

# SYMPOSIUM BI01

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Critical Raw Materials in Emerging Technology  
April 9 - April 11, 2025

Symposium Organizers

Jurgen Eckert, Montanuniversität Leoben  
Alessa Hool, ESM Foundation  
Min-Ha Lee, Korea Institute of Industrial Technology  
Ryan Ott, Ames Laboratory

Symposium Support

**Bronze**  
Korea Institute of Materials Science

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\* Invited Paper  
+ JMR Distinguished Invited Speaker  
^ MRS Communications Early Career Distinguished Presenter

SESSION BI01.01 Critical Raw Materials Policy  
Session Chairs: In Sung Cho and Min-Ha Lee  
Wednesday Afternoon, April 9, 2025  
Summit, Level 3, Room 325

**1:30 PM +BI01.01.01**

**An Unfinished Story in Materials Criticality and Sustainability** [Alan J. Hurd](#); Retired, Los Alamos National Laboratory, United States

**2:00 PM \*BI01.01.02**

**Advancing Circular Economy Practices for Critical Raw Materials through the United Nations Resource Management System** [Harikrishnan Tulsidas](#) and Charlotte Griffiths; UNECE, India

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*BI01.01.03**

**INDUSTRY TRACK: Sustainability of Tomorrow's Magnets and Their Applications** [Oliver Gutfleisch](#); TU Darmstadt, Germany

**4:00 PM \*BI01.01.04**

**Critical Materials Considerations for Emerging Technologies** [Thomas Lograsso](#)<sup>1,2</sup>; <sup>1</sup>Critical Materials Innovation Hub, United States; <sup>2</sup>Ames Laboratory, United States

SESSION BI01.02: Critical Materials in the Functional Applications

Session Chairs: Jurgen Eckert and Atsufumi Hirohata  
Thursday Morning, April 10, 2025  
Summit, Level 3, Room 325

**8:30 AM \*BI01.02.01**

**Energy Harvesting of Waste Heat Using Thermomagnetic Materials** [Anja Waske](#)<sup>1</sup>, Savvina Maria Papaioannou<sup>1</sup> and Sebastian Fähler<sup>2</sup>; <sup>1</sup>BAM, Germany;

<sup>2</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany

**9:00 AM \*BI01.02.02**

**Soft-Magnetic Materials for Functional Applications** Mihai Stoica and Jörg F. Löffler; ETH Zürich, Switzerland

**9:30 AM BREAK**

**10:00 AM \*BI01.02.03**

**Replacement of Critical Raw Materials Used in Magnetic Memories and Storages** Atsufumi Hirohata<sup>1,2</sup>, Hiroki Koizumi<sup>1</sup>, Shigemi Mizukami<sup>1</sup> and Masafumi Shirai<sup>1</sup>; <sup>1</sup>Tohoku University, Japan; <sup>2</sup>Max Planck Institute for Chemical Physics of Solids, Germany

**10:30 AM BI01.02.04**

**Controlling Magnetic Permeability to Enhance the Absorption Properties of Microwave Magnetic Composites** Ching-Chia Lin, Wei-Lin Wu and Fu-Hsiang Ko; National Yang-Ming Chiao Tung University, Taiwan

**10:45 AM BI01.02.05**

**Solid-State Dewetting to Fabricate Defined Nanoparticles-Based Electrodes for Electrocatalysis** Shreyas Harsha<sup>1</sup>, Rakesh K. Sharma<sup>1</sup>, Martin Dierner<sup>2</sup>, Christoph Baeumer<sup>1</sup>, Igor Makhotkin<sup>1</sup>, Guido Mul<sup>1</sup>, Paolo Ghigna<sup>3</sup>, Erdmann Spiecker<sup>2</sup>, Johannes Will<sup>2</sup> and Marco Altomare<sup>1</sup>; <sup>1</sup>University of Twente, Netherlands; <sup>2</sup>Friedrich-Alexander-Universitaet Erlangen-Nuremberg, Germany; <sup>3</sup>Universita degli Studi di Pavia, Italy

**11:00 AM BI01.02.06**

**Colloidal Lignin Nanoparticles Photonic Glasses** Unnimaya Thalakkale Veetil<sup>1</sup>, Alberto Jose Huertas Alonso<sup>1</sup>, Tomás S. Plivelic<sup>2</sup> and Mika H. Sipponen<sup>1,3</sup>; <sup>1</sup>Stockholm University, Sweden; <sup>2</sup>Lund University, Sweden; <sup>3</sup>Wallenberg Wood Science Center, Sweden

**11:15 AM BI01.02.07**

**Challenges in Formulating “Mineral Security” Policy for Critical Raw Materials in Electric Vehicles** Sangita Gayatri Kannan<sup>1</sup> and Michael Toman<sup>2</sup>; <sup>1</sup>Colorado School of Mines, United States; <sup>2</sup>Resources for the Future, United States

**11:30 AM BI01.02.08**

**Study on the Effect of RF Sputtering on Shear Strength of Aluminum Alloy Single Lap Joints** DongEung Kim, ByungEun Kim, Moon-Jo Kim, Sangwoo Kim, JangHyun Bae and Jeongmin Lee; Korea Institute of Industrial Technology, Korea (the Republic of)

SESSION BI01.03: Critical Materials in the Energy Applications

Session Chairs: Ryan Ott and Mihai Stoica

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 325

**1:30 PM \*BI01.03.01**

**Recycle Process for Off-Grade Ti Scrap by Using Electrochemical Deoxidation and Electron Beam Melting** Kyoung-Tae Park, Namhun Kwon, HyunChul Kim, Jaehong Shin, Dong-Hyun Kim and Mihye Lee; Korea Institute of Industrial Technology, Korea (the Republic of)

**2:00 PM BI01.03.02**

**Effect of the Growth Parameters on the Structural and Optoelectronic Properties of ReS<sub>2</sub> on Different Substrate Grown by CVD** Robin Rousseau<sup>1</sup>, Elycia Wright<sup>1</sup>, Kedar Johnson<sup>2,1</sup>, Nijai Dixon<sup>1</sup>, M.K Indika Senevirathna<sup>1</sup> and Michael Williams<sup>1</sup>; <sup>1</sup>Clark Atlanta University, United States; <sup>2</sup>Morehouse College, United States

**2:15 PM BI01.03.03**

**Ink-Based 3D Printing of Selenium-Free Bismuth Telluride Thermoelectric Materials for Enhanced Waste Heat Energy Harvesting** Jinhee Bae, Seungki Jo, Soo-ho Jung and Kyung Tae Kim; Korea Institute of Materials Science, Korea (the Republic of)

**2:30 PM BREAK**

**3:00 PM \*BI01.03.04**

**INDUSTRY TRACK: Clean Energy Technologies Deserve Greener Critical Materials** Yoshiko Fujita<sup>1</sup>, Hongyue Jin<sup>2</sup>, Gary Vanzin<sup>3</sup> and David Reed<sup>1</sup>;

<sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>University of Arizona, United States; <sup>3</sup>Colorado School of Mines, United States

**3:30 PM BI01.03.05**

**Hydrogen Storage Characteristics of Complex Metallic Alloys and Composites** Jurgen H. Eckert<sup>1,2</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences, Austria; <sup>2</sup>Montanuniversität Leoben, Austria

**3:45 PM BI01.03.06**

**Heat Effects of Electron Beam Melting on Impurity Distribution—High Purity Zirconium Ingot** Soosung Kim<sup>1,2</sup>, HyunChul Kim<sup>1,3</sup>, Myungsuk Kim<sup>1,3</sup>, Jieun Kim<sup>1,3</sup>, Yehui Kim<sup>1,3</sup>, Bin Lee<sup>2</sup>, Kyoung-Tae Park<sup>1</sup> and Dong-Hyun Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Kyung Hee University, Korea (the Republic of); <sup>3</sup>Korea University, Korea (the Republic of)

**4:00 PM BI01.03.07**

**Data-Driven Framework to Boost Battery Recycling: Multi-Objective Optimization of Critical Material Recovery** Nima Emami<sup>1</sup>, Luis A. Gomez-Moreno<sup>2</sup>, Anna Klemettinen<sup>2</sup>, Rodrigo Serna-Guerrero<sup>2</sup> and Milica Todorovic<sup>1</sup>; <sup>1</sup>University of Turku, Finland; <sup>2</sup>Aalto University, Finland

**4:15 PM BI01.03.08**

**Recycling and Electrolysis of Rare Earth Metals from Waste Magnets Using Magnesium Halides** Sung Gue Heo, Kyoung-Tae Park and Seok-Jun Seo; Korea Institute of Industrial Technology, Korea (the Republic of)

**4:30 PM BI01.03.09**

**Sustainable Recycling of Spent Batteries—Lithium Pre-Extraction from Lithiated Graphite via Chemical Discharging** Haeun Kim and Youngsik Kim; Ulsan National Institute of Science and Technology, Korea (the Republic of)

SESSION BI01.04: Poster Session

Session Chairs: DongEung Kim and Min-Ha Lee

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**BI01.04.01**

**Automated Quantitative Mineral Characterization of Primary Ore Types from The Erdenetiin Ovoo Cu-Mo Porphyry Deposit, Mongolia** Narangerel Adiyasuren<sup>1</sup>, Batmunkh Tumen-Ayush<sup>2,3</sup>, Davaadulam Batbileg<sup>1</sup>, Chinzorig Bavuu<sup>3</sup> and Ganzorig Chimed<sup>1</sup>; <sup>1</sup>National University of Mongolia, Mongolia; <sup>2</sup>Erdenet Mining Corporation SOE, Mongolia; <sup>3</sup>Mongolian University of Science and Technology, Mongolia

**BI01.04.02**

**Multimodal Characterization of Copper-Bearing Minerals from Erdenet Mining Corporation—Implications for Enhanced Flotation and Processing Efficiency** Bulganchimeg Unentogtokh<sup>1</sup>, Narangerel Adiyasuren<sup>1</sup>, Khaliun Amartuvshin<sup>1</sup>, Batmunkh Tumen-Ayush<sup>2,3</sup> and Ganzorig Chimed<sup>1</sup>; <sup>1</sup>National University of Mongolia, Mongolia; <sup>2</sup>Erdenet Mining SOE, Mongolia; <sup>3</sup>Mongolian University of Science and Technology, Mongolia

**BI01.04.03**

**Production of High-Purity Titanium by Electron Beam Melting and Refining Process** HyunChul Kim<sup>1,2</sup>, Jieun Kim<sup>1,2</sup>, Soosung Kim<sup>2</sup>, Donghyun Kim<sup>2</sup> and Jaehong Shin<sup>2</sup>; <sup>1</sup>Korea University, Korea (the Republic of); <sup>2</sup>Korea Institute of Industrial Technology, Korea (the Republic of)

**BI01.04.04**

**Quality and Performance Enhancement of Lithium-Ion Battery Cathodes Through AI-Based Quality Prediction** Hyoseop Kim; Korea Institute of Industrial Technology (KITECH), Korea (the Republic of)

**BI01.04.05**

**Synthesis of Pt-Adsorbed WO<sub>3</sub> Nanostructures and Their Surface Reactivity Enhancement Properties** Sangwoo Kim<sup>1</sup>, Myung Sik Choi<sup>2</sup> and Changhyun Jin<sup>3</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Kyungpook National University, Korea (the Republic of); <sup>3</sup>Yonsei University, Korea (the Republic of)

**BI01.04.06**

**The Study of Highest Thickness Photo Resist for Cu Post of Fan-Out Wafer Level Packaging** Yuseon Heo<sup>1,2</sup>, Junhyeong Park<sup>2</sup>, Jihye Shim<sup>2</sup> and Jeong-

Yun Sun<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Samsung Electronics, Korea (the Republic of)

#### **BI01.04.07**

**Magnetite Nanocomposites as Photocatalysts for the Degradation of Organic Dyes Under Visible Light Irradiation** Peter Ajibade; University of KwaZulu-Natal, South Africa

SESSION BI01.05: Critical Raw Materials in the Structural Applications

Session Chairs: Kyung Tae Kim and Anja Waske

Friday Morning, April 11, 2025

Summit, Level 3, Room 325

#### **8:30 AM \*BI01.05.01**

**Recent Advances Toward Additive Manufacturing of High-Strength Aluminum Alloys and Thermoelectric Bismuth Telluride Materials** Jungho Choe<sup>1</sup>, Jinhee Bae<sup>1</sup>, Jeong Min Park<sup>1</sup>, Hyomoon Joo<sup>2</sup> and Kyung Tae Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science, Korea (the Republic of); <sup>2</sup>Hyundai Motor Group, Korea (the Republic of)

#### **9:00 AM \*BI01.05.02**

**Material-Efficient Use of Additive Manufacturing Concepts for the Production of Monolithic and Multi-Material Components in Emerging Technologies** Frank Brueckner<sup>1,2</sup>, Holger Hillig<sup>1</sup>, Marc Kaubisch<sup>1</sup>, Marko Seifert<sup>1</sup>, Filofteia-Laura Toma<sup>1</sup>, Jacob-Florian Maetje<sup>1</sup>, Mirko Riede<sup>1</sup>, Elena Lopez<sup>1</sup>, Joao Sousa<sup>3</sup>, Lisanne Wockenfuss<sup>2</sup>, Benedikt Brandau<sup>2</sup> and Christoph Leyens<sup>1,4</sup>; <sup>1</sup>Fraunhofer Institute for Material and Beam Technology IWS, Germany; <sup>2</sup>Lulea University of Technology, Sweden; <sup>3</sup>University of Porto, Portugal; <sup>4</sup>Technische Universität Dresden, Germany

#### **9:30 AM BREAK**

#### **10:00 AM BI01.05.03**

**Advancing Photoredox Catalysis with Earth-Abundant Metals—FeCl<sub>3</sub> as a Paradigm of Sustainable Chemistry** Ahmed El-Zohry, Ravi Kumar Venkatraman and Amal Hassan; King Fahd University of Petroleum and Minerals, Saudi Arabia

#### **10:15 AM BI01.05.04**

**Recycling of Li-Ion Batteries Through Electrodialysis Aiming the Sustainable Development** Amilton B. Botelho Junior; Massachusetts Institute of Technology, United States

#### **10:30 AM BI01.05.05**

**Metal-Assisted Exfoliation of Two-Dimensional Materials on Silicon Substrates** Zehao Li and Yuan Liu; Hunan University, China

#### **10:45 AM BI01.05.06**

**Ru Passivation Layer Enables Cu-Cu Direct Bonding at Low Temperatures with Oxidation Inhibition** Chansu C. Jeon, Sukkyung Kang, Sanha Kim and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

#### **11:00 AM BI01.05.07**

**Electrochemical Carburization for Carbon-Negative Steel Processing** Samuel M. Pennell, Ivy Wu, Haley Hoover, Oluwatamilore Olushina, Robert Bell and Kerry Rippey; National Renewable Energy Laboratory, United States

#### **11:15 AM BI01.05.08**

**Development of Casting Material for Lean Duplex Stainless Steel by Ni+Mo Reduction** In Sung Cho; Korea Institute of Industrial Technology, Korea (the Republic of)

#### **11:30 AM BI01.05.09**

**The Vulnerability of Critical Raw Materials and Supply Chain to Scaling in Quantum Computing** Min-Ha Lee<sup>1,2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Stanford University, United States

# SYMPOSIUM CH01

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Characterization of Dynamics and Heterogeneity in Energy Materials  
April 8 - April 11, 2025

Symposium Organizers

Luxi Li, Argonne National Laboratory  
Yijin Liu, University of Texas at Austin  
Jungwon Park, Seoul National University  
Kejie Zhao, Purdue University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION CH01.01: Characterization of Dynamics and Heterogeneity in Energy Materials I

Session Chairs: Luxi Li and Yijin Liu

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 342

**10:30 AM \*CH01.01.01**

**Bragg Coherent Diffraction Imaging of Compositional Distribution and Strain in Catalytic Alloy Nanoparticles** Tomoya Kawaguchi; Tohoku University, Japan

**11:00 AM \*CH01.01.02**

**In Situ Bragg Coherent Diffraction Imaging and Nano-Diffraction from Energy Materials** Marie-Ingrid Richard<sup>1,2</sup>; <sup>1</sup>CEA, France; <sup>2</sup>ESRF, France

**11:30 AM CH01.01.03**

**Operando X-Ray Based Studies of Evolving Copper Electrocatalysts for CO<sub>2</sub> Reduction** Julian Feijoo<sup>1,2</sup>, Yao Yang<sup>1,2,3</sup>, Maria Fonseca Guzman<sup>1,2</sup>, Alfred C. Vargas<sup>1</sup>, Chubai Chen<sup>1,2</sup>, Christopher J. Pollock<sup>4</sup> and Peidong Yang<sup>1,2,1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Miller Institute for Basic Research in Science, United States; <sup>4</sup>Cornell University, United States

**11:45 AM CH01.01.04**

**Strain-Associated Nanoscale Fluctuating Lithium Transport Within Single-Crystalline NMC Cathode Particles** Chihyun Nam<sup>1</sup>, Danwon Lee<sup>1</sup>, Juwon Kim<sup>1</sup>, Bonho Koo<sup>1</sup>, Hyejeong Hyun<sup>1</sup>, Jinkyu Chung<sup>1</sup>, Su Yong Lee<sup>2</sup>, Namdong Kim<sup>2</sup>, David A. Shapiro<sup>3</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>3</sup>Lawrence Berkeley National Laboratory, United States

SESSION CH01.02: Characterization of Dynamics and Heterogeneity in Energy Materials II

Session Chairs: Veronica Augustyn and Jie Xiao

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 342

**1:30 PM \*CH01.02.01**

**Oxide Acidity Modulates Structural Transformations in Hydrogen Titanates During Electrochemical Ion Insertion** [Veronica Augustyn](#); North Carolina State University, United States

**2:00 PM \*CH01.02.02**

**Surface and Interfacial Dynamics in Electrochemical Energy Materials** [Pietro Papa Lopes](#), Frederick Agyapong-Fordjour, Ronnie Emmons and Cailin Buchanan; Argonne National Laboratory, United States

**2:30 PM CH01.02.03**

**Operando Monitoring of Solid-Liquid Interfaces at Atomic Scale Using Pattern-Enhanced Resonant Soft X-Ray Scattering** [Qi Zhang](#)<sup>1</sup>, Kas Andrie<sup>1</sup>, Haoyi Li<sup>1</sup>, Isvar Cordova<sup>1</sup>, Yao Yang<sup>2</sup>, Zhengxing Peng<sup>1</sup> and Cheng Wang<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>Cornell University, United States

**2:45 PM CH01.02.04**

**Interfacial Reactions in a Thermoelectric Module** [Sinn-Wen Chen](#) and Hong-Dian Chiang; National Tsing Hua University, Taiwan

**3:00 PM BREAK**

SESSION CH01.03: Characterization of Dynamics and Heterogeneity in Energy Materials III

Session Chairs: Veronica Augustyn and Jie Xiao

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 342

**3:30 PM CH01.03.01**

**Effect of the Spatial Dopant Distribution on the Photocatalytic Properties of Rhodium-Doped Strontium Titanate Nanoparticles** [Melanie V. Johanning](#), Mara A. Blöchlinger and Kevin Sivula; EPFL SB ISIC LIMNO, Switzerland

**3:45 PM \*CH01.03.02**

**Characterizing Single Crystal Ni-Rich Cathode materials: from Cathode-Electrolyte Interphase to Single Crystal Growth** [Jie Xiao](#); Pacific Northwest National Laboratory, United States

**4:15 PM CH01.03.03**

**Probing Transport Losses in Transition-Metal Oxide Photoanodes Using Robust Spatial Collection Efficiency Analysis** [Sa'ar Shor Peled](#), Oriane Achour and Daniel Grave; Ben-Gurion University, Israel

SESSION CH01.04: Characterization of Dynamics and Heterogeneity in Energy Materials IV

Session Chairs: Peng Bai and Yuzhang Li

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 342

**8:00 AM \*CH01.04.01**

**Why Aren't We Architecting All Energy-Storing Electrodes?** [Debra R. Rolison](#); U.S. Naval Research Laboratory, United States

**8:30 AM \*CH01.04.02**

**New Cryo-EM Tools for Studying Dynamic Interfaces in Battery Materials** [Yuzhang Li](#); University of California, Los Angeles, United States

**9:00 AM \*CH01.04.03**

**Single-Ion Spectroscopy of h-BN Point Defect Fluorescence in Liquid Environments** Yecun Wu<sup>1</sup>, [Yan-Kai Tzeng](#)<sup>2</sup> and Steven Chu<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**9:30 AM CH01.04.04**

**Heterogeneities Propagation and Homogenization Methods for Li Metal Anodes in Pouch Cells** Bor-Rong Chen, Pallavi Thakur, Pete L. Barnes, Aasray Narla and Eric Dufek; Idaho National Laboratory, United States

**9:45 AM BREAK**

SESSION CH01.05: Characterization of Dynamics and Heterogeneity in Energy Materials V

Session Chairs: Peng Bai and Ming Tang

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 342

**10:15 AM \*CH01.05.01**

**High-Throughput Mesoscale *Operando* Characterizations of Dynamic Heterogeneities in Batteries** Peng Bai; Washington University in St. Louis, United States

**10:45 AM \*CH01.05.02**

**Understanding and Controlling Atomic and Nanoscale Structural Rearrangement in Nanoporous Electrode Materials for Lithium and Sodium Ion Batteries** Sarah H. Tolbert; University of California, Los Angeles, United States

**11:15 AM \*CH01.05.03**

**Reveal the Origins of Reaction Heterogeneity in Battery Electrodes by Combining X-Ray Imaging and Mesoscale Modeling** Ming Tang; Rice University, United States

**11:45 AM CH01.05.04**

**Examining the Evolution of Heterogeneities in Li- and Mn-rich Cathodes** Bryce A. Knutson<sup>1,2</sup>, Michael F. Toney<sup>1,2</sup> and Donal Finegan<sup>2</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>National Renewable Energy Laboratory, United States

SESSION CH01.06: Characterization of Dynamics and Heterogeneity in Energy Materials VI

Session Chairs: Wesley Chang and Dong Su

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 342

**2:00 PM CH01.06.01**

**X-ray Computed Microtomography Characterization of 3D Zinc Sponge Anodes for Rechargeable Alkaline Batteries** Jeffrey W. Long, Andrew B. Geltmacher, Ryan DeBlock and Debra R. Rolison; U.S. Naval Research Laboratory, United States

**2:15 PM CH01.06.02**

**BatteryML—A Comprehensive Platform for Machine Learning on Battery Degradation Prediction** Yuqi Li; Stanford University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION CH01.07: Characterization of Dynamics and Heterogeneity in Energy Materials VII

Session Chairs: Wesley Chang and Dong Su

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 342

**4:00 PM CH01.07.01**

***Operando* Studies of High Entropy Disordered Rocksalt Oxyfluoride Cathode for Li-Ion Batteries** Bei Zhou<sup>1</sup>, Elmar Kataev<sup>2</sup> and Qingsong Wang<sup>1,1</sup>;

<sup>1</sup>University of Bayreuth, Germany; <sup>2</sup>Helmholtz-Zentrum Berlin, Germany

**4:15 PM CH01.07.02**

**Unrecoverable Lattice Rotation Governs Structural Degradation of Single-Crystalline Cathodes** [Tongchao Liu](#); Argonne National Laboratory, United States

**4:30 PM CH01.07.03**

**Battery Electrode Metrology via Non-Contact Ultrasonic Density Mapping** [Wesley Chang](#); Drexel University, United States

**4:45 PM CH01.07.04**

**Tailored Cathode Composite Structure Enables Long Cycle Life at Low-Pressure for Sulfide All-Solid-State Batteries** [Ke Zhou](#) and Ping Liu; University of California, San Diego, United States

SESSION CH01.08: Characterization of Dynamics and Heterogeneity in Energy Materials VIII

Session Chairs: Ming Tang and Feng Wang

Thursday Morning, April 10, 2025

Summit, Level 3, Room 342

**8:00 AM \*CH01.08.01**

***In Situ* Spectroscopy-Guided Process Design and Scale-Up for Battery Material Manufacturing** [Feng N. Wang](#), Pallab Barai, Joseph Libera, Ozgenur Kahvecioglu, Youngho Shin, Krzysztof Pupek and Venkat Srinivasan; Argonne National Laboratory, United States

**8:30 AM \*CH01.08.02**

**Multiscale Electron Microscopy Characterization of Materials and Interfaces for Next-Generation Lithium-Ion Batteries** [Mary Scott](#)<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**9:00 AM CH01.08.03**

**Guidelines for Correlative Imaging and Analysis of Reactive Lithium Metal Battery Materials** [Shuang Bai](#); University of Chicago, United States

**9:15 AM CH01.08.04**

**Revealing the Role of the Hierarchical Structure of Artificial Graphite on State of Charge Heterogeneity During Li-Ion Battery Fast Charge** [Swati Narasimhan](#)<sup>1</sup>, Huada Lian<sup>2</sup>, Zhelong Jiang<sup>1</sup>, Elizabeth Allan-Cole<sup>3</sup>, Michael F. Toney<sup>3</sup>, Martin Bazant<sup>2</sup> and William C. Chueh<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>Massachusetts Institute of Technology, United States; <sup>3</sup>University of Colorado Boulder, United States

**9:30 AM CH01.08.05**

**Molecular Logics of Li Metal Battery—From Interface to Interphase** [Weilai Yu](#)<sup>1,2</sup>, Yi Cui<sup>2</sup> and Zhenan Bao<sup>2</sup>; <sup>1</sup>University of Toronto, United States; <sup>2</sup>Stanford University, United States

**9:45 AM BREAK**

SESSION CH01.09: Characterization of Dynamics and Heterogeneity in Energy Materials IX

Session Chairs: Ming Tang and Feng Wang

Thursday Morning, April 10, 2025

Summit, Level 3, Room 342

**10:15 AM \*CH01.09.01**

**Surface Control of High Energy Cathode Materials for Stable Lithium Ion Batteries** [An-Min Cao](#); Chinese Academy of Sciences, China

**10:45 AM \*CH01.09.02**

**Interface Engineering Between Solid Electrolyte and Electrode for All-Solid-State Batteries** [Taeseup Song](#)<sup>1,1</sup>, Jaeik Kim<sup>1</sup>, Seungwoo Lee<sup>1</sup>, Jiwoon Kim<sup>1</sup>, Insung Hwang<sup>1</sup>, Minsung Kim<sup>1</sup>, Hyungjun Lee<sup>1</sup>, Joonhyeok Park<sup>1</sup>, Jooheon Sun<sup>1</sup>, Seungmin Han<sup>1</sup>, Jinwoo Jeong<sup>1</sup>, Yeseung Lee<sup>1</sup>, Junghyun Choi<sup>2</sup>, Jeonghyun Kim<sup>3</sup> and Ungyu Paik<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Gachon University, Korea (the Republic of); <sup>3</sup>Kwangwoon University,



Korea (the Republic of)

**11:15 AM CH01.09.03**

**Calcination Heterogeneity in Ni-Rich Layered Cathodes Drives Chemo-Mechanical Failure** Donggun Eum<sup>1</sup>, [Hari Ramachandran](#)<sup>1</sup>, Tianxiao Sun<sup>2</sup>, Yan-Kai Tzeng<sup>3</sup>, Yijin Liu<sup>2</sup> and William C. Chueh<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>The University of Texas at Austin, United States; <sup>3</sup>SLAC National Accelerator Laboratory, United States

**11:30 AM CH01.09.04**

**Degradation Mechanisms Induced by Depth-Dependent Inhomogeneity in High-Areal-Capacity Graphite Electrode** [Kyoungoh Kim](#) and Kisuk Kang; Seoul National University, Korea (the Republic of)

**11:45 AM CH01.09.05**

**An In-Operando Mechanical Study on Li Metal Batteries Using Acoustic Impedance Spectroscopy** [Charles Soulen](#) and Ping Liu; University of California, San Diego, United States

SESSION CH01.10: Characterization of Dynamics and Heterogeneity in Energy Materials X

Session Chairs: Tongchao Liu and Weilai Yu

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 342

**1:30 PM \*CH01.10.01**

**Dehydrogenation-Driven Li Metal-Free Prelithiation for High Performance SiO-Based Lithium Storage Materials** [Hansu Kim](#); Hanyang University, Korea (the Republic of)

**2:00 PM \*CH01.10.02**

**Validating the Virtual Calendering Process with 3D-Reconstructed Composite Electrodes of Lithium-Ion Batteries** [Yong Min Lee](#); Yonsei University, Korea (the Republic of)

**2:30 PM CH01.10.03**

**Improving Surface Areas and Pore Size Distribution Determination of Porous Materials Using Computational Approaches** Cheng-Ning Chou<sup>1</sup>, You-Xuan Chen<sup>1,2</sup>, Li-Chiang Lin<sup>2,3</sup> and [Szu-Chia Chien](#)<sup>1</sup>; <sup>1</sup>National Central University, Taiwan; <sup>2</sup>National Taiwan University, Taiwan; <sup>3</sup>The Ohio State University, United States

**2:45 PM BREAK**

**3:15 PM CH01.10.04**

**Nanoporous Stripping and Cycling Morphology of Lithium Metal at Low Temperature** [Emma Hopkins](#) and Ping Liu; University of California, San Diego, United States

**3:30 PM CH01.10.05**

**What Complex Analysis Can Tell Us About Electrochemical Impedance Spectroscopy** [Jithin George](#)<sup>1,2</sup>, Vinod K. Sangwan<sup>1</sup>, Heather Kurtz<sup>1</sup>, Dilara Meli<sup>1</sup>, Jonathan Rivnay<sup>1</sup>, Jeffrey Richards<sup>1</sup>, Mark C. Hersam<sup>1</sup>, Maria K. Chan<sup>2</sup> and Valerie Taylor<sup>2</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Argonne National Laboratory, United States

SESSION CH01.11: Characterization of Dynamics and Heterogeneity in Energy Materials XI

Session Chairs: Tongchao Liu and Weilai Yu

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 342

**3:45 PM \*CH01.11.01**

**Liquid-Phase Electron Microscopy Diagnostics of CO<sub>2</sub> Reduction Reaction Catalysts** [Vaso Tileli](#); EPFL STI IMX INE, Switzerland

**4:15 PM CH01.11.02**

***Operando* Unveiling of Hydrogen Spillover Mechanisms on Tungsten Oxide Surfaces** [Haoyi Li](#)<sup>1</sup>, Mona Abdelgaid<sup>2</sup>, Jay R. Paudel<sup>1</sup>, Noah P. Holzapfel<sup>3</sup>, Veronica Augustyn<sup>3</sup>, James McKone<sup>2,2</sup>, Giannis Mpourmpakis<sup>2</sup> and Ethan Crumlin<sup>1,1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of Pittsburgh, United States; <sup>3</sup>North Carolina State University, United States

**4:30 PM CH01.11.03**

**Oxide Deconstruction in Mixed-Metal Oxygen Electrocatalysts** [Alaina C. Hartnett](#)<sup>1</sup>, Daniel G. Nocera<sup>1</sup> and Ethan Crumlin<sup>2</sup>; <sup>1</sup>Harvard University, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**4:45 PM CH01.11.04**

**Relation Between Double Layer Structure, Capacitance and Surface Tension in Electrowetting of Graphene and Aqueous Electrolytes** [Paola Carbone](#); The University of Manchester, United Kingdom

SESSION CH01.12: Poster Session: Characterization of Dynamics and Heterogeneity in Energy Materials

Session Chairs: Luxi Li and Yijin Liu

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**CH01.12.01**

**Electric-Field-Enhanced Ultrafast Electrochemical Capacitors for Miniaturized Line Filtering** [Yajie Hu](#)<sup>1</sup>, Mingmao Wu<sup>2</sup> and Liangti Qu<sup>1</sup>; <sup>1</sup>Tsinghua University, China; <sup>2</sup>Fuzhou University, China

**CH01.12.02**

**Sound Velocity Determination for Silicon Oxide Thin Films—A Mechanical Approach Using Nanoindentation** [Peter Naguib](#)<sup>1</sup>, Jingfan Ye<sup>2</sup>, Constantin Walenta<sup>2</sup> and Gregor Feiertag<sup>1</sup>; <sup>1</sup>Munich University of Applied Sciences, Germany; <sup>2</sup>RF360 Europe GmbH, Germany

**CH01.12.03**

**Lessons from X-Ray Absorption Spectroscopy Studies of Dopants in CdTe Solar Cells—Where in the CdTe Lattice Do Cu, As and Se Reside?** [Srisuda Rojsatien](#)<sup>1</sup>, Niranjana Mohan Kumar<sup>1</sup>, Trumann Walker<sup>1</sup>, Arkita Chakrabarti<sup>1</sup>, Md. Habibur Rahman<sup>2</sup>, Andrew Kiss<sup>3</sup>, Barry Lai<sup>4</sup>, Michael E. Stuckelberger<sup>5</sup>, Eric Colegrove<sup>6</sup>, Dan Mao<sup>7</sup>, Dmitry Krasikov<sup>7</sup>, Maria K. Chan<sup>4</sup>, Arun Kumar Mannodi-Kanakkithodi<sup>2</sup> and Mariana Bertoni<sup>1</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Purdue University, United States; <sup>3</sup>Brookhaven National Laboratory, United States; <sup>4</sup>Argonne National Laboratory, United States; <sup>5</sup>Deutsches Elektronen-Synchrotron DESY, Germany; <sup>6</sup>National Renewable Energy Laboratory, United States; <sup>7</sup>First Solar, United States

**CH01.12.04**

**Time-Resolved XRD Measurement on Topotactic Reaction of Sr-Fe-Based Perovskite Oxide** [Taiki Kosuge](#)<sup>1</sup>, Chika Yamazoe<sup>2</sup>, Shogo Kawaguchi<sup>3</sup>, Saburo Hosokawa<sup>2</sup>, Masaki Azuma<sup>1,4,1</sup> and Takafumi Yamamoto<sup>5</sup>; <sup>1</sup>Institute of Science Tokyo, Japan; <sup>2</sup>Kyoto Institute of Technology, Japan; <sup>3</sup>Japan Synchrotron Radiation Research Institute, Japan; <sup>4</sup>Kanagawa Institute of Industrial Science and Technology, Japan; <sup>5</sup>Kyoto University, Japan

**CH01.12.05**

**Fabrication of a High-Performance Hybrid Supercapacitor Based on Hydrothermally Synthesized Ni<sub>3</sub>V<sub>2</sub>O<sub>8</sub>-rGO Composite** [Manesh A. Yewale](#) and Dong Kil-Shin; Yeungnam University, Korea (the Republic of)

**CH01.12.06**

**Surface Energetics at Chemically Functionalized p-Type Si (111) Interfaces—An Optoelectronic Study** [Sherina Harilal](#); Ben-Gurion University of the Negev, Israel

**CH01.12.07**

**Ultrathin 2D Nickel/Cobalt Hydroxide Vertical Heterostructures—Unlocking High Energy Density for Flexible Symmetric Solid-State Micro-Supercapacitor** [Sayali Patil](#); Jain University, India

**CH01.12.08**

**High-Throughput MD Simulations of Li<sup>+</sup> Conductivity in the Discharge Products of Li-O<sub>2</sub> Batteries Using Machine Learning Potentials** [Nanako](#)

Ishihara<sup>1</sup>, Kaito Nagita<sup>1</sup>, Yoshiharu Mukouyama<sup>1,2</sup>, Teruyasu Mizoguchi<sup>3</sup> and Shuji Nakanishi<sup>1</sup>; <sup>1</sup>Osaka University, Japan; <sup>2</sup>Division of Science, College of Science and Engineering, Tokyo Denki University, Japan; <sup>3</sup>Institute of Industrial Science, The University of Tokyo, Japan

#### CH01.12.09

**Enhancing Organic Photodetectors for Indoor Low-Light Applications—Material Design, Interface Engineering, and Novel Fabrication Techniques for Improved Performance and Stability** Byung Gi Kim, Woongsik Jang, Kim Min Soo, Zhao Yang, Jihyun Lim, Hyunguk Park and Dong Hwan Wang; Chung-Ang University, Korea (the Republic of)

#### CH01.12.10

**Controlled Deposition of Pt Nanoparticle Size Modified TiO<sub>2</sub> Nanotubes Arrays for Enhanced Air Treatment—Efficient VOC Degradation and Bacteria Inactivation** Anouar Hajjaji<sup>1</sup>, Khaoula Misssaoui<sup>2</sup>, Mohamed Aziz Hajjaji<sup>3</sup> and Aymen Amin Assadi<sup>4</sup>; <sup>1</sup>Center for Energy Research and Technology (CRTE), Tunisia; <sup>2</sup>University of Bordeaux, CNRS, Bordeaux INP, ISM, UMR 5255, 33607 Pessac, France, France; <sup>3</sup>Ecole Nationale Supérieure de Chimie de Rennes, University of Rennes, CNRS, France; <sup>4</sup>Ecole Nationale Supérieure de Chimie de Rennes, University of Rennes, CNRS, France

#### CH01.12.11

**Flat Punch Indentation in Viscoelastic Materials—Analytical, Experimental and Finite Element Analysis Results** Santosh Thapa and Yang T. Cheng; University of Kentucky, United States

#### CH01.12.12

**An *In Situ* Silicon Nanoparticle Size Distribution Measurement Scheme for Silane Plasma Synthesis Process in Vacuum Environments** Jongmin Yoon, Seungjae Lee and Taesung Kim; Sungkyunkwan University, Korea (the Republic of)

#### CH01.12.13

**Heterogeneous Structural and Electronic Properties of Binary Mo<sub>x</sub>S<sub>y</sub> and Ternary M<sub>z</sub>Mo<sub>x</sub>S<sub>y</sub> (M= Mn, Zn, Ni; z ≤ 0.5) Chalcogels for Li-S Batteries** Sahar Bayat<sup>1</sup>, Emmanuel O. Adejumo<sup>1</sup>, Taohedul Islam<sup>2</sup>, Misganaw Adigo Weret<sup>2</sup>, M. Saiful Islam<sup>2</sup> and Chad Risko<sup>1</sup>; <sup>1</sup>University of Kentucky, United States; <sup>2</sup>Jackson State University, United States

#### CH01.12.14

**Nature-Inspired Tandem Catalysts for CO<sub>2</sub> Reduction** Helen J. Zeng<sup>1</sup> and Joel W. Ager<sup>1,2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

#### CH01.12.15

**Insight Exploration of Efficient Charge Transfer in Boosting Photocatalytic of Ag-WS<sub>2</sub> Plasmonic Nanohybrids Toward Textile and Pharmaceutical Waste** Jaspal Singh and Phuong Nguyen-Tri; University of Quebec at Trois Rivieres, Canada

#### CH01.12.16

**Optical Pump THz Probe Spectroscopy on Metal-Organic Frameworks** Kendra Hamilton and Jens Neu; University of North Texas, United States

#### CH01.12.17

**Redox-Driven Switching Behavior in [Ru(NH<sub>3</sub>)<sub>6</sub>][Fe(CN)<sub>6</sub>]—Unlocking Neuromorphic Potential** Maryam Ghotbi and Perla Balbuena; Texas A&M University, United States

#### CH01.12.18

**Domain Structure Observation and Design of Negative Thermal Expansion Material Induced by Polar-Nonpolar Phase Transition** Takumi Nishikubo<sup>1,2</sup>, Yuki Sakai<sup>3,1</sup>, Norihiro Oshime<sup>4</sup>, Kento Sugawara<sup>4</sup>, Kenji Ohwada<sup>4</sup>, Akihiko Machida<sup>4</sup>, Tetsu Watanuki<sup>4</sup>, Kosuke Kurushima<sup>5</sup>, Shigeo Mori<sup>6</sup> and Masaki Azuma<sup>2,1</sup>; <sup>1</sup>Kanagawa Institute of Industrial Science and Technology, Japan; <sup>2</sup>Institute of Science Tokyo, Japan; <sup>3</sup>Comprehensive Research Organization for Science and Society, Japan; <sup>4</sup>National Institutes for Quantum Science and Technology, Japan; <sup>5</sup>Toray Research Center, Japan; <sup>6</sup>Osaka Metropolitan University, Japan

#### CH01.12.19

**Rapid Machine Learning Based Microstructural Analysis and Generation for Heterogeneous Solid Oxide Cell Electrodes** William K. Epting<sup>1</sup>, William Kent<sup>2</sup>, Rochan Bajpai<sup>2</sup>, Rachel Kurchin<sup>2</sup>, Paul Salvador<sup>2</sup>, Yinkai Lei<sup>1,3</sup> and Harry Abernathy<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory, United States; <sup>2</sup>Carnegie Mellon University, United States; <sup>3</sup>NETL Support Contractor, United States

#### CH01.12.20

**Unveiling the Dynamics and Heterogeneity of Free Radicals in Light-Driven Processes** Gang Wan and Arun Majumdar; Stanford University, United States

**CH01.12.21**

**Enhanced Photocatalytic Performance of Intercalated 2D BiOBr Nanosheets into 3D Knobs-Like Bi<sub>2</sub>WO<sub>6</sub> for the Degradation of Antibiotics and Textile Pollutants** Donia Dridi, Jaspal Singh and Phuong Nguyen-Tri; Université du Québec a Trois-Rivieres, Canada

**CH01.12.22**

**Comprehensive Design Strategy for Low-Temperature Fuel Cells—Optimizing Flow Fields, Bipolar Plates and Volumetric Efficiency for Enhanced Performance.** Wonjun Lee and Woong-Ryeol Yu; Seoul National University, Korea (the Republic of)

**CH01.12.23**

**Examining Surface Interactions at the Filler-Matrix Interface in Silicone-Matrix Nanocomposites Containing Barium Titanate Nanoparticles for Energy Devices** Brigitte Lynch Johnson<sup>1</sup>, Natalie Smith<sup>1</sup>, Vanessa Bartling<sup>1</sup>, Ian Osborne<sup>1</sup>, Warren Pham<sup>1</sup>, Albert Dato<sup>1</sup>, Todd Monson<sup>2</sup> and Renee Van Ginhoven<sup>3</sup>; <sup>1</sup>Harvey Mudd College, United States; <sup>2</sup>Sandia National Laboratories, United States; <sup>3</sup>Air Force Research Laboratory, United States

**CH01.12.24**

**Unveiling Robust Potassium Storage Performance of MoS<sub>2</sub>/ZnFe<sub>2</sub>O<sub>4</sub> Nanocomposites: A Key Focus of Experimental and Theoretical Insights** Zeyad Abdulhamid, Daniel Choi, Yarjan Abdul Samad, Nirpendra Singh, Kyriaki Polychronopoulou and Dalaver Anjum; Khalifa University, United Arab Emirates

**CH01.12.25**

**A Unified and Consistent Electrical Double Layer Model for Treatment of Core and Space Charge Layer in Solid Electrolytes** Zeeshan Ahmad; Texas Tech University, United States

**CH01.12.26**

**Experimental and Theoretical Investigations into the Mechanism of Wireless CO<sub>2</sub> Reduction over Defective g-C<sub>3</sub>N<sub>4</sub> Photocatalysts** Mahmoud K. Hussien<sup>1</sup>, Amr Sabbah<sup>1</sup>, Raghunath Putikam<sup>2</sup>, Kuei-Hsien Chen<sup>3</sup> and Li-Chyong Chen<sup>1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>3</sup>Academia Sinica, Taiwan

**CH01.12.27**

**Efficient Polycarbonate Plastic Upcycling into Jet Fuel Cycloalkanes over a Bifunctional MoCo/NiC Hetero-Catalyst** Yiyun Zhang<sup>1,2</sup>; <sup>1</sup>Southeast University, China; <sup>2</sup>Nanjing Forestry University, China

**CH01.12.28**

**Characterization of Pt/Ni Alloy Electrode with YSZ Capping Layer for Improvement of Si-Based  $\mu$ -SOFC** Sung-Yun Byun<sup>1</sup>, Minji Kim<sup>1</sup>, Yoojin Kim<sup>1</sup>, Tae-Kyun Moon<sup>1</sup>, Byeong-Jin Jang<sup>2</sup> and Kyoung-Kook Kim<sup>1,2</sup>; <sup>1</sup>Tech University of Korea, Korea (the Republic of); <sup>2</sup>Tech University Of Korea, Korea (the Republic of)

**CH01.12.29**

**Confocal Raman, Photoluminescence and Photocurrent Imaging of an Organic Solar Cell** Matthew Berry, Nikesh Patel, Angela Flack and Paulina Carmona-Monroy; Edinburgh Instruments Ltd., United Kingdom

**CH01.12.30**

**Vanadium-Stabilized MoB Nanoparticles for Enhanced Hydrogen Evolution at High Current Densities** Sang Bum Kim<sup>1</sup>, Johan Yapo<sup>1</sup>, Akira Yasuhara<sup>2</sup>, Kunio Yubuta<sup>3</sup> and Boniface P. Fokwa<sup>1</sup>; <sup>1</sup>University of California, Riverside, United States; <sup>2</sup>JEOL Ltd, Japan; <sup>3</sup>Shinshu University, Japan

**CH01.12.31**

**In Situ Analysis of Blister Formation in TiFeCeV Hydrogen Storage Alloys During Hydrogenation and Dehydrogenation** Jinyoung You<sup>1</sup>, Sumin Lee<sup>1</sup>, Kyubin Hwang<sup>1,2</sup>, Changhyo Sun<sup>1</sup>, Taejun Ha<sup>2,3</sup>, Jae-Hyuck Shim<sup>1,2,4</sup> and Yunseok Kim<sup>1,2,4</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Korea Institute of Industrial Technology (KITECH), Korea (the Republic of); <sup>4</sup>KIST-SKKU Carbon-Neutral Research Center, Sungkyunkwan University (SKKU), Korea (the Republic of)

**CH01.12.32**

**Utilization of Nanoscale Particulate Matter from the Combustion of Diesel Fuels as an Electrode Material for Supercapacitors** Mariella Anderson<sup>1,1</sup>, Mesut Eryigit<sup>1</sup>, Mehedi H. Himel<sup>2</sup>, Stephen Cronin<sup>2</sup> and Ö. Özgür Çapraz<sup>1</sup>; <sup>1</sup>University of Maryland, Baltimore County, United States; <sup>2</sup>University of Southern California, United States

Friday Morning, April 11, 2025  
Summit, Level 3, Room 342

**8:00 AM CH01.13.01**

**Role of Anions in Lithium-Ion Batteries Studied Using Core-Hole X-Ray Spectroscopy** Abiram Krishnan, Doyoub Kim and Faisal Alamgir; Georgia Institute of Technology, United States

**8:15 AM CH01.13.02**

**Topographic Scanning Electronic Microscopy Reveals the 3D Surface Structure of Materials** Jianyong Ouyang; National University of Singapore, Singapore

**8:30 AM CH01.13.03**

**From Local to Long-Range—Unveiling the Multi-Elements Redox Dynamics of Sodium Manganese Oxide in Sodium-Ion Batteries via Multi *In Situ* Characterizations** Mingqing Sun and Jordi Arbiol; Catalan Institute of Nanoscience and Nanotechnology, Spain

**8:45 AM CH01.13.04**

**The Effects of Kinetic-Induced Heterogeneity in Layered Oxide Cathodes at Low States-of-Charge** Nidhi Kapate<sup>1</sup>, Emma Choy<sup>1</sup>, Emma Kaeli<sup>2</sup>, Peter Csernica<sup>1</sup> and William C. Chueh<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>University of California, Berkeley, United States

**9:00 AM \*CH01.13.05**

**Development of Advanced X-Ray Emission Spectrometry Solution for Battery Materials Studies** Chengjun Sun, Mikhail A. Solovyev and Shelly D. Kelly; Argonne National Laboratory, United States

**9:30 AM CH01.13.06**

**Tailoring Asymmetric Coordination in Single-Atom Catalysts for Highly Efficient and Selective Photocatalytic CO<sub>2</sub> Reduction** Sharmila S. Singh<sup>1</sup>, Mahmoud K. Hussien<sup>1</sup>, Kuei-Hsien Chen<sup>2</sup> and Li-Chyong Chen<sup>1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan

**9:45 AM CH01.13.07**

**Correlating Microscopic Structures and Dynamics with Rheological Behavior in Charged Colloidal Suspensions** Hongrui He<sup>1,2</sup>, Heyi Liang<sup>1,2</sup>, Juan de Pablo<sup>1,2</sup>, Matthew V. Tirrell<sup>1,2</sup>, Suresh Narayanan<sup>1</sup> and Wei Chen<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The University of Chicago, United States

**10:00 AM BREAK**

**10:30 AM CH01.13.08**

**Understanding the Effect of the Electrolyte on SEI Composition and Dynamics in Silicon–Graphite Composite Anodes Via Solid-State MAS NMR** Nahom Enkubahri Asres<sup>1,2</sup>, Marta Cabello<sup>1</sup>, Muhammad Khurram Tufail<sup>1</sup> and Juan Miguel López del Amo<sup>1</sup>; <sup>1</sup>CIC energigune, Spain; <sup>2</sup>University of the Basque Country, Spain

**10:45 AM CH01.13.09**

***Operando* Optical Imaging of Phase Transition During Charging/Discharging of Nickel (Oxy)Hydroxide Electrodes** Avihay Ben Shitrit<sup>1</sup>, Aleksander Kurilovich<sup>1</sup>, David Ellis<sup>1</sup>, Arik Yochelis<sup>2</sup> and Avner Rothschild<sup>1</sup>; <sup>1</sup>Technion–Israel Institute of Technology, Israel; <sup>2</sup>Ben-Gurion University of the Negev, Israel

**11:00 AM CH01.13.10**

**Light-Induced Defect Dynamics in Lead-Halide Perovskites Revealed by X-Ray Photon Correlation Spectroscopy** Randall Headrick<sup>1</sup>, Seid Y. Abate<sup>1,2</sup>, Kenneth Shepherd<sup>1</sup> and Gary Carver<sup>1</sup>; <sup>1</sup>The University of Vermont, United States; <sup>2</sup>Verde Technologies Inc., United States

**11:15 AM CH01.13.11**

**Effects of d0 Ions on  $\delta$ -formation Mechanism of Mn-rich Disordered Rocksalts** Otavio Marques, Zhilin Liang, Oscar Paredes Mellone, Dimosthenis Sokaras, Kevin Stone and Johanna N. Weker; SLAC National Accelerator Laboratory, United States

**11:30 AM CH01.13.12**

**3D Elemental Mapping and Structural Analysis of Au-Cu-Ag Nanorods—Revealing Heterogeneity for Enhanced CO<sub>2</sub> Reduction and Alcohol Production** Siyu Zhou and Catherine Murphy; University of Illinois at Urbana-Champaign, United States

# SYMPOSIUM CH02

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Emerging Optoelectronic and Quantum Materials—Advanced Multimodal Characterizations  
April 8 - April 11, 2025

## Symposium Organizers

Burak Guzelturk, Argonne National Laboratory  
Mengxia Liu, Yale University  
Tze Chien Sum, Nanyang Technological University  
Yuanyuan Zhou, Hong Kong University of Science and Technology

## Symposium Support

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\* Invited Paper

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SESSION CH02.01: Optical Spectroscopy and Microscopy I

Session Chairs: Mengxia Liu and Yuanyuan Zhou

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 343

**10:30 AM +CH02.01.01**

**Ultra-Fast Optical Characterization of Long-Lived Holes in CdSe Quantum Shells** Matthew C. Beard; National Renewable Energy Laboratory, United States

**11:00 AM \*CH02.01.02**

**Optical Probes of Emerging Semiconductors for Light-Harvesting Applications** Laura Herz; University of Oxford, United Kingdom

**11:30 AM CH02.01.03**

**Study of Light Induced Ion Migration in Perovskite Solar Cells Using Non-Linear Impedance Spectroscopy** Sanish Paramadam, Benjamin Howe, Seid Yimer Abate, Randall Headrick and Matthew S. White; The University of Vermont, United States

**11:45 AM CH02.01.04**

**Hot-Carrier Relaxation Within CdSe/CdS Core/Shell Nanoplatelets** Matthew Pelton<sup>1</sup>, Yana Wang<sup>2</sup>, Igor Fedin<sup>3</sup>, Dmitri V. Talapin<sup>4</sup> and Stephen K. O'Leary<sup>2</sup>; <sup>1</sup>University of Maryland, Baltimore County, United States; <sup>2</sup>University of British Columbia, Canada; <sup>3</sup>The University of Alabama, United States; <sup>4</sup>The University of Chicago, United States

SESSION CH02.02: Optical Spectroscopy and Microscopy II

Session Chairs: Mengxia Liu and Yuanyuan Zhou

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 343

**1:30 PM \*CH02.02.01**

**Quantum Exciton Transport in Perovskite Nanocrystal Superlattices** [Libai Huang](#); Purdue University, United States

**2:00 PM CH02.02.02**

**Probing Phase Transition Dynamics of 2D Lead Halide Perovskites with Time-Resolved Optical Spectroscopy** [Shunran Li](#), Bowen Li and Peijun Guo; Yale University, United States

**2:15 PM CH02.02.03**

**Impact of Local Heterogeneities on Transient Absorption Microscopy of Spatiotemporal Charge Carrier Transport** [Garrett May](#), Philipp Kollenz, Julia Anthea Gessner, Andrii Shcherbakov, Shangpu Liu and Felix Deschler; Institute of Physical Chemistry, Germany

**2:30 PM BREAK**

**3:00 PM \*CH02.02.04**

**Using Circularly-Polarized Polarized Spectroscopy and Magnetic Field Effects to Study J Excitons in Hybrid Metal Halide Perovskites** [Bin Hu](#); South China University of Technology, China

**3:30 PM \*CH02.02.05**

**Tracking and Making Use of Heat in Two-Dimensional Metal Halide Perovskites** [Peijun Guo](#); Yale University, United States

**4:00 PM CH02.02.06**

**2D Excitation Emission Matrices Show a Ligand Coverage Effect on Lead Sulfide Quantum Dot Dynamical Lineshapes** [Aman K. Agrawal](#)<sup>1</sup>, Yuzuka Karube<sup>2</sup>, Jonathan S. Owen<sup>2</sup> and David M. Jonas<sup>1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Columbia University, United States

**4:15 PM CH02.02.07**

**Anisotropic Screening of Excitons in van der Waals Materials** [Ting-Hsuan Wu](#)<sup>1</sup>, Chih-En Hsu<sup>2,3</sup>, Rajesh Kumar Ulaganathan<sup>4</sup>, Raman Sankar<sup>1</sup>, Zhenglu Li<sup>3</sup>, Chi-Cheng Lee<sup>2</sup>, Chia-Seng Chang<sup>1</sup> and Kung-Hsuan Lin<sup>1</sup>; <sup>1</sup>Institute of Physics, Academia Sinica, Taiwan; <sup>2</sup>Tamkang University, Taiwan; <sup>3</sup>University of Southern California, United States; <sup>4</sup>Indian Institute of Technology, India

SESSION CH02.03: Ferroelectric and Magnetic Properties in Quantum Materials

Session Chairs: Peijun Guo and Mengxia Liu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 343

**8:30 AM \*CH02.03.01**

**Emerging Phenomena in Ferroelectric and Anti-Ferromagnetic 2D vdW Semiconductors** [Xiaoyang Zhu](#); Columbia University, United States

**9:00 AM \*CH02.03.02**

**Photoemission Electron Microscopy and Optical Techniques for the Study and Control of Antiferroelectric Domains in  $\beta'$ -In<sub>2</sub>Se<sub>3</sub>** [Joseph Spellberg](#)<sup>1</sup>, Lina Kodaimati<sup>1</sup>, Prakriti Joshi<sup>1</sup>, Nasim Mirzajani<sup>1</sup>, Liangbo Liang<sup>2</sup> and Sarah King<sup>1</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**9:30 AM \*CH02.03.03**

**Terahertz Control of Magno-Phononics in van der Waals Antiferromagnets** [Honglie Ning](#) and Nuh Gedik; Massachusetts Institute of Technology, United States

**10:00 AM BREAK**

SESSION CH02.04: Chirality and Spin Properties

Session Chairs: Peijun Guo and Mengxia Liu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 343

**10:30 AM \*CH02.04.01**

**Strain- and Electric Field-Tuned Topological Phases in Freestanding Semiconductors** [Jian Shi](#); Rensselaer Polytechnic Institute, United States

**11:00 AM \*CH02.04.02**

**Making and Breaking Chiral Metal Halide Perovskites** [Carolyn M. Sutter-Fella](#); Lawrence Berkeley National Laboratory, United States

**11:30 AM CH02.04.03**

**Room Temperature Paramagnetism in Chiral Metal Halide Dilute Magnetic Semiconductors—MRI Negative Contrast Agent Potential** [Sang Hyun Nam](#) and Young-Hoon Kim; Hanyang University, Korea (the Republic of)

**11:45 AM CH02.04.04**

**Interface-Sensitive Electron Spin Resonance (iESR) Spectroscopy of Spin-Active Defects in Epitaxially-Grown Materials for Classical and Quantum Devices** [Arjan Singh](#), Cameron Gorsak, Haoran Lu, Vladimir Protasenko, Hari P. Nair, Michael Thompson, Valla Fatemi, Huili Grace G. Xing, Debdeep Jena and Farhan Rana; Cornell University, United States

SESSION CH02.05: X-Ray Probes and Device Characterization

Session Chairs: Burak Guzelturk and Mengxia Liu

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 343

**1:30 PM \*CH02.05.01**

**Picosecond Volume Expansion Drives a Later-Time Insulator–Metal Transition in a Nano-Textured Mott Insulator** [Andrej Singer](#); Cornell University, United States

**2:00 PM \*CH02.05.02**

**Ultrafast X-Ray Probes for THz-Scale Dynamics and Coupled Magnetic/Structural Fundamental Excitations** [Paul G. Evans](#); University of Wisconsin, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*CH02.05.03**

**Multi-Length Scale Active Layer Morphology Studies for Organic and Perovskite Solar Cells** [Xinhui Lu](#); The Chinese University of Hong Kong, Hong Kong

**4:00 PM CH02.05.04**

**Ligand Effects on the Structure and Optoelectronic Properties of InP Magic-Sized Clusters** [Dylan Ladd](#)<sup>1</sup>, Soren Sandeno<sup>2</sup>, Skylar Sherman<sup>1</sup>, Cameron Mollazadeh<sup>1</sup>, Kelsey Levine<sup>1</sup>, Damara G. Dayton<sup>1</sup>, Gordana Dukovic<sup>1</sup>, Brandi Cossairt<sup>2</sup> and Michael F. Toney<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>University of Washington, United States

**4:15 PM \*CH02.05.05**

**Operando Investigation of Nanocrystal Based Optoelectronic Device Using X-Ray Photoemission Imaging** [Emmanuel Lhuillier](#)<sup>1</sup>, Mariarosa Cavallo<sup>1</sup>, Debora Pierucci<sup>1</sup> and José Avila<sup>2</sup>; <sup>1</sup>CNRS, France; <sup>2</sup>SOLEIL Synchrotron, France

**4:45 PM CH02.05.06**

**Complex Dielectric Permittivity Extraction of Mid-Infrared Intersubband Quantum Cascade Structures** [Vida Nooshnab](#), Jeremy Kirch, Luke Mawst



and Eric Tervo; University of Wisconsin-Madison, United States

SESSION CH02.06: Poster Session: Characterization of Emerging Semiconductors and Quantum Materials

Session Chairs: Burak Guzelturk and Mengxia Liu

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

#### CH02.06.01

**Probing Strain-Induced Phonon Polaritons in Hexagonal Boron Nitride via Photo-Induced Force Microscopy** [Jiwoo Seo](#), Amin Hajarian and SungWoo Nam; University of California, Irvine, United States

#### CH02.06.02

**Spectroscopic Detection and Raman Mapping of Oxygen Defects in Cobalt Niobates (CoNb<sub>2</sub>O<sub>6</sub>) Nanofibers** [Joohee Park](#)<sup>1</sup>, Sojeong Ko<sup>1</sup>, Songhee Lee<sup>1</sup>, Heeah Oh<sup>1</sup>, Yejin Kim<sup>1</sup>, Soungmin Bae<sup>2</sup>, Myung Hwa Kim<sup>1</sup> and Seokhyun Yoon<sup>1</sup>; <sup>1</sup>Ewha Womans University, Korea (the Republic of); <sup>2</sup>Tohoku University, Japan

#### CH02.06.03

**High-Throughput Evaluation of Crystallinity and Phase Segregation of Organic Semiconductor Films Using Reflection Polarized Optical Microscopy** [Christopher E. Petoukhoff](#), Rawan A. Alzahrani, Nisreen Alshehri, Alaa A. Alessa, Doha Amer, Oleksandr Matiash, Catherine S. De Castro, Shahidul Alam, José P. Jurado, Julien F. Gorenflot and Frédéric Laquai; King Abdullah University of Science and Technology, Saudi Arabia

#### CH02.06.04

**Synthesis and Characterization of Doped Rare Earth-Zinc Alloys** [Partha Das](#); Missouri State University, United States

#### CH02.06.05

**Characterisation of GeSn Superlattices Grown by RPECVD on Si and Ge Substrates** [Xingshuo Huang](#)<sup>1</sup>, Shao Qi Lim<sup>2</sup>, Lachlan Smillie<sup>3</sup>, Bruce B. Claflin<sup>4</sup>, Gordon Grzybowski<sup>4</sup> and Jim S. Williams<sup>1</sup>; <sup>1</sup>The Australian National University, Australia; <sup>2</sup>The University of Melbourne, Australia; <sup>3</sup>University of Wollongong, Australia; <sup>4</sup>Air Force Research Laboratory, United States

#### CH02.06.06

**Breaking the Mold—Exploration and Characterization of Noncentrosymmetric Materials** [Ernesto Soto](#) and Kirill Kovnir; Iowa State University, United States

#### CH02.06.07

**Monovalent Substitution Through Low Temperature Hydrothermal Synthesis and Its Effect on Electronic and Magnetic Properties in La Based Double Perovskites La<sub>2</sub>XMnO<sub>6</sub> (X = Fe, Ni)** [Suman Mondal](#), Vishal Kotha and Amrita Bhattacharya; Indian Institute of Technology Bombay, India

#### CH02.06.08

**Role of Qausi-Interfacial Landscape in Suppression Electron-Phonon Coupling and Energy Loss for Organic Solar Cells** [Yongmin Luo](#), Yulong Hai, Yao Li and Jiaying Wu; The Hong Kong University of Science and Technology (Guangzhou), China

#### CH02.06.09

**Understanding Spin Waves in 2D Magnets—A Combined Experimental, Computational and Mathematical Theory Approach** [Piper Aislinn](#)<sup>1</sup>, Anthony Winchell<sup>1</sup>, Evan Lambertson<sup>1</sup>, Nikolaus Elsaesser<sup>1</sup>, Logan Lancaster<sup>1</sup>, Taylor Krueger<sup>1</sup>, Tim Zuehlsdorff<sup>1</sup>, Axel Saenz Rodriguez<sup>1</sup>, Chong Fang<sup>1</sup>, Zdenek Sofer<sup>2</sup>, Pallavi Dhagat<sup>1</sup> and Oksana Ostroverkhova<sup>1</sup>; <sup>1</sup>Oregon State University, United States; <sup>2</sup>University of Chemistry and Technology, Czechia

#### CH02.06.10

**Integrated Optical and Nonlinear Microscopy for TMDC Analysis** Matthew Berry, Angela Flack, Nikesh Patel and [Paulina Carmona-Monroy](#); Edinburgh Instruments Ltd., United Kingdom

#### CH02.06.11

**Synaptic luminescence of rare-earth based phosphor for optical neuromorphic computation** [Sangwon Wi](#) and Yunsang Lee; Soongsil University, Korea (the Republic of)

**CH02.06.12**

**Yb<sub>2</sub>Ti<sub>2</sub>O<sub>7</sub>—An Illustration of the Need for Multi-Modal Characterization in the Synthesis of Quantum Materials** [Shannon Bernier](#)<sup>1</sup>, Tanya Berry<sup>1</sup>, Andrew King<sup>2</sup> and Tyrel McQueen<sup>1</sup>; <sup>1</sup>Johns Hopkins University, United States; <sup>2</sup>D-Wave Systems Inc., Canada

SESSION CH02.07: Emerging Semiconductors Toward Device Applications

Session Chairs: Burak Guzelturk and Yuanyuan Zhou

Thursday Morning, April 10, 2025

Summit, Level 3, Room 343

**8:30 AM \*CH02.07.01**

**Exploiting Metal-Halide Perovskites Thermal Evaporation for Device Customization and Quantum Confinement** [Annalisa Bruno](#); Nanyang Technological University, Singapore

**9:00 AM CH02.07.02**

**Ultrafast Carrier Extraction and Hot Carrier Transfer in Perovskites Solar Cell with Efficiency Exceeding 27%** [Xihan Chen](#); Southern University of Science and Technology, China

**9:15 AM CH02.07.03**

**Carrier-Resolved Photo-Hall Analysis of Selenium Thin Films and Solar Cells** [Rasmus S. Nielsen](#)<sup>1</sup>, Oki Gunawan<sup>2</sup>, Teodor Todorov<sup>2</sup>, Clara B. Møller<sup>3</sup>, Ole Hansen<sup>3</sup> and Peter Vesborg<sup>3</sup>; <sup>1</sup>Empa—Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>2</sup>IBM T.J. Watson Research Center, United States; <sup>3</sup>Technical University of Denmark, Denmark

**9:30 AM BREAK**

SESSION CH02.08: Structural Properties of Hybrid Perovskites

Session Chairs: Burak Guzelturk and Yuanyuan Zhou

Thursday Morning, April 10, 2025

Summit, Level 3, Room 343

**10:30 AM \*CH02.08.01**

**Local Structure and Distortions in Crystalline, Glass and Melt States of 2D Hybrid Perovskites** [David B. Mitzi](#); Duke University, United States

**11:00 AM ^CH02.08.02**

**External Stimuli Triggered Structural Dynamics and Phase Change in 2D Perovskite Materials** [Wanyi Nie](#); University at Buffalo, The State University of New York, United States

**11:30 AM CH02.08.03**

**Imaging Functional Microstructures to Understand the Working Mechanism of Perovskite Solar Cells in Operation** [Sudipta Seth](#)<sup>1</sup>, Boris Louis<sup>1</sup>, Koki Asano<sup>2</sup>, Yana Vaynzof<sup>3</sup>, Ivan Scheblykin<sup>4</sup>, Martin Vacha<sup>2</sup> and Johan Hofkens<sup>1</sup>; <sup>1</sup>KU Leuven, Belgium; <sup>2</sup>Tokyo Institute of Technology, Japan; <sup>3</sup>Technische Universität Dresden, Germany; <sup>4</sup>Lund University, Sweden

**11:45 AM CH02.08.04**

**Understanding Ion Pairing in CsPbI<sub>3</sub> Perovskite Precursor Solutions Through X-Ray and Electrochemical Techniques** [Keenan W. Wyatt](#), Keith P. White, Samuel R. Jarvis and Michael F. Toney; University of Colorado Boulder, United States

SESSION CH02.09: *In-Operando* and Multi-Modal Characterization

Session Chairs: Burak Guzelturk and Mengxia Liu

Thursday Afternoon, April 10, 2025  
Summit, Level 3, Room 343

**1:30 PM \*CH02.09.01**

**Mechanistic Insights into Materials Synthesis from Operando Studies** [Karen Chapman](#); Stony Brook University, United States

**2:00 PM \*CH02.09.02**

**Operando Optical Microscopy of Energy Materials** [Akshay Rao](#); University of Cambridge, United Kingdom

**2:30 PM CH02.09.03**

**Investigating Defect Formation in MoS<sub>2</sub> Under DC Bias—Insights from Electrical and Surface Characterization Techniques for Next-Generation Electronics** [Colby Evans](#), Elisabeth Mansfield, Jason Holm, Pavel Kabos and Jason Killgore; National Institute of Standards and Technology, United States

**2:45 PM CH02.09.04**

**Multimodal and Multifidelity Characterization on Combinatorial Thin Films from Uncharted Chemical Spaces** Eugène Bertin, Javier Sanz Rodrigo, Lena A. Mittmann, Anat Itzhak and [Andrea Crovetto](#); Technical University of Denmark, Denmark

**3:00 PM BREAK**

SESSION CH02.10: Structural Properties of Emerging Semiconductors

Session Chairs: Burak Guzelturk and Yuanyuan Zhou

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 343

**3:30 PM CH02.10.01**

**Nanowires from Topological Semimetals—From Growth to Integration into Quantum Nanotechnology** [Anand Roy](#); Weizmann Institute of Science, Israel

**3:45 PM CH02.10.02**

**Characterizing the Solvation Structure of Lead Halide Perovskite Inks** [Keith P. White](#)<sup>1</sup>, Keenan W. Wyatt<sup>1</sup>, Thomas P. Chaney<sup>1</sup>, Rafael Ferreira de Menezes<sup>1</sup>, Ziyue Dong<sup>1</sup>, Luis Kitsu Iglesias<sup>1</sup>, Ross Kerner<sup>2</sup>, Damara G. Dayton<sup>1</sup>, Dylan Ladd<sup>1</sup>, Thomas Hoang<sup>1</sup>, Steven Weigand<sup>3</sup>, Daniel Olds<sup>4</sup>, Joseph Berry<sup>2,1</sup>, Kayla Sprenger<sup>1</sup> and Michael F. Toney<sup>1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>National Renewable Energy Laboratory, United States; <sup>3</sup>Northwestern University, United States; <sup>4</sup>Brookhaven National Laboratory, United States

**4:00 PM CH02.10.03**

**Leveraging Machine Learning and DFT for Identification and Analysis of Dyes for Use in DNA-Templated Dye Aggregates** [Maia N. Ketteridge](#) and Lan Li; Boise State University, United States

**4:15 PM CH02.10.04**

**Effect of Strain and Grain Boundaries on Rydberg Excitons in Thin Films of Cuprous Oxide** [Akshay Agrawal](#), Kinjol Barua, Nithin Abraham, Hadiseh Alaeian and Yong P. Chen; Purdue University, United States

**4:30 PM CH02.10.05**

**Supporting the Structural Characterization of Halide Perovskite and Perovskitoids via Halide Nuclear Quadrupole Resonance** [Claudio Quarti](#)<sup>1</sup>, Regis Gautier<sup>2,3,4</sup> and Claudine Katan<sup>2,5,4</sup>; <sup>1</sup>University of Mons, Belgium; <sup>2</sup>University of Rennes, France; <sup>3</sup>Ecole Nationale Supérieure de Chimie de Rennes, France; <sup>4</sup>CNRS, France; <sup>5</sup>Institut de Sciences Chimiques de Rennes, France

SESSION CH02.11: Poster Session: Emerging Semiconductors Toward Device Applications

Session Chairs: Mengxia Liu and Yuanyuan Zhou

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**CH02.11.01**

**Photonic Multilevel-IOlogic Computational Device with High-Resolution Organic Semiconductor Channels** Sehyun Park, U Jeong Yang, Jinyoung Kim and Vladimir Tsukruk; Georgia Institute of Technology, United States

**CH02.11.02**

**Understanding the Origin of Dark Current in Organic Diodes—Achieving Lower Leakage Currents** Yao Li, Yongmin Luo, Yulong Hai and Jiaying Wu; HKUST-GZ, China

**CH02.11.03**

**Ligand Engineering for Enhanced Charge Injection and Efficiency in InP Quantum Dot Light-Emitting Diodes** Yoonhwa Kim and Bright Walker; Kyung Hee University, Korea (the Republic of)

**CH02.11.04**

**Design Rule—Isomerization Conformation Locker Suppressed Electron-Phonon Coupling and Reduced Non-Radiation Voltage Loss** Yulong Hai, Yongmin Luo, Yao Li and Jiaying Wu; The Hong Kong University of Science and Technology, China

**CH02.11.05**

**Defect Engineering in Complex Oxide Thin Films Using Nanoscale Patterning** Supriya Ghosh<sup>1,2</sup>, Fengdeng Liu<sup>1</sup>, Silu Guo<sup>1</sup>, Jay Shah<sup>1</sup>, Mayank Tanwar<sup>1</sup>, Matthew Neurock<sup>1</sup>, Turan Birol<sup>1</sup>, Bharat Jalan<sup>1</sup> and K. Andre Mkhoyan<sup>1</sup>; <sup>1</sup>University of Minnesota, United States; <sup>2</sup>Intel Corporation, United States

**CH02.11.06**

**Room-Temperature NO<sub>2</sub> Gas Sensing with UV-Activated ZnO/Ag<sub>2</sub>O Nanostructures— Enhanced Sensitivity and Selectivity** Jae-Hun Jeong, Sohyeon Kim, Yoon-Seo Park, Ju-Eun Yang, Jun-Young Lee, Jeongmin Lee, Jeonghye Yoon and Kyoung-Kook Kim; Tech University of Korea, Korea (the Republic of)

**CH02.11.07**

**Critical Evaluation of Thermal and Compositional Dependences in a Finite Strain Model of Ge-Sn Alloys on Ge(100) from DFT** Narges Masoumi and Andrew V. Chizmeshya; Arizona State University, United States

**CH02.11.08**

**Colloidal II–V Semiconductor QDs Emitting Past 1.5  $\mu\text{m}$**  Abdul Halim and Igor Fedin; The University of Alabama, United States

**CH02.11.09**

**Tunable Edge States and Defect States in Metal-Dielectric Photonic Crystals with Organic Semiconductor Dielectric Layers** Matthew S. White<sup>1</sup>, Khadga Thakuri<sup>1</sup>, David Allemeier<sup>2</sup>, Thomas Cleary<sup>1</sup>, Haruto Morinaga<sup>3</sup>, Taisei Kimura<sup>3</sup>, Naoya Aizawa<sup>4</sup>, Ken-Ichi Nakayama<sup>4</sup>, Akito Masuhara<sup>3</sup> and Tsukasa Yoshida<sup>3</sup>; <sup>1</sup>University of Vermont, United States; <sup>2</sup>Boston University, United States; <sup>3</sup>Yamagata University, Japan; <sup>4</sup>Osaka University, Japan

**CH02.11.10**

**Flexible Fiber-Shaped Dye Sensitized Solar Cell Using CNT/PANI Incorporated TiO<sub>2</sub>** Abdullah Mohammad Sarjish and Jasim Uddin; The University of Texas Rio Grande Valley, United States

**CH02.11.11**

**Tellurium Quantum Dots Synthesized by Glancing Angle Deposition** S M Sayem<sup>1</sup>, Salim Hussain<sup>1</sup>, Fumiya Watanabe<sup>2</sup> and Tansel Karabacak<sup>1</sup>; <sup>1</sup>University of Arkansas at Little Rock, United States; <sup>2</sup>Center for Integrative Nanotechnology Sciences, University of Arkansas at Little Rock, United States

**CH02.11.12**

**Isolation and characterization of atomically thin mica phyllosilicates** Kristine L. Haley, Noah F. Lee, Vergil M. Schreiber, Nicholas T. Pereira, Randy M. Sterbentz, Timothy Y. Chung and Joshua O. Island; University of Nevada, Las Vegas, United States

**CH02.11.13**

**Integrated Conductive Transparent Electrodes for Optoelectronic Applications** Mohammad Mehdi Zarei; University of Pittsburgh, United States

**CH02.11.14**

**Superior Adhesion of Monolayer Amorphous Carbon to Copper** [Hongji Zhang](#)<sup>1</sup>, Artem Grebenko<sup>1</sup>, Konstantin Iakoubovskii<sup>1</sup>, Hanning Zhang<sup>2</sup>, Ruslan Yamaletdinov<sup>2</sup>, Anna Makarova<sup>3</sup>, Alexander Fedorov<sup>4,5,6</sup>, Sergey Grebenchuk<sup>1</sup>, Ugur Karadeniz<sup>1</sup>, Lu Shi<sup>1</sup>, Denis V. Vyalikh<sup>2,7,8</sup>, Andrei Starkov<sup>1</sup>, Alena Alekseeva<sup>1</sup>, Chuan Chu Tee<sup>1</sup>, Carlo M. Orofeo<sup>1</sup>, Maciej Koperski<sup>1</sup>, Kostya S. Novoselov<sup>1</sup>, Oleg Yazyev<sup>2</sup>, Barbaros Ozyilmaz<sup>1</sup>, Junhao Lin<sup>9</sup>, Kazutomo Suenaga<sup>10</sup> and Chee Tat Toh<sup>1</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Ecole Polytechnique Fédérale de Lausanne, Switzerland; <sup>3</sup>Freie Universität Berlin, Germany; <sup>4</sup>Leibniz Institute for Solid State and Materials Research Dresden, Germany; <sup>5</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>6</sup>Joint Laboratory “Functional Quantum Materials” at BESSY II, Germany; <sup>7</sup>Donostia International Physics Center, Spain; <sup>8</sup>IKERBASQUE Basque Foundation for Science, Spain; <sup>9</sup>Southern University of Science and Technology, China; <sup>10</sup>Osaka University, Japan

#### CH02.11.15

**Energy Level Alignment in Non-Fullerene Organic Photovoltaic Cells—A UPS and LEIPS Study on Neat and Blend Films** [Seunggu Lee](#) and Yongsup Park; Kyung Hee University, Korea (the Republic of)

#### CH02.11.16

**Mesoporous Carbon Dots Grafted Silica Based Nanocomposites for Non-Invasive Biomarker Detection** [Prama Adhya](#)<sup>1</sup>, Titash Mondal<sup>2</sup> and Manish Kaushal<sup>1</sup>; <sup>1</sup>Department of Chemical Engineering, India; <sup>2</sup>Indian Institute of Technology Kharagpur, India

SESSION CH02.12: X-Ray Probes and Multi-Modal Characterization

Session Chairs: Mengxia Liu and Yuanyuan Zhou

Friday Morning, April 11, 2025

Summit, Level 3, Room 343

#### 8:00 AM CH02.12.01

**Shining Light on Short-Range Ordering in Group-IV Semiconductor Alloys** [Anis Attiaoui](#)<sup>1,2</sup>, John Lentz<sup>1</sup>, Lilian Vogl<sup>3</sup>, Joseph C. Woicik<sup>4</sup>, Jarod E. Meyer<sup>1</sup>, Shunda Shen<sup>5</sup>, Kunal Mukherjee<sup>1</sup>, Tianshu Li<sup>5</sup>, Andrew M. Minor<sup>3</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States; <sup>4</sup>National Institute of Standards and Technology, United States; <sup>5</sup>George Washington University, United States

#### 8:15 AM CH02.12.02

**Investigating Trimeron Dynamics and Lattice Instabilities in Magnetite** [Benjamin M. Fahl](#) and Arkadiy Simonov; ETH Zurich, United States

#### 8:30 AM CH02.12.03

**Facile Scalable Fabrication and Multi-Modal Quantitatively Cross-Correlating Characterization of Gradient Refractive Index Optoelectronic Materials** [Gil Sop Tagne](#)<sup>1</sup>, Zephyr Ramsey<sup>1</sup>, Lam Tran<sup>1</sup>, Jessica Lyza<sup>1</sup>, Darren Stohr<sup>1</sup>, Patrick Lynch<sup>1</sup>, Cristian Cano<sup>2</sup>, Philip Marrero<sup>2</sup>, Roberto Alvarez<sup>3</sup>, Daniel Wiedeman<sup>3</sup>, Rashi Sharma<sup>3</sup>, Kathleen Richardson<sup>3</sup>, Steven Feller<sup>2</sup>, Kun Wang<sup>1</sup>, S. K. Sundaram<sup>1</sup>, Scott Misture<sup>1</sup> and Myungkoo Kang<sup>1</sup>; <sup>1</sup>Alfred University, United States; <sup>2</sup>Coe College, United States; <sup>3</sup>University of Central Florida, United States

#### 8:45 AM CH02.12.04

**Strain Control of Topological Edge Currents in a Chern Insulator** [Shua Sanchez](#)<sup>1</sup>, Raagya Arora<sup>2</sup>, Riccardo Comin<sup>1</sup>, Efthimos Kaxiras<sup>2</sup>, Daniel Bennett<sup>2</sup> and Daniel Larson<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Harvard University, United States

#### 9:00 AM CH02.12.05

**Multi-Modal RF-Photonic Characterizations of Cosmic Radiation Impacts on Nanoscale Optoelectronic Devices** [Tingyi Gu](#); University of Delaware, United States

#### 9:15 AM CH02.12.06

**High Resolution Investigation of WSe<sub>2</sub>/(Al)GaAs Heterostructures via Electron Beam-Induced Current Mapping** Michele Zandrini, Claire Blaga, Mitali Banerjee, Anna Fontcuberta i Morral and [Valerio Piazza](#); Ecole Polytechnique Fédérale de Lausanne, Switzerland

#### 9:30 AM CH02.12.07

**Carbon Dots as Light Converter Agents and Biostimulants for Enhanced Photosynthesis and Antifungal Activity** [Anupam Ghosh](#) and Shivendu Ranajn; Indian Institute of Technology Kharagpur, India

#### 9:45 AM CH02.12.08

**Inference from the Capacitance Analysis in Different Perovskite Solar Cells** [Apoorva Singh](#)<sup>1,2</sup> and Praveen Ramamurthy<sup>1</sup>; <sup>1</sup>Indian Institute of Science,

India; <sup>2</sup>University of Massachusetts Amherst, United States

**10:00 AM BREAK**

SESSION CH02.13: Optical Spectroscopy and Microscopy III

Session Chairs: Mengxia Liu and Yuanyuan Zhou

Friday Morning, April 11, 2025

Summit, Level 3, Room 343

**10:30 AM \*CH02.13.01**

**Probing Lateral and Vertical Heterogeneity in Halide Perovskite Semiconductors— From Photoluminescence to Sub-Diffraction Carrier Dynamics**

Rajiv Giridharagopal; University of Washington, United States

**11:00 AM \*CH02.13.02**

**Waveguide Optics in 3R-Stacked Transition Metal Dichalcogenides** Fabian Mooshammer; Universität Regensburg, Germany

**11:30 AM CH02.13.03**

**Manipulating Optical Emission from Hexagonal Boron Nitride Using Cathodoluminescence Spectroscopy with High Spatial Resolution** HaeYeon

Lee; Rice University, United States

**11:45 AM CH02.13.04**

**Nanoscale Optical Analysis Using AFM-Based Techniques** Artem Danilov<sup>1</sup>, Frank Weston<sup>1</sup>, Tobias Gokus<sup>2</sup> and Andreas Huber<sup>2</sup>; <sup>1</sup>attocube systems Inc, United States; <sup>2</sup>Attocube Systems AG, Germany

# SYMPOSIUM CH03

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Advanced Scanning Probe Microscopy

April 7 - April 10, 2025

Symposium Organizers

Rajiv Giridharagopal, University of Washington

Ilka Hermes, Leibniz Institute for Polymer Research Dresden e.V.

Benjamin Legg, Pacific Northwest National Laboratory

Shan Zhou, South Dakota School of Mines and Technology

Symposium Support

**Bronze**

QUANTUM DESIGN

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION CH03.01: Characterizing Energy Materials via Time-Resolved Electrical AFM I

Session Chairs: Ilka Hermes, Rebecca Saive and Shan Zhou

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 345

**10:30 AM \*CH03.01.01**

**Tracking Charge Dynamics by High Speed and Time Resolved Kelvin Probe Force Microscopy** [Liam Collins](#); Oak Ridge National Laboratory, United States

**11:00 AM \*CH03.01.02**

**Scanning Probe-Based Imaging of Nanoscale Photovoltaic Function** [Stefan A. Weber](#); University of Stuttgart, Germany

**11:30 AM +CH03.01.03**

**Functional Imaging of Halide Perovskites Using Environmental Atomic Force Microscopy** [Marina S. Leite](#); University of California, Davis, United States

SESSION CH03.02: Characterizing Energy Materials via Time-Resolved Electrical AFM II

Session Chairs: Rajiv Giridharagopal, Ilka Hermes and Stefan Weber

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 345

**1:30 PM ^CH03.02.01**

**In-Operando Photovoltage and Photomotion Scanning Probe Microscopy on Optoelectronic Devices** [Rebecca Saive](#); University of Twente, Netherlands

**2:00 PM \*CH03.02.02**

**Electrical Scanning Probe Microscope Measurements Enabling the Acquisition of Nanosecond Conductivity Transients and the Quantification of Charge Density and Electrical Conductivity** [John A. Marohn](#)<sup>1</sup>, Rachael L. Cohn<sup>1</sup>, Christopher A. Petroff<sup>1</sup>, Virginia E. McGhee<sup>1</sup>, Azriel Finsterer<sup>1</sup>, Aditya Kaipa<sup>1</sup>, Robert Witteck<sup>2</sup>, David T. Moore<sup>2</sup> and Roger F. Loring<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>DOE NREL, United States

**2:30 PM \*CH03.02.03**

**Sub-Diffraction Imaging of Carrier Dynamics in Halide Perovskite Semiconductors— Effects of Passivation, Grain Boundaries and Ion Motion** [David S. Ginger](#); University of Washington, United States

**3:00 PM BREAK**

SESSION CH03.03: Nanoscale Infrared Imaging Applications and Development

Session Chairs: Mingyuan Chen, Rajiv Giridharagopal, Ilka Hermes and Shan Zhou

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 345

**3:30 PM \*CH03.03.01**

**Near-Field Optical Microscopy for Nanophotonics, Materials and Device Innovation** [Mingyuan Chen](#); South Dakota School of Mines & Technology, United States

**4:00 PM CH03.03.02**

**Thickness-Dependent Behavior of Phonon Polaritons in Hexagonal Boron Nitride Using Photo-Induced Force Microscopy** [Amin Hajarian](#), Jiwoo Seo and SungWoo Nam; University of California, Irvine, United States

**4:15 PM CH03.03.03**

**Correlation Nanoscopy Using Probe-Assisted Techniques for Optical Analysis at Nanoscale** [Artem Danilov](#)<sup>1</sup>, Tobias Gokus<sup>2</sup>, Frank Weston<sup>1</sup> and Andreas Huber<sup>2</sup>; <sup>1</sup>attocube systems Inc, United States; <sup>2</sup>Attocube Systems AG, Germany

**4:30 PM CH03.03.04**

**Infrared Nanoscopy of Electron-Beam Modified Metal Organic Frameworks** [Samuel A. Tenney](#)<sup>1</sup>, Andrea Kraetz<sup>2</sup>, Prerna Prerna<sup>3</sup>, J. Ilja Siepmann<sup>3</sup> and

Michael Tsapatsis<sup>2</sup>; <sup>1</sup>Brookhaven National Laboratory, United States; <sup>2</sup>Johns Hopkins University, United States; <sup>3</sup>University of Minnesota, United States

**4:45 PM CH03.03.05**

**Quantitative Analysis of Nanoscale Vibrational Spectroscopy in Liquid by Finite Element Methods** Brian O'Callahan<sup>1</sup>, Tarik Cigeroglu<sup>2</sup>, Philip Tran<sup>2</sup>, E Zheng<sup>2</sup> and Eric Muller<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Colgate University, United States

SESSION CH03.04: Scanning Tunneling Microscopy and Non-Contact AFM Applications I

Session Chairs: Rajiv Giridharagopal, Ilka Hermes and Shan Zhou

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 345

**8:30 AM \*CH03.04.01**

**Atomic-Resolution Scanning Probe Microscopy of Boron in the Two-Dimensional Limit** Mark C. Hersam; Northwestern University, United States

**9:00 AM CH03.04.02**

**Multi-Modal Atomic Force Microscopy Reveals Strain-Induced Modulation of Surface Electronics in Thin Mo<sub>2</sub>C Crystals** Gokay Adabasi<sup>1</sup>, Elif Okay<sup>2</sup>, Goknur Cambaz Buke<sup>2</sup> and Mehmet Z. Baykara<sup>1</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>TOBB University of Economics and Technology, Turkey

**9:15 AM \*CH03.04.03**

**Band Engineering and Microscopy in LiNbO<sub>3</sub> Acoustic Metamaterials** Federico Maccagno<sup>1</sup>, Jasleen Kaur<sup>1</sup>, Benjamin H. November<sup>1</sup>, Harris Pirie<sup>2</sup>, Layan Ansari<sup>1</sup>, Rares-Georgian Mihalcea<sup>1</sup>, Daria-Teodora Harabor<sup>1</sup> and Jennifer E. Hoffman<sup>1,1</sup>; <sup>1</sup>Harvard University, United States; <sup>2</sup>University of Oxford, United Kingdom

**9:45 AM BREAK**

SESSION CH03.05: Facing Challenges in Piezoresponse Force Microscopy

Session Chairs: Liam Collins, Rajiv Giridharagopal and Ilka Hermes

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 345

**10:15 AM \*CH03.05.01**

**Improved Sensitivity of Piezoresponse Force Microscopy by Machine Learning** Yunseok Kim; Sungkyunkwan University, Korea (the Republic of)

**10:45 AM CH03.05.02**

**Light-Ferroelectricity Interaction at the Nanoscale in 2D Layered Halide Perovskite** Zinnia Mallick<sup>1,2</sup>, Rajashi Haldar<sup>3</sup>, Sudip Naskar<sup>2</sup>, Maheswaran Shanmugam<sup>3</sup>, Shan Zhou<sup>1</sup> and Dipankar Mandal<sup>2</sup>; <sup>1</sup>South Dakota School of Mines & Technology, United States; <sup>2</sup>Institute of Nano Science and Technology, India; <sup>3</sup>Indian Institute of Technology Bombay, India

**11:00 AM CH03.05.03**

**Finite Element Analysis for Piezoresponse Force Microscopy** Gheorghe Stan<sup>1</sup> and Roger Proksch<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>Asylum Research, an Oxford Instruments Company, United States

**11:15 AM CH03.05.04**

**Polarization-Switchable Electrochemistry of 2D Layered Bi<sub>2</sub>O<sub>2</sub>Se Bifunctional Microreactors by Ferroelectric Modulation** Lu Yang-Sheng<sup>1</sup>, Chun-Hao Chiang<sup>2</sup>, Chun-Wei Chen<sup>2</sup> and Shao-Sian Li<sup>1</sup>; <sup>1</sup>National Taipei University of Technology, Taiwan; <sup>2</sup>National Taiwan University, Taiwan

**11:30 AM CH03.05.05**

**Gated Peak Force Tapping for High-Resolution Electrical, Mechanical and Chemical Property Mapping** Bede Pittenger, Chunzeng Li, Shuiqing Hu, Ji Ma and Peter De Wolf; Bruker, United States



**11:45 AM CH03.05.06**

**Colocalized Multimodal Scanning Probe Microscopy Elucidates Nanoscale Impact of Step Edge Defects in Transition Metal Dichalcogenide**

**Electrocatalysts** Kenneth O. Chua and Megan Jackson; University of North Carolina at Chapel Hill, United States

SESSION CH03.06: Scanning Probe Microscopy for Biological Applications I

Session Chairs: Rajiv Giridharagopal, Ilka Hermes, Shuai Zhang and Shan Zhou

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 345

**3:30 PM ^CH03.06.01**

**Characterization of Nanomaterial-Mediated Cell Phenotype Transition and Protein Preservation Using Nanomechanical Atomic Force Microscopy**

Congzhou Wang; South Dakota School of Mines & Technology, United States

**4:00 PM CH03.06.02**

**Automated AFM for Large-Area Biofilm Imaging—A Breakthrough in Biofilm Characterization** Ruben Millan-Solsona, Spenser R. Brown, Marti

Checa, Lance Zhang, Sita Sirisha Madugula, Rama Vasudevan, Arpan Biswas, Scott T. Retterer, Jennifer Morrell-Falvey, Liam Collins and Huanhuan Zhao; Oak Ridge National Laboratory, United States

**4:15 PM \*CH03.06.03**

**Imaging Plant Cell Wall Cellulose by Atomic Force Microscopy** Shi-You Ding; Michigan State University, United States

SESSION CH03.07: Poster Session: Advanced Scanning Probe Microscopy

Session Chairs: Rajiv Giridharagopal, Ilka Hermes, Benjamin Legg and Shan Zhou

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**CH03.07.01**

**Percolation Pathway Formation and Annihilation Mechanism in Next-Generation Photovoltaics and Memory Devices Probed by *In Situ* Conductive Atomic Force Microscope** Luhang Xu<sup>1</sup>, Yuang Fu<sup>1</sup>, Yuhao Li<sup>2</sup>, Guodong Zhou<sup>3</sup> and Xinhui Lu<sup>1</sup>; <sup>1</sup>The Chinese University of Hong Kong, Hong Kong;

<sup>2</sup>Spallation Neutron Source Science Center, China; <sup>3</sup>Zhejiang University, China

**CH03.07.02**

**A Fundamental Approach to Understanding Active Sites of Bimetallic Non-PGM Nanoparticles Using the Nanodroplet-Mediated Electrodeposition Method for the Oxygen Reduction Reaction** Laura C. Cruz Estrada<sup>1</sup>, Lisandro Cunci Perez<sup>1</sup>, Joshua Reyes Morales<sup>2</sup> and Cristina Villanueva Aponete<sup>1</sup>;

<sup>1</sup>University of Puerto Rico Rio Piedras/University of Puerto Rico at Río Piedras, United States; <sup>2</sup>University of Ana G. Méndez, Puerto Rico

**CH03.07.03**

**Nanomechanical Properties Of Zone-Annealed PEO/PMMA Blends** Sourena Azidhak<sup>1</sup>, Nicholas F. Mendez<sup>2</sup>, Richard Sheridan<sup>3</sup>, Io Saito<sup>3</sup>, Sanat Kumar<sup>2</sup> and Linda S. Schadler<sup>1</sup>; <sup>1</sup>University of Vermont, United States; <sup>2</sup>Columbia University, United States; <sup>3</sup>Duke University, United States

**CH03.07.04**

**Nanoscale Metrology of Gate Dielectrics for Graphene Nanoribbon Transistors** Richard Holloway, Kentaro Yumigeta, Muhammed Yusufoglu, Shelby Janssen and Zafer Mutlu; University of Arizona, United States

**CH03.07.05**

**Imaging of Nanomaterial-Induced Endothelial Cell Changes Using Nanomechanical Atomic Force Microscopy** Xiao Yu, Xin Luo and Congzhou

Wang; South Dakota School of Mines & Technology, United States

**CH03.07.06**

**Evaluation of Atomic-Level Interfacial Layer Using AFM** Min Hyung Kim<sup>1,1,2</sup>, Seungjae Heo<sup>1</sup>, Yonghyeon cho<sup>3</sup>, Hongseok Kim<sup>1</sup>, Min Hyuk H. Park<sup>3</sup> and

Yunseok Kim<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Samsung Electronics Co., Korea (the Republic of); <sup>3</sup>Seoul National University, Korea (the Republic of)

#### CH03.07.07

**Deep learning for high-speed acquisition of ferroelectric domain images** Jangwoo Ko<sup>1</sup>, [Hongseok Kim](#)<sup>1</sup>, Jaeuk Sung<sup>1</sup>, Panithan Sriboriboon<sup>1</sup>, Jungho Ryu<sup>2</sup> and Yunseok Kim<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Yeungnam University, Korea (the Republic of)

#### CH03.07.08

**Imaging Supported Lipid Bilayers during Electroporation Process using Atomic Force Microscopy** [Junming Yue](#), Zinnia Mallick, Joshua Marquardt and Shan Zhou; South Dakota School of Mines & Technology, United States

SESSION CH03.08: Nanomechanics, Electrochemistry and Imaging of Solid-Liquid Interfaces

Session Chairs: Benjamin Legg, Congzhou Wang and Shan Zhou

Thursday Morning, April 10, 2025

Summit, Level 3, Room 345

#### 8:00 AM \*CH03.08.01

**Towards Quantitative Mapping of Mechanical Properties of Soft Materials—When AI Meets Materials!** [Philippe E. Leclere](#)<sup>1</sup> and Igor Sololov<sup>2</sup>; <sup>1</sup>University of Mons, Belgium; <sup>2</sup>Tufts University, United States

#### 8:30 AM CH03.08.02

**The Comparison of AFM-Based Techniques to Access the Adhesion in the Case of Soft Contacts** [Dmitrii Sychev](#)<sup>1</sup>, Doreen Hoffmann<sup>1,2</sup>, Zlata Zagradska-Paromova<sup>1,2</sup>, Simon Schubotz<sup>1</sup>, Quinn Besford<sup>1</sup>, Eva Bittrich<sup>1</sup>, Andreas Fery<sup>1,2</sup> and Gunter Auernhammer<sup>1</sup>; <sup>1</sup>Leibniz-Institut für Polymerforschung Dresden e.V., Germany; <sup>2</sup>Technische Universität Dresden, Germany

#### 8:45 AM CH03.08.03

**Revealing the Effects of Polymer Additives on Zn Dendrite Suppression in Aqueous Zn Batteries Via *In Situ* EC-AFM** [Ying Xia](#)<sup>1,2</sup>, Mingyi Zhang<sup>2</sup>, Duo Song<sup>2</sup>, Zheming Wang<sup>2</sup>, Chenyang Shi<sup>2</sup>, Jingshan Du<sup>2</sup>, Sun Hae Ra Shin<sup>2</sup>, Praveen K. Thallapally<sup>2</sup>, Christine Orme<sup>3</sup>, Jinhui Tao<sup>2</sup>, Maria Sushko<sup>2</sup>, James J. De Yoreo<sup>2,1</sup> and Jun Liu<sup>1,2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>Lawrence Livermore National Laboratory, United States

#### 9:00 AM \*CH03.08.04

**Understanding Mineral Crystallization, Dissolution and Ion Adsorption Using Advanced Atomic Force Microscopy Techniques** [Xin Zhang](#), Xiaoxu Li, Shuai Zhang, James De Yoreo and Kevin Rosso; Pacific Northwest National Laboratory, United States

#### 9:30 AM CH03.08.05

**Deriving Damping Coefficients to Explore the Effect of Individual Molecules Trapped in Nanoscale Sliding Contacts Between Two Materials** Uri Maayan<sup>1</sup>, Enrico Gnecco<sup>2</sup> and [Ronen Berkovich](#)<sup>1,1</sup>; <sup>1</sup>Ben-Gurion University of the Negev, Israel; <sup>2</sup>Jagiellonian University, Poland

#### 9:45 AM BREAK

SESSION CH03.09: Scanning Probe Microscopy for Biological Applications II

Session Chairs: Rajiv Giridharagopal, Ilka Hermes, Philippe Leclere and Shan Zhou

Thursday Morning, April 10, 2025

Summit, Level 3, Room 345

#### 10:30 AM CH03.09.01

**Resolve Protein Two-Dimensional Dynamics at Solid-Liquid Interfaces with High-Speed Atomic Force Microscopy** [Shuai Zhang](#)<sup>1,2</sup>, Benjamin A. Legg<sup>1</sup>, Harley Pyles<sup>2</sup>, Chris Mundy<sup>1,2</sup>, David Baker<sup>2</sup> and James J. De Yoreo<sup>1,2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of Washington, United States

**10:45 AM +CH03.09.02**

**Real-Time Mapping of Collagen Nanostructures and Processes by High-Speed Bimodal AFM** Ricardo Garcia; Consejo Superior de Investigaciones Científicas, Spain

**11:15 AM CH03.09.03**

**Characterization of Patchy Polymer Grafted Nanocube Transformations in Air and Water with Atomic Force Microscopy** Wade Shipley, Yutong She, Fiona Liang and Andrea Tao; University of California, San Diego, United States

**11:30 AM \*CH03.09.04**

**Infrared Light-Matter Interaction at the Nanoscale to Advance Nanomanipulation of Materials and their Characterization** Laurene Tetard<sup>1,2</sup>;

<sup>1</sup>University of Central Florida, United States; <sup>2</sup>Institute of Analytical Sciences CNRS UMR5280, France

SESSION CH03.10: Scanning Tunneling Microscopy and Non-Contact AFM Applications II

Session Chairs: Ilka Hermes and Shan Zhou

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 345

**1:30 PM \*CH03.10.01**

**Spatially Resolved Trap States and Random Telegraph Noise in Semiconductors** Peter Grutter; McGill University, Canada

**2:00 PM CH03.10.02**

**Spin-Polarized STM of Chiral Molecules on Magnetic Surfaces** Mohammad R. Safari<sup>1</sup>, Daniel Bürgler<sup>1</sup> and Karl-Heinz Ernst<sup>2,3,4</sup>; <sup>1</sup>Forschungszentrum Jülich GmbH, Germany; <sup>2</sup>Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>3</sup>University of Zurich, Switzerland; <sup>4</sup>The Czech Academy of Sciences, Czechia

**2:15 PM \*CH03.10.03**

**Probing a Molecular Hubbard Cluster System with Non-Contact Atomic Force Microscopy** Sarah Burke; University of British Columbia, Canada

**2:45 PM CH03.10.04**

**Visualizing Femtosecond-Laser Processed Graphene Micropatterns through AFM Phase and Multi-Parametric Raman Mapping** Susana Alvarez-García, Diego Soto-Puebla and Jose A. Parada-Peralta; University of Sonora, Mexico

## SYMPOSIUM CH04

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Advances in In Situ/Operando TEM Characterization of Dynamics and Functionalities in Materials

April 7 - April 10, 2025

Symposium Organizers

Matthew Hauwiller, Seagate Technology

Lili Liu, Pacific Northwest National Laboratory

Chang Liu, University of Chicago

Wenhui Wang, Beihang University

Symposium Support

**Bronze**

Protochips

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+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION CH04.01: Electrochemical Reactions and Operando Electron Microscopy I

Session Chairs: Matthew Hauwiller and Ivan Moreno-Hernandez

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 344

**10:30 AM \*CH04.01.01**

***In Situ* Transmission Electron Microscopy Solutions for Real-World Applications—Advances in Operando Methods for the Study of Temperature-dependent Electrochemical Processes** [Madeline Duker](#), Katherine Marusak Stephens, Franklin Walden, Yaofeng Guo and John Damiano; Protochips, Inc., United States

**11:00 AM \*CH04.01.02**

***In Situ* STEM with Electrical Bias for Next-Generation Microelectronics Systems** [Judy Cha](#); Cornell University, United States

**11:30 AM CH04.01.03**

**Electron Beam Induced Radiolysis of Water Studied with STEM-EELS** [Sofie Tidemand-Lichtenberg](#), Shima Kadkhodazadeh and Kristian S. Mølhave; Technical University of Denmark, Denmark

**11:45 AM CH04.01.04**

**Operando Vitrifying of Electrocatalysts Under Applied Potential for Analysis of Active Electrolyte/Catalyst Interfaces Using CryoEM** [Karina Masalkovaite](#)<sup>1</sup>, Evan Carlson<sup>1</sup>, Nathan D. Burrows<sup>2</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

SESSION CH04.02: Electrochemical Reactions and Operando Electron Microscopy II

Session Chair: Judy Cha

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 344

**1:30 PM \*CH04.02.01**

**Cryo-EM Imaging of Li Metal Polyhedra Formed by Ultrafast Electrodeposition** [Yuzhang Li](#); University of California, Los Angeles, United States

**2:00 PM \*CH04.02.02**

**Operando Electrochemical Liquid-Cell 4D-STEM Under Controlled Temperatures** [Yao Yang](#); Cornell University, United States

**2:30 PM CH04.02.03**

**Nano-Si for On-Demand H<sub>2</sub> Production—Real Time Observation of pH Effect on Reaction Mechanism in Si-H<sub>2</sub>O Reaction by Liquid-Phase Transmission Electron Microscopy** [Arijit Mitra](#), Gunalan Rachel, Jun-Han Huang, Wen-Huei Chu and Chuan-Pu Liu; National Cheng Kung University, Taiwan

**2:45 PM CH04.02.04**

**Diagnosing the Mechanisms of Zn Metal Anode Degradation via *In Situ* Liquid Cell TEM** [Yi Yuan](#); Department of Materials University and Oxford, United Kingdom

**3:00 PM BREAK**

SESSION CH04.03: Process Under Electron Beam Control

Session Chairs: Miaofang Chi and Judith Yang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 344

**3:30 PM \*CH04.03.01**

**Visualizing Plasmon Mediated Nanochemistry During Liquid Phase Transmission Electron Microscopy** Amy Chen<sup>1,2</sup>, Asher Leff<sup>2</sup>, Zhenpu Li<sup>1</sup>, Carlos Ríos<sup>1</sup>, Jonathan Boltersdorf<sup>2</sup> and [Taylor J. Woehl](#)<sup>1</sup>; <sup>1</sup>University of Maryland, United States; <sup>2</sup>U.S. Army Research Laboratory, United States

**4:00 PM \*CH04.03.03**

**Liquid Phase TEM for Structure Elucidation and Property Prediction of Dynamic Biomaterials** [Nathan C. Gianneschi](#); Northwestern University, United States

**4:30 PM \*CH04.03.02**

**Controlled Electron Beam Enhanced Crystallization and Dissolution Processes** [Yuki Kimura](#); Institute of Low Temperature Science, Japan

SESSION CH04.04: Poster Session

Session Chairs: Chang Liu and Lili Liu

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**CH04.04.01**

**Degradation Mechanism of Li<sub>2</sub>TiSiO<sub>5</sub> Anode Material—Direct Observation of Gradational Pulverization via Cracking** [Sungkyu Kim](#); Sejong University, Korea (the Republic of)

**CH04.04.02**

**In Situ Transmission Electron Microscopy Imaging of High-Temperature Structural Evolution in Phase-Change Materials** [Calvin A. Parkin](#)<sup>1</sup>, Pawan Kumar<sup>2</sup>, James Horwath<sup>2,3</sup>, Kim Karki<sup>1,4</sup>, Deep M. Jariwala<sup>2</sup>, Eric A. Stach<sup>2</sup>, Melissa K. Santala<sup>5</sup> and Daan Hein Alsem<sup>1</sup>; <sup>1</sup>Hummingbird Scientific, United States; <sup>2</sup>University of Pennsylvania, United States; <sup>3</sup>Argonne National Laboratory, United States; <sup>4</sup>Intel Corporation, United States; <sup>5</sup>Oregon State University, United States

**CH04.04.03**

**Real-Time Visualization and Mechanistic Insights of Semiconductor Nanocrystal Transformations via In-Situ Transmission Electron Microscopy** [Hyeonjong Ma](#) and Jiwoong Yang; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**CH04.04.04**

**Opportunities and Challenges of In Situ 4D STEM for Dynamic Structural Analysis** [Carter Francis](#)<sup>1,2</sup>, Barnaby D. Levin<sup>1</sup> and Paul M. Voyles<sup>2</sup>; <sup>1</sup>Direct Electron, United States; <sup>2</sup>University of Wisconsin-Madison, United States

**CH04.04.05**

**In Situ Crystal Surface Reconstructions in Atomic Layer Deposition Thin Films** [Francisco J. Lagunas Vargas](#), Jessica Jones, Shi Li and Zachary D. Hood; Argonne National Laboratory, United States

**CH04.04.06**

**In Situ Liquid-Phase TEM of Trapped Nanoparticles in Nanochannels** [Joakim Lajer](#)<sup>1</sup>, Sofie Tidemand-Lichtenberg<sup>1</sup>, Niccolò Bottauscio<sup>1,2</sup>, Mervan Ramadan<sup>2</sup>, Emil C. Jensen<sup>2</sup> and Kristian S. Mølhav<sup>1</sup>; <sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>Insight Chips, Denmark

**CH04.04.07**

**Visualizing Variation: Continuous EELS Mapping of Metal Nanoparticle Ensemble Phase Transformations** [Benjamin Miller](#) and Cory Czarnik; Gatan, Inc., United States

SESSION CH04.05: Advances in *In-Situ* TEM I

Session Chair: Haimei Zheng

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 344

**8:00 AM \*CH04.05.01**

**Analysis of Intrinsically Disordered Proteins and Their Transient Interactions by LP-TEM and Computer Simulations** Huan Wang and Jia-Ye Li; Peking University, China

**8:30 AM \*CH04.05.02**

**High-Throughput *In Situ* Electron Microscopy with Self-Supervised Machine-Learning Denoising Framework** Jungwon Park; Seoul National University, Korea (the Republic of)

**9:00 AM CH04.05.03**

**Fast Tomography for 3D Characterization of Nanomaterial Dynamics in Liquid-Phase Transmission Electron Microscopy** Zhiheng Lyu<sup>1</sup>, Lehan Yao<sup>2</sup>, Carlos L. Bassani<sup>3</sup>, Xingzhi Wang<sup>1</sup>, Falon C. Kalutantirige<sup>1</sup>, Michael Engel<sup>3</sup> and Qian Chen<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

**9:15 AM CH04.05.04**

**Nanosecond Electron Microscopy of Electrically Triggered Material Dynamics** Daniel B. Durham<sup>1</sup>, Thomas Gage<sup>1</sup>, Connor Horn<sup>2</sup>, Laszlo A. Cline<sup>1,3</sup>, Yue Cao<sup>1</sup>, Xuedan Ma<sup>1</sup>, Haihua Liu<sup>1</sup>, Ilke Arslan<sup>1</sup>, Supratik Guha<sup>1,2</sup> and Charudatta Phatak<sup>1,3</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>Northwestern University, United States

**9:30 AM CH04.05.05**

**Deposition and Etching of Heterostructural Nanocrystals** Shengsong Yang, Chang Liu and A Paul Alivisatos; The University of Chicago, United States

**9:45 AM CH04.05.06**

**Scalable Atomic Fabrication in Electron Microscopy—Precise Control of Cr Atoms in CrSBr** Julian Klein<sup>1</sup>, Kevin Roccapiore<sup>2</sup> and Frances Ross<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**10:00 AM BREAK**

**10:30 AM \*CH04.05.07**

**Learning the Diffusion of Nanoparticles in Liquid Phase TEM Using a Physics-Informed Generative AI** Zain Shabeeb and Vida Jamali; Georgia Institute of Technology, United States

**11:00 AM \*CH04.05.08**

**Understanding Biases in Neural-Network-Based Analysis of TEM Data** Katherine Sytwu<sup>1</sup>, Luis E. Rangel DaCosta<sup>2</sup>, Catherine Groschner<sup>2</sup>, Min Gee Cho<sup>1</sup> and Mary Scott<sup>2,1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

**11:30 AM CH04.05.09**

**Time- and Atom-Resolved 3D Structural Reconstruction of Colloidal Nanocrystals Obtained by Time-Resolved 3D Brownian Tomography** Sungsu Kang<sup>1</sup>, Shengsong Yang<sup>1</sup>, Chang Liu<sup>1</sup>, Jungwon Park<sup>2</sup> and Paul Alivisatos<sup>1</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Seoul National University, Korea (the Republic of)

**11:45 AM CH04.05.10**

**Modification of the Atomic-Scale Structure and Electrothermal Properties of Quasi-One-Dimensional Tungsten Disulfide Nanoribbons via *In Situ* Transmission Electron Microscopy** Chih-Chen Yang<sup>1</sup>, Hsin-Ya Sung<sup>1</sup>, Li-Syuan Lu<sup>2</sup>, Yu-Chuan Lin<sup>1</sup> and Wen-Wei Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>2</sup>The Pennsylvania State University, United States

SESSION CH04.06: Advances in *In-Situ* TEM II

Session Chairs: Madeline Dukes and Andrew Minor

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 344

**1:30 PM \*CH04.06.01**

**Probing Heterogeneity in 2D van der Waals Materials via Cryogenic Scanning Transmission Electron Microscopy** Miaofang Chi<sup>1,2</sup>; <sup>1</sup>Oak Ridge

National Laboratory, United States; <sup>2</sup>Duke University, United States

**2:00 PM \*CH04.06.02**

***In Situ* 4D-STEM—The Best of Both Worlds** Andrew M. Minor<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*CH04.06.03**

**Electrically and Optically-Driven Processes in 2D Heterostructures via *In Situ* TEM** Kate Reidy, Kangan Wang, Sophia Arvin, Michael Crommie and Andrew M. Minor; University of California, Berkeley, United States

**4:00 PM CH04.06.04**

**Strained Interfaces in TEM—Unlocking Material Information Through Dynamic Diffraction Analysis** Frederik Otto, Laura Niermann, Tore Niermann and Michael Lehmann; Technische Universität Berlin, Germany

**4:15 PM CH04.06.05**

**From Acquisition to Analysis—Streamlined 5D STEM Workflows for *In Situ* Experiments** Benjamin Miller, Anahita Pakzad and Cory Czarnik; Gatan, Inc., United States

**4:30 PM CH04.06.06**

**Modifying Polycrystalline WS<sub>2</sub> via *In Situ* Transmission Electron Microscopy** Chun-Yen Fang, Chih-Yen Lin, Hsin-Ya Sung, Yu-Chuan Lin and Wen-Wei Wu; National Yang Ming Chiao Tung University, Taiwan

SESSION CH04.07: Nanocrystal Growth, Assembly and Transformation I

Session Chairs: Vida Jamali and Robert Klie

Thursday Morning, April 10, 2025

Summit, Level 3, Room 344

**8:00 AM \*CH04.07.01**

**Mechanisms for the Formation of Hierarchical Architectures** Maria Sushko; Pacific Northwest National Laboratory, United States

**8:30 AM \*CH04.07.02**

**Understanding Mechanisms of Crystal Growth and Structure-Function Relationship via *In Situ* Techniques** Dongsheng Li; Pacific Northwest National Laboratory, United States

**9:00 AM \*CH04.07.03**

**Understanding Degradation Pathways of Rutile Oxide Electrocatalysts via Liquid Phase Transmission Electron Microscopy** Ivan A. Moreno-Hernandez, S. A. Vigil and Matteo Fratarcangeli; Duke University, United States

**9:30 AM CH04.07.04**

**Atomic Insight into Ferroelectric-Antiferroelectric Transition** Yinlian Zhu<sup>1</sup> and Rujian Jiang<sup>2</sup>; <sup>1</sup>Songshan Lake Materials Laboratory, China; <sup>2</sup>Institute of Metal Research, Chinese Academy of Sciences, China

**9:45 AM BREAK**

**10:15 AM \*CH04.07.05**

**Understanding Nanoparticle Crystallization, Aggregation and Dissolution Using Advanced *In Situ* TEM Techniques** Xin Zhang, Xiaoxu Li, Lili Liu, James J. De Yoreo and Kevin Rosso; Pacific Northwest National Laboratory, United States

**10:45 AM \*CH04.07.06**

**Nucleation and Growth of Molecular Crystals Through Molecular Assembly Unveiled by *In Situ* Liquid Phase Electron Microscopy** Haimei Zheng<sup>1,2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

**11:15 AM CH04.07.07**

**Phonon Mapping of Self-Assembled Nanoparticle-Based Honeycomb Metamaterials by Liquid-Phase Electron Microscopy** [Jiahui Li](#)<sup>1</sup>, Wenting Cheng<sup>2</sup>, Lehan Yao<sup>1</sup>, Sindy Liu<sup>1</sup>, Chang Qian<sup>1</sup>, Chang Liu<sup>1</sup>, Shan Zhou<sup>1</sup>, Xiaoming Mao<sup>2</sup> and Qian Chen<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign, United States; <sup>2</sup>University of Michigan, United States

**11:30 AM CH04.07.08**

**Simultaneous Transmission Electron Microscopy and Nanocalorimetry Capturing the Thermodynamics and Kinetics of the Amorphous-to-Crystalline Transition of Phase Change Materials** [Tamara D. Koledin](#)<sup>1</sup>, Izak McGieson<sup>1</sup>, Karen Bustillo<sup>2</sup>, John Pettibone<sup>3</sup>, William Osborn<sup>3</sup>, Feng Yi<sup>3</sup>, David LaVan<sup>3</sup> and Melissa K. Santala<sup>1</sup>; <sup>1</sup>Oregon State University, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>National Institute of Standards and Technology, United States

SESSION CH04.08: Nanocrystal Growth, Assembly and Transformation II

Session Chair: Kate Reidy

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 344

**1:30 PM \*CH04.08.01**

**Atomic Scale Understanding of Cu and Cu Alloy Oxidation Using *In Situ* Environmental TEM** [Judith C. Yang](#)<sup>1,2</sup>; <sup>1</sup>Brookhaven National Laboratory, United States; <sup>2</sup>University of Pittsburgh, United States

**2:00 PM \*CH04.08.02**

**Liquid Phase Electron Microscopy at High-Spatial Resolution or Elevated Temperatures** [Robert F. Klie](#); University of Illinois at Chicago, United States

**2:30 PM BREAK**

**3:00 PM \*CH04.08.03**

**Mechanisms of Grain Boundary Dynamics and Grain Rotation in Nanocrystalline Platinum: Insights from *in situ* 4D-STEM** [Xiaoqing Pan](#); University of California, Irvine, United States

**3:30 PM \*CH04.08.04**

**From Ammonia Synthesis to Methane Conversion: Enabling Sustainable Chemical Manufacturing with Atomically-Optimized Photocatalysts** [Jennifer A. Dionne](#), Amy Siobhan McKeown-Green, Lin Yuan, Briley Bourgeois, Alan Xin Dai, Parivash Moradifar and Serin Lee; Stanford University, United States

**4:00 PM CH04.08.05**

**Incredible Fatigue Crack Initiation Resistance of Nano-Sized Nickel Single Crystal** [Kota Sugisaka](#), Yamato Ishizaka, Masataka Abe and Takashi Sumigawa; Kyoto University, Japan

**4:15 PM CH04.08.06**

**Observation of Atomic Scale Rearrangement of Ru Aggregates on N-Doped Carbon by *In Situ* Heating TEM Under Thermal Treatment Up to 400°C** [Kwang-Deog Jung](#), Kyung Rok Lee and Kwangho Park; Korea Institute of Science and Technology, Korea (the Republic of)

**4:30 PM CH04.08.07**

**Ion-Exchangeable One-Dimensional Lepidocrocite Titanate—Atomic Structure and Quantum Confinement Effects** [Fateme Karimi](#) and Robert F. Klie; University of Illinois at Chicago, United States

**4:45 PM CH04.08.08**

**Atomic-Scale Study of Polar Order Across Temperatures in Ferroelectric Oxides** [Yang Zhang](#) and Ismail El Baggari; Harvard University, United States

# SYMPOSIUM CH05

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Coherent Multidimensional Spectroscopies from the Visible to the Terahertz Range  
April 8 - April 10, 2025

Symposium Organizers

Eric Bittner, University of Houston  
Jacob Krich, University of Ottawa  
Margherita Maiuri, Politecnico di Milano  
Carlos Silva Acuña, Université de Montréal

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION CH05.01: White Light and Multi-Color Spectroscopies

Session Chairs: Eric Bittner and Carlos Silva Acuña

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 341

**10:30 AM \*CH05.01.01**

**Two-dimensional Electronic Spectroscopy with White Light: From Photosynthetic Nanotubes to Singlet Fission Dimers** Vivek Tiwari; Indian Institute of Science, India

**11:00 AM CH05.01.02**

**Mapping Vibronic Couplings in Mixed-Frequency Regimes Using Coherent Multidimensional Vibrational-Electronic Spectroscopy** Srijan Chatterjee, Caroline Loe and Munira Khalil; UNIVERSITY OF WASHINGTON, United States

**11:15 AM \*CH05.01.03**

**Femtosecond Multidimensional Multicolor Spectroscopy of Complex Systems** William Jeffries, Srijan Chatterjee and Munira Khalil; University of Washington, United States

SESSION CH05.02: Advances in Multidimensional Spectroscopy

Session Chairs: Ajay Ram Kandada and Doran Raccah

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 341

**1:30 PM \*CH05.02.01**

**Applications of Generalized Einstein Relations Between Absorption and Emission Spectra** Sarang Yeola, Aman K. Agrawal, Callum Douglass and David Jonas; University of Colorado Boulder, United States

**2:00 PM \*CH05.02.02**

**Space-Time-Resolved Spectroscopy of Multi-Particle Interactions** Tobias Brixner; Universität Würzburg, Germany

**2:30 PM BREAK**

**3:00 PM \*CH05.02.03**

**Two-Dimensional Fluorescence Excitation Spectroscopy (2D-FLEX)** Juergen Hauer; Technical University of Munich (TUM), Germany

**3:30 PM \*CH05.02.04**

**Multi-Excitation Pump-Probe Spectroscopy—Technique and Applications** Pavel Maly; Charles University, Czechia

SESSION CH05.03: Poster Session

Session Chairs: Jacob Krich, Margherita Maiuri and Carlos Silva Acuña

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**CH05.03.01**

**Examination of Photoluminescence in Rhodamine 6G Using Excited State Dynamics** William Tupa, [David R. Graupner](#) and Dmitri Kilin; North Dakota State University, United States

**CH05.03.02**

**Eliminating Incoherent Mixing Signals in Multidimensional Action Spectroscopies** [Zachary M. Fultz](#) and Martin Zanni; University of Wisconsin - Madison, United States

**CH05.03.03**

**Vibrational Quantum Beat Amplitudes Implicate Coherent Intramolecular Singlet Fission in a Series of Pentacene Dimers** [Atandrita Bhattacharyya](#), Kanad Majumder, Satish Patil and Vivek Tiwari; Indian Institute of Science, India

**CH05.03.04**

**Toward the Ultrastrong Coupling Regime with Organic Materials** [Courtney Ragle](#); Vanderbilt University, United States

**CH05.03.05**

**2D IR Spectroscopy for the Elucidation of the Effects of Stimuli on Peptide Aggregation and Self-Assembly** [Jason M. Snyder](#), Kayla Hess, Alisa Shmidt and Lauren Buchanan; Vanderbilt University, United States

**CH05.03.06**

**Spatially Resolving Energy Transfer in Thin Films of Semiconducting Carbon Nanotubes with Ultrafast 2D Microscopy** [Dasol Im](#), Zachary M. Fultz and Martin Zanni; University of Wisconsin-Madison, United States

**CH05.03.07**

**Investigating the Effects of Stimuli on the Mechanisms of Polypeptide Aggregation and Assembly** [Alisa Shmidt](#), Jason M. Snyder, Kayla Hess and Lauren Buchanan; Vanderbilt University, United States

SESSION CH05.04: Detecting Correlations in Complex Materials

Session Chairs: Tobias Brixner and Sean Roberts

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 341

**8:30 AM \*CH05.04.01**

**Field-Resolved Optical Spectroscopy and Microscopy** [Akshay Rao](#); University of Cambridge, United Kingdom

**9:00 AM \*CH05.04.02**

**Direct Visualization of Confinement and Many-Body Correlation Effects in 2D Spectroscopy of Quantum Dots** [Tonu Pullerits](#); Lund University, Sweden

**9:30 AM CH05.04.03**

**Hole Transfer Dynamics and Optoelectronic Properties in PCE10:FOIC Blends for Organic Photovoltaics** [Giuseppe Ammirati](#)<sup>1,2</sup>, Stefano Turchini<sup>1</sup>, Francesco Toschi<sup>1</sup>, Patrick O'Keeffe<sup>1</sup>, Alessandra Paladini<sup>1</sup>, Giuseppe Mattioli<sup>1</sup>, Paolo Moras<sup>1</sup>, Valeria Milotti<sup>1</sup>, Polina Sheverdyaeva<sup>1</sup>, Christoph J. Brabec<sup>3</sup>, Michael Wagner<sup>3</sup>, Iain McCulloch<sup>4</sup>, Aldo Di Carlo<sup>1,2</sup> and Daniele Catone<sup>1</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Università degli Studi di Roma Tor Vergata, Italy; <sup>3</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; <sup>4</sup>King Abdullah University of Science and Technology, Saudi Arabia

**9:45 AM BREAK**

SESSION CH05.05: Detecting Many Body Interactions and Correlations

Session Chairs: Munira Khalil and Pavel Maly

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 341

**10:15 AM \*CH05.05.01**

**Extreme Many-Body Interactions of Giant Excitons in a Rydberg Blockade** [Eric Arsenault](#), Gillian Minarik, Vinicius da Silveira Lan Avelar, Taketo Handa and Xiaoyang Zhu; Columbia University, United States

**10:45 AM \*CH05.05.02**

**Unraveling the Many-Body Physics of Polariton Condensation Through Nonlinear Spectroscopy** [Ajay Ram S. Kandada](#); Wake Forest University, United States

**11:15 AM \*CH05.05.03**

**Coherent Electron-Phonon Coupling Dynamics Sensed by Ultrafast THz Spectroscopy** [David Cooke](#); McGill University, Canada

**11:45 AM CH05.05.04**

**Lattice Phonon and Surface Ligand Contributions to Vibronic Coherences in Nanocrystal Photocatalysts** [William Jeffries](#) and Munira Khalil; U. of Washington, United States

SESSION CH05.06: Coherent Dynamics in Biological and Bio-Inspired Systems

Session Chairs: Elisabetta Collini and Jacob Krich

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 341

**2:00 PM \*CH05.06.01**

**Simulating Spectroscopy on the Mesoscale—Searching for a  $O(1)$  Algorithm** [Doran Raccach](#); The University of Texas at Austin, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*CH05.06.02**

**Exploring Pigment-Protein Interactions in *De Novo* Maquettes Using Super-Broadband Two-Dimensional Electronic Spectroscopy** Camilla Gajo, Caleb Jordan, Ross Anderson and [Tom Oliver](#); University of Bristol, United Kingdom

**4:00 PM \*CH05.06.03**

**Unraveling Coherent Dynamics in Matter by Spectroscopic and Diffractive Methods** [Hong-Guang Duan](#); Ningbo University, China

SESSION CH05.07: Singlet Fission and Optical Electronics

Session Chairs: Margherita Maiuri and Tonu Pullerits

Thursday Morning, April 10, 2025

Summit, Level 3, Room 341

**9:00 AM \*CH05.07.01**

**Tracking Energy Transport Within Photon Conversion Systems** [Sean T. Roberts](#); The University of Texas at Austin, United States

**9:30 AM CH05.07.02**

**Singlet Fission in a Contorted Naphthalenediimide Dimer Proceeds Through a Coherently Coupled Triplet Pair State** [Sanjoy Patra](#)<sup>1</sup>, Ch. Mudasar Hussain<sup>2</sup>, Vijay Singh<sup>2</sup>, Pritam Mukhopadhyay<sup>2</sup> and Vivek Tiwari<sup>1</sup>; <sup>1</sup>Indian Institute of Science (IISc), India; <sup>2</sup>Jawaharlal Nehru University, New Delhi, India

**9:45 AM BREAK**

**10:15 AM \*CH05.07.03**

**Ultrafast Dynamics of Colloidal Plexcitonic Nanohybrids Studied by 2D Electronic Spectroscopy** Federico Toffoletti and [Elisabetta Collini](#); University of Padova, Italy

**10:45 AM \*CH05.07.04**

**Coherent Electronic Spectroscopy of Mid-IR Bandgap Materials** [Minhaeng Cho](#)<sup>1,2</sup>; <sup>1</sup>IBS Center for Molecular Spectroscopy and Dynamics, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**11:15 AM CH05.07.05**

**Coherent Infrared Hyper-Raman Four Wave Mixing Spectroscopy—A Probe of Vibronic Coupling and Non-Condon Effects** [Ryan P. McDonnell](#), Daniel D. Kohler and John C. Wright; University of Wisconsin, United States

# SYMPOSIUM EL01

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Emerging Solution-Processable Nanomaterials for Optoelectronics and Photonics  
April 7 - April 11, 2025

Symposium Organizers

Namyong Ahn, Yonsei University  
Pieter Geiregat, Ghent Univ  
Wanyi Nie, SUNY University at Buffalo  
Valerio Pinchetti, Los Alamos National Laboratory

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL01.01: NIR Emitters/Polymer Nanocomposite Solutions for Solar Energy

Session Chairs: Namyong Ahn, Pieter Geiregat, Wanyi Nie and Valerio Pinchetti

Monday Afternoon, April 7, 2025  
Summit, Level 4, Room 427

**1:30 PM \*EL01.01.01**

**INDUSTRY TRACK: Optimizing Sunlight With Quantum Dots** [Hunter McDaniel](#); UbiQD, Inc., United States

**2:00 PM EL01.01.02**

**Durable Quantum Dot-Based Luminescent Solar Concentrators Enabled by a Photoactive Block Copolymer** [Raimon Terricabres Polo](#), Thomas A. de Bruin, Annanta Kaul, Wilfried G.J.H.M. van Sark and Celso de Mello Donega; Utrecht University, Netherlands

**2:15 PM EL01.01.03**

**Tailoring Anisotropies in NIR-Plasmonic Semiconductor Nanocrystals** [Jongwook Kim](#); École Polytechnique, France

**2:30 PM EL01.01.04**

**Eco-Friendly, High-Performance Short Wave Infrared (SWIR) Quantum Dot Emitters** [Avijit Saha](#) and Vladimir Lesnyak; Technische Universität Dresden, Germany

**2:45 PM EL01.01.05**

**Improving Nanoparticle Dispersion in Organic-Inorganic Nanocomposite Blends via Low-Temperature Processing** [Rachel Kilbride](#)<sup>1</sup>, Michael Weir<sup>2</sup>, Oleksandr Mykhaylyk<sup>1</sup>, Richard Jones<sup>3</sup>, Anthony Ryan<sup>1</sup> and Daniel Toolan<sup>3</sup>; <sup>1</sup>University of Sheffield, United Kingdom; <sup>2</sup>The University of Nottingham, United Kingdom; <sup>3</sup>The University of Manchester, United Kingdom

**3:00 PM BREAK**

SESSION EL01.02: Quantum Dot-Based NIR Photodetectors

Session Chairs: Valerio Pinchetti and Ivo Tanghe

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 427

**3:30 PM \*EL01.02.01**

**INDUSTRY TRACK: Where Are the Traps? In-Depth Characterization of QD-Based Photodetectors for SWIR Imaging** [Maria Isabel Pintor Monroy](#)<sup>1</sup>, Arman U. Zaman<sup>1</sup>, Marina Vildanova<sup>1</sup>, Myung Jin Lim<sup>1</sup>, Abu Bakar Siddik<sup>1,2</sup>, Wenya Song<sup>1</sup>, Itai Lieberman<sup>1</sup> and Pawel E. Malinowski<sup>1</sup>; <sup>1</sup>imec, Belgium; <sup>2</sup>KU Leuven, Belgium

**4:00 PM \*EL01.02.02**

**PbI<sub>2</sub> Passivation of 3D PbS Quantum Dot Superlattices Towards Optoelectronic Metamaterials** [Maria Antonietta Loi](#); University of Groningen, Netherlands

**4:30 PM EL01.02.03**

**Mid-Wave Infrared Photodetectors Based on HgTe Colloidal Quantum Dots** [Galih R. Suwito](#), Khursand Yorov, Ivonne Medina-Salazar, Lutfan Sinatra, Marat Lutfullin and Alexander Bessonov; Quantum Solutions, Innovation Quarter, Oxford Technology Park, United Kingdom

**4:45 PM EL01.02.04**

**Infrared Colloidal Quantum Dot Imagers** [Ayaskanta Sahu](#); New York University, United States

SESSION EL01.03: LEDs and Lasers

Session Chairs: Namyoun Ahn and Jongchan Kim

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 427

**10:30 AM \*EL01.03.01**

**Fast, Bright OLEDs Enable an Electrically Driven Polymer Laser** Kou Yoshida<sup>1</sup>, Junyi Gong<sup>1</sup>, Alexander Kanibolotsky<sup>2</sup>, Peter Skabara<sup>2</sup>, Graham A. Turnbull<sup>1</sup> and Ifor Samuel<sup>1</sup>; <sup>1</sup>University of St Andrews, United Kingdom; <sup>2</sup>University of Glasgow, United Kingdom

**11:00 AM \*EL01.03.02**

**Aggregation-Shape Effects of ASE in Perovskite Nanoparticles** Bin Hu; South China University of Technology, China

**11:30 AM EL01.03.03**

**Solution-processed polariton microcavities: A novel platform to study organic optoelectronics through strong light-matter coupling** Hassan Ali Qureshi, Michael Papachatzakis, Ahmed G. Abdelmagid, Mikko Sälomäki, Ermei Mäkilä, Olli Siltanen and Konstantinos Daskalakis; University of Turku, Finland

**11:45 AM EL01.03.04**

**Synthesis, Charge Transport and Photophysical Properties of Novel Disubstituted Silylethyne Acenes** John Anthony and Karl Thorley; University of Kentucky, United States

SESSION EL01.04: Quantum Dot Synthesis and Surface Chemistry

Session Chairs: Wanyi Nie and Ivo Tanghe

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 427

**1:45 PM \*EL01.04.01**

**From Molecular Inks to Colloidal Tin Halide Perovskite Nanostructures** Loredana Protesescu; University of Groningen, Netherlands

**2:15 PM EL01.04.03**

**Thermodynamically Stable Structures of Bare and Ligand-Capped CsPbBr<sub>3</sub> Quantum Dots** Andriy Stelmakh<sup>1,2</sup>, Ihor Cherniukh<sup>1,2</sup>, Kseniia Shcherbak<sup>1,2</sup>, Andriy Baumketner<sup>3</sup> and Maksym V. Kovalenko<sup>1,2</sup>; <sup>1</sup>ETH Zürich, Switzerland; <sup>2</sup>Empa – Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>3</sup>Institute for Condensed Matter Physics, NAS of Ukraine, Ukraine

**2:30 PM EL01.04.04**

**Heterostructure Design of Zn Chalcogenide Shell on Ga-rich In<sub>1-x</sub>Ga<sub>x</sub>As Quantum Dots** Jun Hyuk Chang and Dmitri V. Talapin; The University of Chicago, United States

**2:45 PM EL01.04.05**

**Effect of Z-Type Metal Halide Ligand Exchanges on Photoluminescence Quantum Yields in Quantum Dots** Chenqi Fan<sup>1</sup>, Amanda Brewer<sup>1,2</sup>, Minhal Hasham<sup>1</sup> and Paul Alivisatos<sup>1</sup>; <sup>1</sup>The University of Chicago, United States; <sup>2</sup>University of California, Berkeley, United States

**3:00 PM BREAK**

SESSION EL01.05: Photonic Integrated Circuits

Session Chairs: Namyoung Ahn and Ivo Tanghe

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 427

**3:30 PM \*EL01.05.01**

**Photonic ICs with Photodetectors and Light Sources Based on Colloidal Quantum Dots—From Building Blocks to Advanced Demonstrators** Dries Van Thourhout<sup>1,2</sup>, Chao Pang<sup>1,2</sup>, Korneel Molken<sup>1</sup>, Ivo Tanghe<sup>1,2</sup>, Yuhao Deng<sup>1</sup>, Pieter Geiregat<sup>1</sup> and Zeger Hens<sup>1</sup>; <sup>1</sup>Ghent University, Belgium; <sup>2</sup>IMEC, Belgium

**4:00 PM EL01.05.02**

**Shaping the Photoluminescence of Infrared-Emitting Nanocrystals Through Their Coupling to Photonic Structures** Erwan Bossavit<sup>1,2</sup>, Oleksandra Yeromina<sup>3</sup>, Lina Makke<sup>4</sup>, Yoann Prado<sup>2</sup>, Mathieu Silly<sup>1</sup>, Sandrine Ithurria<sup>4</sup>, Peter Reiss<sup>3</sup> and Emmanuel Lhuillier<sup>2</sup>; <sup>1</sup>SOLEIL Synchrotron, France; <sup>2</sup>Sorbonne Université, CNRS, Institut des NanoSciences de Paris, INSP, France; <sup>3</sup>Université Grenoble Alpes, CEA, CNRS, IRIG, SyMMES, France; <sup>4</sup>Laboratoire de Physique et d'Etude des Matériaux, ESPCI, PSL Research University, Sorbonne Université, CNRS, France

**4:15 PM EL01.05.03**

**Efficient Single-Photon Emission from Buried Perovskite Quantum Dots in Wide-Bandgap Perovskite Thin Films** Hao Zhang<sup>1</sup>, Altaf Pasha<sup>2</sup>, Isaac Metcalf<sup>1</sup>, Philippe Tamarat<sup>3</sup>, Brahim Lounis<sup>3</sup>, Sandhya Susarla<sup>4</sup>, Xuedan Ma<sup>5</sup>, Jacky Even<sup>6</sup> and Aditya D. Mohite<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Jain University, India; <sup>3</sup>Université de Bordeaux, France; <sup>4</sup>Arizona State University, United States; <sup>5</sup>Argonne National Laboratory, United States; <sup>6</sup>Université de Rennes, France

**4:30 PM EL01.05.04**

**Near IR Organic Photodetectors with Plasmonic Nanogap Coplanar Electrodes for Integrated Photonic Circuit** Danbi Kim<sup>1,2</sup>, Jae Hoon Han<sup>1</sup>, Changsoo Choi<sup>1</sup>, Jeong Ho Cho<sup>2</sup> and Jung Ah Lim<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Yonsei University, Korea (the Republic of)

SESSION EL01.06: Poster Session I

Session Chairs: Namyong Ahn, Pieter Geiregat, Wanyi Nie and Valerio Pinchetti

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL01.06.01**

**Organic Polaritons for Angle-Independent Narrowband Microcavity Photodiodes** Ahmed G. Abdelmagid<sup>1</sup>, Zhuoran Qiao<sup>2</sup>, Boudewijn Coenegracht<sup>1,3</sup>, Gaon Yu<sup>1</sup>, Thomas D. Anthopoulos<sup>4,5</sup>, Nicola Gasparini<sup>2</sup> and Konstantinos Daskalakis<sup>1</sup>; <sup>1</sup>University of Turku, Finland; <sup>2</sup>Imperial College London, United Kingdom; <sup>3</sup>Technische Universiteit Eindhoven, Netherlands; <sup>4</sup>The University of Manchester, United Kingdom; <sup>5</sup>King Abdullah University of Science and Technology, Saudi Arabia

**EL01.06.02**

**Synthesis of Anisotropic Wurtzite Copper Indium Sulfide Nanocrystals** Aoife Kavanagh and Yurii K. Gun'ko; Trinity College Dublin, Ireland

**EL01.06.03**

**Development of New Appreciably Water-Soluble Materials for Designing Optical and Electrochemical Biosensors** Phuong-Truc T. Pham<sup>1</sup>, Samar M. Al Rifai<sup>2</sup>, Sarah H. Younas<sup>2</sup>, Rajwah Y. Al Ohaly<sup>2</sup>, Jumana Idris<sup>2</sup>, Juri A. Al Bussaili<sup>2</sup>, Ahlem H. Teniou<sup>2</sup>, Mohammed H. Zourob<sup>2</sup> and Mamoun M. Bader<sup>2</sup>; <sup>1</sup>Penn State Scranton, United States; <sup>2</sup>Alfaisal University, Saudi Arabia

**EL01.06.04**

**Advanced SERS Sensor with Horizontally Aligned Sub-5 nm Silicon Nanowires and High-Density Silver Nanoparticles for Ultra-Sensitive Molecular Analysis** Peiyun Feng<sup>1</sup>, Juyeon Seo<sup>1</sup>, Jianlin Li<sup>1</sup>, Hyunyoung Jung<sup>2</sup> and Yung Joon Jung<sup>1</sup>; <sup>1</sup>Northeastern University, United States; <sup>2</sup>Gyeongsang National University, Korea (the Republic of)

**EL01.06.05**

**Synthesis of Durable SiO<sub>2</sub> Nanoparticle Coatings for Self-Cleaning Solar Panel Surfaces** Pratima Parajuli, Christopher Pung and Lihong H. Jiao; Grand Valley State University, United States

**EL01.06.06**

**Surface Chemistry for the Generation of Luminescent Silver Nanodots** Junhua Yu; Seoul National University, Korea (the Republic of)

**EL01.06.07**

**A Novel Pixel Design and Process Architecture to Minimize Blooming and Dark Current in a Photodiode by TCAD Simulation** Jeong H. Joon and Bo S. Kim; Korea University, Korea (the Republic of)

**EL01.06.08**

**On-device Data Encryption in Visible Light Communication of Quantum Dot Permeable Electrode Light-Emitting Triodes** [Seungmin Shin](#)<sup>1</sup>, Kyung-geun Lim<sup>2</sup> and Himchan Cho<sup>1,1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Research Institute of Standards and Science, Korea (the Republic of)

**EL01.06.09**

**Heralded Generation of Correlated Photon Pairs from CdS/CdSe/CdS Quantum Shells** [Sean Smith](#)<sup>1</sup>, Andrew Marder<sup>1</sup>, James Cassidy<sup>2</sup>, Dulanjan Harankahage<sup>2</sup>, Zhongjian Hu<sup>3</sup>, Steve M. Savoy<sup>3</sup>, George C. Schatz<sup>4</sup>, Mikhail Zamkov<sup>2</sup> and Anton Malko<sup>1</sup>; <sup>1</sup>The University of Texas at Dallas, United States; <sup>2</sup>Bowling Green University, United States; <sup>3</sup>Nanohmics Inc, United States; <sup>4</sup>Northwestern University, United States

**EL01.06.10**

**Seedless Synthesis of Colloidal III-V Quantum Dots for Infrared Non-Invasive Biomonitoring** [Beom Kwan Kim](#)<sup>1,2</sup> and Seungjin Jee<sup>1</sup>; <sup>1</sup>Korea University, Korea (the Republic of); <sup>2</sup>Korea Research Institute of Standards and Science, Korea (the Republic of)

**EL01.06.11**

**Fast Extended Shortwave Infrared Photodetector Using Silver Telluride Colloidal Quantum Dots** [Yongnam Ahn](#), So Young Eom, Gahyeon Kim, Jin Hyeok Lee, Beom Kwan Kim, Dongeon Kim, Min-Jae Si, Minjung Yang, Bo Seon Kim, Yoon Jang Chung, Kwang Seob Jeong and Se-Woong Baek; Korea University, Korea (the Republic of)

**EL01.06.12**

**Deep Blue Emission from Pure Bromide-Based Colloidal Perovskite Nanocrystals** [Su Hwan Lee](#), Serim Cho, Bongjun Yeom and Young-Hoon Kim; Hanyang University, Korea (the Republic of)

**EL01.06.13**

**Enhancing Inter-Domain Connectivity by Reducing Fractal Dimension—The Key to Passivating Deep Traps in Organic Photovoltaics** [Yuang Fu](#)<sup>1</sup>, Yuhao Li<sup>2,3</sup>, Luhang Xu<sup>1</sup>, Guilong Cai<sup>4</sup>, Yubin Ke<sup>2,3</sup>, Man-Chung Tang<sup>5</sup>, Xiaowei Zhan<sup>6</sup> and Xinhui Lu<sup>1</sup>; <sup>1</sup>The Chinese University of Hong Kong, Hong Kong; <sup>2</sup>Spallation Neutron Source Science Centre, China; <sup>3</sup>Institute of High Energy Physics, Chinese Academy of Sciences, China; <sup>4</sup>Beijing Key Laboratory of Ionic Liquids Clean Process, Institute of Process Engineering, Chinese Academy of Sciences, China; <sup>5</sup>Tsinghua Shenzhen International Graduate School, Tsinghua University, China; <sup>6</sup>Peking University, China

**EL01.06.14**

**Colloidal Semiconductor Quantum Shells for Solution-Processed Laser Applications** [Amelia Waters](#), Dulanjan Harankahage, Divesh Nazar, Jiamin Huang and Mikhail Zamkov; Bowling Green State University, United States

**EL01.06.15**

**Amino Acids Derived Carbon Quantum Dots for Antipathogenic Purpose** [Jorge Torres](#)<sup>1</sup>, Mehtap Sahiner<sup>2</sup>, Seli S. Suner<sup>2</sup> and Nurettin Sahiner<sup>1,2</sup>; <sup>1</sup>Florida Gulf Coast University, United States; <sup>2</sup>Canakkale Onsekiz Mart University, Turkey

**EL01.06.16**

**Synthesis of the Elusive Cadmium Oxyorthosilicate, Cd<sub>3</sub>SiO<sub>5</sub>: From Unwanted Impurity to Promising Phosphor Matrix** Elena I. Santos and [Flavio M. Vichi](#); University of Sao Paulo, Brazil

**EL01.06.17**

**Probing Solid-State Conformation of Polythiophenes using Transmission SANS** [Kundu Thapa](#)<sup>1</sup>, Zhiqiang Cao<sup>2</sup>, Changwoo Do<sup>2</sup>, Lilin He<sup>2</sup>, William Heller<sup>2</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**EL01.06.18**

**Broadband Electroluminescence Based on Copper Halides** [Dingshuo Zhang](#), Xingliang Dai and Zhizhen Ye; Zhejiang University, China

SESSION EL01.07: Charge Transport

Session Chairs: Namyong Ahn and Valerio Pinchetti

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 427

8:30 AM \*EL01.07.01



**Charge Transport Physics of Hybrid Perovskite Semiconductor** Henning Sirringhaus; Cambridge University, United Kingdom

**9:00 AM \*EL01.07.02**

**Simulation-Guided Design of High-Performance, Low-Cost Organic Transistors** Oana D. Jurchescu; Wake Forest University, United States

**9:30 AM EL01.07.03**

**Designing Robust Quasi-2D Perovskites Thin Films for Stable Light-Emitting Applications** Sharmistha Khan<sup>1</sup>, Reshna Shrestha<sup>1</sup>, Mengru Jin<sup>2</sup>, Doyun Kim<sup>2</sup>, Guan-Lin Chen<sup>3</sup>, Yijia Gu<sup>4</sup>, Qing Tu<sup>2</sup>, Namyong Ahn<sup>5</sup> and Wanyi Nie<sup>1</sup>; <sup>1</sup>University at Buffalo, The State University of New York, United States; <sup>2</sup>Texas A&M University, United States; <sup>3</sup>National Taiwan University, Taiwan; <sup>4</sup>Missouri University of Science and Technology, United States; <sup>5</sup>Yonsei University, Korea (the Republic of)

**9:45 AM EL01.07.04**

**Langmuir-Blodgett Deposition of 2D PbS Quantum Dot Superlattice** Jacopo Pinna<sup>1</sup>, Alexandru Mednicov<sup>1</sup>, Razieh Mehrabi Koushki<sup>1</sup>, Majid Ahmadi<sup>1</sup>, Jose Ruiz Franco<sup>1,2</sup>, Andrea Giuntoli<sup>1</sup>, Bart J. Kooi<sup>1</sup>, Giuseppe Portale<sup>1</sup> and Maria Antonietta Loi<sup>1</sup>; <sup>1</sup>University of Groningen, Netherlands; <sup>2</sup>Universitat de Barcelona, Spain

**10:00 AM BREAK**

SESSION EL01.08: Light Amplification and Lasing

Session Chairs: Pieter Geiregat and Maria Antonietta Loi

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 427

**10:30 AM \*EL01.08.01**

**Liquid Semiconductor Lasers and Laser Diodes Based on Colloidal Quantum Dots** Victor I. Klimov; Los Alamos National Laboratory, United States

**11:00 AM EL01.08.02**

**Amplified Spontaneous Emission from Polyexciton States in Colloidal CdSe Nanoplatelets** Richard D. Schaller<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Northwestern University, United States

**11:15 AM EL01.08.03**

**Extending and Understanding the Optical Gain of Bulk Nanocrystals from Green to Red** Servet A. Cayan<sup>1,1</sup>, Ivo Tanghe<sup>1,1</sup>, Margarita Samoli<sup>1</sup>, Dobromil Respekta<sup>1</sup>, Isabella Wagner<sup>2,3</sup>, Chao-Yang Lin<sup>3,4</sup>, Ali Hossain Khan<sup>5</sup>, Justin Hodgkiss<sup>2,3</sup>, Kai Chen<sup>3,4,6</sup>, Dries Van Thourhout<sup>1,1</sup>, Iwan Moreels<sup>1</sup>, Zeger Hens<sup>1</sup> and Pieter Geiregat<sup>1,1</sup>; <sup>1</sup>Ghent University, Belgium; <sup>2</sup>Victoria University of Wellington, New Zealand; <sup>3</sup>MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand; <sup>4</sup>Robinson Research Institute, Victoria University of Wellington, New Zealand; <sup>5</sup>S. N. Bose National Centre for Basic Sciences, India; <sup>6</sup>University of Otago, New Zealand

**11:30 AM EL01.08.04**

**Sub-Bandgap Lasing in Colloidal Quantum Dots Due to Auger-Assisted Stimulated Emission** Clement Livache<sup>1,2</sup>, Valerio Pinchetti<sup>2</sup>, Namyong Ahn<sup>2</sup>, Young-Shin Park<sup>2</sup>, Jun Du<sup>2</sup> and Victor I. Klimov<sup>2</sup>; <sup>1</sup>École Polytechnique, France; <sup>2</sup>Los Alamos National Laboratory, United States

**11:45 AM EL01.08.05**

**Unraveling the Nature of Lasing Emission from Hybrid Silicon Nitride and Colloidal Nanocrystal Low Refractive Index Photonic Crystals** Ivo Tanghe<sup>1</sup>, Tom Vandekerckhove<sup>1</sup>, Margarita Samoli<sup>1</sup>, Amelia Waters<sup>2</sup>, Dulanjan Harankahage<sup>2</sup>, Mikhail Zamkov<sup>2</sup>, Zeger Hens<sup>1</sup>, Christian Seassal<sup>3</sup>, Hai Son Nguyen<sup>3</sup>, Dries Van Thourhout<sup>1</sup> and Pieter Geiregat<sup>1</sup>; <sup>1</sup>University Ghent, Belgium; <sup>2</sup>Bowling Green University, United States; <sup>3</sup>Ecole Centrale De Lyon, France

SESSION EL01.09: SWIR Detectors

Session Chairs: Emmanuel Lhuillier and Ifor Samuel

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 427

**2:00 PM EL01.09.01**

**Noise Reduction Based on Experimental Investigation of Barrier Energy and Structural Innovation with Multijunction Photoactive Layer for Efficient Organic Photodetector** Woongsik Jang and Dong Hwan Wang; Chung-Ang University, Korea (the Republic of)

**2:15 PM EL01.09.02**

**Reduction of High Dark Currents in Organic SWIR Photodetectors Using Novel Solution-Processable Narrow Bandgap Donors** Tyler Davidson-Hall<sup>1</sup>, Nathan Yee<sup>1</sup>, Barbara Y. Martin<sup>1</sup>, Salima Alem<sup>1</sup>, Jianying Ouyang<sup>1</sup>, Philippe Berrouard<sup>2</sup>, Jianping Lu<sup>1</sup> and Neil Graddage<sup>1</sup>; <sup>1</sup>National Research Council Canada, Canada; <sup>2</sup>Brilliant Matters, Canada

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EL01.10: Innovative Devices and Materials

Session Chairs: Namyong Ahn and Wanyi Nie

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 427

**3:30 PM \*EL01.10.01**

**Microsized Optical Spectrometers and Polarimeter Enabled by Organic Photodetectors** Ni Zhao, Xie He, Yuanzhe Li and Shih-Chi Chen; Chinese University of Hong Kong, Hong Kong

**4:00 PM EL01.10.02**

**Photon Avalanching Nanocrystals with Intrinsic Optical Bistability** Artiom Skripka and Emory Chan; Lawrence Berkeley National Laboratory, United States

**4:15 PM EL01.10.03**

**Exploring Zintl-Phase Quantum Dots for Optoelectronic Applications** Matthew Hautzinger and Sage Bauers; National Renewable Energy Laboratory, United States

**4:30 PM EL01.10.04**

**Neuromorphic Color Vision Systems Enabled by Bandgap-Engineered Metal-Oxide Homostructure Synapses** Eunchong Ju<sup>1</sup>, Dong Hwan Byeon<sup>1</sup>, Jongmin Lee<sup>1</sup>, Yong-Hoon Kim<sup>2</sup>, Sung Woon Cho<sup>3</sup> and Sung Kyu Park<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of); <sup>3</sup>Sunchon National University, Korea (the Republic of)

**4:45 PM EL01.10.05**

**Structure-Property Relationships in Triple-Cation Sn-Based Perovskites for High-Mobility Field-Effect Transistors** Stefano Pecorario, Xin Chen, Rozana Mazlumian, Youcheng Zhang, Ian Jacobs, Milos Dubajic and Henning Sirringhaus; University of Cambridge, United Kingdom

SESSION EL01.11: Poster Session II

Session Chairs: Namyong Ahn, Pieter Geiregat, Wanyi Nie and Valerio Pinchetti

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL01.11.01**

**Spectroscopic, Morphological and Charge Carrier Storage Between a Conjugated Polymer and Its Incorporated Synthetic Monomer in Solution Processed Thin Film Field-Effect Transistors and Capacitors** Chen Chi, Yuqi Song, Art Bragg and Howard Katz; Johns Hopkins University, United States

**EL01.11.02**

**Band-Gap Engineered Ag-Doped Zinc Oxide Nanoparticles Enabled UV-Sensitive Thin-Film Transistor** Sehyun Park, U Jeong Yang, Woosung Choi

and Vladimir Tsukruk; Georgia Institute of Technology, United States

#### EL01.11.03

**Near-Infrared Absorbing/Emitting Nanoparticles-Based 3D Data Platform** [Sohyung Kim](#), Suyeon Kim, Sung Hyun Park and Joonseok Lee; Hanyang University, Korea (the Republic of)

#### EL01.11.04

**Solution-Processed Self-Isolated C8-BTBT Coated Tungsten Diselenide Phototransistors for Enhanced UV Photosensitivity** Jaewan Park, June Kyun Park, Younghoon Lee and [Seongin Hong](#); Gachon University, Korea (the Republic of)

#### EL01.11.05

**Colloidal Quantum Dot Microlasers** [Tung H. Dang](#), Donghyo Hahm, Changjo Kim, Valerio Pinchetti and Victor I. Klimov; Los Alamos National Laboratory, United States

#### EL01.11.06

**Improved Photoluminescence Signals of Thiazole Orange by Embedded Implanted Silver Nanoparticles** [Shahid Iqbal](#)<sup>1</sup>, Asghar Kayani<sup>2</sup>, Griffin Wierzba<sup>1</sup>, Spencer Sivertson<sup>1</sup> and Shivi Saxena<sup>2</sup>; <sup>1</sup>University of Wisconsin-La Crosse, United States; <sup>2</sup>Western Michigan University, United States

#### EL01.11.07

**Morphology Evolution Strategy for Efficient Energy Harvesting and Light Signal Detection in Organic Electronic Devices** [Minsoo Kim](#), Woongsik Jang and Dong Hwan Wang; Chung-Ang University, Korea (the Republic of)

#### EL01.11.08

**Non-Destructive Steady-State and Time-Resolved Photoluminescence Characterization of Photovoltaic Devices** [Christian Oelsner](#); PicoQuant GmbH, Germany

#### EL01.11.09

**Ultraviolet Light Protection in Human Pupillary Response Emulation by Using Crystalline Self-Assembled Monolayer in Synaptic Transistors** [Ya Shuan Wu](#)<sup>1</sup>, Yan-Cheng Lin<sup>2</sup> and Wen-Chang Chen<sup>1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>National Cheng Kung University, Taiwan

#### EL01.11.10

**Optoelectronic Properties Based on Cu Contact InSe Nanowires** [Wan-Chen Tsai](#) and Chiu-Yen Wang; National Taiwan University of Science and Technology, Taiwan

#### EL01.11.11

**Perovskite Nanoclusters of Icosahedral Symmetry** [Igor Dmytruk](#)<sup>1</sup>, Andriy Dmytruk<sup>2</sup>, Nataliya Berezovska<sup>1</sup> and Rodion Belosludov<sup>3</sup>; <sup>1</sup>Taras Shevchenko National University of Kyiv, Ukraine; <sup>2</sup>Institute of Physics, National Academy of Sciences of Ukraine, Ukraine; <sup>3</sup>Institute for Materials Research, Tohoku University, 2 Chome-1-1 Katahira, Japan

#### EL01.11.12

**CdHgSe Quantum Shells for Enhanced Near-Infrared Emission** [Divesh Nazar](#), Dulanjan Harankahage and Mikhail Zamkov; Bowling Green State University, United States

#### EL01.11.13

**Utilizing Impedance Spectroscopy to Optimize the Fabrication of Semitransparent Agrivoltaics** [Angelo G. Vicini](#), Kathleen Meehan and Monica So; California State University, Chico, United States

#### EL01.11.14

**Chemically Driven Sintering of Colloidal Nanocrystals for Building Functional Devices from the Bottom Up** [Tianshuo Zhao](#)<sup>1,2</sup>, Jun Xu<sup>2</sup>, Cherie R. Kagan<sup>2</sup> and Zhixuan Zhao<sup>1</sup>; <sup>1</sup>The University of Hong Kong, Hong Kong; <sup>2</sup>University of Pennsylvania, United States

#### EL01.11.15

**High Efficiency Upconversion Photoluminescence Properties of Nitrogen Doped Graphene Quantum Dots for Biomedical Applications** [Muhammad Shehzad Sultan](#)<sup>1</sup>, Wojciech Jadwisienczak<sup>2</sup>, Brad R. Weiner<sup>3</sup> and Gerardo Morell<sup>1</sup>; <sup>1</sup>University of Puerto Rico at Río Piedras, United States; <sup>2</sup>Ohio University, United States; <sup>3</sup>University of Puerto Rico - Río Piedras, United States

#### EL01.11.16

**Advancing Efficiency of Organic Solar Cells with ZnO Quantum Dots as Electron-Extraction Component** [Abdus Saboor](#)<sup>1,2</sup>, Chao Liu<sup>2</sup>, Oleksandr

Stroyuk<sup>2</sup>, Oleksandra Raievska<sup>2</sup>, Jens Hauch<sup>1,2</sup> and Christoph J. Brabec<sup>1,2</sup>; <sup>1</sup>University of Erlangen-Nuremberg, Germany; <sup>2</sup>Helmholtz-Institut Erlangen-Nürnberg für Erneuerbare Energien (HI ERN) Hauptsitz, Germany

**EL01.11.17**

**Mechanocoalescing Assembly of CsPbBr<sub>3</sub> Perovskite Nanoparticles for Enhanced Optoelectronic Performance** [Karthika Vijayan](#)<sup>1,2</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan

**EL01.11.18**

**An Inorganic/Organic Molecular Hybrid Material for Fully Solution-Processed Photonic Crystals** [Mehul Dhoot](#)<sup>1</sup>, Victoria Quirós-Cordero<sup>2,1</sup> and Natalie Stingelin<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>Columbia University, United States

SESSION EL01.12: Spin and Non-Linear Optical Properties

Session Chairs: Hilmi Volkan Demir and Valerio Pinchetti

Thursday Morning, April 10, 2025

Summit, Level 4, Room 427

**8:30 AM \*EL01.12.01**

**Controlling Light and Spin Through Chiral Organic-Inorganic Hybrid Semiconductors** [Mengxia Liu](#); Yale University, United States

**9:00 AM \*EL01.12.02**

**Novel Chiroptical Probes to Track Spin and Light Polarization in Space and Time in Emerging Semiconductors** [Sascha Feldmann](#); École Polytechnique Fédérale de Lausanne, Switzerland

**9:30 AM EL01.12.03**

**Spin-Exchange Carrier Multiplication in Manganese-Doped Inverted Core/Shell CdSe/HgSe Quantum Dots** [Jungchul Noh](#), Clement Livache, Donghyo Hahm, Valerio Pinchetti, Ho Jin, Changjo Kim and Victor I. Klimov; Los Alamos National Laboratory, United States

**9:45 AM EL01.12.04**

**Revealing Long Dephasing Time Properties on CdSe/ZnSe Strain-Graded Quantum Dots with Multidimensional Optical Nonlinear Spectroscopy** [Lucas B. Melo](#)<sup>1</sup>, Jonathan Cotrino Lemus<sup>1</sup>, Jeong W. Park<sup>2</sup>, Diogo B. Almeida<sup>3</sup>, Wan Ki Bae<sup>2</sup> and Lazaro Padilha<sup>1</sup>; <sup>1</sup>Universidade Estadual de Campinas, Brazil; <sup>2</sup>Sungkyunkwan University, Korea (the Republic of); <sup>3</sup>Universidade Federal do ABC, Brazil

**10:00 AM BREAK**

SESSION EL01.13: Nanoplatelets

Session Chairs: Clement Livache and Wanyi Nie

Thursday Morning, April 10, 2025

Summit, Level 4, Room 427

**10:30 AM \*EL01.13.01**

**Emerging Nanocrystal Optoelectronics of Colloidal Quantum Wells** [Hilmi Volkan Demir](#)<sup>1,2</sup>; <sup>1</sup>NTU Singapore - Nanyang Technological University, Singapore; <sup>2</sup>Bilkent University, Turkey

**11:00 AM EL01.13.02**

**Blue-Emitting 2D CsPbBr<sub>3</sub> Nanoplatelets with Enhanced Quantum Yield and Stability via Dual-Ligand Surface Modification for Lighting and Display Technologies** [Naresh Varnakavi](#), John Leo Velpugonda, Matthew Yerich and Lih Y Lin; University of Washington, United States

**11:15 AM EL01.13.03**

**Tailoring Band Edge Photoluminescence in CdSe Nanoplatelets** [Maurizio Riesner](#)<sup>1</sup>, Farzan Shabani<sup>2</sup>, Levin Zeylmans van Emmichoven<sup>1</sup>, Julian Klein<sup>1</sup>, Savas Delikanli<sup>2,3</sup>, Rachel Fainblat<sup>1</sup>, Hilmi Volkan Demir<sup>2,3</sup> and Gerd Bacher<sup>1</sup>; <sup>1</sup>Universität Duisburg-Essen, Germany; <sup>2</sup>Bilkent University, Turkey; <sup>3</sup>Nanyang Technological University, Singapore

**11:30 AM EL01.13.04**

**Multimodal Imaging of Semiconductor Nanocrystal Deformation Trajectories at Atomic Resolution with Liquid-Phase Transmission Electron Microscopy** [Chang Liu](#)<sup>1</sup>, Tommy Lin<sup>2</sup>, Woonhyuk Baik<sup>1</sup>, Arashdeep Thind<sup>3</sup>, Robert F. Klie<sup>3</sup>, Eran Rabani<sup>2</sup> and Paul Alivisatos<sup>1</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>University of California, Berkeley, United States; <sup>3</sup>University of Illinois at Chicago, United States

SESSION EL01.14: Infrared Photodetectors

Session Chairs: Wanyi Nie and Ivo Tanghe

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 427

**1:30 PM \*EL01.14.01**

**Understanding Thermal Stability of Organic Photodetectors** [Thuc-Quyen Nguyen](#); University of California, Santa Barbara, United States

**2:00 PM \*EL01.14.02**

**Active Photonics from Nanocrystal Based Devices** [Emmanuel Lhuillier](#)<sup>1,2</sup>, Tung H. Dang<sup>3</sup> and Angela Vasanelli<sup>4</sup>; <sup>1</sup>CNRS, France; <sup>2</sup>Sorbonne Université, France; <sup>3</sup>Ecole normale supérieure de Paris, France; <sup>4</sup>Université Paris Cité, France

**2:30 PM EL01.14.03**

**Extracting Disorder Parameters from Optical Spectra of Non-Fullerene Acceptors** [Siebe Frederix](#), Melissa Van Landeghem, Sigurd Mertens and Koen Vandewal; Hasselt University, Belgium

**2:45 PM EL01.14.04**

**Solution-Processed PbS Quantum Dots and CsPbBr<sub>3</sub> Nanocrystals Based Bulk-Nano Heterojunction Enabled Efficient Optoelectronic Devices** [Akshaykumar D. Salunke](#) and Santanu Pradhan; Indian Institute of Technology Roorkee, India

**3:00 PM BREAK**

SESSION EL01.15: High-Energy Radiation Detectors

Session Chairs: Namyoun Ahn and Valerio Pinchetti

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 427

**3:30 PM \*EL01.15.01**

**Solution Processed Zero-Dimensional Organic Metal Halide Hybrids for X-Ray Scintillators and Detectors** [Biwu Ma](#); Florida State University, United States

**4:00 PM \*EL01.15.02**

**Harnessing Quantum Shells for Next-Generation Optoelectronic Devices** [Mikhail Zamkov](#); Bowling Green State University, United States

**4:30 PM EL01.15.03**

**Bright, Fast and Durable Scintillation from Colloidal Quantum Shells** [Burak Guzelturk](#); Argonne National Laboratory, United States

SESSION EL01.16: Poster Session III

Session Chairs: Namyoun Ahn, Pieter Geiregat, Wanyi Nie and Valerio Pinchetti

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL01.16.01**

**Designing Multifunctional Phenothiazine-Based Self-Assembled Monolayers for Enhanced Interface in High-Efficiency Perovskite Solar Cells**

Rahmatia Fitri Binti Nasrun<sup>1,2</sup>, Dong Hwan Son<sup>1,2</sup> and Joo Hyun Kim<sup>1,2</sup>; <sup>1</sup>Pukyong National University, Korea (the Republic of); <sup>2</sup>CECS Research Institute, Core Research Institute, Korea (the Republic of)

**EL01.16.02**

**Exciton Dynamics in Strain-Graded CdSe/ZnSe Core/Shell Quantum Dots** Jonathan Cotrino Lemus<sup>1</sup>, Lucas B. Mélo<sup>1</sup>, Jeong W. Park<sup>2</sup>, Wan Ki Bae<sup>2,3</sup>

and Lazaro Padilha<sup>1</sup>; <sup>1</sup>University of Campinas, Brazil; <sup>2</sup>Sungkyunkwan University Advanced Institute of NanoTechnology, Korea (the Republic of);

<sup>3</sup>Sungkyunkwan University, Korea (the Republic of)

**EL01.16.03**

**Development of Large-Area Stamps for Roll-to-Roll Nanoimprinting and Additive Nanopatterning of Functional Materials Using Topographical**

**Discontinuous Dewetting** Iona Welsch<sup>1</sup>, Yidenekachew Donie<sup>2</sup>, Lorraine Francis<sup>2</sup>, Daniel Frisbie<sup>2</sup> and Vivian Ferry<sup>2</sup>; <sup>1</sup>St. Olaf College, United States;

<sup>2</sup>University of Minnesota Twin Cities, United States

**EL01.16.04**

**Insights into Excited States Dynamics in Organic Photovoltaic Materials** Nisreen Alshehri<sup>1,2</sup>, Christopher E. Petoukhoff<sup>1</sup>, Catherine S. De Castro<sup>1</sup> and

Frédéric Laquai<sup>1</sup>; <sup>1</sup>King Abdullah University of Science and Technology, Saudi Arabia; <sup>2</sup>King Saud University, Saudi Arabia

**EL01.16.05**

**Solution Combustion Synthesis—The Alternative Wet Chemical Method** Michael K. Musembi; Machakos University, Kenya

**EL01.16.06**

**Impact of Self-Assembled Monolayers on the Morphology and Optoelectronic Properties of Conjugated Polymer Films** Christopher E. Petoukhoff,

Napan Phuphathanaphong, Ghady Alqadi, Biswajit Pal, Diego Rosas Villalva, Catherine S. De Castro, Derya Baran and Frédéric Laquai; King Abdullah

University of Science and Technology, Saudi Arabia

**EL01.16.07**

**The Effect of Processing Parameters on the Optoelectronic Properties and Homogeneity of Spin Coated Indium Tin Oxide Multilayer Thin Films**

Mikis M. Mays Jr. and Rosario Gerhardt; Georgia Institute of Technology, United States

**EL01.16.08**

**Investigating the Ligand Exchange in CuFeS<sub>2</sub> QDs for Thermophotovoltaic Application** Trupthi D. Chonamada and Erik Johansson; Uppsala University,

Sweden

**EL01.16.09**

**Scalable Manufacturing of Melt-Blended Organic Scintillators for High Efficiency Neutron Detectors** Gail Frances H. Garcia, Nicholas Myllenbeck,

Annabelle Benin, Ryan Witzke, Tyler Eckles and Patrick Feng; Sandia National Laboratories, United States

**EL01.16.10**

**One-Step Synthesis of Color-Tunable Carbon Dots in Silica Sol using Microwave and Their Applications** Yehyeon Shin, Jihun Kang, Seunghwan

Moon and Jong-Souk Yeo; Yonsei University, Korea (the Republic of)

**EL01.16.11**

**Development of Multiplexed Biosensors Using Beads Coated with Gold Nanoclusters and Carbon Dots** Yehyeon Shin, Jihun Kang and Jong-Souk Yeo;

Yonsei University, Korea (the Republic of)

**EL01.16.12**

**Tuning Optical Properties of High Quantum Yield Nitrogen Doped Graphene Quantum Dots Synthesized by Pulsed LASER Ablation** Muhammad

Shehzad Sultan<sup>1</sup>, Wojciech Jadwisienczak<sup>2</sup>, Brad R. Weiner<sup>3</sup> and Gerardo Morell<sup>1</sup>; <sup>1</sup>University of Puerto Rico at Río Piedras, United States; <sup>2</sup>Ohio University,

United States; <sup>3</sup>University of Puerto Rico - Río Piedras, United States

**EL01.16.13**

**Photocatalytic Oxidation in Few-Layer Tellurene for Loss-Invariant Integrated Photonic Resonance Trimming** Tingyi Gu; University of Delaware,

United States

**EL01.16.14**

**Improving the Electrical Characteristics of Pentacene Organic Field Effect Transistors with Low-Cost Copper Electrodes by Self-Assembled Monolayer Modification** Tuul Tsagaantsooj<sup>1</sup>, Daariimaa Odbayar<sup>1</sup>, Munkh-Erdene Erdene-Ochir<sup>1</sup>, Davaajargal Darambazar<sup>1</sup>, Erdenechimeg Odbat<sup>1</sup>, Zagarzusem Khurelbaatar<sup>2</sup>, Bat-Erdene Ganzorig<sup>1</sup>, Shih-Jye Sun<sup>3,4</sup> and Ganzorig Chimed<sup>1</sup>; <sup>1</sup>National University of Mongolia, Mongolia; <sup>2</sup>Mongolian University of Science and Technology, Mongolia; <sup>3</sup>National University of Kaohsiung, Taiwan; <sup>4</sup>National Sun Yat-sen University, Taiwan

**EL01.16.15**

**Characteristics of Self-Assembly of One-Dimensional High-Efficiency Photonic Emitters Using Electric Field-Assisted Dielectrophoresis** Sunwoo Lim<sup>1</sup>, Sohyeon Kim<sup>1</sup>, Yoojin Kim<sup>1</sup>, Seo-Eun Kang<sup>2</sup>, Go-Eun Bang<sup>2</sup> and Kyoung-Kook Kim<sup>1,2</sup>; <sup>1</sup>Tech University of Korea, Korea (the Republic of); <sup>2</sup>Tech University Of Korea, Korea (the Republic of)

**EL01.16.16**

**Colloidal Synthesis of Emerging Lead-Free Double Perovskite Nanocrystals for Optoelectronic and Photocatalytic Applications** Razi Ahmad and Stepan Kment; Regional Centre of Advanced Technologies and Materials, Palacký University Olomouc, Czechia

**EL01.16.17**

**Enhancing Performance and Uniformity in Carbon Nanotube Thin-Film Transistors via Selective Thermal Degradation of Cellulose Surfactants** Minkyun Kang<sup>1,2</sup>, Joonyoung Kim<sup>1,2</sup>, Jinsu Yoon<sup>1,2</sup> and Yongtaek Hong<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Inter-University Semiconductor Research Center (ISRC), Korea (the Republic of)

**EL01.16.18**

**Enhanced Performance of Cadmium Oxide and Indium Gallium Oxide Heterojunction Structures for Advanced Electronic Applications** Daniel K. Azati; Pukyong National University, Korea (the Republic of)

**EL01.16.19**

**Enhancing Broad-Band Light Sensing in ZnO Nanorods with Organic PDI-C8 Composite** YiYu Tsai, Ming-Yu Kuo and Hsiang Chen; National Chi Nan University, Taiwan

SESSION EL01.17: Chemistry and Applications of InP Quantum Dots

Session Chairs: Wanyi Nie and Loredana Protesescu

Friday Morning, April 11, 2025

Summit, Level 4, Room 427

**8:45 AM \*EL01.17.01**

**Resin-Free Quantum Dot Color Converters—Applications and Challenges to Address** Yu Kambe<sup>1</sup>, Forrest S. Etheridge<sup>1</sup>, Alexis V. Miranda<sup>1</sup>, Mehr Unnisa Zaheer<sup>1</sup>, Marissa M. Tranquilli<sup>1</sup>, Rivi Ratnaweera<sup>1</sup>, Amirhossein Ghods<sup>1</sup>, Rui Peng<sup>1</sup>, Dmitri V. Talapin<sup>1,2,3</sup> and Danielle R. Chamberlin<sup>1</sup>; <sup>1</sup>NanoPattern Technologies, Inc., United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>Argonne National Laboratory, United States

**9:15 AM EL01.17.02**

**Photoinduced Hot Carrier Transfer in Tin-Doped Indium Oxide Nanocrystals** Sara Russo, Lauren Cisneros, Brandon Reynolds and Matthew Crane; Colorado School of Mines, United States

**9:30 AM EL01.17.03**

**Shedding Light on InP/ZnSe/ZnS QDs—Photodarkening and Photostability** Raimon Terricabres Polo<sup>1</sup>, Reinout F Ubbink<sup>2</sup>, Arjan J Houtepen<sup>2</sup> and Celso de Mello Donega<sup>1</sup>; <sup>1</sup>Utrecht University, Netherlands; <sup>2</sup>Delft University of Technology, Netherlands

**9:45 AM BREAK**

SESSION EL01.18: Organic Photovoltaics

Session Chairs: Valerio Pinchetti and Ivo Tanghe

Friday Morning, April 11, 2025

Summit, Level 4, Room 427

**10:15 AM \*EL01.18.01**

**New Device Architectures and Performance Limitations of Organic Infrared Sensors** Koen Vandewal<sup>1,2</sup>; <sup>1</sup>Hasselt University, Belgium; <sup>2</sup>imec - imomec, Belgium

**10:45 AM EL01.18.02**

**Precisely Controlling Polymer Acceptors with Weak Intramolecular Charge Transfer Effect and Superior Coplanarity for Efficient Indoor All-Polymer Solar Cells with over 27% Efficiency** Bosen Zou<sup>1</sup>, Ho Ming Ng<sup>1</sup>, Han Yu<sup>1</sup>, Pengbo Ding<sup>1</sup>, Jia Yao<sup>1</sup>, Dezhang Chen<sup>1</sup>, Sai Ho Pun<sup>1</sup>, Huawei Hu<sup>2</sup>, Kan Ding<sup>3</sup>, Ruijie Ma<sup>4</sup>, Qammar Memoona<sup>1</sup>, Wei Liu<sup>1</sup>, Weiwei Wu<sup>1</sup>, Joshua Yuk Lin Lai<sup>1</sup>, Chaoyue Zhao<sup>1</sup>, Mingao Pan<sup>1</sup>, Liang Guo<sup>5</sup>, Jonathan E. Halpert<sup>1</sup>, Harald Ade<sup>3</sup>, Gang Li<sup>4</sup> and He Yan<sup>1</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>Donghua University, China; <sup>3</sup>North Carolina State University, United States; <sup>4</sup>The Hong Kong Polytechnic University, Hong Kong; <sup>5</sup>Southern University of Science and Technology, China

**11:00 AM EL01.18.03**

**Organic Solar Cells and Broad-Band Photodetectors Fabricated from Nanoparticle Dispersions** Jonas Armleder, Jan Bruder, Karen Fischer, Holger Roehm and Alexander Colsmann; Karlsruhe Institute of Technology, Germany

**11:15 AM EL01.18.04**

**Conjugated Polyelectrolyte Doping Strategy for Defect Passivation in ZnO Electron Transport Layers for Efficient Inverted Organic Solar Cells** Dong Hwan Son<sup>1,2</sup>, Rahmatia Fitri Binti Nasrun<sup>1,2</sup> and Joo Hyun Kim<sup>1,2</sup>; <sup>1</sup>Pukyong National University, Daeyeon Campus, Korea (the Republic of); <sup>2</sup>CECS Research Institute, Core Research Institute, Korea (the Republic of)

**11:30 AM EL01.18.05**

**Towards High-Stability Organic Solar Cells Using Thermally Cleavable Side Chains in the Active Layer** Andrew Bates<sup>1</sup>, Haoyu Zhao<sup>1</sup>, Jordan Shanahan<sup>2</sup>, Wei You<sup>2</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>University of North Carolina at Chapel Hill, United States

SESSION EL01.19: Advanced Optical Spectroscopy

Session Chairs: Namyong Ahn and Koen Vandewal

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 427

**1:30 PM \*EL01.19.01**

**Understanding Transition Dipole Moment Orientation in Thin Films via Fourier Imaging Microscopy** Jongchan Kim; Yonsei University, Korea (the Republic of)

**2:00 PM EL01.19.02**

**Ultraviolet Polariton Formation in CdS Magic-Size Clusters** Aleesha George, River Carson, Richard Robinson and Andrew Musser; Cornell University, United States

**2:15 PM EL01.19.03**

**Impact of Exciton Fine Structure on the Energy Transfer in (CdSe)<sub>13</sub> and Mn<sup>2+</sup>:(CdSe)<sub>13</sub> Magic Sized Clusters** Jan Bieniek<sup>1</sup>, Woonhyuk Baek<sup>2,3,4</sup>, Severin Lorenz<sup>1</sup>, Franziska E. Muckel<sup>1,1</sup>, Rachel Fainblat<sup>1</sup>, Torben Steenbock<sup>5</sup>, Gabriel Bester<sup>5</sup>, Taeghwan Hyeon<sup>2,3</sup> and Gerd Bacher<sup>1</sup>; <sup>1</sup>Universität Duisburg-Essen, Germany; <sup>2</sup>Seoul National University, Korea (the Republic of); <sup>3</sup>Institute for Basic Science, Korea (the Republic of); <sup>4</sup>College of Natural Science, Korea (the Republic of); <sup>5</sup>Universität Hamburg, Germany

**2:30 PM EL01.19.04**

**Investigating the Fine Structure of Cadmium Selenide Nanocrystals** Niamh Brown<sup>1</sup>, Tara Šverko<sup>1</sup>, Colette Sullivan<sup>2</sup>, Lea Nienhaus<sup>2</sup>, William Tisdale<sup>1</sup> and Mounqi Bawendi<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Rice University, United States

**2:45 PM BREAK**

SESSION EL01.20: Chemical Sensors

Session Chairs: Namyong Ahn, Pieter Geiregat, Wanyi Nie and Valerio Pinchetti



Friday Afternoon, April 11, 2025  
Summit, Level 4, Room 427

**3:15 PM \*EL01.20.01**

**Molecular Doping, Transport and Desorption in Organic Semiconductor Films—Insights from Studies of Fluorescent Chemical Sensors** Edward Ogugu<sup>1</sup>, Liam Anderson<sup>1</sup>, Salam Mohammed<sup>2,1</sup>, Ramakant Sharma<sup>1</sup>, Dominic Taylor<sup>3</sup>, Ioic Mager<sup>4</sup>, Benoit Heinrich<sup>4</sup>, Stephane Mery<sup>4</sup>, Neil McKeown<sup>3</sup>, Ross Gillanders<sup>1</sup>, Ifor Samuel<sup>1</sup>, Jean-Charles Ribierre<sup>1</sup> and Graham A. Turnbull<sup>1,2</sup>; <sup>1</sup>University of St Andrews, United Kingdom; <sup>2</sup>SWEDEC, Sweden; <sup>3</sup>University of Edinburgh, United Kingdom; <sup>4</sup>Université de Strasbourg, France

**3:45 PM EL01.20.02**

**Micro-LED Embedded Layer-by-Layer Synthesized Conductive Metal-Organic Framework Chemiresistor Arrays** Kichul Lee<sup>1</sup>, Young-Moo Jo<sup>2</sup>, Myung Sung Sohn<sup>2</sup>, Yun Chan Kang<sup>2</sup> and Inkyu Park<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**4:00 PM EL01.20.03**

**Single Chromophore Through-Space Charge Transfer—How Far Can We Push It?** Ruth M. Pollard, Charles Patrick Mikan, Jonathan P. Knowles and Marc K. Etherington; Northumbria University, United Kingdom

**4:15 PM EL01.20.04**

**Triple-Readout Hydrogel Optical Fiber Sensors for Real-Time pH Monitoring** Israr Ahmed, Yarjan Abdul Samad and Haider Butt; Khalifa University, United Arab Emirates

## SYMPOSIUM EL02

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Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing  
April 7 - April 8, 2025

Symposium Organizers

Su-Mi Hur, Chonnam National University  
Hyeong Min Jin, Chungnam National University  
Paul Nealey,  
Tamar Segal-Peretz, Technion–Israel Institute of Technology

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL02.01: Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing I

Session Chairs: Paul Nealey and Tamar Segal-Peretz

Monday Morning, April 7, 2025

Summit, Level 3, Room 326

**8:00 AM \*EL02.01.01**

**Non-Equilibrium Processing of Block Copolymer Directed Self-Assembled Polymer-Inorganic Hybrid Materials** Ulrich Wiesner; Cornell University, United States

**8:30 AM +EL02.01.02**

**Three Dimensional Structures from the Directed Self-Assembly of Block Copolymers** Caroline A. Ross; Massachusetts Institute of Technology, United States

**9:00 AM \*EL02.01.03**

**Controlled Orientation of Nanostructured Silicon-Containing Block Copolymer Thin Films for Nanopatterning** Rong-Ming Ho; National Tsing Hua University, Taiwan

**9:30 AM BREAK**

**10:00 AM \*EL02.01.04**

**Combination of Block Copolymer Templates and Ion Implantation for the Doping of Semiconductors at the Nanoscale** Michele Perego; CNR-IMM, Italy

**10:30 AM \*EL02.01.05**

**Shear-Rolling Induced Unidirectional Alignment of Nanostructures in Block Copolymer Films for Quasi-Monograin Nanogyroid and Distortion-Free Stretchable Substrates** Jung Hur<sup>1,2</sup>, Woo Hyun Nam<sup>1,2</sup>, Junghyun Cho<sup>1</sup> and Jeong Gon Son<sup>1,2</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**11:00 AM \*EL02.01.06**

**Chemically Tailored PS-*b*-PMMA Derivatives for Scalable High-Fidelity Sub-10-nm Directed Self-Assembly Patterning** Teruaki Hayakawa<sup>1</sup>, Shinsuke Maekawa<sup>1</sup>, Takehiro Seshimo<sup>2</sup>, Takahiro Dazai<sup>2</sup>, Kazufumi Sato<sup>2</sup>, Kan Hatakeyama-Sato<sup>1</sup> and Yuta Naba<sup>1</sup>; <sup>1</sup>Institute of Science Tokyo, Japan; <sup>2</sup>Tokyo Ohka Kogyo Co., Japan

**11:30 AM EL02.01.07**

**Directed Self-Assembly of POSS-Based Giant Surfactants by Nano-Trench for Nanopatterning** Cheng-Hsun Tung<sup>1</sup>, Feng Ye<sup>2,2</sup>, Weiyi Li<sup>2,2</sup>, The Anh Nguyen<sup>1,3</sup>, Ming Chang Lee<sup>1</sup>, Tao Wen<sup>2,2</sup>, Zi Hao Guo<sup>2,2</sup>, Stephen Z. D. Cheng<sup>4,2,2</sup> and Rong-Ming Ho<sup>1</sup>; <sup>1</sup>National Tsing Hua University, Taiwan; <sup>2</sup>South China University of Technology, China; <sup>3</sup>Vietnam National University, Hanoi, Viet Nam; <sup>4</sup>The University of Akron, United States

**11:45 AM EL02.01.08**

**Block Copolymer Based Artificial Fingerprints as Nanoscale Physical Unclonable Functions for Authentication and Identification** Federico Ferrarese Lupi<sup>1</sup>, Irdi Murataj<sup>1</sup>, Matteo Fretto<sup>1</sup>, Chiara Magosso<sup>2</sup>, Stefano Carignano<sup>3</sup> and Gianluca Milano<sup>1</sup>; <sup>1</sup>Istituto Nazionale di Ricerca Metrologica, Italy; <sup>2</sup>Politecnico di Torino, Italy; <sup>3</sup>Barcelona Supercomputing center, Spain

SESSION EL02.02: Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing II

Session Chairs: Su-Mi Hur and Hyeong Min Jin

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 326

**1:30 PM \*EL02.02.01**

**Block Copolymer Self-Assembly for Post AI-Era** Sang Ouk Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**2:00 PM \*EL02.02.02**

**Direct Visualization of Block Copolymer Brush Monolayers in Lithographic Patterns via Metal Oxide Deposition** Whitney Loo<sup>1</sup>, Hongbo Feng<sup>2</sup>, Ricardo Ruiz<sup>3</sup> and Paul Nealey<sup>2</sup>; <sup>1</sup>University of Wisconsin–Madison, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**2:30 PM EL02.02.03**

**Engineering Block Copolymer/Homopolymer Blend Assembly Pathways for Nanopattern Optimization** Karthika Madathil, Nikhil Tiwale, Semih Cetindag, Esther Tsai, Ruipeng Li and Gregory S. Doerk; Brookhaven National Laboratory, United States

**2:45 PM EL02.02.04**

**Polymer Self-Assembly and High Resolution Structural Control in Supercritical Fluids** Loren G. Kaake; Simon Fraser University, Canada

**3:00 PM BREAK**

**3:30 PM \*EL02.02.05**

**Self-Assembled Block Copolymer Structural Color for Human-Interactive Sensing Displays** Cheolmin Park; Yonsei University, Korea (the Republic of)

**4:00 PM \*EL02.02.06**

**Directed Self Assembly and Applications in Semiconductor Device Manufacturing** Chandra Sarma; Wolfspeed, United States

**4:30 PM EL02.02.07**

**Morphological Characterization of Sub-10 nm Surface Patterns Created by Block Copolymer Self-Assembly on Different Substrates** Harikrishnan Venugopal, Janna X. Friebe, Julius Bürger and Jörg K.N. Lindner; Paderborn University, Germany

**4:45 PM EL02.02.08**

**Formation of Silver-Mediated A:T Duplexes with Anti-Parallel Strand Orientation and Enhanced Thermal Stability** Eshana Bethur, Rweetuparna Guha and Stacy Copp; University of California, Irvine, United States

SESSION EL02.03: Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing III

Session Chairs: Su-Mi Hur and Kevin Yager

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 326

**10:30 AM \*EL02.03.01**

**Formation and Applications of Isoporous Block Copolymer Membranes** Volker Abetz<sup>1,2</sup>, Zhenzhen Zhang<sup>1</sup>, Oliver Dreyer<sup>1,2</sup>, Clarissa Abetz<sup>1</sup>, Niklas Blagojevic<sup>3</sup>, Marcus Müller<sup>3</sup>, Assaf Simon<sup>4</sup>, Tamar Segal-Peretz<sup>4</sup>, Liang Gao<sup>5</sup> and Ulrich Schwaneberg<sup>5,6</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon, Germany; <sup>2</sup>University of Hamburg, Germany; <sup>3</sup>Georg August University Göttingen, Germany; <sup>4</sup>Technion–Israel Institute of Technology, Israel; <sup>5</sup>RWTH Aachen University, Germany; <sup>6</sup>DWI – Leibniz-Institute for Interactive Materials, Germany

**11:00 AM \*EL02.03.02**

**Development of Direct Infiltration Methods to Define Inorganic Patterns from Self-Assembled Thin Films** Michael A. Morris<sup>1,2</sup>; <sup>1</sup>Trinity College Dublin, Ireland; <sup>2</sup>AMBER Research Centre, Ireland

**11:30 AM EL02.03.03**

**Can Vapor Phase Infiltration in Block Copolymers Directly Construct Functional Patterns?** Rotem Azoulay, Ruoke Cai and Tamar Segal-Peretz; Technion–Israel Institute of Technology, United States

**11:45 AM ^EL02.03.04**

**Designing Block Copolymer Materials for Directed Self-Assembly in Next-Generation Lithography** Kyunghyeon Lee<sup>1</sup>, Ki Hyun Kim<sup>1</sup> and Paul Nealey<sup>1,2</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States

SESSION EL02.04: Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing IV

Session Chairs: Hyeong Min Jin, Whitney Loo, Tamar Segal-Peretz and Jeong Gon Son

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 326

**1:30 PM \*EL02.04.01**

**Characterization of Directed Self Assembly Materials Using Soft X-Rays** R. Joseph Kline and Daniel Sunday; National Institute for Standards and Technology, United States

**2:00 PM \*EL02.04.02**

**Non-Native Block Copolymer Ordering via Directed Blends** Kevin G. Yager; Brookhaven National Laboratory, United States

**2:30 PM \*EL02.04.03**

**Nanoscale Self-Assembled Complex Networks Mimicking Brain's Structural and Functional Development Processes** Hanchan Song, Sang Ouk Kim and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**3:00 PM BREAK**

**3:30 PM EL02.04.04**

**Absorption-Desorption Isotherms for Understanding the Self-Assembly of Block Copolymer Supramolecules** Nayanathara Hendeniya, Caden Chittick, Shaghayegh Abtahi, Chizoba Iheme, Sharif Tasnim Mahmud, Gabriel O. Mogbojuri and Boyce Chang; Iowa State University, United States

**3:45 PM EL02.04.05**

**Wide Neutrality Windows for Block Copolymer Vertical Orientation Using Congruent and Incongruent Polymer Bushes** Sharif Tasnim Mahmud, Boyce Chang and Kaitlyn Hillery; Iowa State University, United States

**4:00 PM \*EL02.04.06**

**Surface Directed Self-Assembly of Organic Semiconductors on Atomically Thin Graphene Templates** Kilwon Cho; Pohang University of Science and Technology, Korea (the Republic of)

**4:30 PM EL02.04.07**

**Low Temperature Solid-State Dewetting of Gold Thin Films on Planar and Nanostructured Polystyrene Structures** Felix Lohmeyer, Daniel Kool, Julius Bürger and Jörg K.N. Lindner; University of Paderborn, Germany

**4:45 PM EL02.04.08**

**Solution Processing MXene Macrostructures—From 2D Nanosheets to Fiber, Film and Aerogels** Jizhen Zhang<sup>1,2</sup>; <sup>1</sup>National Institute for Materials Science, Japan; <sup>2</sup>Deakin University, Australia

SESSION EL02.05: Poster Session: Innovations in Directed Self-Assembly for Next-Generation Nanomanufacturing

Session Chairs: Su-Mi Hur and Hyeong Min Jin

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL02.05.01**

**Study of Profile Improvement Through Shift of Phase Between RF Source and Bias at the RF-Biased ICP Reactor** Paul Yang, Karam Ahn, Wan Soo Song, Chiyoung Lee, Yoon Young Lee, Jinchul Son and Cheolkyu Lee; PSK Inc., Korea (the Republic of)

**EL02.05.02**

**High-Speed, Pinhole-Free, Uniform Wet Deposition Techniques for Two-Dimensional Materials** Kyeonghun Jeong<sup>1</sup>, Chansoo Kim<sup>2</sup>, Ha Young Lee<sup>1</sup>, Junyi Zhao<sup>2</sup>, Hyun-Sik Kim<sup>3</sup>, Jeong-Yeon Kim<sup>3</sup>, Youjin Kim<sup>1</sup>, Heechae Choi<sup>4</sup>, Alloyssius Gorospe<sup>1</sup>, Seung Joon Yoo<sup>5</sup>, Chuan Wang<sup>2</sup> and Dongwook Lee<sup>1</sup>; <sup>1</sup>Hongik University, Korea (the Democratic People's Republic of); <sup>2</sup>Washington University in St. Louis, United States; <sup>3</sup>University of Seoul, Korea (the Republic of); <sup>4</sup>Xi'an Jiaotong-Liverpool University, China; <sup>5</sup>Gwangju Institute of Science and Technology, Korea (the Republic of)

**EL02.05.03**

**Block Copolymer-Assisted Fabrication of 3D Mesoporous MnO@C Nanocomposite for High-Performance Aqueous Zinc-Ion Battery Cathodic Materials** Jisung Park and Hyeong Min Jin; Chungnam National University, Korea (the Republic of)

**EL02.05.04**

**Corona Discharge Assisted Localized Growth of Low Resistive Copper Oxide Microstructure—Material and Electrical Properties** Arka Mukherjee<sup>1,1</sup>, Bardia Aliabadian<sup>1,1</sup>, Johannes Reiprich<sup>1,1,2</sup> and Heiko O. Jacobs<sup>1,1</sup>; <sup>1</sup>Technische Universität Ilmenau, Germany; <sup>2</sup>Technical University of Munich, Germany

**EL02.05.05**

**Modulating Three-Dimensional Molecular Orientation of Liquid Crystal Semiconductor by Anisotropic Surface Treatment** Moon Jong Han<sup>1</sup>, Changyong Um<sup>1</sup>, Dayan Wei<sup>2</sup>, Hee Seong Yun<sup>3</sup>, Seong-hun Lee<sup>4</sup>, Hyungju Ahn<sup>5</sup>, David M. Walba<sup>2</sup>, Tae Joo Shin<sup>4</sup> and Dong Ki Yoon<sup>3</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>University of Colorado Boulder, United States; <sup>3</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of);

<sup>4</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>5</sup>Pohang Accelerator Laboratory, Korea (the Republic of)

**EL02.05.06**

**Hydrogen Gas Sensor with Enhanced Detection Limit Using Cracked Template Lithography and Palladium Nanogaps** Seung Taek Jo, Gyeongtae Kim, Dae-Hwang Yoo and Jong Wook Roh; Kyungpook National University, Korea (the Republic of)

**EL02.05.07**

**Morphological Impact on the Photocatalytic Activity of Self-Assembled CeO<sub>2</sub> Nanocrystals** Nagaveni G H and M N. Kalasad; Davangere University, India

**EL02.05.08**

**Enabling Data-Driven Design of Block Copolymers** Federico Ferrarese Lupi<sup>1</sup>, Magosso Chiara<sup>1</sup>, Irdi Murataj<sup>1</sup>, Michele Perego<sup>2</sup>, Gabriele Seguinì<sup>2</sup>, Debra Audus<sup>3</sup> and Gianluca Milano<sup>1</sup>; <sup>1</sup>Istituto Nazionale di Ricerca Metrologica, Italy; <sup>2</sup>CNR-IMM, Italy; <sup>3</sup>National Institute of Standards and Technology, United States

**EL02.05.09**

**Mechanistic Study of Photocatalytic CO<sub>2</sub> Conversion to CH<sub>4</sub> by Dopant-Defect Engineered SnS<sub>2</sub> Thin Films** Tadros T. Mamo<sup>1,2,2</sup>, Adane G. Hailemariam<sup>2</sup>, Mohammad Qorbani<sup>3</sup>, Heng-Liang Wu<sup>1</sup>, Li-Chyong Chen<sup>3,3</sup> and Kuei-Hsien Chen<sup>2,3</sup>; <sup>1</sup>Department of Chemistry, National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan; <sup>3</sup>National Taiwan University, Taiwan

**EL02.05.10**

**Investigation of charge carrier dynamics in a Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene for ultrafast photonics applications** Ankita Rawat and Pawan Kumar Kulriya; Jawaharlal Nehru University, India

**EL02.05.11**

**Integration of 2D PtSe<sub>2</sub> nanolayers in device applications** Vera G. Marinova; IOMT-BAS, Bulgaria

**EL02.05.12**

**Anti-Reflective Robust Nanostructures by Blockcopolymer Self-Assembly Patterns for Future Flexible Display Applications** Dongwon You and Sangouk Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**EL02.05.13**

**Development of Metal Combined N-Doped Hierarchical Porous Carbon Film Catalysts via Vapor-Induced Phase Separation of Block Copolymers for Hydrogen Production** Bomyeong Choi and Hyeong Min Jin; Chungnam National University, Korea (the Republic of)

## SYMPOSIUM EL03

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Progress in van der Waals Heterostructures for Sustainable Electronics  
April 7 - April 11, 2025

Symposium Organizers

Mads Brandbyge, Technical University of Denmark  
Luca Camilli, University of Rome Tor Vergata  
José Manuel Caridad Hernández, Universidad de Salamanca  
Eli Sutter, University of Nebraska--Lincoln

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL03.01: Towards Scalable Production of 2D Materials and Their Heterostructures

Session Chairs: Andras Kis and Eli Sutter

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 425

**10:30 AM \*EL03.01.01**

**Scalable and Sustainable Production of Printable Two-Dimensional Nanoelectronic Inks** [Mark C. Hersam](#); Northwestern University, United States

**11:00 AM EL03.01.02**

**Scalable and Controllable Deposition of Few-Layer MoS<sub>2</sub> Using Atomic Layer Deposition** [Sungjoon Kim](#) and Jeffrey W. Elam; Argonne National Laboratory, United States

**11:15 AM EL03.01.03**

**Charge Separation Outcompetes Interlayer Exciton Formation for Defect-Engineered Liquid Phase Exfoliated 2D Lateral Hetero-Networks**

[Christopher E. Petoukhoff](#)<sup>1</sup>, Antonio Gaetano Ricciardulli<sup>2</sup>, Anna Zhuralova<sup>2</sup>, Adam Kelly<sup>3</sup>, Chun Ma<sup>2</sup>, Frédéric Laquai<sup>1</sup>, Jonathan N. Coleman<sup>3</sup> and Paolo Samori<sup>2</sup>; <sup>1</sup>King Abdullah University of Science and Technology, Saudi Arabia; <sup>2</sup>Université de Strasbourg, France; <sup>3</sup>Trinity College Dublin, The University of Dublin, Ireland

**11:30 AM EL03.01.04**

**Polymer-Free and Dry-Patterning of Wafer Scale Two Dimensional Semiconductors via van der Waals Delamination** [Shuimei Ding](#) and Yuan Liu; Hunan University, China

SESSION EL03.02: Applications of 2D Semiconductor Heterostructures

Session Chairs: Adina Luican-Mayer and Maurizia Palumbo

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 425

**1:30 PM \*EL03.02.01**

**Exciton Manipulation and Transport in 2D Semiconductor Heterostructures** [Andras Kis](#); Ecole Polytechnique Federale de Lausanne, Switzerland

**2:00 PM EL03.02.02**

**Valley-Selective Carrier Transfer in SnS-Based van der Waals Heterostructures** [Eli Sutter](#); University of Nebraska-Lincoln, United States

**2:15 PM EL03.02.03**

**MOCVD Grown Type-II TMDC Heterostructures for Photodetecting Devices** [Tilmar Kuemmel](#)<sup>1</sup>, Yannick Beckmann<sup>1</sup>, Mohamed Abdelbaky<sup>1</sup>, Henrik Myja<sup>1</sup>, Ulrike Hutten<sup>1</sup>, Annika Grundmann<sup>2</sup>, Amir Ghiami<sup>2</sup>, Wolfgang Martin<sup>1</sup>, Michael Heuken<sup>3,2</sup>, Holger Kalisch<sup>2</sup>, Andrei Vescan<sup>2</sup> and Gerd Bacher<sup>1</sup>;

<sup>1</sup>Universität Duisburg-Essen, Germany; <sup>2</sup>RWTH Aachen University, Germany; <sup>3</sup>AIXTRON SE, Germany

**2:30 PM BREAK**

SESSION EL03.03: On the Epitaxial Growth of van der Waals Heterostructures

Session Chairs: Mads Brandbyge and Mark Hersam

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 425

**3:00 PM \*EL03.03.01**

**Epitaxial Molding of New van der Waals Quantum Lattice** [Moon-Ho Jo](#); Pohang University of Science and Technology, Korea (the Republic of)

**3:30 PM EL03.03.02**

**Epitaxial Growth of Stacking Faults-Free Bilayer MoS<sub>2</sub>** Taejoon Mo; Pohang University of Science and Technology, Korea (the Republic of)

**3:45 PM EL03.03.04**

**Van der Waals Epitaxy of GaSe on Sapphire—Insights into Phase Control and Morphological Transitions** Michele Bissolo, Marco Dembecki, Jan Schabesberger, Abhilash S. Ulhe, Florian Rauscher, Gregor Koblmüller, Eugenio Zallo and Jonathan J. Finley; Technische Universität München, Germany

**4:00 PM EL03.03.05**

**Spontaneous Decoupling of Graphene from Sapphire** Stiven Forti<sup>1</sup>, Neeraj Mishra<sup>1</sup>, Leonardo Martini<sup>1</sup>, Antonio Rossi<sup>1</sup>, Federico Chianese<sup>2</sup>, Francesco Bisio<sup>3</sup>, Zonghoon Lee<sup>4</sup>, Jong-Hyun Ahn<sup>5</sup>, Camilla Coletti<sup>1</sup> and Vaidotas Miseikis<sup>1</sup>; <sup>1</sup>Istituto Italiano di Tecnologia, Italy; <sup>2</sup>Università degli Studi di Napoli Federico II, Italy; <sup>3</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>4</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>5</sup>Yonsei University, Korea (the Republic of)

SESSION EL03.04: Optoelectronic Properties of van der Waals Structures

Session Chairs: Luca Camilli and Andrea Li Bassi

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 425

**8:45 AM \*EL03.04.01**

**Quasi-Particles and Excitons in 2D/Layered Materials—Insight by Ground and Excited State Simulations** Maurizia Palummo<sup>1,2</sup>; <sup>1</sup>Università degli Studi di Roma Tor Vergata, Italy; <sup>2</sup>INFN, Italy

**9:15 AM EL03.04.02**

**Short Wavelength Infrared Triggered Retinomorphic Artificial Synapse Electronics via Multi-Dimensional van der Waals Heterojunctions** Soobin Shim and Jun Hong Park; Gyeongsang National University, Korea (the Republic of)

**9:30 AM EL03.04.03**

**Engineered Bi<sub>2</sub>S<sub>3</sub>/SnTiO<sub>2</sub> Nanofibers for Enhanced Interfacial Charge Transfer and Improved Photocatalytic CO<sub>2</sub> Reduction to Methanol (CH<sub>3</sub>OH)** Hazina M. Charles, Plassidius J. Chengula, Jiyeon Seo and Caroline Sunyong S. Lee; Hanyang University, Korea (the Republic of)

**9:45 AM BREAK**

SESSION EL03.05: Synthesis of 2D Materials and Their Heterostructures

Session Chairs: Luca Camilli and Peter Sutter

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 425

**10:15 AM \*EL03.05.01**

**Topotaxy in 2D Materials—Towards Synthesis of Novel 2D Materials by Surface Reactions** Matthias Batzill; University of South Florida, United States

**10:45 AM EL03.05.02**

**Patterned Regrowth of Coherent Lateral Heterojunctions in Transition Metal Dichalcogenides** Ce Liang; The University of Chicago, United States

**11:00 AM EL03.05.03**

**Three-Dimensional Crystal Construction by Single-Crystal Two-Dimensional Material Supercell Multiplying** Wei Kong, Wenhao Li and Huaze Zhu; Westlake University, China

**11:15 AM EL03.05.04**

**Insights into MOCVD of TMDC Thin Films by *In Situ* Spectral Reflectance Measurements** Songyao Tang<sup>1</sup>, Yibing Wang<sup>1</sup>, Hleb Fiadziushkin<sup>1</sup>, Yingfang Ding<sup>1</sup>, Amir Ghiami<sup>1</sup>, Michael Heuken<sup>1,2</sup>, Andrei Vescan<sup>1</sup> and Holger Kalisch<sup>1</sup>; <sup>1</sup>RWTH Aachen University, Germany; <sup>2</sup>AIXTRON SE, Germany

**11:30 AM \*EL03.05.05**

**Simulating Atomic Layer Processing of 2D Materials** Suresh K. Natarajan, Nidhi Pandey, Julian Schneider, Jess Wellendorff and Anders Blom; Synopsys, United States

SESSION EL03.06: Towards 2D Material-Based Electronic Devices I

Session Chairs: Anders Blom and Eli Sutter

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 425

**1:30 PM \*EL03.06.01**

**Will 2D Materials Play a Role in Semiconductor Electronics?** Eric Pop; Stanford University, United States

**2:00 PM EL03.06.02**

**Hybrid 2D Atomic Crystal-Supramolecular Polymer Heterostructures for Energy-Efficient Memory Transistors** Yu Zhong; Cornell University, United States

**2:15 PM EL03.06.03**

**Bi<sub>2</sub>Te<sub>3</sub>/Ge van der Waals Heterostructure for Unpinning Fermi-Level of n-Ge** Wen Hsin Chang<sup>1</sup>, Shogo Hatayama<sup>1</sup>, Naoya Okada<sup>1</sup>, Toshifumi Irisawa<sup>1</sup> and Yuta Saito<sup>2,1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology, Japan; <sup>2</sup>Tohoku University, Japan

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EL03.07: Properties and Applications of 2D Semiconductors

Session Chairs: Matthias Batzill and Mads Brandbyge

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 425

**3:30 PM \*EL03.07.01**

**Van der Waals Semiconductors and Heterostructures—Mastering Few-Layer Crystals** Peter Sutter; University of Nebraska-Lincoln, United States

**4:00 PM EL03.07.02**

**Stacking CVD-Grown MoS<sub>2</sub> Monolayers for High-Performance 2D Optoelectronics** Muhammad Aamir Abbas, Timothy Ismael, Josh N. Sasson, Owen P. Harris and Matthew D. Escarra; Tulane University, United States

**4:15 PM EL03.07.03**

**Multilevel Conductance States of Vapor-Transport-Deposited Sb<sub>2</sub>S<sub>3</sub> Memristors achieved via Electrical and Optical Modulation** Somnath S. Kundale and Jun H. Park; Gyeongsang National University, Korea (the Republic of)

**4:30 PM EL03.07.04**

**Opto-Electronic Properties of Isotopically Purified Monolayer MoS<sub>2</sub>** Tara Pena<sup>1</sup>, Ahn Tuan Hoang<sup>1,1</sup>, Ashildur Fridriksdottir<sup>1</sup>, Zherui Han<sup>1</sup>, Kathryn Neilson<sup>1</sup>, Samuel Lai<sup>1</sup>, Jierong Wang<sup>1</sup>, Crystal A. Nattoo<sup>1</sup>, Tony F. Heinz<sup>1,2</sup>, Paul C. McIntyre<sup>1</sup>, Andrew J. Mannix<sup>1,2</sup> and Eric Pop<sup>1,1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**4:45 PM EL03.07.05**

**Chemical and Mechanical Control over Structure and Interfaces in 2D Semiconductors** Andrew J. Mannix<sup>1,2</sup>; <sup>1</sup>Stanford University, United States;

<sup>2</sup>SLAC National Accelerator Laboratory, United States

SESSION EL03.08: Poster Session

Session Chairs: Mads Brandbyge and Luca Camilli

Wednesday Afternoon, April 9, 2025



5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL03.08.01**

**Anisotropic Transport Phenomena in Quasi-One-Dimensional ZrTe<sub>3</sub> Nanoribbons** Jeongmin Kim<sup>1</sup>, Seonhye Youn<sup>2</sup>, Dong Hwan Kim<sup>1</sup> and Wooyoung Lee<sup>2</sup>; <sup>1</sup>DGIST, Korea (the Republic of); <sup>2</sup>Yonsei University, Korea (the Republic of)

**EL03.08.02**

**Unidirectional van der Waals Monolayer Single Crystals by Deterministic Vicinal Epitaxy** Suk-Ho Lee<sup>1,2</sup>, Jong Yun Choi<sup>1,2</sup> and Moon-Ho Jo<sup>1,2</sup>; <sup>1</sup>IBS, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of)

**EL03.08.03**

**Broadening Visible-Light Absorption in g-C<sub>3</sub>N<sub>4</sub>/Polymer Heterostructures for Superior Photocatalytic Hydrogen Evolution** Mohamed H. Elsayed; King Fahd University of Petroleum and Minerals, Saudi Arabia

**EL03.08.04**

**MOCVD of Monolayer WS<sub>2</sub> on Si/SiO<sub>2</sub> Substrates** Yingfang Ding<sup>1</sup>, Songyao Tang<sup>1</sup>, Yibing Wang<sup>1</sup>, Amir Ghiami<sup>1</sup>, Hleb Fiadziushkin<sup>1</sup>, Michael Heuken<sup>2,1</sup>, Andrei Vescan<sup>1</sup> and Holger Kalisch<sup>1</sup>; <sup>1</sup>RWTH Aachen University, Germany; <sup>2</sup>AIXTRON SE, Germany

**EL03.08.05**

**Enhancing Electrical Performance of 2D Semiconductor Tungsten Diselenide (WSe<sub>2</sub>)—Metal Junctions for Sustainable Electronics Through Hydrochloric Acid Surface Modification** Hogeun Ahn<sup>1,2</sup>, Seunghwan Seo<sup>2</sup>, Kiseok Kim<sup>2</sup>, Doyoon Lee<sup>2</sup>, Jin-Hong Park<sup>1</sup> and Jeehwan Kim<sup>2</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Massachusetts Institute of Technology, United States

**EL03.08.06**

**Development of Devices with Multilayer Graphene and Graphene/Metal-Oxide Thin Films** Yuxuan Wang, Bruno Rente and Peter K. Petrov; Imperial College London, United Kingdom

**EL03.08.07**

**Probing Charge Carrier Dynamics in 2D Perovskite-MoS<sub>2</sub> Heterostructure** Bikram Ghosh, Prashant Kamat and Greg Hartland; University of Notre Dame, United States

**EL03.08.08**

**Analysis of Optoelectronic Properties of TMD-MoS<sub>2</sub>/WS<sub>2</sub> Heterostructures Grown by Different CVD Approach** Elycia Wright<sup>1</sup>, Kedar Johnson<sup>2,1</sup>, Robin Rousseau<sup>1</sup>, Nijai Dixon<sup>1</sup>, M.K Indika Senevirathna<sup>1</sup> and Michael Williams<sup>1</sup>; <sup>1</sup>Clark Atlanta University, United States; <sup>2</sup>Morehouse College, United States

**EL03.08.09**

**Ultra-Low Saturation Voltage Source-Gated WS<sub>2</sub> Transistor with Self-Aligned Tunnel Contact** Seongyun Yang, Donggyu Lee and Jihyun Kim; Seoul National University, Korea (the Republic of)

**EL03.08.10**

**Integrated 1D epitaxial mirror twin boundaries for ultra-scaled 2D MoS<sub>2</sub> field-effect transistor** Hyun Je Cho<sup>1,2</sup>, Gunho Moon<sup>1,2</sup>, Heonsu Ahn<sup>1,2</sup> and Moon-Ho Jo<sup>2,1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**EL03.08.11**

**Atomically thin synapse networks on van der waals photo-memtransistors** Seok-Young Min<sup>1,2</sup>, Gunho Moon<sup>1,2</sup> and Moon-Ho Jo<sup>2,1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**EL03.08.12**

**Long-term Stability of Atomically Precise Graphene Nanoribbon Transistors** Shelby Janssen, Muhammed Yusufoglu, Kentaro Yumigeta and Zafer Mutlu; University of Arizona, United States

**EL03.08.13**

**Ambient-Stable Inorganic Remote Modulation Doping in Two-Dimensional Transition Metal Dichalcogenide by Oxygen Plasma Treatment** Juntae Jang<sup>1</sup>, Jaehyoung Park<sup>1</sup>, Jongeun Yoo<sup>1</sup>, Seongmin Ko<sup>1</sup>, Takhee Lee<sup>1</sup>, Yan Wang<sup>2</sup>, Han Yan<sup>2</sup>, Maheera Ghani<sup>2</sup> and Manish Chhowalla<sup>2</sup>; <sup>1</sup>Seoul National

University, Korea (the Republic of); <sup>2</sup>University of Cambridge, United Kingdom

**EL03.08.14**

**Investigating the Optical and Magnetic Interplay in MnPS<sub>3</sub>—Temperature-Dependent Optical Spectroscopy and Structural Insights** [Katarzyna Ignatowicz](#)<sup>1</sup>, Milosz Rybak<sup>1</sup>, Nikolaos Antonatos<sup>1</sup>, Jaroslaw Serafinczuk<sup>1</sup>, Maciej Peter<sup>1</sup>, Zdenek Sofer<sup>2</sup>, Robert Kudrawiec<sup>1</sup> and Wojciech M. Linhart<sup>1</sup>; <sup>1</sup>Wroclaw University of Science and Technology, Poland; <sup>2</sup>University of Chemistry and Technology Prague, Czechia

**EL03.08.15**

**Large Scale Multi-layer MoS<sub>2</sub> Growth by Reactive Sputtering for Light Absorber Applications** [Myeongok Kim](#)<sup>1</sup>, Takaya Kubo<sup>1</sup>, Hiroshi Segawa<sup>1</sup>, Tomah Sogabe<sup>2,1</sup> and Yoshitaka Okada<sup>1</sup>; <sup>1</sup>Research Center for Advanced Science and Technology, The University of Tokyo, Japan; <sup>2</sup>The University of Electro-Communications, Japan

**EL03.08.16**

**Overcoming Mobility Limit in 2D Remote Side-Gate Hot-Carrier Transistors** [Daw Debottam](#) and Young Hee Lee; Sungkyunkwan University, Korea (the Republic of)

**EL03.08.17**

**Exploring Direct Growth of High Quality InP Nanocrystals on Graphene Substrates via Moiré Epitaxy** Riccardo Brondolin<sup>1</sup>, Sena Türker<sup>1</sup>, Cyril Cayron<sup>2</sup>, Thomas Hagger<sup>1</sup>, Mitali Banerjee<sup>2</sup>, Anna Fontcuberta i Morral<sup>1</sup> and [Valerio Piazza](#)<sup>1</sup>; <sup>1</sup>Ecole Polytechnique Federale de Lausanne, Switzerland; <sup>2</sup>École Polytechnique Fédérale de Lausanne, Switzerland

**EL03.08.18**

**Optical Markers of Magnetic Phase Transition in CrSbR** [Wojciech M. Linhart](#)<sup>1</sup>, Milosz Rybak<sup>1</sup>, Magdalena Birowska<sup>2</sup>, Kseniia Mosina<sup>3</sup>, Vlastimil Mazanek<sup>3</sup>, Zdenek Sofer<sup>3</sup> and Robert Kudrawiec<sup>1</sup>; <sup>1</sup>Wroclaw University of Science and Technology, Poland; <sup>2</sup>University of Warsaw, Poland; <sup>3</sup>University of Chemistry and Technology Prague, Czechia

**EL03.08.19**

**Tuning Interfacial Electron Transfer Kinetics in Graphene Electrode via Electrostatic and Doping Modulations** [Yizhe Wang](#); University of California, Berkeley, United States

**EL03.08.20**

**Enhanced Carrier Dynamics and Excitation of Optically Stimulated Artificial Synapse Using van der Waals Passivation Layers** [Hangil Kwak](#); Gyeongsang National University, Korea (the Republic of)

SESSION EL03.09: Towards 2D Material-Based Electronic Devices II

Session Chairs: Luca Camilli and Humberto Gutierrez

Thursday Morning, April 10, 2025

Summit, Level 4, Room 425

**8:30 AM EL03.09.01**

**Transparent Photo-Driven Neurotransmitter Using 2D SnS Photodetectors and Artificial Synapses** [Joondong Kim](#), Naveen Kumar and Malkeshkumar Patel; Incheon National University, Korea (the Republic of)

**8:45 AM EL03.09.02**

**Degenerately Doped Thermally Stable 2D Transistors with Low Contact Resistance** [Inha Kim](#)<sup>1,2</sup>, Naoki Higashitarumizu<sup>1,2,3</sup> and Ali Javey<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>JST PRESTO, Japan

**9:00 AM \*EL03.09.03**

**There's Plenty of Room at the Bottom when Everything is 2D** [Kirby Maxey](#), Wouter Mortelmans, Azimkhan Kozhakhmetov, Pratyush Buragohain, Ande Kitamura, Santiago Miret, Marc Jaikissoon, Chelsey Dorow, Carly Rogan, Lutfi Siddiqui, Rahul Ramamurthy, Jennifer Lux, Shane Harlson, Eric Gillispie, Tyrone Wilson, Adedapo Oni, Ashish Penumatcha, Mahmut Kavrik, Sudarat Lee, Andrey Vyatskikh, Nazmul Arefin, David Kencke, Joshua Kevek, Tristan Tronic, Matthew Metz, Scott Clendenning, Kevin P. O'Brien and Uygur Avci; Intel Corporation, United States

**9:30 AM BREAK**

SESSION EL03.10: On the Transition Metal Dichalcogenides

Session Chairs: Luca Camilli and Kirby Maxey

Thursday Morning, April 10, 2025

Summit, Level 4, Room 425

**10:00 AM \*EL03.10.01**

**Pulsed Laser Deposition of 2D Transition Metal Dichalcogenides—From Large-Area Single-Layers to Hetero-Bilayers and Lateral Heterostructures**

Francesco Tumino<sup>1</sup>, Paolo S. D'Agosta<sup>2</sup>, Alice Cartoceti<sup>2</sup>, Valeria Russo<sup>2</sup>, Carlo S. Casari<sup>2</sup> and [Andrea Li Bassi](#)<sup>2</sup>; <sup>1</sup>Queen's University, Canada; <sup>2</sup>Politecnico di Milano, Italy

**10:30 AM EL03.10.02**

**Achieving Boosted Thermoelectric Power Factor of MoS<sub>2</sub> Through Selective Charged-Impurity Free Doping** [Sooyeon Moon](#)<sup>1,2</sup>, Kyungjune Cho<sup>3</sup>,

Hyejin Jang<sup>1</sup> and Seungjun Chung<sup>2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of); <sup>3</sup>Korea Institute of Science and Technology, Korea (the Republic of)

**10:45 AM EL03.10.03**

**Low Resistance and Stable P-Type Contacts to Monolayer WSe<sub>2</sub> Through Chlorinated Solvent Doping** [Lauren Hoang](#), Ahn Tuan Hoang, Tara Pena,

Zhepeng Zhang, Zhenghan Peng, Marisa Hocking, Ashley P. Saunders, Fang Liu, Eric Pop and Andrew J. Mannix; Stanford University, United States

**11:00 AM EL03.10.04**

**Back-End of the Line Compatible Growth of Wafer Scale MoS<sub>2</sub> Bilayer for Neuromorphic Device Application** [Prashant Bisht](#), Junoh Shim and

Sunkook Kim; Sungkyunkwan University, Korea (the Republic of)

**11:15 AM EL03.10.05**

**Atomic Oxygen Treatment for Uniform High- $\kappa$  Dielectric Deposition on TMD Monolayers** [Khondker Shihabul Hoque](#), Jiaxuan Wen and Steven J.

Koester; University of Minnesota Twin Cities, United States

**11:30 AM \*EL03.10.06**

**A microscopic view of twisted 2D materials using scanning tunneling microscopy** [Adina Luican-Mayer](#); University of Ottawa, Canada

SESSION EL03.11: Growth of 1D, 2D and 3D Structures

Session Chairs: Mads Brandbyge and Andrea Li Bassi

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 425

**1:30 PM \*EL03.11.01**

**Supertwisted Chiral 2D Quantum Materials Through Self-Assembly and Screw Dislocations** [Song Jin](#); University of Wisconsin-Madison, United States

**2:00 PM EL03.11.02**

**Synthesis and Structural Characterization of Nanowire and Other Nanostructures of PdSe<sub>2</sub>** [Kaylin Xu](#), Nicholas Hagopian, Paul M. Voyles and Song

Jin; University of Wisconsin-Madison, United States

**2:15 PM EL03.11.03**

**The Growth of Gold Within a Two-Dimensional Confined Space Created by Twisted Bilayer Molybdenum Disulfide** [Yi Cui](#) and Robert Sinclair;

Stanford University, United States

**2:30 PM BREAK**

SESSION EL03.12: Properties of 2D Heterostructures

Session Chairs: Mads Brandbyge and Song Jin

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 425

**3:00 PM \*EL03.12.01**

**Spatial Modulation of Composition, Bandgap, Doping and Magnetism in Two-Dimensional Lateral Heterostructures** Humberto R. Gutierrez;

University of South Florida, United States

**3:30 PM \*EL03.12.02**

**Synthetic Magnetic 2D Materials and Heterostructures** Cecilia Mattevi; Imperial College London, United Kingdom

**4:00 PM EL03.12.03**

**Catalytic Activity Modulation and Field Effects in 2D-Confined Metals via van der Waals Heterostructures** Arturo Medina, Ines Saih, Vikas

Muralidharan and Faisal Alamgir; Georgia Institute of Technology, United States

**4:15 PM \*EL03.12.04**

**A Twist in Complex Oxides** Mar Garcia Hernandez<sup>1</sup>, Gabriel Sanchez-Santolino<sup>2</sup>, Thomas Pucher<sup>1</sup>, Victor Rouco<sup>2</sup>, Victor Zamora<sup>2</sup>, Hugo Aramberri<sup>3</sup>, Sergio Puebla<sup>1</sup>, Fabian Cuellar<sup>2</sup>, Federico J. Mompean<sup>1</sup>, Mariona Cabero<sup>2</sup>, Yong Xie<sup>1,4</sup>, Estrella Sanchez-Viso<sup>1</sup>, Carmen Munuera<sup>1</sup>, Carlos Leon<sup>2</sup>, Andres Castellanos-Gomez<sup>1</sup>, Jorge Iniguez-Gonzalez<sup>3</sup> and Jacobo Santamaria<sup>2</sup>; <sup>1</sup>CSIC, Spain; <sup>2</sup>Universidad Complutense de Madrid, Spain; <sup>3</sup>Luxembourg Institute of Science and Technology, Luxembourg; <sup>4</sup>Xidian University, China

SESSION EL03.13: Towards 2D Material-Based Electronic Devices III

Session Chairs: Luca Camilli and Camilla Coletti

Friday Morning, April 11, 2025

Summit, Level 4, Room 425

**8:15 AM EL03.13.01**

**Superconducting Layered NbSe<sub>2</sub> Electrodes for Semiconductors** Yeonjoo Lee<sup>1</sup>, Yeonhoo Kim<sup>2</sup>, Junghwan Lee<sup>3</sup>, Sergiy Krylyuk<sup>4</sup>, Roxanne Tutchtou<sup>1</sup>, Jian-Xin Zhu<sup>1</sup>, Hoon Hahn Yoon<sup>3</sup>, Albert Davydov<sup>4</sup> and Jinkyoun Yoo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Korea Research Institute of Standards and Science, Korea (the Republic of); <sup>3</sup>Gwangju Institute of Science and Technology, Korea (the Republic of); <sup>4</sup>National Institute of Standards and Technology, United States

**8:30 AM \*EL03.13.02**

**2D Materials for Future Physical Computing** Feng Miao; Nanjing University, China

**9:00 AM EL03.13.03**

**High-Performance CVD Monolayer WSe<sub>2</sub> pFETs** Lei Sun and Xuefei Li; Huazhong University of Science & Technology, China

**9:15 AM EL03.13.04**

**Nanoscale Editing of Multi and Single Layer WS<sub>2</sub> via Gas-Assisted Focused Electron Beam Induced Etching for Device Prototyping** Brendan S. Gellerup<sup>1,2</sup>, John Lasseter<sup>2</sup>, Sujoy Ghosh<sup>2</sup>, Kai Xiao<sup>2</sup>, Scott T. Retterer<sup>2</sup>, Steven Randolph<sup>2</sup> and Philip Rack<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**9:30 AM \*EL03.13.05**

**Assessing the Electronics of 2D Heterostructures—Stacked, Joined, Nested or Shaped to a Topography** Boris I. Yakobson, Sunny Gupta, Xingfu Li and Junjie Zhang; Rice University, United States

**10:00 AM BREAK**

SESSION EL03.14: Graphene and Graphene-Based Heterostructures

Session Chairs: Feng Miao and Boris Yakobson

Friday Morning, April 11, 2025

Summit, Level 4, Room 425

**10:30 AM \*EL03.14.01**

**INDUSTRY TRACK: Novel Synthetic Approaches for High-Mobility Graphene—From Decoupled Graphene on Cu/Sapphire to Artificial Intelligence Assisted Growth** [Camilla Coletti](#); Istituto Italiano di Tecnologia, Italy

**11:00 AM \*EL03.14.02**

**Twist Angle Effects on the Electronic Structure of Graphene and WS<sub>2</sub>** [Antonija Grubisic-Cabo](#); University of Groningen, Netherlands

**11:30 AM EL03.14.03**

**Property Changes Induced by Proton Irradiation of Graphene/WS<sub>2</sub> van der Waals Heterostructure** [Yeonjoo Lee](#)<sup>1</sup>, Xuejing Wang<sup>2</sup>, Michael T. Pettes<sup>1</sup>, Yongqiang Wang<sup>1</sup>, Andrew Jones<sup>1</sup> and Jinkyong Yoo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Macau University of Science and Technology, China

**11:45 AM EL03.14.04**

**Quantum Transport and Fractional Hall Effect in Moiré Correlated/Anticorrelated Interface Channels** [Farzaneh Shayeganfar](#)<sup>1,2</sup> and Ali Ramazani<sup>3</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Amirkabir University of Technology, Iran (the Islamic Republic of); <sup>3</sup>Massachusetts Institute of Technology, United States

SESSION EL03.15: Properties of van der Waals Crystal

Session Chair: Mads Brandbyge

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 425

**1:30 PM \*EL03.15.01**

**Ion Transport Within van der Waals Crystals** [Wooyoung Shim](#); Yonsei University, Korea (the Republic of)

**2:00 PM EL03.15.02**

**Mononuclear Bonds and Their Impact on the Functional Properties of 2D Layered van der Waals Materials** [Peng Yan](#), Anthony Casale and Joseph W. Bennett; University of Maryland, Baltimore County, United States

**2:15 PM EL03.15.03**

**First-Principles Investigation of the Resistive Switching Mechanism in Monolayer MoS<sub>2</sub>—Insights into Metal Diffusion and Adsorption** [Jameela Fatheema](#)<sup>1</sup>, Liangbo Liang<sup>2</sup>, Wennie Wang<sup>1</sup> and Deji Akinwande<sup>1</sup>; <sup>1</sup>The University of Texas at Austin, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**2:30 PM BREAK**

SESSION EL03.16: Organic-Based Heterostructures

Session Chairs: Luca Camilli and Wooyoung Shim

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 425

**3:00 PM EL03.16.01**

**Carbon Nanotube Interconnected Polypyrrole@ E-MXene Organic-Inorganic Hybrids for Interdigitated In-Plane Supercapacitors for Wearable Applications** [Namsheer Kuniyil](#)<sup>1,2</sup>, Seetha Lakshmy<sup>2</sup>, Chandra Sekhar Rout<sup>1</sup> and Chandra Shekhar Sharma<sup>2</sup>; <sup>1</sup>Jain University, India; <sup>2</sup>Indian Institute of

Technology Hyderabad, India

**3:15 PM EL03.16.02**

**A New Structure for High-Performance Operation of Oxide and Organic Semiconductor Heterojunction Transistors—Spatially Separating Layer Sandwiched Anti-Ambipolar Transistor** [Youngmin Han](#) and Hocheon Yoo; Gachon University, Korea (the Republic of)

**3:30 PM EL03.16.03**

**Modeling of Interlayer Heterogeneity in Electroactive Covalent Organic Frameworks** [Tim Kowalczyk](#); Western Washington University, United States

## SYMPOSIUM EL04

Radiation Effects in Semiconductors for Extreme Environments

April 7 - April 9, 2025

Symposium Organizers

Dan Fleetwood, Vanderbilt University

Ulrike Grossner, ETH Zurich - APS

Miaomiao Jin, The Pennsylvania State University

Tania Roy, Duke University

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL04.01: Device Hardening and Radiation Tolerance

Session Chairs: Stefano Bonaldo and Enxia Zhang

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 438

**1:30 PM \*EL04.01.01**

**Advancing Radiation-Hard Electronics with Group-III Nitride Semiconductors** [Miguel C. Sequeira](#)<sup>1</sup>, Sall Mamour<sup>2</sup>, Flyura Djurabekova<sup>3</sup>, Kai H. Nordlund<sup>3</sup>, Isabelle Monnet<sup>2</sup>, Clara Grygiel<sup>2</sup>, Christian Wetzel<sup>4</sup> and Katharina Lorenz<sup>5</sup>; <sup>1</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany; <sup>2</sup>Centre de recherche sur les Ions, les Matériaux et la Photonique, France; <sup>3</sup>University of Helsinki, Finland; <sup>4</sup>Rensselaer Polytechnic Institute, United States; <sup>5</sup>Instituto Superior Técnico, Universidade de Lisboa, Portugal

**2:00 PM EL04.01.02**

**The Effect of Interfaces in Increasing the Radiation Damage Tolerance Demonstrated in GaAs/AlAs Superlattice** [Ella K. Pek](#)<sup>1</sup>, Thai Hang Chung<sup>2</sup>, Chao Jiang<sup>1</sup>, Amey Khanolkar<sup>1</sup>, Zilong Hua<sup>1</sup>, Kevin D. Vallejo<sup>1</sup>, Brelon J. May<sup>1</sup>, Anshul Kamboj<sup>1</sup>, Kaustubh Bawane<sup>1</sup>, Marat Khafizov<sup>3</sup>, David Hurley<sup>1</sup>, Farida Selim<sup>2</sup>, Trent A. Garrett<sup>4</sup>, Maddison D. Nordstrom<sup>4</sup>, Paul J. Simmonds<sup>5</sup> and Cody A. Dennett<sup>6</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Arizona State University, United States; <sup>3</sup>The Ohio State University, United States; <sup>4</sup>Boise State University, United States; <sup>5</sup>Tufts University, United States; <sup>6</sup>Massachusetts Institute of Technology, United States

**2:15 PM EL04.01.03**

**Atoms to Devices—Evolution of Heterostructure Degradation in High Energy Environments** [Bethany Matthews](#)<sup>1</sup>, Kayla H. Yano<sup>1</sup>, Jenna Pope<sup>1</sup>, Christina Doty<sup>1</sup>, Mike Holden<sup>1</sup>, Xin Zhang<sup>1</sup>, Skye Supakul<sup>1</sup> and Khalid Hattar<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>The University of Tennessee, Knoxville, United States

**2:30 PM \*EL04.01.04**

**Voltage-Stress- and Radiation-Induced Gate Leakage During Cryogenic Operation of AlGaIn/GaN HEMTs** Enxia Zhang<sup>1</sup>, Xun Li<sup>2</sup>, Ronald Schrimpf<sup>2</sup> and Dan Fleetwood<sup>2</sup>; <sup>1</sup>University of Central Florida, United States; <sup>2</sup>Vanderbilt University, United States

**3:00 PM BREAK**

**3:30 PM EL04.01.05**

**Multimodal Characterization of 2D Semiconductors Irradiated by High-Energy, High-Fluence Protons** Farhan Zahin<sup>1</sup>, Tuan Dung Nguyen<sup>1</sup>, Fangyuan Liu<sup>2</sup>, Sisi Xiang<sup>1</sup>, Zhenping Wang<sup>2</sup>, Jiadi Zhu<sup>3</sup>, Mengru Jin<sup>1</sup>, Fevronia Andreou<sup>1</sup>, Enzi Zhai<sup>1</sup>, Yusong Deng<sup>2</sup>, Jeewan Ranasinghe<sup>4</sup>, Arnab Maji<sup>1</sup>, Xunqiandi Cao<sup>1</sup>, Christian Schade<sup>1</sup>, Matthew Cupich<sup>1</sup>, Rachel Lee<sup>1</sup>, Dhruv Nandwani<sup>1</sup>, Joshua Yough<sup>1</sup>, Griffin Turner<sup>1</sup>, Henry Clark<sup>1</sup>, Kelvin Y. Xie<sup>1</sup>, Sarbajit Banerjee<sup>1,1</sup>, Shengxi Huang<sup>4,4</sup>, Qing Tu<sup>1</sup>, Tomás Palacios<sup>3</sup>, Curtis Hill<sup>5</sup>, Cong Su<sup>2</sup> and Yuxuan Cosmi Lin<sup>1,1</sup>; <sup>1</sup>Texas A&M University, United States; <sup>2</sup>Yale University, United States; <sup>3</sup>Massachusetts Institute of Technology, United States; <sup>4</sup>Rice University, United States; <sup>5</sup>NASA Marshall Space Flight Center, United States

**3:45 PM \*EL04.01.06**

**From Neutron-SiC Interactions to the Destruction of the SiC MOSFETs by SEB** Rosine Coq Germanicus<sup>1,2</sup>, Alain Michez<sup>3</sup>, Kimmo Niskanen<sup>4</sup>, Guillaume Bascoul<sup>5</sup> and Frederic Wrobel<sup>3</sup>; <sup>1</sup>University of Caen Normandie, France; <sup>2</sup>CRISMAT UMR6508, France; <sup>3</sup>Université de Montpellier, France; <sup>4</sup>University of Jyväskylä, Finland; <sup>5</sup>CNES, France

**4:15 PM \*EL04.01.07**

**Total-Ionizing-Dose Degradation Mechanisms in Nanometer-Scale CMOS Technologies** Stefano Bonaldo<sup>1</sup>, Giulio Borghello<sup>2</sup> and Federico Faccio<sup>2</sup>; <sup>1</sup>University of Padova, Italy; <sup>2</sup>CERN, Switzerland

**4:45 PM EL04.01.08**

**Effects of Electronic Energy Loss on Damage Evolution in Oxide Perovskites Under Ion Irradiation** William J. Weber; University of Tennessee, United States

SESSION EL04.02: Radiation Damage Characterization and Effects

Session Chairs: Esmat Farzana and Fan Ren

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 438

**10:30 AM \*EL04.02.01**

**Radiation Damage Effects in the UWBG Semiconductors Ga<sub>2</sub>O<sub>3</sub> and AlN** Fan Ren<sup>1</sup>, Jian Sian Li<sup>1</sup>, Chao-Ching Chiang<sup>1</sup>, Hsiao-Hsuan Wan<sup>1</sup>, Aman Haque<sup>2</sup>, Leonid Chernyak<sup>3</sup>, Alfons Schulte<sup>3</sup>, Ani Khachatrian<sup>4</sup>, Jihyun Kim<sup>5</sup>, Alexander Polyakov<sup>6</sup> and Stephen Pearton<sup>1</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>The Pennsylvania State University, United States; <sup>3</sup>University of Central Florida, United States; <sup>4</sup>U.S. Naval Research Laboratory, United States; <sup>5</sup>Seoul National University, Korea (the Republic of); <sup>6</sup>National University of Science and Technology MISiS, Russian Federation

**11:00 AM EL04.02.02**

**Electron Beam-Induced Alterations in Deformation Behavior of Oxide Materials for Semiconductor Devices** In-Suk Choi; Seoul National University, Korea (the Republic of)

**11:15 AM \*EL04.02.03**

**Radiation Effects on Vertical  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> High-Power Diodes** Esmat Farzana<sup>1</sup>, Nolan Hendricks<sup>2</sup>, Sajal Islam<sup>3</sup>, Aditha Senarath<sup>3</sup>, Arijit Sengupta<sup>3</sup>, Rick M. Cadena<sup>3</sup>, Dennis R. Ball<sup>3</sup>, Enxia Zhang<sup>4</sup>, Dan Fleetwood<sup>3</sup>, Ronald Schrimpf<sup>3</sup> and James Speck<sup>5</sup>; <sup>1</sup>Iowa State University, United States; <sup>2</sup>Air Force Research Laboratory, United States; <sup>3</sup>Vanderbilt University, United States; <sup>4</sup>University of Central Florida, United States; <sup>5</sup>University of California, Santa Barbara, United States

**11:45 AM EL04.02.04**

**Piezoelectric Surface Acoustic Device Behavior in Nuclear Reactor Environment** Ryan Chesser and Marat Khafizov; The Ohio State University, United States

SESSION EL04.03: Modeling and Simulation of Radiation Effects

Session Chairs: Dan Fleetwood and Blair Tuttle

Tuesday Afternoon, April 8, 2025  
Summit, Level 4, Room 438

**1:45 PM EL04.03.01**

**Simulations of the Effect of Temperature on the Broadening of Defect Absorption Lines** [Rodrigo García Álvarez Valeiras](#)<sup>1</sup>, Antoine Jay<sup>1</sup>, Anne Hemeryck<sup>1</sup>, David Fernandes Machado<sup>1</sup> and Maria D. Bolino<sup>1,2</sup>; <sup>1</sup>CNRS, France; <sup>2</sup>Onera, France

**2:00 PM \*EL04.03.02**

**An *Ab Initio* Approach to Closing the “10-100 eV Gap” for Charge-Carrier Thermalization in Semiconductors** [Massimo Fischetti](#)<sup>1</sup>, Dallin Nielsen<sup>1</sup>, Chris G. Van de Walle<sup>2</sup>, Sokrates Pantelides<sup>3</sup>, Laura Nichols<sup>3</sup>, Ronald Schrimpf<sup>3</sup> and Dan Fleetwood<sup>3</sup>; <sup>1</sup>The University of Texas at Dallas, United States; <sup>2</sup>University of California, Santa Barbara, United States; <sup>3</sup>Vanderbilt University, United States

**2:30 PM EL04.03.03**

**Non-Equilibrium Defect Formation Energies—What Happens to Defect Concentrations in the Presence of Excess Carriers?** Isaac D. Thomas and [Mike Scarpulla](#); University of Utah, United States

**2:45 PM BREAK**

**3:15 PM \*EL04.03.04**

**First-Principles Studies of Radiation Damage Mechanisms** [Chris G. Van de Walle](#); University of California, Santa Barbara, United States

**3:45 PM EL04.03.05**

***Ab Initio* Crystal Trajectory Sampling of Electronic Stopping Power for Non-Metallic Materials—Application to Si** [Thomas Jarrin](#); Commissariat à l'énergie atomique et aux énergies alternatives, France

**4:00 PM \*EL04.03.06**

**Microscopic Theory of Displacement Damage in Semiconductors—Threshold Energies, Electronic Structure and Device Consequences** [Blair Tuttle](#); Penn State Behrend, United States

**4:30 PM EL04.03.07**

**First-Principles Investigation of Low-Energy Recoils and Nonradiative Carrier Capture Rates for Defect Complexes in GaN** [Alexander S. Hauck](#)<sup>1</sup>, Blair Tuttle<sup>2</sup> and Miaomiao Jin<sup>1</sup>; <sup>1</sup>The Pennsylvania State University, United States; <sup>2</sup>Penn State Behrend, United States

**4:45 PM EL04.03.08**

**Using Machine Learning Potentials to Describe Collision Cascades Phenomena in Germanium** [Adrien Hellier](#)<sup>1,2</sup>, Antoine Jay<sup>2</sup>, Nicolas Richard<sup>1</sup>, Anne Hemeryck<sup>2</sup> and Thomas Jarrin<sup>1</sup>; <sup>1</sup>CEA/DAM, France; <sup>2</sup>Laboratoire d'Analyse et d'Architecture des Systèmes, France

SESSION EL04.04: Poster Session: Radiation Damage in Devices and Semiconductor Materials

Session Chairs: Dan Fleetwood and Miaomiao Jin

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL04.04.01**

**Heavy Ion Induced SEB Robustness for Wide Bandgap and Ultra-Wide Bandgap Semiconductors** [Zhaowen He](#), Borca-Tasciuc Giorgian, Dongyang Li, Wei Ji and T. Paul Chow; Rensselaer Polytechnic Institute, United States

**EL04.04.02**

**Molecular Dynamics Evaluation of the Displacement Threshold Energy in GaAs and GaN** Julien Parize<sup>1</sup>, Lilian Khelladi<sup>1</sup>, [Nicolas Richard](#)<sup>1,2</sup>, Anne Hemeryck<sup>3</sup> and Thomas Jarrin<sup>1</sup>; <sup>1</sup>CEA, France; <sup>2</sup>Université Paris-Saclay, France; <sup>3</sup>Centre National de la Recherche Scientifique, France

**EL04.04.03**

**Proton and X-Ray Irradiation Effects on Al<sub>2</sub>O<sub>3</sub> /  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> MIS Capacitors** [Quinn H. Shuai](#)<sup>1</sup>, Joseph McGlone<sup>1</sup>, Hemant Jagannath Ghadi<sup>1</sup>, Lingyu



Meng<sup>1</sup>, Hongping Zhao<sup>1</sup>, Michael McCurdy<sup>2</sup>, Christopher M. Smyth<sup>3</sup>, Edward Bielejec<sup>3</sup>, Bas Vaandrager<sup>3</sup>, Aaron R. Arehart<sup>1</sup> and Steven Ringel<sup>1</sup>; <sup>1</sup>The Ohio State University, United States; <sup>2</sup>Vanderbilt University, United States; <sup>3</sup>Sandia National Laboratories, United States

SESSION EL04.05: High-Energy Radiation and Materials Responses

Session Chairs: Miaomiao Jin and Andrew O'Hara

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 438

**8:30 AM \*EL04.05.01**

**Effects of Energetic Ion Strikes in Wide-Gap Semiconductors** Andrew O'Hara<sup>1,2</sup>, Haardik Pandey<sup>2</sup>, Grant M. Mayberry<sup>2</sup>, Demos Negash<sup>2</sup>, Ronald Schrimpf<sup>2</sup>, Dan Fleetwood<sup>2,2</sup> and Sokrates Pantelides<sup>2,2</sup>; <sup>1</sup>Western Michigan University, United States; <sup>2</sup>Vanderbilt University, United States

**9:00 AM EL04.05.02**

**High-Energy Radiation Hardness of Isotopically Pure Monolayer MoS<sub>2</sub> Probed by Raman Spectroscopy** Jerry A. Yang<sup>1</sup>, Tara Pena<sup>1</sup>, Adam Wright<sup>2</sup>, Paul Adams<sup>2</sup>, Ahn Tuan Hoang<sup>1,1</sup>, Jennifer Taggart<sup>2</sup>, Dicky Daniel<sup>2</sup> and Eric Pop<sup>1,1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>The Aerospace Corporation, United States

**9:15 AM EL04.05.03**

**Self-Healing Semiconducting Chalcogenide Glasses Upon Gamma Irradiation** Myungkoo Kang<sup>1</sup>, Byoung-Uk Sohn<sup>2</sup>, Qingyang Du<sup>3</sup>, Danhao Ma<sup>3</sup>, Raturaj Pujari<sup>3</sup>, Anupama Yadav<sup>4</sup>, Patrick Lynch<sup>1</sup>, Jonathan Lee<sup>4</sup>, Spencer Novak<sup>5</sup>, Casey Schwarz<sup>6</sup>, Igor Luzinov<sup>5</sup>, Juejun Hu<sup>3</sup>, Anuradha Agarwal<sup>3</sup>, Dawn Tan<sup>2</sup> and Kathleen Richardson<sup>4</sup>; <sup>1</sup>Alfred University, United States; <sup>2</sup>Singapore University of Technology and Design, Singapore; <sup>3</sup>Massachusetts Institute of Technology, United States; <sup>4</sup>University of Central Florida, United States; <sup>5</sup>Clemson University, United States; <sup>6</sup>Ursinus College, United States

**9:30 AM BREAK**

**10:00 AM EL04.05.04**

**Investigating Radiation-Induced Crystalline Defects in AlGaN** Miaomiao Jin, Farshid Reza, Alexander S. Hauck, Mahjabin Mahfuz, Xing Wang, Rongming Chu and Blair Tuttle; The Pennsylvania State University, United States

**10:15 AM EL04.05.05**

**Damage Buildup in Ultrathin Boron Nitride Under Ion Bombardment** Minsuk Seo<sup>1</sup>, Finnian O'Neill<sup>1</sup>, Leonardus Bimo Bayu Aji<sup>1</sup>, Sreya Vangara<sup>2</sup>, Sang Cheol Kim<sup>2</sup>, Yan-Kai Tzeng<sup>3</sup>, Chang-Eun Kim<sup>1</sup>, Yilong Zhou<sup>1</sup>, Liwen Wan<sup>1</sup>, Bo Wang<sup>1</sup>, Tae Wook Heo<sup>1</sup>, Luis A. Zepeda-Ruiz<sup>1</sup>, Steven Chu<sup>2</sup> and Sergei Kucheyev<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>Stanford University, United States; <sup>3</sup>SLAC National Accelerator Laboratory, United States

**10:30 AM \*EL04.05.06**

**Single-Event Effects Induced by Ultrafast Laser Pulses in Wide Bandgap Semiconductor Devices** Ani Khachatrian<sup>1</sup>, Stephen Buchner<sup>1,2</sup>, Stephen Pearton<sup>3</sup>, Fan Ren<sup>3</sup>, Aman Haque<sup>4</sup>, Joel Hales<sup>1,2</sup>, Adrian Ildefonso<sup>1</sup> and Dale McMorrow<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory, United States; <sup>2</sup>Jacobs Inc, United States; <sup>3</sup>University of Florida, United States; <sup>4</sup>The Pennsylvania State University, United States

**11:00 AM \*EL04.05.07**

**Comparison of Proton and Swift Heavy Ion-Induced Traps in GaN and  $\beta$ -Ga<sub>2</sub>O<sub>3</sub>** Dongseop Lee<sup>1</sup>, Yanzhen Zhao<sup>1</sup>, Zach Biegler<sup>2</sup>, Quinn H. Shuai<sup>1</sup>, Steven Ringel<sup>1</sup>, James Speck<sup>2</sup> and Aaron R. Arehart<sup>1</sup>; <sup>1</sup>The Ohio State University, United States; <sup>2</sup>University of California, Santa Barbara, United States

**11:30 AM EL04.05.08**

**Exploring the Role of Stress and Irradiation Fluence in Latent Track Formation in TiO<sub>2</sub> via Swift Heavy Ion Irradiation** Hamed Attariani; Wright State University, United States

SESSION EL04.06: Towards Understanding Radiation-induced Defects

Session Chairs: Ulrike Grossner and Peter Schultz

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 438

**3:30 PM EL04.06.01**

**First-principles Studies of Electron-Stimulated Si-H Bond Breaking** Woncheol Lee, Mark Turiansky and Chris G. Van de Walle; University of California, Santa Barbara, United States

**3:45 PM EL04.06.02**

**Using the Atomistically Informed Device Engineering (AIDE) Method to Identify Experimentally "Invisible" Defects—The Mystery of the Ga Vacancy in Gallium Arsenide** Leopoldo Diaz, Harold P. Hjalmarson, Jesse J. Lutz and Peter A. Schultz; Sandia National Laboratories, United States

**4:00 PM EL04.06.03**

**Toward Understanding Radiation Defects in a Ternary InGaAs Alloy** Peter A. Schultz and Evan M. Anderson; Sandia National Laboratories, United States

**4:15 PM EL04.06.04**

**Simulation of Near Zero Field Magnetoresistance Contributions from Vacancies in GaN as a Probe of Radiation Damage** Joseph R. Sink<sup>1</sup>, David Fehr<sup>1</sup>, Patrick M. Lenahan<sup>2</sup> and Michael E. Flatté<sup>1,3</sup>; <sup>1</sup>The University of Iowa, United States; <sup>2</sup>The Pennsylvania State University, United States; <sup>3</sup>Eindhoven University of Technology, Netherlands

**4:30 PM EL04.06.05**

**The role of Self-Interaction in detecting defects in irradiated semiconductors** Maria D. Bolino<sup>1,2</sup>, Layla Samos<sup>3</sup>, Christophe Inguibert<sup>1</sup>, Anne Hemeryck<sup>2</sup>, Thomas Jarrin<sup>4</sup>, Nicolas Richard<sup>4</sup>, Rodrigo Garcia Alvarez Valeiras<sup>2</sup> and Antoine Jay<sup>2</sup>; <sup>1</sup>ONERA, France; <sup>2</sup>CNRS, France; <sup>3</sup>CNR-IOM, Italy; <sup>4</sup>CEA, France

## SYMPOSIUM EL05

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2D and 3D Printed Optoelectronics and Sensors—Advanced Materials, Device Functionality and Systems  
April 8 - April 11, 2025

Symposium Organizers

Mujeeb Chaudhry, Durham University  
Gerardo Hernandez-Sosa, Karlsruhe Institute of Technology  
Wei Lin Leong, Nanyang Technological University  
Tse Nga Ng, University of California, San Diego

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL05.01: 3D Printing and Nanomaterials I

Session Chairs: Gerardo Hernandez-Sosa and Wei Lin Leong

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 431

**10:30 AM \*EL05.01.01**

**Self-Healing and Recyclable Printed Electronics** Fabio Ciccoira; Ecole Polytechnique de Montreal, Canada

**11:00 AM EL05.01.02**

**3D Printed Gyroid Designs for Pressure Sensing Applications** Chao Bao and Woo Soo Kim; Simon Fraser University, Canada

**11:15 AM EL05.01.03**

**High Durometer, Mechanically Durable Silicone Elastomers for 3D Printing** Spencer Schmidt; Lawrence Livermore National Laboratory, United States

**11:30 AM EL05.01.04**

**Digital Light Processing 3D Printing of Piezoelectric Ceramics—Materials, 3D Printing, and Debinding and Sintering** Insup Kim<sup>1,2</sup>, Hui-suk Yun<sup>1,3</sup> and Yong-Jin Yoon<sup>2</sup>; <sup>1</sup>Korea Institute of Materials Science, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Korea University of Science and Technology (UST), Korea (the Republic of)

**11:45 AM EL05.01.05**

**3D-Printed Plastic Scintillators for Environmental Analysis and Decontamination** Vivek Anand, Bhavika Bansal and Anil Kumar Gourishetty; Indian Institute of Technology Roorkee, India

SESSION EL05.02: 3D Printing and Nanomaterials II

Session Chairs: Sungjune Jung and Wenzhuo Wu

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 431

**1:30 PM \*EL05.02.01**

**Tissue-Interfaced Organic Bioelectronics** Sungjune Jung; Pohang University of Science and Technology, Korea (the Republic of)

**2:00 PM EL05.02.02**

**Optimizing 3D-Printable Wearable Piezoelectric Nanocomposites Through Poling Agent Integration** Haotian Lu<sup>1,2</sup>, Victor Couedel<sup>1</sup> and Xiaoyu (Rayne) Zheng<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>University of California, Los Angeles, United States

**2:15 PM EL05.02.03**

**Rapid and Flexible Prototyping of Custom Devices with Direct Atomic Layer Deposition (DALP)** Simone Santucci, Louise Anderfaas and Benjamin Borie; Atlant 3D, Denmark

**2:30 PM EL05.02.04**

**3D Printing of Architected Hydrophone** Victor Couedel, Haotian Lu and Xiaoyu (Rayne) Zheng; University of California, Berkeley, United States

**2:45 PM BREAK**

**3:15 PM \*EL05.02.05**

**Layer-by-Layer Assembly of Two-Dimensional MXene Nanosheets with Polyelectrolyte and Emerging Applications** Jodie Lutkenhaus, Micah Green and Miladin Radovic; Texas A&M University, United States

**3:45 PM \*EL05.02.06**

**Tellurene Electronics and Beyond** Wenzhuo Wu; Purdue University, United States

**4:15 PM EL05.02.07**

**Layer-by-Layer Assembly and Structured Color of Ti<sub>3</sub>C<sub>2</sub>T<sub>z</sub> MXene/Polyelectrolyte Heterostructures** Natalie Neal, Micah Green, Miladin Radovic and Jodie Lutkenhaus; Texas A&M University, United States

**4:30 PM \*EL05.02.08**

**Transduction of Intracellular Action Potentials in Cardiomyocytes with Printed Electrolyte-Gated Polymer Transistors** Mario Caironi; Istituto Italiano di Tecnologia, Italy

SESSION EL05.03: Nanomaterials and Their Applications I

Session Chairs: Mujeeb Chaudhry and Wei Lin Leong

Wednesday Morning, April 9, 2025  
Summit, Level 4, Room 431

**9:00 AM \*EL05.03.01**

**Printed Bioelectronics for Multimodal Physiochemical Sensing** Wei Gao; California Institute of Technology, United States

**9:30 AM EL05.03.02**

**Strong Dipolar Intermolecular Correlations and High Performance Zwitterionic Dielectric Materials** Loren G. Kaake; Simon Fraser University, Canada

**9:45 AM EL05.03.03**

**Development of Piezo-Electric, Nitride Based Material Using a Gas-Phase Reactive Additive Manufacturing System** Kourtney Porsch; Johns Hopkins University Applied Physics Laboratory, United States

**10:00 AM BREAK**

**10:30 AM EL05.03.04**

**Functionalized Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub>-Au Nanomaterials with Tunable SERS Enhancement for Sensitive Detection of Pathogenic Bacteria** Ya-Ching Yu<sup>1</sup>, Anupma Thakur<sup>1,2</sup>, Xu Ke<sup>1</sup>, Nithin C. B.S.<sup>3</sup>, Zhijian Wang<sup>1</sup>, Xinghang Zhang<sup>1</sup>, Babak Anasori<sup>1,2</sup> and Lia Stanciu<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Indiana University-Purdue University Indianapolis, United States; <sup>3</sup>Indian Institute of Technology Madras, India

**10:45 AM EL05.03.05**

**Ligand-Exchange Assisted Nano-Printing of Colloidal Nanocrystals to Enable All-Printed Sub-Micron Optoelectronics** Zhixuan Zhao; The University of Hong Kong, Hong Kong

**11:00 AM EL05.03.06**

**Screen-Printed Electrodes Modified with Electropolymerized Poly(Ortho-Ethoxyaniline) (POEA) Films Grafted with Graphene Derivatives** Fabio R. Simoes<sup>1</sup>, José H. Carnaúba<sup>1</sup>, Milton A. Cardoso<sup>1</sup>, Gabriela M. Araújo<sup>2</sup> and Christopher M. Brett<sup>3</sup>; <sup>1</sup>Federal University of São Paulo, Brazil; <sup>2</sup>Federal University of São Carlos, Brazil; <sup>3</sup>University of Coimbra, Portugal

**11:15 AM EL05.03.07**

**Flexible Strain Sensors with Ultra-High Sensitivity Using ZnO-Assisted Laser-Induced Graphene** Do Hoon Lee, Takuma Miyashita, Yan Xuan and Kuniharu Takei; Hokkaido University, Japan

**11:30 AM EL05.03.08**

**Femtosecond-Laser-Induced Graphene Formation for Smart Textiles** Dongwook Yang<sup>1</sup>, Han Ku Nam<sup>1</sup>, Younggeun Lee<sup>1</sup>, Hyeonwoo Kim<sup>1</sup>, Seung-Woo Kim<sup>1</sup>, Soongeun Kwon<sup>2</sup> and Young-Jin Kim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Institute of Machinery and Materials, Korea (the Republic of)

SESSION EL05.04: Nanomaterials and Their Applications II

Session Chairs: Gerardo Hernandez-Sosa and Tse Nga Ng

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 431

**1:30 PM \*EL05.04.01**

**Bio-Inspired Micro/Nanostructures for Skin-Like Soft Sensors** Hyunhyub Ko; Ulsan National Institute of Science and Technology, Korea (the Republic of)

**2:00 PM EL05.04.02**

**Fabrication of a Graphene-Based Chemiresistor for Ammonia Gas Detection** Nida Khattak<sup>1</sup>, Domenica Convertino<sup>2</sup>, Neeraj Mishra<sup>2</sup>, Thomas Kalach<sup>1</sup>, Camilla Coletti<sup>2</sup>, Stephen Sadow<sup>1</sup>, Sylvia Thomas<sup>1</sup> and Arash Takshi<sup>1</sup>; <sup>1</sup>University of South Florida, United States; <sup>2</sup>Istituto Italiano di Tecnologia, Italy

**2:15 PM EL05.04.03**

**Flexible Electrochemical Biosensor with Graphene and Gold Nanoparticle Modification for Enhanced e-ELISA Point-of-Care Biomarker Detection** Zahrasadat Hosseini and George Jie Yuan; The Hong Kong University of Science and Technology, Hong Kong

**2:30 PM BREAK**

**3:30 PM \*EL05.04.04**

**Printable Hydrogen Sensor for Distributed Monitoring Applications** Thomas D. Anthopoulos; The University of Manchester, United Kingdom

**4:00 PM EL05.04.05**

**AI-Driven 3D Electrophysiological Sensor for Non-Invasive Crop Health Monitoring** Yiting Chen and Woo Soo Kim; Simon Fraser University, Canada

**4:15 PM EL05.04.06**

**Control Strategies for Solution-Processed ZTO-Based Thin-Film Transistors Tailored Toward Volatile Organic Compound Detection** Lauren Miller<sup>1</sup>, Alejandro Galan Gonzalez<sup>2</sup>, Ben Nicholson<sup>1</sup>, Guillaume Monier<sup>3</sup>, Del Atkinson<sup>1</sup>, Dagou Zeze<sup>1</sup> and Mujeeb U. Chaudhry<sup>1</sup>; <sup>1</sup>Durham University, United Kingdom; <sup>2</sup>Instituto de Carboquímica, Spain; <sup>3</sup>Université Clermont Auvergne, France

**4:30 PM EL05.04.07**

**AI-Enhanced Flexible IL-6 Sensor—Smart Detection for Early Disease Alerts** Moritz Ploner<sup>1</sup>, Mattia Stighezza<sup>2</sup>, Bajramshah Shkodra<sup>1</sup>, Valentina Bianchi<sup>2</sup>, Michele Caselli<sup>2</sup>, Daniele Resnati<sup>3</sup>, Andrea Boni<sup>2</sup>, Paolo Lugli<sup>1</sup>, Iliaria De Munari<sup>2</sup> and Luisa Petti<sup>1</sup>; <sup>1</sup>Free University of Bozen-Bolzano, Italy; <sup>2</sup>Università degli Studi di Parma, Italy; <sup>3</sup>Empatica Srl, Italy

**4:45 PM EL05.04.08**

**Laser-Induced Graphene from Commercial Inks and Dyes** Alexander Dallinger<sup>1</sup>, Rachel Camerini<sup>2</sup>, Paola Parlanti<sup>3</sup>, Mauro Gemmi<sup>3</sup>, Sreenadh T. Sankaran<sup>4</sup>, Marina Galliani<sup>4</sup>, Rodorico Giorgi<sup>2</sup>, Birgit Kunert<sup>1</sup> and Francesco Greco<sup>4,5,1</sup>; <sup>1</sup>Graz University of Technology, Austria; <sup>2</sup>University of Florence, Italy; <sup>3</sup>Istituto Italiano di Tecnologia, Italy; <sup>4</sup>Sant'Anna School of Advanced Studies, Italy; <sup>5</sup>Scuola Superiore Sant'Anna, Italy

SESSION EL05.05: Innovations in Optoelectronics I

Session Chairs: Adam Bickerdike and Stefano Toffanin

Thursday Morning, April 10, 2025

Summit, Level 4, Room 431

**8:30 AM \*EL05.05.01**

**Out-of-Plane Photodetectors on Flexible Substrates Using Printed Technologies** Abhishek Dahiya and Ravinder Dahiya; Northeastern University, United States

**9:00 AM EL05.05.02**

**Fabrication of Laser-Induced Graphene (LIG) Diffractive Lenses on Flexible Colorless Polyimide (CPI) Substrates for Aerospace Applications** Younggeun Lee, Hyeokin Kang, Hyogeun Han, Seunghwan Kim, Dongwook Yang, Hyeonwoo Kim, Han Ku Nam, Seung-Woo Kim and Young-Jin Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**9:15 AM EL05.05.03**

**In Situ Structural Analysis of Blade Coated Dilute Donor Organic Solar Cells** Emma Spooner<sup>1</sup>, Rachel Kilbride<sup>2</sup>, Daniel Toolan<sup>3</sup>, Matthew Halsall<sup>1</sup> and Iain Crowe<sup>1</sup>; <sup>1</sup>University of Manchester, United Kingdom; <sup>2</sup>The University of Sheffield, United Kingdom; <sup>3</sup>The University of Manchester, United Kingdom

**9:30 AM \*EL05.05.04**

**Improved Charge Recombination Efficiency in Organic Light-Emitting Transistors via Luminescent Radicals** Stefano Toffanin; CNR-ISMN, Italy

**10:00 AM BREAK**

**10:30 AM \*EL05.05.05**

**Comprehensive Molecular Design from TADF to Organic Laser Molecules** Chihaya Adachi; Kyushu University, Japan

**11:00 AM EL05.05.06**

**Purely Electrical Detection of Electrolyte Concentration Through Microfluidic Impedance Spectroscopy** Thomas J. Wade, Thiagarajan Natarajan,

Sabryna Malik, Liam Ives, Nordin Catic and Sohini Kar-Narayan; University of Cambridge, United Kingdom

**11:15 AM EL05.05.07**

**Micropatterning of Mussel-Inspired Materials to Empower Selective Functionality of Microdevices** Zeynab Tavasolyzadeh<sup>1</sup>, Peng Tang<sup>2</sup>, Marc Benjamin Hahn<sup>1</sup>, Xenia Knigge<sup>1</sup>, Niclas Nordholt<sup>1</sup>, Jörg Radnik<sup>1</sup>, Rainer Haag<sup>2</sup>, Heinz Sturm<sup>1</sup> and [Ievgeniia Topolniaik](#)<sup>1</sup>; <sup>1</sup>Federal Institute for Materials Research and Testing, Germany; <sup>2</sup>Freie University Berlin, Germany

**11:30 AM \*EL05.05.08**

**Unravelling the Spatio-Temporal Exciton Dynamic of an Electrically Pumped Organic Laser** [Adam E. Bickerdike](#), Roderick Mackenzie and Mujeeb U. Chaudhry; Durham University, United Kingdom

SESSION EL05.06: Innovations in Optoelectronics II  
Session Chairs: Ravinder Dahiya and Graham Turnbull  
Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 431

**1:30 PM \*EL05.06.01**

**Integration of Nanoimprinted Layers in Organic Semiconductor Chemical Sensors and Lasers** [Graham A. Turnbull](#), Ross Gillanders, James Glackin, Edward Ogugu, Sagarika Mishra, Junyi Gong and Ifor Samuel; University of St Andrews, United Kingdom

**2:00 PM EL05.06.02**

**Double Layer Transfer Printing for High-Definition and Highly Efficient Quantum Dot Light-Emitting Diodes** [Moon Kee Choi](#); Ulsan National Institute of Science and Technology, Korea (the Republic of)

**2:15 PM EL05.06.03**

**Single Pixel Spectrometer Based on a Bias-Tunable Tandem Organic Photodetector** [Brendan T. O'Connor](#), Harry Schrickx, Abdullah Al Shafe, Caleb Moore and Michael Kudenov; North Carolina State University, United States

**2:30 PM \*EL05.06.04**

**Micro-to-Macro 3D Printing of Conductive Composites for Sensing and Soft Robotics** [Derya Baran](#)<sup>1</sup>, Daniel A. Corzo<sup>1,2</sup>, Emily Bezerra Alexandre<sup>1,2</sup> and Anuj Kumar<sup>1</sup>; <sup>1</sup>King Abdullah University of Science and Technology, Saudi Arabia; <sup>2</sup>Silicon Austria Labs, Austria

**3:00 PM BREAK**

**3:30 PM \*EL05.06.05**

**Infrared Photodetection Using Narrow Bandgap Conjugated Polymers** [Jason D. Azoulay](#); Georgia Institute of Technology, United States

**4:00 PM EL05.06.06**

**Photoluminescence Response of ZnO Nanostructures in Phosphate Optical Fibers for Chemical Sensing Applications** [Rayan Zaiter](#)<sup>1</sup>, Supattra Somsri<sup>2</sup>, Gabriel Loget<sup>2</sup>, David Talaga<sup>2</sup>, Angeline Poulon<sup>1</sup> and Thierry Cardinal<sup>1</sup>; <sup>1</sup>Institut de Chimie de la Matière Condensée de Bordeaux, France; <sup>2</sup>Institut des Sciences Moléculaires, UMR 5255, France

**4:15 PM EL05.06.07**

**Carbon Electrodes for Efficient Low-Light Perovskite Photovoltaics in IoT Applications** [Ariya C. Steed](#), Ershad Parvazian, Carys Worsley and Trystan Watson; Swansea University, United Kingdom

**4:30 PM \*EL05.06.08**

**Printable Organic Photodetectors for Multispectral Light Detection** [Vincenzo Pecunia](#); Simon Fraser University, Canada

SESSION EL05.07: Poster Session  
Session Chairs: Gerardo Hernandez-Sosa and Tse Nga Ng  
Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**EL05.07.01**

**Advanced Multi-Layer Graphene Array Electrodes for High-Performance Dopamine Sensing in Complex Biological Environments** Abdulrahman Al-hagri; The Arctic University of Norway, Norway

**EL05.07.02**

**3D-Printed Prosthetic Sockets Enhancing Comfort Through Stretchable Sensor Integration** Hadi Moeinnia and Woo Soo Kim; Simon Fraser University, Canada

**EL05.07.03**

**Self-powered Box Knot Neckband Sensor for Cardiovascular Symptom Monitoring** Tae-Ho Kim<sup>1</sup>, Dominic Jaworski<sup>1</sup>, Rakesh Sethi<sup>2</sup>, Elise Huisman<sup>2</sup>, Kam Fung<sup>2</sup> and Edward J. Park<sup>1</sup>; <sup>1</sup>Simon Fraser University, Canada; <sup>2</sup>Medtronic, United States

**EL05.07.04**

**Modulating Interfacial Self-Assembly and Molecular Arrangement via Functionalized Polymers for Organic Optoelectronics** Jihyun Lim, Woongsik Jang and Dong Hwan Wang; Chung-Ang University, Korea (the Republic of)

**EL05.07.05**

**Chemical Bath Deposited and Screen Printed CuxS Films on PET Substrates for UV Light and NH<sub>3</sub> Gas Sensing** Yung-Tang Nien, Zhen Han, Xunmin Su and Shihcheng Ma; National Formosa University, Taiwan

**EL05.07.06**

**Wafer-scale uniform non-ferroelectric *k*-phase In<sub>2</sub>Se<sub>3</sub> transistors via thermal evaporation** Jaeyun Lee<sup>1</sup>, Yongwoo Lee<sup>2</sup>, Jimin Kwon<sup>2</sup> and Yong-Young Noh<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of)

**EL05.07.07**

**Ultrasensitive dual-channel chemosensory synapse based on gas-induced ion flux and hole generating electrochemical transistor** Elvis K. Boahen<sup>1</sup>, Hanbin Choi<sup>1</sup>, Hyukmin Kweon<sup>1,2</sup>, Hayoung Oh<sup>1</sup>, Hayoung Lim<sup>1</sup>, So Young Kim<sup>1</sup>, Zhengyang Kong<sup>1</sup> and Do Hwan Kim<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Stanford University, United States

**EL05.07.08**

**Femto-second Laser-directed 3D Printing of Organic Semiconductor Microdevices for Microelectronic Circuitry and Biomedical Applications** Mohammad Reza Abidian and Omid Dadras-Toussi; University of Houston, United States

**EL05.07.09**

**Enhancing the Sensitivity and Selectivity of Conjugated Polymer Gas Sensors Towards Volatile Amines Using Metal Organic Additives** Kavinraaj Ella Elangovan, Rui Zhang, Matthew Confer, Siqing Wang, Rohit Bhargava and Ying Diao; University of Illinois at Urbana-Champaign, United States

**EL05.07.10**

**Screen Printed, Flexible, Capacitive Soil Moisture Sensor Compatible with High Frequency Electronics** Nicole T. Luna<sup>1</sup>, Titan Yuan<sup>2</sup>, Taylor Sharpe<sup>1</sup>, Madhur Atreya<sup>1</sup> and Gregory L. Whiting<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>University of California, Berkeley, United States

**EL05.07.11**

**Enhancing Gas Sensing Performance through Chemical and Physical Modifications of Organic Thin Films via Ultraviolet-Ozone Treatment** Gu Nahyeon, InHwa Ko and Yeong Don Park; Incheon National University, Korea (the Republic of)

**EL05.07.12**

**Controlling the molecular weight of poly(3-hexylthiophene) for highly sensitive and flexible gas sensor** InHwa Ko, Gu Nahyeon and Yeong Don Park; Incheon National University, Korea (the Republic of)

**EL05.07.13**

**Wireless Monitoring of Ethylene Gas Using a 3D-Printed Capacitive-Inductive (LC) Sensor** Sogol Heidarishahrivar and Woo Soo Kim; Simon Fraser University, Canada

**EL05.07.14**

**Optimizing Gas Sensing Properties of Nanoporous Cu<sub>2</sub>O Thin Films** [Tesaalem Welearegay](#); Uppsala University, Sweden

**EL05.07.15**

**Atmospheric plasma growth porous nanostructured zinc oxide for broadband photodetector applications** Deng-Yi Wang<sup>1</sup>, Yu-Cheng Lo<sup>2</sup>, Yung-Sen Lin<sup>3</sup>, [Hsiang Chen](#)<sup>2</sup> and YewChung Sermon Wu<sup>1</sup>; <sup>1</sup>National Yang-Ming Chiao-Tung Univ, Taiwan; <sup>2</sup>National Chi Nan Univ, Taiwan; <sup>3</sup>Feng Chia Univ, Taiwan

**EL05.07.16**

**Solution Sequential Doping of Lewis-paired Dopants for Conjugated polymer-based Semiconductors** [Sang Beom Kim](#), Eui Hyun Suh, Jaejin Choi and Jaeyoung Jang; Hanyang university, Korea (the Republic of)

**EL05.07.17**

**The Impact of 1,8-Diiodooctane on the Morphology, Performance and Stability of Organic Photovoltaics** [Rachel Kilbride](#)<sup>1</sup>, Emma Spooner<sup>2</sup>, David Lidzey<sup>1</sup>, Richard Jones<sup>2</sup> and Andrew Parnell<sup>1</sup>; <sup>1</sup>University of Sheffield, United Kingdom; <sup>2</sup>The University of Manchester, United Kingdom

**EL05.07.18**

**Room temperature sputtered nanocrystalline WO<sub>3</sub> thin films for highly responsive and selective NO gas sensing** [Somdatta Singh](#)<sup>1</sup>, Prachi Gurawal<sup>1</sup>, Gaurav Malik<sup>2</sup>, Ravikant Adalati<sup>1</sup>, Davinder Kaur<sup>1</sup> and Ramesh Chandra<sup>1</sup>; <sup>1</sup>IIT Roorkee, India; <sup>2</sup>Dongguk University, Korea (the Republic of)

**EL05.07.19**

**Ultra-sensitive Nitrogen Dioxide Detection Based on MoS<sub>2</sub>/Porous Silicon** [Prachi Gurawal](#)<sup>1</sup>, Somdatta Singh<sup>1</sup>, Ravikant Adalati<sup>2</sup>, Vivek Kumar Malik<sup>1</sup> and Ramesh Chandra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee, Uttarakhand, India, India; <sup>2</sup>University of Mons, Belgium

**EL05.07.20**

**High-Performance Thermoelectric Composites via Scalable Low-Cost Ink Deposition** [Ali Newaz Mohammad Tanvir](#)<sup>1</sup>, Md Omarsany Bappy<sup>1</sup>, Minxiang Zeng<sup>2</sup>, Wenjie Shang<sup>1</sup>, Ke Wang<sup>1</sup>, Kaidong Song<sup>1</sup>, Yukun Liu<sup>3</sup>, Eleonora Isotta<sup>3</sup>, Mercouri G. Kanatzidis<sup>3</sup>, Jeff Snyder<sup>3</sup>, Alexander W. Dowling<sup>1</sup>, Tengfei Luo<sup>1</sup> and Yanliang Zhang<sup>1</sup>; <sup>1</sup>University of Notre Dame, United States; <sup>2</sup>Texas Tech University, United States; <sup>3</sup>Northwestern University, United States

**EL05.07.21**

**Volatile Ligands as Solvents for Solution-Processing of Coordination Polymers** Pongkamon Prayongkul, Jetnipat Songkerdthong and [Pichaya Pattanasattayavong](#); Vidyasirimedhi Institute of Science and Technology, Thailand

**EL05.07.22**

**Rapid Fabrication of Holographic Fresnel Lenses Using Vat Photopolymerization for Advanced Optical Sensing** [Murad Ali](#) and Haider Butt; Khalifa University of Science and Technology, United Arab Emirates

**EL05.07.23**

**Golden Age of Carbene-Metal-Amide Energy Materials in Energy Efficient OLEDs** [Alexander Romanov](#); University of Manchester, United Kingdom

**EL05.07.24**

**Nanotransfer Printing of Metal and Metal-Oxide Nanopatterns on Electrospun Fibers for Wearable Healthcare Applications** Ji-Hwan Ha<sup>1</sup>, [Sohee Jeon](#)<sup>1</sup>, Junseong Ahn<sup>2</sup>, Yongrok Jeong<sup>3</sup>, SoonHyung Hwang<sup>1</sup>, Jun-Ho Jeong<sup>1</sup> and Inkyu Park<sup>3</sup>; <sup>1</sup>Korea Institute of Machinery and Materials, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of); <sup>3</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**EL05.07.25**

**Effects of Solvent Properties on the Performance of Electroluminescent Quantum Dots Fabricated by Inkjet Printing** [Seong Woo Jeong](#)<sup>1</sup>, Jun Young Park<sup>2</sup>, Dae Yun Kim<sup>3</sup>, Byeong Guk Jeong<sup>3</sup>, Dong Ryeol Whang<sup>2</sup> and JunYoung Kim<sup>1</sup>; <sup>1</sup>Gyeongsang National University, Korea (the Republic of); <sup>2</sup>Hannam University, Korea (the Republic of); <sup>3</sup>Pusan National University, Korea (the Republic of)

**EL05.07.26**

**3D-Printed Biocompatible Hollow Microneedle-Based Electrochemical Sensor for Wireless Glucose Monitoring** [Chuchu Chen](#) and Kaiyan Qiu; Washington State University, United States

**EL05.07.27**

**Development of Crosslinkable Emitters for Micropatterning the Emissive Layer in Solution-Processed Organic Light-Emitting Diodes** [Hyobin Ham](#)<sup>1</sup>, Seunghan Lee<sup>2</sup>, Moon Sung Kang<sup>2</sup> and BongSoo Kim<sup>1</sup>; <sup>1</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Sogang University, Korea (the Republic of)



**EL05.07.28**

**Organic Electrochemical Transistors for Effectively Diagnosing Neurodegenerative Conditions** Gurashish Singh, Mujeeb U. Chaudhry, Paul Chazot, Raheleh Kafieh and Daniel T. Smith; Durham University, United Kingdom

**EL05.07.29**

**3D-Printed Interpenetrated Electrode Architecture for Enhanced Ion Diffusion in Next-Generation Electrochemical Energy Storage Devices** Kangkang Zhang<sup>1</sup>, Xinzhe Xue<sup>2</sup>, Qiu Ren<sup>2</sup>, Longsheng Feng<sup>1</sup>, Cassidy Tran<sup>2</sup>, Samuel Eisenberg<sup>2</sup>, Anica Pinongcos<sup>2</sup>, Yat Li<sup>2</sup> and Cheng Zhu<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>University of California, United States

SESSION EL05.08: Advanced Sensing Technologies I

Session Chairs: Tse Nga Ng and Gregory Whiting

Friday Morning, April 11, 2025

Summit, Level 4, Room 431

**8:30 AM \*EL05.08.01**

**High-Throughput and Hybrid Printing of Multifunctional Devices for Energy Harvesting and Multimodal Sensing** Yanliang Zhang; University of Notre Dame, United States

**9:00 AM EL05.08.02**

**Distributable Screen-Printed Soil pH Sensor Shows Long Term Invariant Data Acquisition Across Soil Moisture, Compaction Levels and Soil Types** Juan P. Cisneros Barba, Catherine Crichton and Gregory L. Whiting; University of Colorado Boulder, United States

**9:15 AM EL05.08.03**

**Sustainable Liquid-Phase Production of Cellulose-Derived Graphene for Printable Agricultural Monitoring Devices** Janan Hui<sup>1</sup>, Haoyang You<sup>2</sup>, Lindsay Chaney<sup>1</sup>, Jinrui Zhang<sup>1</sup>, Arash Elahi<sup>3</sup>, Wesley Chen<sup>1</sup>, Julia R. Downing<sup>1</sup>, Dokyoung Lee<sup>4</sup>, Elizabeth Ainsworth<sup>4</sup>, Santanu Chaudhuri<sup>3</sup>, Jennifer Dunn<sup>1</sup>, Wei Chen<sup>1</sup>, Stuart Rowan<sup>2</sup> and Mark C. Hersam<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>University of Illinois at Chicago, United States; <sup>4</sup>University of Illinois at Urbana-Champaign, United States

**9:30 AM \*EL05.08.04**

**Printed Sensors for Continuous Monitoring of Soil and Plant Conditions** Gregory L. Whiting<sup>1</sup>, Catherine Crichton<sup>1</sup>, Nicole T. Luna<sup>1</sup>, Eloise Bihar<sup>2,1</sup>, Juan Cisneros<sup>1</sup>, Elliot Strand<sup>1</sup>, Nicholas Bruno<sup>1</sup> and Taylor Sharpe<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>University at Buffalo, The State University of New York, United States

**10:00 AM BREAK**

**10:30 AM \*EL05.08.05**

**Sensing Everywhere—Printed Ferroelectric Polymer Sensors for Human-Machine Interfaces, Biosignal Monitoring and Large-Area Sensor Networks** Barbara Stadlober<sup>1</sup>, Andreas Petritz<sup>1</sup>, Jonas Groten<sup>1</sup>, Oliver Werzer<sup>1</sup>, Philipp Schäffner<sup>1</sup>, Asier Alvarez Rueda<sup>1</sup>, Martin Zirkl<sup>1</sup>, Andreas Tschopp<sup>1</sup>, Elisabeth Schreck<sup>1</sup>, Matthias Hammer<sup>1</sup>, Manfred Adler<sup>1</sup>, Takafumi Uemura<sup>2</sup>, Teppei Araki<sup>2</sup> and Tsuyoshi Sekitani<sup>2</sup>; <sup>1</sup>Joanneum Research Forschungsgesellschaft, Austria; <sup>2</sup>Osaka University, Japan

**11:00 AM EL05.08.06**

**Flexible and Transmissive All-Polymeric Heater Based on n-Doped Poly(Benzodifurandione)** Joseph A. Romo<sup>1</sup>, Won-June Lee<sup>1</sup>, Aalok Gaitonde<sup>1</sup>, Liyan You<sup>1</sup>, Benjamin Cerjan<sup>1</sup>, Lucas Flagg<sup>2</sup>, Daniel Sunday<sup>2</sup>, Chad R. Snyder<sup>2</sup>, Dean M. DeLongchamp<sup>2</sup>, Amy Marconnet<sup>1</sup> and Jianguo Mei<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>National Institute of Standards and Technology, United States

**11:15 AM EL05.08.07**

**Potentiometric Nitrate Sensors with Inkjet Printed Nafion Films** Sharar Muhtasim, Kuan-Yu Chen, Jingyi Huang and Joseph Andrews; University of Wisconsin–Madison, United States

**11:30 AM \*EL05.08.08**

**Bioprinted Optoelectronically Active Cardiac Tissues** Cunjiang Yu; University of Illinois at Urbana-Champaign, United States

SESSION EL05.09: Advanced Sensing Technologies II

Session Chairs: Barbara Stadlober and Cunjiang Yu

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 431

**1:30 PM EL05.09.01**

**Single-Walled and Multi-Walled Carbon Nanotube Sensors for Volatile Organic Compound (VOC) Detection** [Thomas Kalach](#), Nida Khattak and Arash Takshi; University of South Florida, United States

**1:45 PM EL05.09.02**

**Facile Synthesis of Functional Metal Oxide Nanorods on Laser-Induced Graphene and Its Applications** [Hyeonwoo Kim](#)<sup>1</sup>, Tae Sung Kim<sup>2</sup>, Jehoon Lee<sup>2</sup>, Junyeob Yeo<sup>2,2</sup> and Young-Jin Kim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Kyungpook National University, Korea (the Republic of)

**2:00 PM EL05.09.03**

**Nozzle Clogging Investigation of Silver Nanoparticle Ink for Improved Printing Performance of Flexible, Wearable Medical Devices** [Yu Han Lim](#)<sup>1</sup>, Adrian Ong<sup>1,2</sup>, Wen See Tan<sup>1</sup>, Jarrid A. Wittkopf<sup>2</sup> and Juha Song<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>HP Inc., Singapore

**2:15 PM EL05.09.04**

**Heterojunction p-n Diodes Based on Inkjet-Printed Carbon Nanotubes and MoS<sub>2</sub>** [Fugu Tian](#)<sup>1</sup>, Dingzhou Cui<sup>1</sup>, Mingrui Chen<sup>1</sup>, Zhiyuan Zhao<sup>1</sup>, Wenbo Chen<sup>1</sup>, Zikuan Wang<sup>1</sup>, Silvia Guadagnini<sup>1</sup>, Sarah Alsaggaf<sup>2</sup>, Shahad Albawardi<sup>2</sup>, Michelle Povinelli<sup>1</sup>, Mohammed Amer<sup>2</sup>, Jia Lu<sup>1</sup> and Chongwu Zhou<sup>1</sup>; <sup>1</sup>University of Southern California, United States; <sup>2</sup>King Abdulaziz City for Science and Technology, Saudi Arabia

**2:30 PM EL05.09.05**

**Low-Voltage Redox Gating for Energy-Efficient Electronic Devices** Andrew Erwin<sup>1</sup>, Shiyu Hu<sup>1</sup>, Hui Cao<sup>1</sup>, Changjiang Liu<sup>1</sup>, Hua Zhou<sup>1</sup>, Yuepeng Zhang<sup>1</sup> and [Wei Chen](#)<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The University of Chicago, United States

**2:45 PM EL05.09.06**

**Direct Processing by  $\mu$ DALP™—Precision Coatings for Next Gen Devices** Masoud Akbari, Simone Santucci, [Mira Baraket](#), Ivan Kundrata and Maksym Plakhotnyuk; ATLANT 3D, Denmark

## SYMPOSIUM EL06

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Novel Perovskite Semiconductors and Optoelectronics

April 8 - April 11, 2025

Symposium Organizers

Letian Dou, Purdue University

Shuzi Hayase, University of Electro-Communications

Teresa S. Ripolles, University of Valencia

Rui Wang, Westlake University

Symposium Support

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^ MRS Communications Early Career Distinguished Presenter

SESSION EL06.01: Perovskite Durability  
Session Chairs: Letian Dou and Jingjing Xue  
Tuesday Morning, April 8, 2025  
Summit, Level 4, Room 432

**10:30 AM \*EL06.01.01**

**Overview of Cross-Linkable Perovskite Materials and Recent Advances in High-Performance Solar Cells** Yang Yang<sup>1</sup> and Gang Li<sup>2</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>The Hong Kong Polytechnic University, United States

**11:00 AM EL06.01.02**

**Absolute Photoluminescence Measurements for Sub-Cell Characterization of Perovskite Multijunction Solar Cells** Willemijn H. Remmerswaal<sup>1</sup>, Junke Wang<sup>1</sup>, Bruno Branco<sup>1</sup>, Martijn M. Wienk<sup>1</sup> and Rene A. Janssen<sup>1,2</sup>; <sup>1</sup>Eindhoven University of Technology, Netherlands; <sup>2</sup>Dutch Institute for Fundamental Energy Research, Netherlands

**11:15 AM \*EL06.01.03**

**Regulating the Organic Moieties in Perovskite Solar Cells** Jingjing Xue; Zhejiang University, China

**11:45 AM EL06.01.04**

**Efficient Green Spin Light-Emitting Diodes Enabled by Ultrafast Energy-and Spin-Funneling in Chiral Perovskites** Zhiyu Wang; The Hong Kong University of Science and Technology, Hong Kong

SESSION EL06.03: Poster Session I  
Session Chairs: Letian Dou and Rui Wang  
Tuesday Afternoon, April 8, 2025  
5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**EL06.03.01**

**Induced Circularly Polarized Luminescence and Exciton Fine Structure Splitting in Magnetic-Doped Chiral Perovskites** Zixuan Zhang; The Hong Kong University of Science and Technology, Hong Kong

**EL06.03.02**

**Squeezing the Threshold of Metal-Halide Perovskite Micro-Crystal Lasers Grown by Solution Epitaxy** Shuyu Zhou and Wolfgang Hei; Friedrich-Alexander-Universitt Erlangen-Nrnberg, Germany

**EL06.03.03**

**Spin-Polarized Magneto-Optical Properties of Organic-Inorganic Perovskite Materials Doped with Lanthanide Ions** Xudong Xiao and Tao Xu; Northern Illinois University, United States

**EL06.03.04**

**Self-Assembled Molecular Electron Transport Layers for Perovskite Solar Cells** Ranush Durgaryan and Gerrit Boschloo; Uppsala University, Sweden

**EL06.03.05**

**All Inorganic-Based Perovskite Thin Film Using Evaporation and Atomic Layer Deposition** Jihye Park, Minji Jeong and Hyo Sik Chang; Chungnam National University, Korea (the Republic of)

**EL06.03.06**

**Surface Treatments for Efficient and Stable Tin Halide Perovskite Solar Cells** Pok Fung Chan, Minchao Qin and Xinhui Lu; The Chinese University of Hong Kong, Hong Kong

**EL06.03.07**

**Metal Halide Perovskite Thin Film Optical Properties Following H<sub>2</sub> Exposure— Implications for Gas Sensors** [Jorge Arteaga](#) and Sayantani Ghosh; University of California, Merced, United States

**EL06.03.08**

**Novel Defect Imide Double Antiperovskites AE<sub>5</sub>AsPn(NH)<sub>2</sub> (AE = Ca, Sr; Pn = Sb, Bi) as Potential Solar Cell Absorber Materials** [Dan Han](#)<sup>1,2</sup>, Thanh G. Chau<sup>2</sup>, Florian Wolf<sup>2</sup>, Stefan S Rudel<sup>2</sup>, Yuxuan Yao<sup>3,4</sup>, Harald Oberhofer<sup>4</sup>, Thomas Bein<sup>2</sup>, Hubert Ebert<sup>2</sup> and Wolfgang Schnick<sup>2</sup>; <sup>1</sup>Jilin University, China; <sup>2</sup>Ludwig-Maximilians-Universität München, Germany; <sup>3</sup>Technische Universität München, Germany; <sup>4</sup>University of Bayreuth, Germany

**EL06.03.09**

**Dermal Cytotoxicity of the Methylammonium Lead Iodide Based Perovskites** [Masafumi Koremura](#), Nao Saito, Masashi Ikegami, Tsutomu Miyasaka and Kaoru Yoshida; Toin Yokohama University, Japan

**EL06.03.10**

**Ab-Initio Studies of Octahedral Clusters as Building Blocks for Pb-Free Hybrid Perovskites in Photocatalysis and Photovoltaic Applications** [Ariel S. Asare](#)<sup>1,2</sup>, Gebremedhn Hagoss<sup>1</sup> and Nicola Seriani<sup>2</sup>; <sup>1</sup>University of Ghana, Ghana; <sup>2</sup>International Centre for Theoretical Physics, Italy

**EL06.03.11**

**From Sunlight to Hydrogen—High-Voltage FAPbBr<sub>3</sub> Single-Junction Perovskite Solar Cells for Continuous Light-Driven Water-Splitting** [Laura Bellini](#), Daniël Grosfeld, Bruno Branco, Nicolas Daub, Martijn M. Wienk and Rene A. Janssen; Technische Universiteit Eindhoven, Netherlands

**EL06.03.12**

**Mixed Cation and Anion Perovskite Nanocrystals for Amplified Spontaneous Emission** [Sarah Phillips](#)<sup>1</sup>, Naoaki Oshita<sup>2</sup>, Matthew S. White<sup>1</sup> and Akito Masuhara<sup>2,2</sup>; <sup>1</sup>University of Vermont, United States; <sup>2</sup>Yamagata University, Japan

**EL06.03.13**

**Amplification of Circular Dichroism in Chiral Hybrid Organic-Inorganic Perovskites for Enhanced Circularly Polarized Light Detection** [Haeni Song](#), Minjoon Kwak, Wonbin Choi, Dongwon Yoo and Joon Hak Oh; Seoul National University, Korea (the Republic of)

**EL06.03.14**

**Bandgap Modulation of Lead-Free Cs<sub>2</sub>AgBiBr<sub>6</sub> Double Perovskite via Hydrogen Treatment** Hao-Yu Tsen and [Chih-Liang Wang](#); National Tsing Hua University, Taiwan

**EL06.03.15**

**Effect of Solvent Polarity on Antisolvent Bathing of Halide Perovskite Film for Large-Scale Solar Cells** [Vishal Pal](#), Marc Migliozi, Youngsoo Jung and Jung-Kun Lee; University of Pittsburgh, United States

SESSION EL06.04: Low Dimensional Perovskite I

Session Chairs: Teresa S. Ripolles and Qiuming Yu

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 432

**8:00 AM \*EL06.04.01**

**Multi-Junction Perovskite Solar Cells—Understanding to Drive Device Development** [Samuel D. Stranks](#); University of Cambridge, United Kingdom

**8:30 AM \*EL06.04.02**

**Phase Purity in Low Dimensional Perovskites** [Juan-Pablo Correa-Baena](#); Georgia Institute of Technology, United States

**9:00 AM \*EL06.04.03**

**Formation, Stability and Crystallization of Two-Dimensional Perovskites and Their Interfaces** [Ana Flavia Nogueira](#); University of Campinas, Brazil

**9:30 AM EL06.04.04**

**Two-Dimensional Lattice Confined Single-Molecule-Like Aggregates** [Kang Wang](#)<sup>1,2</sup>; <sup>1</sup>Chinese Academy of Sciences, China; <sup>2</sup>Purdue University, United States

**9:45 AM EL06.04.05**

**Controlled Synthesis of High-Quality Oriented 2D Chiral Perovskites Thin Films** [Raphael F. Moral](#)<sup>1,2</sup>, Raushan Nurdillayeva<sup>3,1</sup>, Do-Kyoung Lee<sup>2,1</sup>, Tim Kodalle<sup>1,4</sup>, Paulo E. Marchezi<sup>5</sup>, David Fenning<sup>5</sup>, Craig Schwartz<sup>2</sup> and Carolin M. Sutter-Fella<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of Nevada, Las Vegas, United States; <sup>3</sup>Khoja Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan; <sup>4</sup>Advanced Light Source, United States; <sup>5</sup>University of California, San Diego, United States

**10:00 AM BREAK**

**10:30 AM \*EL06.04.06**

**The Impact of Structure in Achieving Optically Efficient One-Dimensional Lead Halide Perovskite Nanostructures** Alexander M. Oddo<sup>1,2</sup> and [Peidong Yang](#)<sup>1,2,3</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Kavli Energy NanoScience Institute, United States

**11:00 AM \*EL06.04.07**

**Multidimensional Application-Oriented Crystallization Control for Improved Perovskite Devices** [Pablo P. Boix](#); ITQ (UPV-CSIC), Spain

**11:30 AM EL06.04.08**

**Reversible Growth of 2D/3D Single Crystal Hybrid-Perovskite Heterostructure** [Daniela Marongiu](#), Selene Matta, Valeria Demontis, Silvia Liscia, Angelica Simbula, Riccardo Pau, Aditya Bhardwaj, Francesco Quochi, Michele Saba, Andrea Mura and Giovanni Bongiovanni; Universita di Cagliari, Italy

**11:45 AM EL06.04.09**

**Chiral Two-Dimensional Perovskites for Highly Selective Room-Temperature Spin-Polarized Light-Emitting Diodes** [Gyumin Jang](#), Jaehyun Son, Junwoo Lee, Jeongyoub Lee, Chan Uk Lee, Wooyong Jeong and Jooho Moon; Yonsei University, Korea (the Republic of)

SESSION EL06.05: Perovskite LEDs

Session Chairs: Juan-Pablo Correa-Baena and Shuzi Hayase

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 432

**1:45 PM \*EL06.05.01**

**Progress Toward Halide Perovskite Laser Diodes** [Barry P. Rand](#); Princeton University, United States

**2:15 PM EL06.05.02**

**Thermally Evaporated All-Inorganic Perovskites for Pure-Red Light Emitting Diodes and Quantum-Well Heterostructures** [Krishanu Dey](#), Shaoni Kar and Henry Snaith; University of Oxford, United Kingdom

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EL06.06: Tin Perovskite

Session Chairs: Barry Rand and Teresa S. Ripolles

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 432

**3:30 PM \*EL06.06.01**

**New Bulk Passivation for Sn-Perovskite Solar Cells** [Maria Antonietta Loi](#); University of Groningen, Netherlands

**4:00 PM \*EL06.06.02**

**Materials and Interface Engineering for Tin Perovskite Solar Cells** [Qiuming Yu](#); Cornell University, United States

**4:30 PM EL06.06.03**

**Introducing Bromide into Full-Iodide Mixed Lead-Tin Systems to Obtain the Ideal Bandgap** [Lana M. Kessels](#)<sup>1</sup>, Henry Kwan<sup>1</sup>, Martijn M. Wienk<sup>1</sup> and Rene A. Janssen<sup>1,2</sup>; <sup>1</sup>University of Technology Eindhoven, Netherlands; <sup>2</sup>Dutch Institute for Fundamental Energy Research, Netherlands

4:45 PM EL06.06.04

**Enabling Robust Chemical State Analysis of Metal Halide Perovskites via XPS—Sn-Based Perovskites and Beyond** [Alexander Wiczorek](#) and Sebastian Siol; Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

SESSION EL06.07: Poster Session II

Session Chairs: Julia Anthea Gessner and Teresa S. Ripolles

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

EL06.07.01

**CsSnI<sub>3</sub> Nanocrystals for NIR *In Vivo* Fluorescent Imaging** [Thomas Adams](#), Christian Burns, Joel Spencer and Sayantani Ghosh; University of California, Merced, United States

EL06.07.02

**Green Solvent-Enabled Sustainable Fabrication Route for High-Quality Halide Perovskite Devices** [Aakash Sharma](#)<sup>1</sup>, Ayan Zhumekenov<sup>2</sup>, Nripan Mathews<sup>2</sup> and Wei Lin Leong<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>Nanyang Technological University, Singapore, Singapore

EL06.07.03

**High-Performance Perovskite Solar Cell Via Chirality-Engineered Graphene Quantum Dot Interface Passivation** [Jonghoon Han](#), Jincheol Kim and Shujuan Huang; Macquarie University, Australia

EL06.07.04

**Reducing Charge Recombination in 2D/3D Heterostructure Perovskite Through Charge Carrier Spin Polarization with 2D Chiral Perovskite** [Junwoo Lee](#), Jaehyun Son, Gyumin Jang, Chan Uk Lee, Wooyong Jeong, Jeong Hyun and Jooho Moon; Yonsei University, Korea (the Republic of)

EL06.07.05

**Ultra-Stable Solution-Processable CsPbBr<sub>3</sub>-SiO<sub>2</sub> Quantum Dots Scintillator for X-Ray Detector and Imaging** Yining Zhao<sup>1</sup>, Stephen Kearney<sup>1</sup>, Linyuan Lian<sup>2</sup>, Yujia Fan<sup>1</sup>, Rob Moss<sup>1</sup>, Zhifeng Shi<sup>2</sup> and [Mingqing Wang](#)<sup>1</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>Zhengzhou University, China

EL06.07.06

**Single-Crystal Hybrid Perovskites—The Next-Generation Perovskite Optoelectronics** [Valeria Demontis](#); Università degli Studi di Cagliari, Italy

EL06.07.07

**Tailoring Perovskite Interfaces and Film Properties for Improved Solar Cell Performance** [Yuan Lin](#), Yanyan Fang and Yuanhuang Zhang; Chinese Academy of Sciences, China

EL06.07.08

**Investigating Architectures of Carbohydrate Block Copolymers Influencing on Perovskite Nanocrystal for Nonvolatile Phototransistor Memory** [Ping-Jui Yu](#)<sup>1,2,3</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Université Grenoble Alpes, France; <sup>3</sup>Centre National de la Recherche Scientifique, France

EL06.07.09

**High-Performance Vapour-Deposited Metal-Halide Perovskite p-Channel Transistors** [Youjin Reo](#)<sup>1</sup>, Taoyu Zou<sup>1</sup>, Taesu Choi<sup>1</sup>, Ji-Young Go<sup>1</sup>, Soonhyo Kim<sup>1</sup>, Taewan Roh<sup>1</sup>, HyoungHa Ryu<sup>1</sup>, Huihui Zhu<sup>2</sup>, Ao Liu<sup>2</sup> and Yong-Young Noh<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>University of Electronic Science and Technology of China, China

EL06.07.10

**Melt-Processed One-Dimensional Halide Perovskite White Light Emitters** [Jyorthana Rajappa Muralidhar](#) and Connor G. Bischak; The University of Utah, United States

EL06.07.11

**Vapor Growth of All-Inorganic 2D Ruddlesden-Popper Lead- and Tin-Based Perovskites** Xinting Shuai<sup>1</sup>, Siraj Sidhik<sup>1</sup>, Mingrui Xu<sup>1</sup>, Xiang Zhang<sup>1</sup>, Michael Siena<sup>2</sup>, Laurent Pedesseau<sup>3</sup>, Hao Zhang<sup>1</sup>, Guanhui Gao<sup>1</sup>, Anand Puthirath<sup>1</sup>, Wenbin Li<sup>1</sup>, Ayush Agrawal<sup>1</sup>, Jianan Xu<sup>1</sup>, Jin Hou<sup>1</sup>, Jessica H. Persaud<sup>1</sup>, Jeremy Daum<sup>1</sup>, Anamika Mishra<sup>1</sup>, Yafei Wang<sup>4</sup>, Robert Vajtai<sup>1</sup>, Claudine Katan<sup>3</sup>, Mercouri G. Kanatzidis<sup>2</sup>, Jacky Even<sup>3</sup>, Pulickel Ajayan<sup>1</sup> and Aditya D. Mohite<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>Université de Rennes, France; <sup>4</sup>Guangzhou University, China

**EL06.07.12**

**Double A Site Cation Engineering in Perovskite-Inspired Materials—Transforming 0D-Cs<sub>3</sub>Bi<sub>2</sub>I<sub>9</sub> into 2D-Cs<sub>2</sub>AgBi<sub>2</sub>I<sub>9</sub> with Enhanced Charge Transport and Photoresponse** Mozakkar Hossain<sup>1,2</sup>, Kuntal Singh<sup>2</sup>, Ankita Narwal<sup>3</sup>, Md Sariful Sheikh<sup>2</sup>, Sandeep K. Reddy<sup>4</sup>, Kiran Vankayala<sup>5</sup>, Asha Singh<sup>6</sup>, Saleem Khan<sup>6,7</sup>, Salahuddin Khan<sup>6,7</sup>, Praveen K. Velpula<sup>8</sup>, Manohar Chirumamilla<sup>9,10</sup>, Sharma S. Yamijala<sup>3,3,3</sup>, G. Krishnamurthy Grandhi<sup>11</sup>, Paola Vivo<sup>11</sup> and K. D. M. Rao<sup>2</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>Indian Association for the Cultivation of Science, India; <sup>3</sup>Indian Institute of Technology Madras, India; <sup>4</sup>Indian Institute of Technology Kharagpur, India; <sup>5</sup>Birla Institute of Technology and Science (BITS) Pilani, India; <sup>6</sup>Raja Ramanna Centre for Advanced Technology, India; <sup>7</sup>Homi Bhabha National Institute, India; <sup>8</sup>UGC-DAE Consortium for Scientific Research, University Campus, India; <sup>9</sup>Aalborg University, India; <sup>10</sup>Hamburg University of Technology, Germany; <sup>11</sup>Tampere University, Finland

**EL06.07.13**

**Insights into 2D Hybrid Perovskite Crystal Growth Using RIR-MAPLE** Manosi Roy<sup>1</sup>, Jose Castaneda<sup>2</sup>, Sharonda J. LeBlanc<sup>2</sup> and Adrienne D. Stiff-Roberts<sup>1</sup>; <sup>1</sup>Duke University, United States; <sup>2</sup>North Carolina State University, United States

**EL06.07.14**

**Machine Learning Assisted Search for Novel Hybrid Perovskites for High-Energy Radiation Detectors** Alloffy M. A and Vidya Ravindran; Anna University, India

SESSION EL06.08: Low Dimensional Perovskite II

Session Chairs: Bin Chen and Yi Hou

Thursday Morning, April 10, 2025

Summit, Level 4, Room 432

**8:30 AM EL06.08.01**

**Ligand Engineering for Improving the Primary Color Emission Efficiency and Stability of Low-Dimensional Perovskites** Wallace C. Choy<sup>1,2</sup>;

<sup>1</sup>University of Hong Kong, China; <sup>2</sup>HKU-SIRI, China

**8:45 AM EL06.08.02**

**Robotic Crystallization of Perovskite Single Crystals** Makhsud Saidaminov; University of Victoria, Canada

**9:00 AM \*EL06.08.03**

**Controlling Polarons and Polaritons in Perovskite Quantum Dot Solids** Andrew Musser; Cornell University, United States

**9:30 AM EL06.08.04**

**Exciton Dynamics in Hybrid Halide 2D Perovskites—The Role of Organic Spacers in Low-Dose X-Ray Detection** Shivani Choudhary<sup>1</sup>, Joydip Ghosh<sup>2</sup>, Naveen K. Tailor<sup>1</sup>, Paul Sellin<sup>3</sup> and Soumitra Satapathi<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee, India; <sup>2</sup>University of Oxford, United Kingdom; <sup>3</sup>University of Surrey, United Kingdom

**9:45 AM EL06.08.05**

**In Situ Atomic-Level Tracking of Thermal Transformations in Multi-Dimensional Halide Perovskites** Benjamin Gallant, Shrestha Banerjee and Dominik Kubicki; University of Birmingham, United Kingdom

**10:00 AM BREAK**

SESSION EL06.09: Perovskite Tandem

Session Chair: Andrew Musser

Thursday Morning, April 10, 2025

Summit, Level 4, Room 432

**10:30 AM \*EL06.09.01**

**Stabilizing the Interfaces of Efficient Inverted Perovskite Solar Cells** [Bin Chen](#); Northwestern University, United States

**11:00 AM \*EL06.09.02**

**Can Efficiency, Stability and Commercial Viability be Combined in Perovskite-Based Tandem Solar Cells?** [Yi Hou](#); National University of Singapore, Singapore

**11:30 AM EL06.09.03**

**Efficient and Stable Perovskite-Based Tandem Solar Cells Enabled by Material and Interface Modification** [Xin Wu](#) and Zonglong Zhu; City University of Hong Kong, China

**11:45 AM EL06.09.04**

**A Theoretical Perspective on the Impact from Compositional Disorder on the Electronic Properties of Mixed Halide Perovskites** [Claudio Quarti](#); University of Mons, Belgium

SESSION EL06.10: Reliability and Characterizations

Session Chairs: Bin Chen and Gang Li

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 432

**1:30 PM \*EL06.10.01**

**Design and Application of Tailored Organic Molecules for Hybrid Perovskites and Their Devices** Arthur Maufort<sup>1</sup>, Yorrick Boeije<sup>2</sup>, Stijn Lenaers<sup>1</sup>, Stijn Lammar<sup>3,1</sup>, Anurag Krishna<sup>3</sup>, Tom Aernouts<sup>3</sup>, Samuel D. Stranks<sup>2</sup>, Laurence Lutsen<sup>3,1</sup>, Dirk Vanderzande<sup>1,3</sup> and [Wouter Van Gompel](#)<sup>1</sup>; <sup>1</sup>Universiteit Hasselt, Belgium; <sup>2</sup>University of Cambridge, United Kingdom; <sup>3</sup>imec, Belgium

**2:00 PM \*EL06.10.02**

**Ultrafast Spin Dynamics in Chiral Metal-Halide Perovskites** [Julia Anthea Gessner](#) and Felix Deschler; University of Heidelberg, Germany

**2:30 PM EL06.10.03**

**Nanosecond Recombination Dynamics in Perovskite Solar Cells with Bayesian Inference** [Barnaby Lewis](#)<sup>1</sup>, Taeheon Kang<sup>1</sup>, Bart Roose<sup>1</sup>, Simon Kahmann<sup>1,2</sup> and Samuel D. Stranks<sup>1</sup>; <sup>1</sup>The University of Cambridge, United Kingdom; <sup>2</sup>Technische Universität Chemnitz, Germany

**2:45 PM EL06.10.04**

**In *Operando* Microscale Photophysics in Perovskite Solar Cells by Noninvasive Correlative Microscopy** [Sudipta Seth](#)<sup>1</sup>, Boris Louis<sup>1</sup>, Qingzhi An<sup>2</sup>, Ran Ji<sup>2</sup>, Yana Vaynzof<sup>2</sup>, Johan Hofkens<sup>1</sup> and Ivan Scheblykin<sup>3</sup>; <sup>1</sup>KU Leuven, Belgium; <sup>2</sup>Technische Universität Dresden, Germany; <sup>3</sup>Lund University, Sweden

**3:00 PM BREAK**

SESSION EL06.11: Scale Up

Session Chairs: Selina Olthof and Wouter Van Gompel

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 432

**3:30 PM \*EL06.11.01**

**Progress and Challenges to Commercialize Utility-Scale Perovskite PV** [Gang Xiong](#); First Solar, Inc, United States

**4:00 PM EL06.11.02**

**Oxide Thin-Film Transistors Based Active-Matrix Perovskite Photodetector Arrays** [Bowen Zhu](#); Westlake University, China



**4:15 PM EL06.11.03**

***N-i-p* Inorganic Perovskite/Organic Tandem Solar Cells Approaching 26% via Bottom Contact Modulation** Gang Li, Yu Han and Zhiwei Ren; Hong Kong Polytechnic University, Hong Kong

**4:30 PM EL06.11.04**

**Super-Fast Vacuum Deposition of Complex Perovskites** Lennart V. Hengel and Henk J. Bolink; University of Valencia, Spain

**4:45 PM EL06.11.05**

**Flexible Perovskite Bifacial Devices by Quasi Roll-to-Roll Coatings** Nisha Sarda and Shaibal Sarkar; Indian Institute of Technology Bombay, India

SESSION EL06.12: Poster Session III

Session Chairs: Letian Dou and Rui Wang

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL06.12.01**

**DMSO-Free Processed All-Inorganic CsSnI<sub>3</sub> Perovskite Solar Cells.** Zafar Iqbal and Antonio Abate; Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany, Germany

**EL06.12.02**

**Exploring the Feasibility of Copper Incorporation in Halide Perovskites—Impact on CO<sub>2</sub> Photoreduction Performance** Naveen K. Tailor and Soumitra Satapathi; Indian Institute of Technology Roorkee, India

**EL06.12.03**

**Photovoltaic Properties of ABSe<sub>3</sub> (A = Ca, Sr, Ba; B = Zr, Hf) Chalcogenide Perovskites** Surajit Adhikari and Priya Johari; Shiv Nadar Institution of Eminence, India

**EL06.12.04**

**Sn- and Ti-Doped SrZrS<sub>3</sub> for Efficient, Stable and Ecofriendly Photovoltaic Cells** Henry I. Eya<sup>1</sup>, Nelson Y. Dzade<sup>1</sup> and Robert Petterson<sup>2</sup>; <sup>1</sup>The Pennsylvania State University, United States; <sup>2</sup>University of New South Wales, Australia

**EL06.12.05**

**Charge Transport in Triple-Cation Sn-Based Perovskites** Stefano Pecorario, Youcheng Zhang, Rozana Mazlumian, Xin Chen, Ian Jacobs, Milos Dubajic, Capucine Mamak, Samuel D. Stranks, Caterina Ducati and Henning Sirringhaus; University of Cambridge, United Kingdom

**EL06.12.06**

**Molecules with Multifunctional Groups for Versatile Passivation in Tin-Lead (SnPb) Perovskite Solar Cells (PSCs) to Achieve High Efficiency and Stability** Shahrir Razey Sahamir<sup>1</sup>, Qing Shen<sup>1</sup>, Hiroshi Segawa<sup>2</sup> and Shuzi Hayase<sup>1</sup>; <sup>1</sup>The University of Electro-Communications, Japan; <sup>2</sup>The University of Tokyo, Japan

**EL06.12.07**

**Life Cycle Assessment of Lead Recycling Strategies for Sustainable Perovskite Solar Cells** Hee Jung Kim, JaeMyeong Lee and Hyun Suk Jung; Sungkyunkwan University, Korea (the Republic of)

**EL06.12.08**

**Surface Bromination of CsPbI<sub>3</sub> Nanocrystals for Highly Efficient Skin Attachable Pure Red Perovskite LEDs** Yunho Kim<sup>1</sup> and Kyunghoon Lee<sup>2</sup>; <sup>1</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**EL06.12.09**

**From 0D to 2D—Dimensional Tuning of Structural and Optoelectronic Properties of Pt Halide Perovskites** Huilong Liu<sup>1</sup>, Maitreyo Biswas<sup>1</sup>, Zihan Zhang<sup>2</sup>, Walter Smith<sup>1</sup>, Dmitry Y. Zemlyanov<sup>1</sup>, Thomas Beechem<sup>1</sup>, Arun Kumar Mannodi-Kanakithodi<sup>1</sup> and Shubhra Bansal<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Colorado Boulder, United States

**EL06.12.10**

**Investigating Hole Extraction and Stability in Triple Cation Wide Bandgap Perovskite Solar Cells** Apoorva Singh<sup>1,2</sup>, Zhaojie Zhang<sup>2</sup>, Praveen Ramamurthy<sup>1</sup> and Dhandapani Venkataraman<sup>2</sup>; <sup>1</sup>Indian Institute of Science, India; <sup>2</sup>University of Massachusetts Amherst, United States

**EL06.12.11**

**Materials and Device Engineering for Triple Halide Wide-Bandgap Perovskite Solar Cells** Kayo d. Vieira, Rosalva d. Marques, Eliane A. Namikuchi, Fernando G. Echeverrigaray and Fernando Ely; CTI-Renato Archer, Brazil

SESSION EL06.13: Sustainability and Beyond Photovoltaics

Session Chairs: Senol Oez and Bowen Zhu

Friday Morning, April 11, 2025

Summit, Level 4, Room 432

**8:30 AM \*EL06.13.01**

**INDUSTRY TRACK: Advancing Sustainable Perovskite Photovoltaics Through Innovative Green Halide Chemistry** Senol Oez; Solaveni GmbH, Germany

**9:00 AM EL06.13.02**

**Hydrothermal Growth and Characterization of Large Rb<sub>2</sub>SnBr<sub>6</sub> Double Perovskite Crystals—A Promising Wide Bandgap Semiconductor for Photocatalysis and Optoelectronics** Rahidul Hasan, Hafiz Z. Aslam, Rutva Joshi, Roger Lalancette and Georgiy Akopov; Rutgers, The State University of New Jersey, United States

**9:15 AM EL06.13.03**

**Whispering Gallery Mode Lasing with Single Perovskites and Atmospheric Stable Double Perovskites as Gain Medium** Subitan Laskar and Sudakar Chandran; Indian Institute of Technology Madras, India

**9:30 AM EL06.13.04**

**On Substrate Functionalization and How It Affects the Nonradiative Losses in Metal-Halide Perovskites** Guus J. Aalbers, Willemijn H. Remmerswaal, Ralph H. van den Heuvel, Laura Bellini, Lana M. Kessels, Christ H. Weijtens, Nick R. Schipper, Martijn M. Wienk and Rene A. Janssen; Eindhoven University of Technology, Netherlands

**9:45 AM EL06.13.05**

**Stable and Highly Emissive Infrared Yb-Doped Perovskite Quantum Cutters Engineered by Machine Learning** Yao Jing<sup>1,1,1</sup>, Andre K. Y. Low<sup>1,2</sup>, Yun Liu<sup>2</sup>, Minjun Feng<sup>1</sup>, Jia Wei Melvin Lim<sup>1</sup>, Quadeer Rehman<sup>1</sup>, Nripan Mathews<sup>1,1</sup>, Kedar Hippalgaonkar<sup>1,2</sup>, Tze Chien Sum<sup>1</sup>, Annalisa Bruno<sup>1,1,1</sup> and Subodh G. Mhaisalkar<sup>1,1,3</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>Agency for Science, Technology and Research (A\*STAR), Singapore; <sup>3</sup>Sungkyunkwan University, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM EL06.13.06**

**Deciphering the Role of Halide Engineering in Enhancing Outdoor and Indoor Photovoltaic Performance of DMSO-Free Tin Halide Perovskites** Debendra P. Panda<sup>1</sup>, Zafar Iqbal<sup>2</sup>, Issaoui Rabeb<sup>1</sup> and Antonio Abate<sup>1,2</sup>; <sup>1</sup>University of Naples Federico II, Italy; <sup>2</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

**10:45 AM EL06.13.07**

**Pushing the Boundaries of Stability and Band Gap Pareto Front with High-Entropy Perovskites** Zhendian Zhang and Guoxiang (Emma) Hu; Georgia Institute of Technology, United States

**11:00 AM EL06.13.08**

**Nanopatterning of Perovskite Thin Films via Advanced Femtosecond Laser Techniques—A New Approach in Light-Management** Rocío Ariza, Marie Domen, Stijn Lammerant, Sylvie Castagne and Maarten Roefsaers; KU Leuven, Belgium

**11:15 AM EL06.13.09**

**Structural Distortion Drives Magnetic Ordering in Halide Double Perovskites** Yuttapoom Puttisong<sup>1</sup>, Kunpot Mopoung<sup>1</sup>, Quanzheng Tao<sup>1</sup>, Muye Zhang<sup>1</sup>, Fabio Orandi<sup>2</sup>, Kingshuk Mukhuti<sup>3</sup>, Maarten de Dreu<sup>3</sup>, Andrew Boothroyd<sup>4</sup>, Peter Chirstianen<sup>3</sup>, Johanna Rosen<sup>1</sup>, Feng Gao<sup>1</sup>, Irina A. Buyanova<sup>1</sup> and Weimin M. Chen<sup>1</sup>; <sup>1</sup>Linköping University, Sweden; <sup>2</sup>ISIS Neutron Muon Source, Science and Technology Facilities Council, Rutherford, Appleton Laboratory, Harwell Campus, Didcot Oxfordshire, United Kingdom; <sup>3</sup>Radboud University, Netherlands; <sup>4</sup>Oxford University, United Kingdom

**11:30 AM EL06.13.10**

**Surface-Binding Molecular Multipods Strengthen Halide Perovskite Lattice and Improve Luminescence Efficiency** Dong-Hyeok Kim<sup>1</sup>, Seung-Je Woo<sup>1</sup>, Claudia Pereyra<sup>2</sup>, Min-Ho Park<sup>1</sup>, Aaron Schankler<sup>2</sup>, Zhenbang Dai<sup>2</sup>, Jung-Min Heo<sup>1</sup>, Sungjin Kim<sup>1</sup>, Guy Reuveni<sup>3</sup>, Sungsu Kang<sup>1</sup>, Joo Sung Kim<sup>1</sup>, Hyung Joong Yun<sup>4</sup>, Jinwoo Park<sup>1</sup>, Jungwon Park<sup>1</sup>, Omer Yaffe<sup>3</sup>, Andrew M. Rappe<sup>2</sup> and Tae-Woo Lee<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>University of Pennsylvania, United States; <sup>3</sup>Weizmann Institute of Science, Israel; <sup>4</sup>Korea Basic Science Institute, Korea (the Republic of)

**11:45 AM EL06.13.11**

**Correlation Between Colloidal Size, Crystallization Kinetics and Its Impact on Photovoltaic Performance of Tin-Based Halide Perovskites** Aditya Pradhan, Jessica H. Persaud and Aditya D. Mohite; Rice University, United States

SESSION EL06.14: Perovskite Photovoltaics

Session Chairs: Xiwen Gong and Yi Hou

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 432

**2:00 PM \*EL06.14.01**

**Probing the Electronic Structure of 2D Halide Perovskites** Selina Olthof<sup>1,2</sup>; <sup>1</sup>Wuppertal University, Germany; <sup>2</sup>University of Cologne, Germany

**2:30 PM BREAK**

**3:00 PM \*EL06.14.02**

**Molecular Design to Stabilize Perovskite Solar Cells** Xiwen Gong; University of Michigan, United States

**3:30 PM \*EL06.14.03**

**Material Engineering toward High Performance Perovskite Solar Cells and Modules** Hiroshi Segawa; The University of Tokyo, Japan

**4:00 PM EL06.14.04**

**Controlling Light Emission in Multinary Copper(I) Halides for Advanced Optoelectronic Applications** Dilruba A. Popy and Bayram Saparov; University of Oklahoma, United States

## SYMPOSIUM EL07

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Superconducting Materials

April 7 - April 9, 2025

Symposium Organizers

Hang Chi, University of Ottawa

Nathalie de Leon, Princeton University

Tayebeh Mousavi, King's College London

Toshinori Ozaki, Kwansai Gakuin University

Symposium Support

**Bronze**

QUANTUM DESIGN

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\* Invited Paper  
+ JMR Distinguished Invited Speaker  
^ MRS Communications Early Career Distinguished Presenter

SESSION EL07.01: Device  
Session Chairs: Valla Fatemi and Javad Shabani  
Monday Morning, April 7, 2025  
Summit, Level 4, Room 439

**9:00 AM \*EL07.01.01**

**Next Generation Quantum Devices with New Superconductor-Semiconductor Heterostructures** Javad Shabani; New York University, United States

**9:30 AM EL07.01.02**

**Gas Assisted Focused Electron Beam Induced Etching for Direct Write Editing of Niobium Thin Films and Superconducting Devices** Brendan S. Gellerup<sup>1</sup>, John Lasseter<sup>2</sup>, Reece Emery<sup>1</sup>, Dustin Gilbert<sup>1</sup>, Ahmedullah Aziz<sup>1</sup>, Scott T. Retterer<sup>2</sup>, Steven Randolph<sup>2</sup> and Philip Rack<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**9:45 AM EL07.01.03**

**Effect of Temperature on the Aging of Al/AIO<sub>x</sub>/Al Josephson Junctions** Hiroyasu Kawano<sup>1,2</sup>, Norinao Kouma<sup>1,2</sup>, Yoshiyasu Doi<sup>1,2</sup>, Shintaro Sato<sup>1,2</sup>, Shuhei Tamate<sup>2</sup> and Yasunobu Nakamura<sup>2,3</sup>; <sup>1</sup>Fujitsu Limited, Japan; <sup>2</sup>RIKEN Center for Quantum Computing, Japan; <sup>3</sup>The University of Tokyo, Japan

**10:00 AM BREAK**

**10:30 AM \*EL07.01.04**

**Novel Materials and Fabrication for Superconducting Quantum Devices** Valla Fatemi; Cornell University, United States

**11:00 AM EL07.01.05**

**Identification of Two-Level Systems in Superconducting Qubits from Experimental Characterizations to Theoretical Calculations** Soohyun Im<sup>1,2</sup>, Venkata Surya Chaitanya Kolluru<sup>3</sup>, Keith G. Ray<sup>4</sup>, Loren D. Alegria<sup>4</sup>, Vincenzo Lordi<sup>4</sup>, Yaniv J. Rosen<sup>4</sup>, Maria K. Chan<sup>3</sup> and Paul M. Voyles<sup>2</sup>; <sup>1</sup>University at Buffalo, The State University of New York, United States; <sup>2</sup>University of Wisconsin–Madison, United States; <sup>3</sup>Argonne National Laboratory, United States; <sup>4</sup>Lawrence Livermore National Laboratory, United States

**11:15 AM EL07.01.06**

**Superconducting Qubits Technology Utilizing 300mm Advanced Materials Engineering** Jake Rochman, Haoxiong Yan, Yue Chen, Lei Jiang, Wenhui Wang, Zihao Yang, Ruoyu Li, Leslie Du, Zhebo Chen, Mingwei Zhu, Nag Patibandla and Robert Visser; Applied Materials, Inc., United States

**11:30 AM EL07.01.07**

**Characterization of Interfaces for Quantum Computing Devices with Electron Energy Loss Spectroscopy** Zhaslan Baraissov<sup>1</sup>, Maciej Olszewski<sup>1</sup>, J.T. Paustian<sup>2</sup>, Sarvesh Chaudhari<sup>1</sup>, Cristóbal Méndez<sup>1</sup>, Tathagata Banerjee<sup>1</sup>, Jaehong Choi<sup>1</sup>, Gregory Fuchs<sup>1</sup>, Ivan Pechenezhskiy<sup>2</sup>, Britton Plourde<sup>2</sup>, Tomas Arias<sup>1</sup>, Valla Fatemi<sup>1</sup> and David A. Muller<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Syracuse University, United States

SESSION EL07.02: High-T<sub>c</sub> Materials  
Session Chairs: Toshinori Ozaki and Hideki Yamamoto  
Monday Afternoon, April 7, 2025  
Summit, Level 4, Room 439

**1:45 PM \*EL07.02.01**

**Key New Cuprates Tailored by MBE to Comprehend High-T<sub>c</sub> Superconductivity** Hideki Yamamoto<sup>1</sup>, Yoshiharu Krockenberger<sup>1</sup>, Ai Ikeda<sup>1</sup>, Yoshitaka Taniyasu<sup>1</sup> and Michio Naito<sup>2</sup>; <sup>1</sup>NTT Basic Research Labs, NTT Corp., Japan; <sup>2</sup>Tokyo University of Agriculture and Technology, Japan

**2:15 PM EL07.02.02**

**Imaging Oxygen Vacancies in Superconducting Sr<sub>2</sub>CuO<sub>3+δ</sub> Film with Electron Ptychography** Hongbin Yang<sup>1</sup>, Jinkwon Kim<sup>1</sup>, Darrell G. Schlom<sup>1,2,3</sup> and

David A. Muller<sup>1,2</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Kavli Institute at Cornell for Nanoscale Science, United States; <sup>3</sup>Leibniz-Institut für Kristallzüchtung, Germany

## 2:30 PM BREAK

SESSION EL07.03: Iron-Based

Session Chairs: Qiang Li and Takasada Shibauchi

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 439

### 3:00 PM \*EL07.03.01

**What Do We Know About Iron-Chalcogenide Superconductors for Potential Quantum Computing?** Qiang Li; Stony Brook University/Brookhaven National Laboratory, United States

### 3:30 PM \*EL07.03.02

**Exotic Pairing States in FeSe-Based Superconductors** Takasada Shibauchi; University of Tokyo, Japan

SESSION EL07.04: REBCO Films and Coated Conductors, HTS Applications

Session Chairs: Tayeb Mousavi and Judy Wu

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 439

### 10:30 AM \*EL07.04.01

**Understanding Enhanced Pinning Efficiency of 1D BaZrO<sub>3</sub> Artificial Pinning Centers by Ca Ion Diffusion into YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-x</sub> Matrix** Judy Z. Wu<sup>1</sup>, Aafiya Aafiya<sup>1</sup>, Mary Ann Sebastian<sup>2</sup>, Jianan Shen<sup>3</sup>, Matteo Mocerì<sup>3</sup>, Victor Ogunjimi<sup>1</sup>, Mohan Panth<sup>1</sup>, Benson Qun Tsai<sup>3</sup>, Abhijeet Choudhury<sup>3</sup>, Timothy Haugan<sup>2</sup> and Haiyan Wang<sup>3</sup>; <sup>1</sup>University of Kansas, United States; <sup>2</sup>U.S. Air Force Research Laboratory, United States; <sup>3</sup>Purdue University, United States

### 11:00 AM EL07.04.02

**Overdoping of Superconducting TLAG - YBa<sub>2</sub>Cu<sub>3</sub>O<sub>7-δ</sub> Films** Aiswarya Kethamkuzhi, Carla Torres, Lavinia Saltarelli, Diana G. Franco, Kapil Gupta, Susagna Ricart, Joffre Gutierrez, Xavier Obradors Berenguer and Teresa Puig; Institute of Material Science Barcelona, Spain

### 11:15 AM EL07.04.03

**Revealing the Mechanisms of Ultrafast Transient Liquid Assisted Growth (TLAG) of REBCO Superconducting Films by *In Situ* Synchrotron Radiation—X-Ray Diffraction and X-Ray Absorption Spectroscopy** Elzbieta Pach<sup>1</sup>, Carla Torres<sup>1</sup>, Ona Mola<sup>1</sup>, Emma Ghiara<sup>1</sup>, Cornelia Pop<sup>1</sup>, Vittorio Bertini<sup>1</sup>, Victor Fuentes<sup>1</sup>, Valentina Roxana Vlad<sup>1</sup>, Jordi Aguilar<sup>1,2</sup>, Daniel Sanchez<sup>3</sup>, Jordi Farjas<sup>3</sup>, Eduardo Solano<sup>2</sup>, Laura Simonelli<sup>2</sup>, Xavier Obradors<sup>1</sup> and Teresa Puig<sup>1</sup>; <sup>1</sup>The Institute of Materials Science of Barcelona (ICMAB-CSIC), Spain; <sup>2</sup>ALBA Synchrotron, Spain; <sup>3</sup>GRMT, University of Girona, Spain

### 11:30 AM \*EL07.04.04

**Mass Productive Processing of REBCO Coated Conductors Involving IBAD and Hot-Wall PLD Technique for High Field Magnet Applications** Yasuhiro Iijima, Masaki Ohsugi, Kazuomi Kakimoto, Shogo Muto, Shinji Fujita, Wataru Hirata, Naonori Nakamura and Masanori Daibo; Fujikura Ltd, Japan

SESSION EL07.05: Device III

Session Chairs: Jagadeesh Moodera and Teruo Ono

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 439

### 1:30 PM \*EL07.05.01

**Superconducting Diode Effect** Teruo Ono; Kyoto University, Japan

**2:00 PM \*EL07.05.02**

**Extrinsic Origin of the Josephson Diode Effect** Stuart S. Parkin; Max Planck Institute of Microstructure Physics, Germany

**2:30 PM BREAK**

**3:00 PM EL07.05.03**

**Field-Resilient Supercurrent Diode in a Multiferroic Josephson Junction** Hung-Yu Yang<sup>1</sup>, Joseph J. Cuzzo<sup>2</sup>, Anand J. Bokka<sup>1</sup>, Gang Qiu<sup>1</sup>, Christopher Eckberg<sup>1</sup>, Yanfeng Lyu<sup>3</sup>, Shuyuan Huyan<sup>4</sup>, Paul C. W. Chu<sup>4</sup>, Kenji Watanabe<sup>5</sup>, Takashi Taniguchi<sup>5</sup> and Kang L. Wang<sup>1</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>Sandia National Laboratories, United States; <sup>3</sup>Nanjing University of Posts and Telecommunications, China; <sup>4</sup>University of Houston, United States; <sup>5</sup>National Institute for Materials Science, Japan

**3:15 PM \*EL07.05.04**

**Ubiquitous Superconducting Diode Effect Leads to Efficient Superconductor Thin Film Devices for Quantum Circuits** Jagadeesh S. Moodera; Massachusetts Institute of Technology, United States

**3:45 PM \*EL07.05.05**

**Antiferromagnetic Quantum Anomalous Hall Effect Modulated by Spin Flips and Flops** Chang Liu; Renmin University of China, China

SESSION EL07.06: Poster Session

Session Chairs: Tayebeh Mousavi and Toshinori Ozaki

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL07.06.01**

**Systematic Studies on Critical Current Density of GdBa<sub>2</sub>Cu<sub>3</sub>O<sub>y</sub> Coated Conductors Irradiated with 350 keV Ar-ions** Toshinori Ozaki<sup>1</sup>, Hiroyuki Okazaki<sup>2</sup>, Hiroshi Koshikawa<sup>2</sup>, Shunya Yamamoto<sup>2</sup>, Tetsuya Yamaki<sup>2</sup>, Morihisa Saeki<sup>2</sup>, Tetsuro Sueyoshi<sup>3</sup> and Hitoshi Sakane<sup>4</sup>; <sup>1</sup>Kwansei Gakuin University, Japan; <sup>2</sup>National Institutes for Quantum Science and Technology, Japan; <sup>3</sup>Kyushu Sangyo University, Japan; <sup>4</sup>SHI-ATEX Co. Ltd., Japan

**EL07.06.02**

**Tunability of the Superconductivity of NbSe<sub>2</sub> Films Grown by Two-Step Vapor Deposition** Meijuan Chang and Huihui Lin; National University of Singapore, Singapore

SESSION EL07.07: Novel Materials I

Session Chairs: Hang Chi and Yusuke Iguchi

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 439

**9:00 AM \*EL07.07.01**

**Unconventional Superconductivity and Spin-Active Interfaces in Chiral Material/Superconductor Heterostructures** Peng Wei; University of California, Riverside, United States

**9:30 AM \*EL07.07.02**

**An Enlightened Combinatorial Search for New Superconductors** Ivan K. Schuller<sup>1</sup>, Tianxing D. Wang<sup>1,2</sup> and Ali C. Basaran<sup>1</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>University of California San Diego, United States

**10:00 AM BREAK**

**10:30 AM EL07.07.03**

**Tuning Superconductivity in Transparent In<sub>2-3</sub>Sn<sub>y</sub>O<sub>3-δ</sub> (ITO) by Oxygen Deficiency** Aaron E. Parra, Meiyi Li, Leunam Fernandez-Izquierdo, Manuel

Quevedo-Lopez and [Ali Aliyev](#); The University of Texas at Dallas, United States

**10:45 AM EL07.07.04**

**Giant Magnetoelastic Interactions in HoSb Probed by High-Resolution Dilatometry and X-Ray Diffraction** [Volodymyr Buturlim](#)<sup>1</sup>, Narayan Poudel<sup>2</sup>, Zahir Islam<sup>3</sup> and Krzysztof Gofryk<sup>2</sup>; <sup>1</sup>Glenn T. Seaborg Institute, Idaho National Laboratory, United States; <sup>2</sup>Idaho National Laboratory, United States; <sup>3</sup>Argonne National Laboratory, United States

**11:00 AM \*EL07.07.05**

**Magnetic Imaging of Chiral and Magnetic Superconductors** [Yusuke Iguchi](#); Stanford University, United States

SESSION EL07.08: Novel Materials II

Session Chairs: Hang Chi and Genda Gu

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 439

**1:30 PM \*EL07.08.01**

**Nickel Age of High-Temperature Superconductivity** [Ariando Ariando](#); National University of Singapore, Singapore

**2:00 PM EL07.08.02**

**Structural Basis for Achieving Superconductivity in a Ultrathin Multilayer-Nickelate** [Hua Zhou](#), Yan Xi, Hong Zheng, Yan Li, Daniel P. Phelan, Hawoong Hong, Anand Bhattacharya and Dillon D. Fong; Argonne National Laboratory, United States

**2:15 PM EL07.08.03**

**Searching for Ideal Topological Crystalline Insulators and Topological Superconductors in Pb-Sn-In-Te System** [Genda Gu](#); BNL, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM EL07.08.04**

**Workflow of Characterization for Superconductors** [Francisco Robles Hernandez](#)<sup>1,1,1</sup>, Maria C. Belduque Correa<sup>1</sup>, Anika I. Lim<sup>1</sup>, Alba M. Valero Morales<sup>1</sup>, Denise Torres Avalos<sup>1</sup>, Hugo Barragan Vargas<sup>1</sup>, Samprash Risal<sup>1</sup>, Sanam Milapati<sup>1</sup>, Zheng Fan<sup>1,1</sup> and Judy Z. Wu<sup>2</sup>; <sup>1</sup>University of Houston, United States; <sup>2</sup>The University of Kansas, United States

**3:45 PM \*EL07.08.05**

**Ordered and Tunable Majorana-Zero-Mode Lattice in Iron-Based Superconductors** [Hongjun Gao](#); Institute of Physics, Chinese Academy of Sciences, China

**4:15 PM \*EL07.08.06**

**Control of Twin Boundaries and Vortex Penetration in FeSe via Swift-Particle Irradiation** [Tsuoyoshi Tamegai](#)<sup>1</sup>, Tong Ren<sup>1</sup>, Yue Sun<sup>2</sup>, Francesco Laviano<sup>3</sup>, Zhixiang Shi<sup>2</sup>, Ryosuke Sakagami<sup>1</sup> and Satoru Okayasu<sup>4</sup>; <sup>1</sup>University of Tokyo, Japan; <sup>2</sup>Southeast University, China; <sup>3</sup>Politecnico di Torino, Italy; <sup>4</sup>Japan Atomic Energy Agency, Japan

# SYMPOSIUM EL08

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Ferrous Materials and Heterostructures

April 7 - April 11, 2025

Symposium Organizers

Michele Conroy, Imperial College London

John Heron, University of Michigan

Dennis Meier, Norwegian University of Science and Technology

Morgan Trassin, ETH Zurich

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL08.01: Microscopy and Growth of (Multi)ferroics I

Session Chairs: John Heron and Lynette Keeney

Monday Morning, April 7, 2025

Summit, Level 4, Room 433

**8:30 AM EL08.01.01****Exotic magnetoelectric interactions in Co<sup>2+</sup>-based quantum materials** [Xianghan Xu](#); University of Minnesota, Twin Cities, United States**8:45 AM EL08.01.02****Magnetization Reversal in BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> III: High-Quality Magnetoelectric BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> Nanodot Array Fabricated with Electron-Beam-Lithographed HSQ Mask** [Hajime Nakayama](#)<sup>1</sup>, Koomok Lee<sup>1</sup>, Kuniyuki Kakushima<sup>1</sup>, Takuya Hoshii<sup>1</sup>, Satoru Kaneko<sup>2</sup>, Manabu Yasui<sup>2</sup>, Masahito Kurouchi<sup>2</sup>, Kei Shigematsu<sup>1,2</sup> and Masaki Azuma<sup>1,2</sup>; <sup>1</sup>Institute of Science Tokyo, Japan; <sup>2</sup>Kanagawa Institute of Industrial Science and Technology, Japan**9:00 AM \*EL08.01.03****Identifying magneto-electrical response of spin topologies using multimodal approaches** [Sophie Morley](#); Lawrence Berkeley National Laboratory, United States**9:30 AM EL08.01.04****Mechanism of 2D anisotropic thermal expansion in Ca<sub>2</sub>RuO<sub>4</sub> Mott insulator** [Hena Das](#)<sup>1,2</sup> and Masaki Azuma<sup>2,1</sup>; <sup>1</sup>Kanagawa Institute of Industrial Science and Technology (KISTEC), Japan; <sup>2</sup>Institute of Science Tokyo, Japan**9:45 AM BREAK****10:15 AM EL08.01.05****Magnetization Reversal in BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> - 2: Electric Field induced Magnetic Domain Change after Ferroelectric Topological Domain Switching in BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> nanodots** [Koomok Lee](#)<sup>1</sup>, Peter Meisenheimer<sup>2</sup>, Paul Stevenson<sup>3</sup>, Yasuhito Nagase<sup>1</sup>, Kei Shigematsu<sup>1,4</sup>, Hena Das<sup>4,1</sup>, Ramamoorthy Ramesh<sup>2</sup> and Masaki Azuma<sup>1,4</sup>; <sup>1</sup>Institute of Integrated Research, Institute of Science Tokyo, Japan; <sup>2</sup>University of California, Berkeley, United States; <sup>3</sup>Northeastern University, United States; <sup>4</sup>Kanagawa Institute of Industrial Science and Technology, Japan**10:30 AM EL08.01.06****Mechanical Patterning of Photovoltaic Property in BiFeO<sub>3</sub> Thin Films by Nanoindentation** [Mengjun Wu](#), Xintong Wang, Weijin Chen and Yue Zheng; Sun Yat-sen University, China**10:45 AM EL08.01.07****Phase transformation at buffer layer in epitaxial BiFeO<sub>3</sub>-based thin film** [SeongMin Park](#)<sup>1</sup>, WooJun Seol<sup>1</sup>, Su Yong Lee<sup>2</sup>, Hyunjin Joh<sup>1</sup>, Hyeon Jun Lee<sup>3</sup> and Ji Young Jo<sup>1</sup>; <sup>1</sup>GIST, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>3</sup>Kangwon National University, Korea (the Republic of)**11:00 AM EL08.01.08****Magnetization Reversal in BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> I: Magnetic Domain Change Induced by In-Plane Electric Polarization Switching in BiFe<sub>0.9</sub>Co<sub>0.1</sub>O<sub>3</sub> Thin Film** [Kei Shigematsu](#)<sup>1,2</sup>, Marin Katsumata<sup>1</sup>, Takuma Itoh<sup>1</sup>, Keita Ozawa<sup>1</sup>, Haruki Shimizu<sup>1</sup>, Keisuke Shimizu<sup>1</sup> and Masaki Azuma<sup>1,2</sup>; <sup>1</sup>Institute of Science Tokyo, Japan; <sup>2</sup>Kanagawa Institute of Industrial Science and Technology, Japan**11:15 AM EL08.01.09****Experimental Confirmation of Predicted Cobalt-Based Magnetic Antiperovskite Nitrides** [Sita Dugu](#)<sup>1</sup>, Sharad Mahatara<sup>1</sup>, Corlyn Regier<sup>2</sup>, Ian Leahy<sup>1</sup>, Andriy Zakutayev<sup>1</sup>, Jamie Neilson<sup>2</sup> and Sage Bauers<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Colorado State University, United States



SESSION EL08.02: Microscopy and Growth of (Multi)ferroics II

Session Chairs: Michele Conroy, John Heron and Morgan Trassin

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 433

**1:45 PM \*EL08.02.01**

**Phase Evolution in Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> Thin Films Deposited by Off-Axis Magnetron Sputtering** [Yaqi Li](#)<sup>1,1</sup>, Edoardo Zatterin<sup>2</sup>, Eva Aw<sup>1</sup>, Daniel A. Chaney<sup>2</sup>, Michele Conroy<sup>1</sup>, Pavlo Zubko<sup>1,3</sup> and Sebastian Kalbfleisch<sup>4</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>ESRF, The European Synchrotron, France; <sup>3</sup>London Centre for Nanotechnology, United Kingdom; <sup>4</sup>MAX IV Laboratory, Sweden

**2:15 PM EL08.02.02**

**Scalable Magnetoelectric PVDF-TrFE/Ni Composite Devices: Towards CMOS-Compatible Output Voltages** [Federica Luciano](#)<sup>1,2</sup>, Erika Giorgione<sup>3,2</sup>, Emma Van Meirvenne<sup>1,2</sup>, Andrei Galan<sup>4,2</sup>, Ilaria Marzorati<sup>5,2</sup>, Arne De Coster<sup>1,2</sup>, Dominika Wysocka<sup>2</sup>, Bart Sorée<sup>1,2</sup>, Stefan De Gendt<sup>1,2</sup>, Florin Ciubotaru<sup>2</sup> and Christoph Adelmann<sup>2</sup>; <sup>1</sup>KU Leuven, Belgium; <sup>2</sup>imec, Belgium; <sup>3</sup>Politecnico di Torino, Italy; <sup>4</sup>Université de Liège, Belgium; <sup>5</sup>Politecnico di Milano, Italy

**2:30 PM EL08.02.03**

**Enhancing Multi-Factor Authentication with Phase-Dependent Physically Unclonable Functions based on PVDF-HFP-a-IGZO Thin-Film Transistors** [Youngmin Han](#) and Hocheon Yoo; Gachon university, Korea (the Republic of)

**2:45 PM EL08.02.04**

**Measurements of electron and phonon transport and scattering in ferroelectric thin films using ultrafast and infrared spectroscopy** [Sara Makarem](#)<sup>1</sup>, Saman Zare<sup>1</sup>, Ian Mercer<sup>2</sup>, Jon-Paul Maria<sup>2</sup> and Patrick E. Hopkins<sup>1</sup>; <sup>1</sup>The University of Virginia, United States; <sup>2</sup>The Pennsylvania State University, United States

**3:00 PM BREAK**

**3:30 PM EL08.02.05**

**Enhanced Conductivity in Artificial Charged Domain Walls of van der Waals Ferroelectric Heterostructures** [Shahriar Muhammad Nahid](#)<sup>1</sup>, Haiyue Dong<sup>1</sup>, Gillian Nolan<sup>1</sup>, Andre Schleife<sup>1</sup>, Nadya Mason<sup>2</sup>, Pinshane Y. Huang<sup>1</sup>, SungWoo Nam<sup>3</sup> and Arend M. van der Zande<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>University of California, Irvine, United States

**3:45 PM EL08.02.06**

**Ferroelectric Switching in Two-dimensional Ga<sub>2</sub>O<sub>3</sub> Down to Sub-nanometer** [Wei Kong](#), Tong Jiang, Yubo Yuan, Huaze Zhu, Han Chen and Wenbin Li; Westlake University, China

**4:00 PM EL08.02.07**

**Combining Mixed-phase Domain Configuration and Multilayer Structure for High-performance Thin-film Piezoelectrics** [Zishen Tian](#)<sup>1,2</sup>, Menglin Zhu<sup>3</sup>, Jaegyu Kim<sup>1</sup>, Pius Behera<sup>1</sup>, Michael Xu<sup>3</sup>, Thomas J. Lee<sup>1</sup>, Ching-Che (Leo) Lin<sup>1</sup>, Hao Pan<sup>1</sup>, Jieun Kim<sup>1</sup>, James M. LeBeau<sup>3</sup> and Lane W. Martin<sup>4,1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Massachusetts Institute of Technology, United States; <sup>4</sup>Rice University, United States

**4:15 PM EL08.02.08**

**Ferroelectric-Dielectric Superlattice Engineering Enabling Ultra-High-Density Capacitors for On-Chip Adaptive Voltage Conversion** [Myeongseop Song](#)<sup>1</sup>, Asir Intisar Khan<sup>1,2</sup>, Shimeng Yu<sup>3</sup> and Sayeef Salahuddin<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Georgia Institute of Technology, United States

**4:30 PM EL08.02.09**

**Symmetry-breaking in Ferroelastic Domain Walls in Inorganic Halide Perovskite CsPbI<sub>3</sub>** [Ida C. Skogvoll](#) and Sverre Selbach; Norwegian University of Science and Technology, Norway

**4:45 PM EL08.02.10**

**Preparation and Core-Electron Spectroscopy of Y- or Sc- Doped AlN Films** [David Ehre](#)<sup>1</sup>, Asaf Cohen<sup>1</sup>, Junying Li<sup>2</sup>, Hagai Cohen<sup>1</sup>, Sergey Khodorov<sup>1</sup>, Ellen Wachtel<sup>1</sup>, Igor Lubomirsky<sup>1</sup> and Anatoly Frenkel<sup>2</sup>; <sup>1</sup>Weizmann Institute of Science, Israel; <sup>2</sup>Stony Brook University, The State University of New York,

United States

SESSION EL08.03: Theoretical Wonderland of Ferroics

Session Chairs: Gustau Catalan and Michele Conroy

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 433

**10:30 AM \*EL08.03.01**

**Intrinsic Surface Properties of Ferroic Thin Films** Nicola Spaldin; ETH Zurich, Switzerland

**11:00 AM \*EL08.03.02**

**Creating Currents of Electric Bubble Quasiparticles** Jorge Iniguez-Gonzalez<sup>1,2</sup>; <sup>1</sup>Luxembourg Institute of Science and Technology, Luxembourg;

<sup>2</sup>University of Luxembourg, Luxembourg

**11:30 AM \*EL08.03.03**

**Proposing, Designing and Detecting Hidden Order Ferroic Order Parameters** Sinead M. Griffin; Lawrence Berkeley National Laboratory, United States

SESSION EL08.04: Atomic Engineering Ferroic Topologies I

Session Chairs: Sinead Griffin and Morgan Trassin

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 433

**1:30 PM \*EL08.04.01**

**Vortices, Skyrmions and Cycloids in Ferroelectrics** Ramamoorthy Ramesh<sup>1,2</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>University of California, Berkeley, United States

**2:00 PM EL08.04.02**

**Magnetoelectric coupling at the nanoscale for advanced spintronic applications** Florin Ciubotaru<sup>1</sup>, Anais Guerenneur<sup>1,2</sup>, Fanfan Meng<sup>1</sup>, Emma Van Meirvenne<sup>1,2</sup>, Federica Luciano<sup>1,2</sup>, Daniele Narducci<sup>1</sup>, Pol Van Dorpe<sup>1,2</sup>, Bart Sorée<sup>1,2</sup>, Stefan De Gendt<sup>1,2</sup> and Christoph Adelmann<sup>1</sup>; <sup>1</sup>imec, Belgium; <sup>2</sup>KU Leuven, Belgium

**2:15 PM EL08.04.03**

**Combining Ferroelectric Nitrides and Topological Insulators for Ferroelectric Control of Spin-Charge Interconversion** Anouk S. Goossens<sup>1</sup>, Thomas Buttens<sup>1</sup>, Luis Moreno Vicente-Arche<sup>1</sup>, Gaëtan Verdierre<sup>1</sup>, Sylvain Massabeau<sup>1</sup>, Henri Jaffres<sup>1</sup>, Marta Rossell<sup>2</sup> and Manuel Bibes<sup>1</sup>; <sup>1</sup>Laboratoire Albert Fert, France; <sup>2</sup>Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**2:30 PM BREAK**

**3:00 PM \*EL08.04.04**

**Topological Textures at Antiferroelectric Domain Walls** Gustau Catalan; Institut Català de Nanociència i Nanotecnologia, Spain

**3:30 PM \*EL08.04.05**

**Unconventional Polar Phenomena in Epitaxial Multiferroic Heterostructures** Lucas M. Caretta<sup>1</sup>, Angela Wittmann<sup>2</sup>, Alexei Zakharov<sup>3</sup>, Ramamoorthy Ramesh<sup>4</sup>, Christoph Klewe<sup>5</sup> and Darrell G. Schlom<sup>6</sup>; <sup>1</sup>Brown University, United States; <sup>2</sup>Johannes Gutenberg University Mainz, Germany; <sup>3</sup>MAX IV, Sweden; <sup>4</sup>University of California, Berkeley, United States; <sup>5</sup>Lawrence Berkeley National Laboratory, United States; <sup>6</sup>Cornell University, United States

**4:00 PM EL08.04.06**

**Ultrascale epitaxial BaTiO<sub>3</sub> nanoislands on silicon and their topological polar texture** Olanivan I. Ibukun<sup>1,2</sup>, Iurii Tikhonov<sup>3</sup>, Valentin Hevelke<sup>1</sup>, Sven Wiesner<sup>1</sup>, Leifeng Zhang<sup>4</sup>, Anna Razumnaya<sup>5</sup>, Nikolay Cherkashin<sup>4</sup>, Sylvie Schamm-Chardon<sup>4</sup>, Igor Lukyanchuk<sup>3</sup>, Dong-Jik Kim<sup>1</sup> and Catherine Dubourdieu<sup>1,2</sup>; <sup>1</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>2</sup>Freie Universität Berlin, Germany; <sup>3</sup>University of Picardie, France; <sup>4</sup>CEMES-CNRS and Université de Toulouse, France; <sup>5</sup>Jozef Stefan Institute, Slovenia

**4:15 PM EL08.04.07**

***Interacting Magnetic Phenomena in a Layered Cu–Based Halide Perovskite Heterostructure*** Caravaggio Caniglia, Yuntian Li, Jiajia Wen, Magdalene Brueggemeyer, Edward Solomon, Young Lee, Ian R. Fisher and Hemamala Karunadasa; Stanford University, United States

**4:30 PM \*EL08.04.08**

**Beyond Ferroelectrics—Antiferroelectric- and Relaxor-Based Multilayers and Superlattices** Lane W. Martin; Rice University, United States

SESSION EL08.05: Atomic Engineering Ferroics Topologies II

Session Chairs: Lucas Caretta and John Heron

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 433

**8:15 AM \*EL08.05.01**

**Cation Ordering and Interfacial Engineering in Ferrimagnetic Iron Garnets** Caroline A. Ross; Massachusetts Institute of Technology, United States

**8:45 AM \*EL08.05.02**

**Impact of Manganese Substitution on the Crystal Structure and Magnetic Properties of Aurivillius Phases** Lynette Keeney<sup>1</sup>, Jennifer Halpin<sup>1</sup>, Louise Colfer<sup>1</sup>, Anurag Pritam<sup>1</sup>, Michael Schmidt<sup>1</sup>, Manisha Bansal<sup>2</sup>, Tuhin Maity<sup>2</sup>, Michele Conroy<sup>3</sup> and Roger W. Whatmore<sup>3</sup>; <sup>1</sup>Tyndall National Institute, Ireland; <sup>2</sup>IISER-Thiruvananthapuram, India; <sup>3</sup>Imperial College London, United Kingdom

**9:15 AM EL08.05.03**

**Nanoscale Imaging of Current Flow Within Ferroelectric Domain Walls with a Single-Spin Magnetometer** James Dalzell, Conor J. McCluskey, Raymond McQuaid, Marty Gregg and Amit Kumar; Queen's University Belfast, United Kingdom

**9:30 AM EL08.05.04**

**Enhancing Vertical Polarization in Aurivillius Phase Ferroelectric Thin Films** Debismita Dutta<sup>1</sup>, Tigran Simonian<sup>2,2</sup>, Michael Schmidt<sup>1</sup>, Sabir Hussain<sup>1</sup>, Valeria Nicolosi<sup>2</sup> and Lynette Keeney<sup>1</sup>; <sup>1</sup>Tyndall National Institute, University College Cork, Ireland; <sup>2</sup>Trinity College Dublin, The University of Dublin, Ireland

**9:45 AM BREAK**

**10:15 AM \*EL08.05.05**

**Interplay Between Strain, Polar States and Spin Textures in Magnetoelectric BiFeO<sub>3</sub>** Vincent Garcia; Laboratoire Albert Fert, France

**10:45 AM EL08.05.06**

**Exploiting the Competition Between Antiferroelectric and Ferroelectric Orders for Ultrahigh Electromechanical Response** Khuong P. Ong<sup>1,2</sup>, Huajun Liu<sup>3,2</sup>, Baichen Lin<sup>4,3</sup>, Tiannan Yang<sup>5</sup>, Yeng Ming Lam<sup>4</sup> and David Singh<sup>6</sup>; <sup>1</sup>Institute of High Performance Computing, Singapore; <sup>2</sup>Agency for Science, Technology and Research (A\*STAR), Singapore; <sup>3</sup>Institute of Materials Research and Engineering, Singapore; <sup>4</sup>Nanyang Technological University, Singapore; <sup>5</sup>Shanghai Jiao Tong University, China; <sup>6</sup>University of Missouri, United States

**11:00 AM EL08.05.07**

**Reversible Control over the Polar-to-Antipolar Phase Transition in Multiferroic Thin Films** Bixin Yan<sup>1</sup>, Marvin Müller<sup>1</sup>, Hyeon Ko<sup>1</sup>, Yen-Lin Huang<sup>2</sup>, Ramamoorthy Ramesh<sup>3</sup>, Marta Rossell<sup>4</sup>, Manfred Fiebig<sup>1</sup> and Morgan Trassin<sup>1</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>3</sup>Rice University, United States; <sup>4</sup>Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**11:15 AM EL08.05.08**

**Epitaxial Growth and Strain-Dependent Phase Stability of Layered Carpy-Galy A<sub>2</sub>B<sub>2</sub>O<sub>7</sub> Films for Polar Metallicity** Elzbieta Gradauskaitė<sup>1</sup>, Anouk S. Goossens<sup>1</sup>, Xiaoyan Li<sup>2</sup>, Lucia Iglesias<sup>1</sup>, Alexandre Gloter<sup>2</sup>, Quintin Meier<sup>3</sup> and Manuel Bibes<sup>1</sup>; <sup>1</sup>Laboratoire Albert Fert, France; <sup>2</sup>Laboratoire de Physique des Solides, CNRS, Université Paris Saclay, France; <sup>3</sup>Université Grenoble Alpes, Institut Néel, CNRS, France

SESSION EL08.06: Atomic Engineering Ferroic Topologies III

Session Chairs: Michele Conroy and Vincent Garcia

Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 433

**1:30 PM \*EL08.06.01**

**Twisted Charged Interfaces in Ferroelectrics** Andrew Rogers, Ronan Lynch, Kristina Holsgrove, Conor J. McCluskey, Amit Kumar, Raymond McQuaid and Marty Gregg; Queen's Univ Belfast, United Kingdom

**2:00 PM EL08.06.02**

**Ferroelectricity Enhancement of Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub> Thin Films with ZrO<sub>2</sub>-Seed Layer Induced Crystallization** Kyongjae Kim and You Seung Rim; Sejong University, Korea (the Republic of)

**2:15 PM EL08.06.03**

**Influence of W and TiN Electrodes on Ferroelectric ALD-(Hf,Zr)O<sub>2</sub> Capacitors at Cryogenic Temperatures** Seungbin Lee<sup>1</sup>, Jongmug Kang<sup>1</sup>, Jae Hun Kim<sup>1</sup>, Jin-Hyun Kim<sup>2</sup>, Minjong Lee<sup>2</sup>, Min Hwan Lee<sup>3</sup>, Jiyoung Kim<sup>2</sup> and Si Joon Kim<sup>1</sup>; <sup>1</sup>Kangwon National University, Korea (the Republic of); <sup>2</sup>The University of Texas at Dallas, United States; <sup>3</sup>University of California, Merced, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EL08.06.04**

**Tunable Piezoelectricity of Hafnia-Based Ferroelectrics** Alexei L. Gruverman; University of Nebraska-Lincoln, United States

**4:00 PM EL08.06.05**

**Influence of Substrate Crystallographic Orientation on Ferroelectric Properties of ZrO<sub>2</sub>/HfO<sub>2</sub> Layered Ultrathin Films** Hsiang-Chih Chan, Shu-Chih Chang and Tzong-Lin Jay Shieh; National Taiwan University, Taiwan

**4:15 PM EL08.06.06**

**Evolution of Phase and Stress in ZrO<sub>2</sub> Ultrathin Films—Influence of Film Thickness and Crystal Orientation on Ferroelectricity** Hsin-Yu Hsieh, Hsiang-Chih Chan and Tzong-Lin Jay Shieh; National Taiwan University, Taiwan

**4:30 PM EL08.06.07**

**A Threshold Switching Selector Based on Anti-Ferroelectric Tunnel Junction (AFTJ) in Ultra-Thin ZrO<sub>2</sub> for Resistive Memory Applications** Chungjin Kim<sup>1,2</sup>, Balreen Saini<sup>1</sup> and Paul C. McIntyre<sup>1,3</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>Samsung Electronics, Korea (the Republic of); <sup>3</sup>SLAC National Accelerator Laboratory, United States

**4:45 PM EL08.06.08**

**Thermal Budget Analysis of Ferroelectric ALD-(Hf,Zr)O<sub>2</sub> Thin Films Using the JMAK Model** Hyeonhong Min<sup>1</sup>, Jongmug Kang<sup>1</sup>, Jae Hun Kim<sup>1</sup>, Seungbin Lee<sup>1</sup>, Jin-Hyun Kim<sup>2</sup>, Minjong Lee<sup>2</sup>, Jiyoung Kim<sup>2</sup> and Si Joon Kim<sup>1</sup>; <sup>1</sup>Kangwon National University, Korea (the Republic of); <sup>2</sup>The University of Texas at Dallas, United States

SESSION EL08.07: Poster Session: Ferroic Materials and Heterostructures

Session Chairs: Michele Conroy and Morgan Trassin

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL08.07.01**

**Ultra-Efficient Charge-Trapping and Interface Optimization in HfO<sub>2</sub>-TiO<sub>2</sub> Films via Remote Plasma ALD for Cutting-Edge Memory Technology to Power Future AI Advancements** Inkook Hwang, Jiwon Kim, Changbun Yoon and Hyosil Yang; Tech University of Korea, Korea (the Republic of)

**EL08.07.02**

**A Phenomenological Thermodynamic Energy Density Function for Ferroelectric Wurtzite Al<sub>1-x</sub>Sc<sub>x</sub>N Single Crystals** Yijia Gu<sup>1</sup>, Andrew C. Meng<sup>2</sup>, Aiden Ross<sup>3</sup> and Long-Qing Chen<sup>3</sup>; <sup>1</sup>Missouri University of Science and Technology, United States; <sup>2</sup>University of Missouri–Columbia, United States; <sup>3</sup>The Pennsylvania State University, United States

**EL08.07.03**

**Creation of Independently Controllable and Long-lifetime Polar Skyrmion Textures in Ferroelectric-Metallic Heterostructures** Fei Sun, Jianhua Ren, Weijin Chen and Yue Zheng; Sun Yat-sen University, China

**EL08.07.04**

**B.A.Baitimbetova, Zh. Karaidarova, A.G.Tyagunov A.G., Zh. E.Ibraeva** Bagila A. Baitimbetova<sup>1,2</sup>; <sup>1</sup>The Pennsylvania State University, United States; <sup>2</sup>Satbayev University, Kazakhstan

**EL08.07.05**

**Temperature Dependent Band Gap and Phonon Modes of CVD Grown MoSe<sub>2</sub>/MoS<sub>2</sub> Heterostructures on GaN and Sapphire Substrates** Kedar Johnson<sup>1,2</sup>, Elycia Wright<sup>2</sup>, Robin Rouseau<sup>2</sup>, Nijai Dixon<sup>2</sup>, Selena Coye<sup>2</sup>, M.K Indika Senevirathna<sup>2</sup> and Michael Williams<sup>2</sup>; <sup>1</sup>Morehouse College, United States; <sup>2</sup>Clark Atlanta University, United States

**EL08.07.06**

**Band structure modification of the Mn-doped Multicomponent Dilute Semiconductors and Topological Semimetal Layers** Oksana Yastrubchak<sup>1</sup>, Nataliia Tataryn<sup>1</sup>, Sergii Mamykin<sup>1</sup>, Khrystyna Levchenko<sup>2</sup>, Rostyslav Serha<sup>2</sup>, Janusz Sadowski<sup>3</sup>, Volodymyr Romanyuk<sup>1</sup>, Badih Assaf<sup>4</sup>, Jacek Furdyna<sup>4</sup> and Xinyu Liu<sup>4</sup>; <sup>1</sup>V. E. Lashkaryov Institute of Semiconductor Physics of NAS of Ukraine, Ukraine; <sup>2</sup>University of Vienna, Austria; <sup>3</sup>ENSEMBLE3 FOR NANOPHOTONICS, ADVANCED MATERIALS AND NOVEL CRYSTAL GROWTH-BASED TECHNOLOGIES, Poland; <sup>4</sup>University of Notre Dame, United States

**EL08.07.07**

**Multifunctional Device with Robust Performance for RNG and Ternary Logic Application utilizing N-P-N Sandwiched Heterojunction Transistor** Jaechan Song, Youngmin Han and Hocheon Yoo; Gachon university, Korea (the Republic of)

**EL08.07.08**

**Artificial Neuron Based on Ferroelectric Hafnia with Polarization Switching-Induced Negative Differential Resistance** Dae Haa Ryu, Joonbong Lee, Hyunbin Chung, Juhyeong Lee, Myeongyun Lee, Moon Seop Choi and Taekjib Choi; Sejong University, Korea (the Republic of)

**EL08.07.09**

**Optimization of Ferroelectric and Memory Characteristics in HZO Gate Insulator FeTFTs Through ALD Cycle Control** Ju Hyun Lee, Jae Seong Han, Kyungmoon Kwak, Kyungho Park, Subi Choi and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

**EL08.07.10**

**Ferroids, multiferroids and magnetoelectrics: reconsidering new paths to large transduction, ultra-low power sensors and giant energy conversion** Peter Finkel; Naval Research Laboratory, United States

**EL08.07.11**

**All-Electrical Control of Chiral Spin Textures** Anjan Soumyanarayanan<sup>1,2</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Agency for Science, Technology and Research, Singapore

**EL08.07.12**

**Direct Growth of Ferroelectric Orthorhombic ZrO<sub>2</sub> on Ru by Atomic Layer Deposition at 300 °C** Myeongchan Ko, Ji Su Park, Soyun Joo, Seungbum Hong, Jong Min Yuk and Kyung Min Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**EL08.07.13**

**Suppressing Metallization in MoS<sub>2</sub> for Enhanced Negative Magnetoresistance** Ting-Chun Huang<sup>1</sup>, Chiashain Chuang<sup>2</sup>, Chi-Feng Pai<sup>3</sup>, Mario Hofmann<sup>3</sup> and Ya-Ping Hsieh<sup>1</sup>; <sup>1</sup>Academia Sinica, Taiwan; <sup>2</sup>Chung Yuan Christian University, Taiwan; <sup>3</sup>National Taiwan University, Taiwan

**EL08.07.14**

**Exploring Ferroelectricity of Buffer-Free Epitaxial Hf<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> Films** Hugo Romero<sup>1</sup>, Ruben Corcuera<sup>1</sup>, Eduardo Barriuso<sup>1</sup>, Lourdes Martinez de Baños<sup>1</sup>, Ricardo Jimenez<sup>2</sup>, Eric Langenberg<sup>3</sup>, Panagiotis Koutsogiannis<sup>1</sup>, Javier Blasco<sup>1</sup>, Irene Lucas del Pozo<sup>1</sup>, Luis Morellon<sup>1</sup>, Miguel Alguero<sup>2</sup>, Pedro Algarabel<sup>1</sup>, Jose A. Pardo<sup>1</sup> and Cesar Magen<sup>1</sup>; <sup>1</sup>Instituto de Nanociencia y Materiales de Aragón (INMA), Universidad de Zaragoza - CSIC, Spain; <sup>2</sup>Instituto de Ciencia de Materiales de Madrid, CSIC, Spain; <sup>3</sup>Universitat de Barcelona, Spain

SESSION EL08.08: Probing Ferroic Topologies I

Session Chairs: Marty Gregg and Yu-Tsun Shao

Thursday Morning, April 10, 2025

Summit, Level 4, Room 433

**8:00 AM \*EL08.08.01**

**Visualizing amorphization in In<sub>2</sub>Se<sub>3</sub>, 2D ferroelectric through in situ microscopy** [Pavan Nukala](#); Indian Institute of Science, India

**8:30 AM EL08.08.02**

**Atomic-Resolution Electron Microscopy Characterization of Conductive Domain Walls in PZT Thin Films** Panagiotis Koutsogiannis<sup>1</sup>, Felix Risch<sup>2</sup>, Jose A. Pardo<sup>1</sup>, Igor Stolichnov<sup>2</sup> and [Cesar Magen](#)<sup>1</sup>; <sup>1</sup>Instituto de Nanociencia y Materiales de Aragón (INMA), CSIC-Universidad de Zaragoza, Spain; <sup>2</sup>Ecole Polytechnique Fédérale de Lausanne, Switzerland

**8:45 AM \*EL08.08.03**

**Electrical properties of ferroelectric superlattices** [Pavlo Zubko](#); University College London, United Kingdom

**9:15 AM \*EL08.08.04**

**Ferroelectricity and Ferrielectricity in the “Antiferroelectric” PbZrO<sub>3</sub> and PbHfO<sub>3</sub> Thin Films** [Nazanin Bassiri-Gharb](#)<sup>1</sup>, Seonkyu Shin<sup>1</sup>, Milan Haddad<sup>1</sup>, Aaron B Naden<sup>2,3</sup>, Nikhilesh Maity<sup>4</sup>, Vasily Lebedev<sup>5</sup>, Kristina Holsgrove<sup>2</sup>, Nior Sharma<sup>2</sup>, Sergey Lisenkov<sup>4</sup>, Lewys Jones<sup>5</sup>, Amit Kumar<sup>2</sup> and Inna Pomonareva<sup>4</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>Queen's University Belfast, United Kingdom; <sup>3</sup>University of St Andrews, United Kingdom; <sup>4</sup>University of South Florida, United States; <sup>5</sup>Trinity College Dublin, The University of Dublin, Ireland

**9:45 AM BREAK**

**10:00 AM \*EL08.08.05**

**Frontiers in Accurate Mapping of Three-Dimensional Nano-Electromechanics** [Roger Proksch](#); Asylum Research Oxford Instruments, United States

**10:30 AM EL08.08.06**

**In-Operando Electro-Optical Defect Characterization on Hf<sub>x</sub>Zr<sub>(1-x)</sub>O<sub>2</sub> based MFM Devices as a Function of Lifetime** [Fernando J. Vega Amaya](#)<sup>1</sup>, Yong Kyu Choi<sup>2</sup>, Jon Ihlefeld<sup>2</sup> and Thomas Beechem<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Virginia, United States

**10:45 AM EL08.08.07**

**Optical Characterization of Freestanding Oxide Membranes and Their Heterostructures** [Huijue Liu](#)<sup>1</sup>, Jieyang Zhou<sup>1</sup>, Medha Dandu<sup>2</sup>, Hudson Shih<sup>1</sup>, Harishankar Jayakumar<sup>2</sup>, Archana Raja<sup>2</sup> and Seung Sae Hong<sup>1</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**11:00 AM EL08.08.08**

**Atomic-Scale Phase Transition and Polarization Switching Mechanism of Fluorite Oxide Ferroelectrics by In-Situ Scanning Transmission Electron Microscopy** [Xinyan Li](#)<sup>1,1,2</sup>, Qinghua Zhang<sup>2</sup>, Chen Ge<sup>2</sup>, Lin Gu<sup>3</sup>, Yimo Han<sup>1,1</sup> and Ramamoorthy Ramesh<sup>1,1,1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Chinese Academy of Sciences, China; <sup>3</sup>Tsinghua University, China

**11:15 AM EL08.08.09**

**Understanding the Role of Strain, Stress, Defects and Dopants in the Ferroelectric, Switching and Phase Stability Properties of Epitaxial Hafnia and Zirconia Films** [Veniero Lenzi](#)<sup>1,1</sup>, Alexandre Silva<sup>1,1</sup>, Ignasi Fina<sup>2</sup>, Florencio Sanchez<sup>2</sup>, José Silva<sup>1,1</sup> and Luís Marques<sup>1,1</sup>; <sup>1</sup>University of Minho, Portugal; <sup>2</sup>Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

**11:30 AM \*EL08.08.10**

**Electric Field-Manipulated Optical Chirality in Ferroelectric Vortex Domains** Haojie Han<sup>1</sup>, Wei Li<sup>1</sup>, Qinghua Zhang<sup>2</sup>, Houbing Huang<sup>3</sup>, Ce-wen Nan<sup>1</sup>, Qian Li<sup>1</sup> and [Jing Ma](#)<sup>1</sup>; <sup>1</sup>TSINGHUA UNIVERSITY, China; <sup>2</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>3</sup>Beijing Institute of Technology, China

SESSION EL08.09: Probing Ferroic Topologies II

Session Chair: Roger Proksch

Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 433

**1:30 PM \*EL08.09.01**

**Atomic-Resolution Imaging of Polar Order Across Temperatures** Ismail El Baggari and Yang Zhang; Harvard University, United States

**2:00 PM \*EL08.09.02**

**Probing Real-Space Topological Textures in Multiferroic Heterostructures with Multi-Modal Electron Microscopy** Yu-Tsun Shao<sup>1</sup>, Ting-Ran Liu<sup>1</sup>, Koushik Jagadish<sup>1</sup>, Maya Ramesh<sup>2</sup>, Bastien F. Grosse<sup>3</sup>, Amir Avishai<sup>1</sup>, Lucas M. Caretta<sup>4</sup>, Nicola A. Spaldin<sup>5</sup>, Darrell G. Schlom<sup>2</sup> and Ramamoorthy Ramesh<sup>6</sup>; <sup>1</sup>University of Southern California, United States; <sup>2</sup>Cornell University, United States; <sup>3</sup>University of Birmingham, United Kingdom; <sup>4</sup>Brown University, United States; <sup>5</sup>ETH Zürich, Switzerland; <sup>6</sup>Rice University, United States

**2:30 PM \*EL08.09.03**

**Engineering and Understanding the Dynamics of Ferroelectric Domain Walls and Boundaries** Marti Checa<sup>1</sup>, Shivarajan Raghuraman<sup>1</sup>, Bharat Pant<sup>2</sup>, Pravin Kavle<sup>3,4</sup>, Arvind Dasgupta<sup>3,4</sup>, Rama Vasudevan<sup>1</sup>, Liam Collins<sup>1</sup>, Lane W. Martin<sup>5</sup>, Ye Cao<sup>2</sup>, Kyle Kelley<sup>1</sup>, Stephen Jesse<sup>1</sup> and Neus Domingo Marimon<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>University of Texas at Arlington, United States; <sup>3</sup>University of California, Berkeley, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States; <sup>5</sup>Rice University, United States

**3:00 PM BREAK**

**3:30 PM \*EL08.09.04**

**Oxygen mobility and ferroelectric switching in scaled hafnia synapses** Alexandre Baigol Sisó<sup>1</sup>, Yanming Zhang<sup>1</sup>, Till Zellweger<sup>1</sup>, Paul Uriarte Vicandi<sup>1</sup>, Anwasha Panda<sup>1</sup> and Laura Bégon-Lours<sup>1,2</sup>; <sup>1</sup>ETH Zürich, Switzerland; <sup>2</sup>IBM Research-Zurich, Switzerland

**4:00 PM EL08.09.05**

**Composition-driven structural and dielectric transitions in epitaxial (1-x)PbMg<sub>1/3</sub>Nb<sub>2/3</sub>O<sub>3</sub>-(x)PbZrO<sub>3</sub> relaxor-antiferroelectric thin films** Sreekeerthi Pamula<sup>1,2</sup>, Hao Pan<sup>1</sup>, Bridget Denzer<sup>3</sup>, Zishen Tian<sup>1,2</sup>, Tae Joon Park<sup>1</sup>, James M. LeBeau<sup>3</sup> and Lane Martin<sup>1,2,4</sup>; <sup>1</sup>University of California Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Massachusetts Institute of Technology, United States; <sup>4</sup>Rice University, United States

**4:15 PM EL08.09.06**

**Direct Imaging of Hot Spots in Domain Wall Devices Using Scanning Thermal Microscopy** Lindsey Lynch, Kristina Holsgrove, Marty Gregg and Raymond McQuaid; Queen's University Belfast, United Kingdom

**4:30 PM \*EL08.09.07**

**Tunneling in Ferroelectric Heterostructures—Making it Better with Hybrid Interfaces** Nagarajan Valanoor; University of New South Wales, Australia

SESSION EL08.10: Probing Ferroic Topologies III

Session Chairs: Michele Conroy and Neus Domingo Marimon

Friday Morning, April 11, 2025

Summit, Level 4, Room 433

**8:00 AM EL08.10.01**

**Exploring Cooperative Effects of Multi-Element Substitution in AlN** Rebecca Smaha<sup>1</sup>, Julia Martin<sup>1</sup>, Cheng-Wei Lee<sup>2</sup>, Andriy Zakutayev<sup>1</sup>, Keisuke Yazawa<sup>1,2</sup> and Prashun Gorai<sup>2,1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Colorado School of Mines, United States

**8:15 AM EL08.10.02**

**The More the Better: Designing Wurtzite Ferroelectrics Through Co-Alloying** Victoria Bradford<sup>1</sup>, Thi Nguyen<sup>2</sup>, Geoff L. Brennecke<sup>3</sup>, Cheng-Wei Lee<sup>3</sup> and Prashun Gorai<sup>2</sup>; <sup>1</sup>University of Connecticut, United States; <sup>2</sup>Rensselaer Polytechnic Institute, United States; <sup>3</sup>Colorado School of Mines, United States

**8:30 AM \*EL08.10.03**

**Periodic Whirling Polar Textures in BaTiO<sub>3</sub>/SrTiO<sub>3</sub> Superlattices on Silicon** Catherine Dubourdieu<sup>1,2</sup>; <sup>1</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>2</sup>Freie Universität Berlin, Germany

**9:00 AM \*EL08.10.04**

**Probing the Interaction Between Ferroelectric Surfaces and Adsorbed Water** [Patrycja Paruch](#); University of Geneva, Switzerland

**9:30 AM EL08.10.05**

**Engineering Unequal Antipolar Displacement in Ferromagnetic Layered Oxide Heterostructures** Jonathan Spring<sup>1</sup>, Natalya Fedorova<sup>2</sup>, Javier Herrero - Martin<sup>3</sup>, Evgenios Stylianidis<sup>4</sup>, Pavlo Zubko<sup>4</sup>, Jorge Iniguez-Gonzalez<sup>2</sup>, Marta Rossell<sup>5</sup> and [Marta Gibert](#)<sup>6</sup>; <sup>1</sup>University of Zurich, Switzerland; <sup>2</sup>LIST, Luxembourg; <sup>3</sup>ALBA Synchrotron, Spain; <sup>4</sup>UCL, United Kingdom; <sup>5</sup>Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>6</sup>Technische Universität Wien, Austria

**9:45 AM EL08.10.06**

**Reversible and rewritable p- and n-type conducting ferroelectric domain walls?** [Sverre M. Selbach](#), Ida C. Skogvoll, Kristoffer Eggestad, Muhammed Zeeshan Khalid and Benjamin A. Williamson; NTNU Norwegian University of Science and Technology, Norway

**10:00 AM BREAK****10:30 AM \*EL08.10.07**

**Layered Tugsten Bronzes [Ba(PO<sub>4</sub>)<sub>2</sub>]W<sub>m</sub>O<sub>3m-3</sub>: a New Playground for Ferroic Order and Electronic Properties.** Quintin Meier<sup>1</sup>, Angel Arevalo-Lopez<sup>1</sup>, Hicham Nimoh<sup>1</sup>, Claire Minaud<sup>1</sup>, Marielle Huve<sup>1</sup>, Frédéric Capet<sup>1</sup>, Robert Glaum<sup>2</sup>, Olivier Mentré<sup>1</sup> and [Andrés Cano](#)<sup>1</sup>; <sup>1</sup>CNRS, France; <sup>2</sup>U. Bonn, Germany

**11:00 AM EL08.10.08**

**Influence of epitaxial stress on thermally activated endurance phenomena in Hf<sub>0.5</sub>Zr<sub>0.5</sub>O<sub>2</sub>** [Joshua W. Adkins](#)<sup>1,2</sup>, Florencio Sanchez<sup>3</sup> and Ignasi Fina<sup>3</sup>; <sup>1</sup>University of Illinois Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Spain

**11:15 AM EL08.10.09**

**Effects of AlO<sub>x</sub> Interlayers on Ferroelectric Properties of TiN/Al-doped HfO<sub>2</sub>/TiN Capacitors Treated by Flash Lamp Annealing** [Hideaki Tanimura](#)<sup>1,2</sup>, Tomoya Mifune<sup>2</sup>, Yuma Ueno<sup>1</sup>, Yusuke Tani<sup>1</sup>, Hironori Fujisawa<sup>2</sup>, Seiji Nakashima<sup>2</sup>, Ai I. Osaka<sup>2</sup>, Shinichi Kato<sup>1</sup> and Takumi Mikawa<sup>1</sup>; <sup>1</sup>SCREEN Semiconductor Solutions, Japan; <sup>2</sup>University of Hyogo, Japan

**11:30 AM EL08.10.10**

**Topological Defects and Domain Patterns in 2D and 3D Ferroics** [Aaron Merlin Müller](#)<sup>1</sup>, Amadé Bortis<sup>1</sup>, Quintin Meier<sup>2</sup>, Arkadiy Simonov<sup>1</sup>, Andrés Cano<sup>2</sup>, Manfred Fiebig<sup>1</sup> and Thomas Lottermoser<sup>1</sup>; <sup>1</sup>ETH Zürich, Switzerland; <sup>2</sup>Univ. Grenoble Alpes, CNRS, Grenoble INP, Institut Néel, France

SESSION EL08.11: Probing Ferroic Topologies IV

Session Chairs: Michele Conroy, John Heron and Morgan Trassin

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 433

**2:00 PM EL08.11.01**

**Opto-electronic Control Domain Manipulation in Ferroelectric Oxides** [Subhajit Pal](#)<sup>1</sup>, Lan-Tien Hsu<sup>2</sup>, Haoying Sun<sup>3</sup>, Sheng-Han Teng<sup>2</sup>, Vivek Dwij<sup>4</sup>, Emanuele Palladino<sup>1</sup>, Yuefeng Nie<sup>3</sup>, Anna Gruenebohm<sup>2</sup> and Joe Briscoe<sup>1</sup>; <sup>1</sup>Queen Mary University of London, United Kingdom; <sup>2</sup>Ruhr-University Bochum, Germany; <sup>3</sup>Nanjing University, China; <sup>4</sup>Tata Institute of Fundamental Research, India

**2:15 PM EL08.11.02**

**Millisecond Crystallization of Ferroelectric Al:HfO<sub>2</sub> Thin Films with Different Al Concentrations by Flash Lamp Annealing** [Tomoya Mifune](#)<sup>1</sup>, Hideaki Tanimura<sup>1,2</sup>, Yuma Ueno<sup>2</sup>, Yusuke Tani<sup>2</sup>, Yukiya Sano<sup>1</sup>, Hironori Fujisawa<sup>1</sup>, Seiji Nakashima<sup>1</sup>, Ai I. Osaka<sup>1</sup>, Shinichi Kato<sup>2</sup> and Takumi Mikawa<sup>2</sup>; <sup>1</sup>University of Hyogo, Japan; <sup>2</sup>SCREEN Semiconductor Solutions Co. Ltd., Japan

**2:30 PM EL08.11.03**

**Large Electromechanical Coupling Due to Cooperative Effects in Zr-doped Ceria** Anatoly Frenkel<sup>1</sup>, Yue Qi<sup>2</sup>, Ellen Wachtel<sup>3</sup>, David Ehre<sup>1</sup> and [Igor Lubomirsky](#)<sup>3</sup>; <sup>1</sup>Stony Brook University, United States; <sup>2</sup>, United States; <sup>3</sup>Weizmann Institute of Science, Israel

**2:45 PM EL08.11.04**



**Epitaxial Superlattices as a Platform for Maximizing the Spontaneous Polarization and Cyclability of Ferroelectric Hafnia** [Johanna van Gent González](#), Ewout van der Veer, Yulei Li and Beatriz Noheda; University of Groningen, Netherlands

**3:00 PM BREAK**

**3:15 PM EL08.11.05**

**Temperature-Dependent Switching Behavior and Structural Changes in Ultra-Thin Ferroelectric Hafnia-Zirconia Capacitors** [Balreen Saini](#)<sup>1</sup>, Cristian Ruano Arens<sup>1</sup>, Vivek Thampy<sup>2</sup>, Wilman Tsai<sup>1</sup>, John Baniecki<sup>2</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**3:30 PM EL08.11.06**

**Exploring Ferroelectric Domain Switching Dynamics and Phase Configuration and Optical Properties** [Peter Finkel](#); Naval Research Laboratory, United States

**3:45 PM EL08.11.07**

**Ferroelastic Domain Switching in (K,Na)NbO<sub>3</sub>-Based Polymorphic Perovskites Under Combined Stress and Temperature Stimuli** [Seohyeon Jo](#) and Yan Chen; Oak Ridge National Laboratory, United States

**4:00 PM EL08.11.08**

**On-the-fly Machine-learned Force Fields for MD Simulations of Ferroelectric Phase Transitions and Domain Wall Pinning** [Kristoffer Eggestad](#), Ida C. Skogvoll, Benjamin A. Williamson and Sverre Selbach; Norwegian University of Science and Technology, Norway

**4:15 PM EL08.11.09**

**Noninvasive Three-dimensional Mapping of Polar Skyrmion Structures with Atomic Resolution** [Joohee Bang](#)<sup>1</sup>, Nives Strkalj<sup>2</sup>, Hugo Aramberri<sup>3</sup>, Morgan Trassin<sup>1</sup> and Thomas Weber<sup>1</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>Institute of Physics, Zagreb, Croatia; <sup>3</sup>Luxembourg Institute of Science and Technology, Luxembourg

**4:30 PM EL08.11.10**

**Thermodynamic Theory of Linear Optical and Electro-Optic Properties of Ferroelectrics** [Aiden Ross](#), Mohamed S.M.M Ali, Akash Saha, Rui Zu, Venkatraman Gopalan, Ismaila Dabo and Long-Qing Chen; The Pennsylvania State University, United States

## SYMPOSIUM EL09

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Stability of Metal Halide Perovskites—From Materials to Devices  
April 7 - April 11, 2025

Symposium Organizers

Bin Chen, Northwestern University  
Giulia Grancini, University of Pavia  
Yi Hou, National University of Singapore  
Lethy Krishnan Jagadamma, University of St. Andrews

Symposium Support

**Gold**  
Singfilm Solar Pte. Ltd

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL09.01: Advances in Perovskite Technology

Session Chairs: Bin Chen and Yi Hou

Monday Morning, April 7, 2025  
Summit, Level 4, Room 430

**8:30 AM \*EL09.01.01**

**The Genesis and Latest Developments of Perovskite Solar Cells** Nam-Gyu Park; Sungkyunkwan University, Korea (the Republic of)

**9:00 AM EL09.01.02**

**Improving the Stability of Tin Halide Perovskites—From Additives to Two-Dimensional Materials** Kenneth R. Graham<sup>1</sup>, Syed Joy<sup>1</sup>, Tareq Hossain<sup>1</sup>, Harindi R. Atapattu<sup>1</sup>, Henry Prueft<sup>1</sup>, Stephen Johnson<sup>2</sup> and Sean Parkin<sup>1</sup>; <sup>1</sup>University of Kentucky, United States; <sup>2</sup>Transylvania University, United States

**9:15 AM \*EL09.01.03**

**Understanding the Long-Term Instability of Metal Halide Perovskite Solar Cells** Jinsong Huang; University of North Carolina-Chapel Hill, United States

**9:45 AM EL09.01.04**

**High-Performance Semitransparent Solar Cells and Materials** Changzhi Li; Zhejiang University, China

**10:00 AM BREAK**

**10:30 AM \*EL09.01.05**

**Engineering Perovskite Nanocrystals as Versatile Quantum Emitters** Maksym V. Kovalenko<sup>1,2</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**11:00 AM EL09.01.06**

**Highly Stable Perovskite Nanocrystal Patterns via Rheology-Controlled Microlithography** Sang Woo Bae, Jinmin Park, Do Hwan Kim and Young-Hoon Kim; Hanyang University, Korea (the Republic of)

**11:15 AM \*EL09.01.07**

**An Autonomous Lab Approach for Stabilizing Perovskite Thin Films Across Scales** Shijing Sun; University of Washington, United States

**11:45 AM EL09.01.08**

**Determining Parameters of Perovskite Half-Devices Using Time-Resolved Photoluminescence and Bayesian Inference** Manuel Kober-Czerny, Akash Dasgupta, Seongrok Seo, Florine Rombach, David McMeekin, Heon Jin and Henry Snaith; University of Oxford, United Kingdom

SESSION EL09.02: Pathways to Reliable and Scalable Perovskites

Session Chairs: Yi Hou and Nicholas Rolston

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 430

**1:30 PM \*EL09.02.01**

**Interface Engineering for Efficient and Stable Perovskite Photovoltaics** Stefaan De Wolf; King Abdullah University of Science and Technology, Saudi Arabia

**2:00 PM EL09.02.02**

**Interdiffusion Control in Sequentially Evaporated Organic-Inorganic Fully Vacuum Deposited Perovskite Solar Cells** Rahul A. Nambiar; University of Oxford, United Kingdom

**2:15 PM \*EL09.02.03**

**Sequential Vacuum Thermal Evaporation Process for Perovskite Solar Cells** Luana Mazzarella, Jin Yan, Reinder Boekhoff, Tom Savenije and Olindo Isabella; Technical University Delft, Netherlands

**2:45 PM EL09.02.04**

**Scalable Inverted Perovskite Solar Cells with Atomic Layer Deposition (ALD) NiO as Hole Transport Layer** Aedan Gibson<sup>1</sup>, Seokhoon Han<sup>1</sup> and

Hyunjung Shin<sup>1,2</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>SKKU Institute of Energy Science and Technology (SIEST), Korea (the Republic of)

**3:00 PM BREAK**

**3:30 PM \*EL09.02.05**

**Understanding and Quantifying Ion Diffusion in Two-Dimensional Halide Perovskite Heterostructures** [Letian Dou](#); Purdue University, United States

**4:00 PM \*EL09.02.06**

**Irreproducibility of High-Performance Perovskite Solar Cells—Causes and Possible Solutions** [Jin-Wook Lee](#); Sungkyunkwan University, Korea (the Republic of)

**4:30 PM EL09.02.07**

**Ultrathin Aluminum Oxide Layers for Encapsulation of Perovskite Solar Cells** [Melissa Davis](#), Duong Nguyen Minh, Kelly Schutt, Michael Kempe, Matthew Reese, Kaitlyn VanSant, Axel F. Palmstrom and Joseph Luther; National Renewable Energy Laboratory, United States

**4:45 PM EL09.02.08**

**Highly Efficient and Stable Passivation Layers for Perovskite Solar Cells** [Cheng Liu](#), Bin Chen, Mercouri G. Kanatzidis and Edward Sargent; Northwestern University, United States

SESSION EL09.03: Keynote Session: Electrochemical Stability of Perovskite Devices

Session Chairs: Bin Chen and Lethy Krishnan Jagadamma

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 430

**10:30 AM \*EL09.03.01**

**Preventing Reverse Bias Degradation in Partially Shaded Perovskite Solar Panels** [Michael D. McGehee](#); University of Colorado, United States

**11:00 AM \*EL09.03.02**

**Interface Modification and Stability of Halide Perovskite Devices—From Solar Cells to LEDs** [David S. Ginger](#); University of Washington, United States

**11:30 AM \*EL09.03.03**

**Iodine Electrochemistry and Halide Perovskite Degradation** [Barry P. Rand](#); Princeton University, United States

SESSION EL09.04/EL06.02: Joint Session: High Performance Perovskite Devices I

Session Chairs: Bin Chen and Rui Wang

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 430

**1:30 PM \*EL09.04/EL06.02.01**

**INDUSTRY TRACK: Field-Relevant Degradation Mechanisms in Metal Halide Perovskite Modules** [Laura T. Schelhas](#); National Renewable Energy Laboratory, United States

**2:00 PM \*EL09.04/EL06.02.02**

**Enhancing Stability of Perovskite Solar Cells Towards Outdoor Operation** [Kai Zhu](#); National Renewable Energy Laboratory, United States

**2:30 PM \*EL09.04/EL06.02.03**

**Stability of Vacuum Deposited Perovskite Solar Cells, Effects of Outdoor and Accelerated Stress Conditions** Maximiliano Senno, Javier Sebastian, Jorge Ferrando, Lidon Gil-Escrig, Kassio Zanoni, Michele Sessolo and [Henk J. Bolink](#); University of Valencia, Spain

**3:00 PM BREAK**

**3:30 PM \*EL09.04/EL06.02.04**

**Engineering Nanocrystalline Perovskites for Bright and Efficient Next-Generation Displays** Tae-Woo Lee; Seoul National University, Korea (the Republic of)

**4:00 PM \*EL09.04/EL06.02.05**

**Molecular Design of Interlayer Materials for Efficient Perovskite Photovoltaics** Atsushi Wakamiya<sup>1,2</sup>; <sup>1</sup>Kyoto University, Japan; <sup>2</sup>EneCoat Technology, Co. Ltd., Japan

**4:30 PM EL09.04/EL06.02.06**

**Surpassing 90% Shockley-Queisser Voc Limit in 1.79 eV Wide-Bandgap Perovskite Solar Cells Using Bromine-Substituted Self-Assembled Monolayers** Zhouyin Wei<sup>1,1</sup>, Xiuxiu Niu<sup>1,1</sup>, Armin Gerhard Aberle<sup>1,1</sup>, Xinxing Yin<sup>2</sup> and Yi Hou<sup>1,1</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Jiaying University, China

**4:45 PM EL09.04/EL06.02.07**

**Transient Reflected Microwave Conductivity measurements for the assessment of the quality and stability of triple-cation, triple-anion Perovskite films** Arpana Singh<sup>1</sup>, Felix Lang<sup>2</sup>, Biruk A. Seid<sup>2</sup>, Marinus Kunst<sup>3</sup> and Heinz C. Neitzert<sup>1</sup>; <sup>1</sup>Salerno University, Italy; <sup>2</sup>University of Potsdam, Germany; <sup>3</sup>Helmholtz-Zentrum Berlin, Germany

SESSION EL09.05: Poster Session I

Session Chairs: Benjamin Gallant and Yuan Liu

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL09.05.01**

**Design of advanced photoactive materials based on  $M_3Bi_2I_6Br_3$  (M=Cs, K) for CO<sub>2</sub> and H<sub>2</sub>O conversion.** Andrea A. Cepeda-Aguirre, Leticia M. Torres-Martínez, Boris I. Kharrissov, Edith Luévano-Hipólito and Oxana V. Kharrissova; Universidad Autónoma de Nuevo León, Mexico

**EL09.05.02**

**Enhancing Efficiency and Stability of Tin-Based Perovskite Solar Cells Via Addition of Nickel (II) Porphyrin Complex** Tewodros A. Debele<sup>1,2,3</sup>; <sup>1</sup>National Yang-Ming Chiao Tung University, Taiwan; <sup>2</sup>Taiwan International Graduate Program (TIGP), Taiwan; <sup>3</sup>Academia Sinica, Taiwan

**EL09.05.03**

**Enhancing X-Ray Sensitivity through Optimized Charge Transport in 0-Dimensional Perovskites** Xin Song, Lijie Wang, Jiayi Wang and Omar Mohammed; King Abdullah University of Science and Technology, Saudi Arabia

**EL09.05.04**

**First principle insight into surface/interface engineering for efficient and stable perovskite optoelectronic devices** Yeming Xian, Xiaoming Wang and Yanfa Yan; University of Toledo, United States

**EL09.05.05**

**Luminescence Imaging for Studying Ion Movements in Perovskite Solar Cells** Priyabrata Sadhukhan, Gerrit Boschloo and Erik Johansson; Department of Chemistry - Ångström Laboratory, Uppsala University, Sweden

**EL09.05.06**

**Suppressing Hole Accumulation Through Sub-Nanometer Dipole Interfaces in Hybrid Perovskite/Organic Solar Cells for Boosting Near-Infrared Photon Harvesting** Min Seok Kim, Min-Ho Lee and Jung-Yong Lee; Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of)

**EL09.05.07**

**Facile Photo-Mediated Dopant for Efficient Oxidation of Spiro-OMeTAD Hole Transport Layer in Perovskite Solar Cells** Huei Min Chua, Wei Lin Leong and Nripan Mathews; Nanyang Technological University, Singapore

**EL09.05.08**

**Optimizing Stability and Energy Transfer in Water-dispersed Perovskite-Chromophore Assemblies** [Pooja Aggarwal](#), Anubhab Halder, Neelakshi Neelakshi, Ramesh Ramapanicker and Vishal Govind Rao; Indian Institute of Technology Kanpur, India

**EL09.05.09**

**Antisolvent-free ambient air-processed CsPbI<sub>2</sub>Br Perovskite Solar Cells for Indoor applications** [Zafar Iqbal](#), Florian Ruske and Antonio Abate; Helmholtz-Zentrum Berlin für Materialien und Energie GmbH, Germany, Germany

**EL09.05.10**

**In situ Radiation-Induced Instability Behaviour of Organic-Inorganic Halide Perovskite Single Crystals** [Ruitian Chen](#) and Yu Zou; University of Toronto, Canada

**EL09.05.11**

**RF Magnetron Sputtered RuO<sub>2</sub> as New Hole Transport Material used in Perovskite Solar cells in (n-i-p) configuration** [Rajat Sharma](#) and Shaibal Sarkar; Indian Institute of Technology Bombay, India

**EL09.05.12**

**Hydrogen Bonding-Induced High-Performance Deep-Blue Perovskite Light Emitting Diodes at 452 nm Electroluminescence** [HyoJae Lee](#) and Jae Woong Jung; Kyung Hee University, Korea (the Republic of)

**EL09.05.13**

**Two-Dimensional Dion-Jacobson Tin Perovskite Transistors with Enhanced Ambient Stability** [Wantaek Park](#)<sup>1</sup>, Youjin Reo<sup>1</sup>, Wonryeol Yang<sup>1</sup>, Hamin Choi<sup>1</sup>, Seungju Jeon<sup>2</sup>, Bogyu Lim<sup>3</sup>, Ao Liu<sup>4</sup>, Huihui Zhu<sup>4</sup> and Yong-Young Noh<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Research Institute of Chemical Technology, Korea (the Republic of); <sup>3</sup>Chungbuk National University, Korea (the Republic of); <sup>4</sup>University of Electronic Science and Technology of China, China

**EL09.05.14**

**Surface Passivation with Glyoxylic Acid for Stable and Enhanced Device Performance of Perovskite Solar Cells** [YuBean Bae](#) and Jae Woong Jung; Advanced Materials Engineering for Information & Electronics, Kyung Hee University, Korea (the Republic of)

**EL09.05.15**

**Interface Engineering of Perovskite Absorber Layers by Polystyrene for Efficient and Reliable Inverted Perovskite Solar Cells** [Jae Hyeok Song](#) and Jae Woong Jung; Advanced Materials Engineering for Information & Electronics, Kyung Hee University, Korea (the Republic of)

**EL09.05.16**

**Mitigating Mobile Ion-Induced Instabilities and Performance Losses in 2D Passivated Perovskite Solar Cells** [Biruk A. Seid](#)<sup>1</sup>, Sercan Ozen<sup>1</sup>, Andrés-Felipe Castro-Méndez<sup>1</sup>, Dieter Neher<sup>1</sup>, Martin Stollerfoht<sup>2</sup> and Felix Lang<sup>1</sup>; <sup>1</sup>University of Potsdam, Germany; <sup>2</sup>The University of Hong Kong, China

**EL09.05.17**

**Incorporation of Small Molecules with Functional Group to Achieve Over 25% Efficiency and Supreme Stability in Perovskite Solar Cells** [Atif Ali](#)<sup>1,2,3</sup>, Ruijia Tian<sup>3</sup>, Chang Liu<sup>3</sup> and Ziyi Ge<sup>3</sup>; <sup>1</sup>Chinese Academy of Science, China; <sup>2</sup>University of Gujrat, Pakistan; <sup>3</sup>Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, China

**EL09.05.18**

**Air-Resistant Lead Halide Perovskite Nanocrystals Embedded into Polyimide of Intrinsic Microporosity** [Mahmoud Abdulhamid](#); King Fahd University of Petroleum and Minerals, Saudi Arabia

**EL09.05.19**

**Biomass-Derived Functional Additive for Highly Efficient and Stable Lead Halide Perovskite Solar Cells with Built-In Lead Immobilisation** [Jing Li](#)<sup>1</sup>, Xiang Qiao<sup>2</sup>, Meng Li<sup>2</sup>, Zhe Li<sup>1</sup> and Yao Lu<sup>1</sup>; <sup>1</sup>Queen Mary University of London, United Kingdom; <sup>2</sup>Henan University, China

**EL09.05.20**

**Heterostructure Growth via Cation Reaction for Surface Passivation in Inverted Perovskite Solar Cells** [Duong Nguyen Minh](#) and Joseph Luther; National Renewable Energy Laboratory, United States

**EL09.05.21**

**Understanding Self-Assembled Monolayer Formation via Solvent-Driven Structural Analysis for Enhanced Performance in Perovskite**

**Optoelectronics** Zach Pizzo, Carlos A. Figueroa Morales, Zhengtao Hu, Sijun Seong and Xiwen Gong; University of Michigan, United States

SESSION EL09.06 High Performance Perovskite Devices II

Session Chairs: Bin Chen and Jin-Wook Lee

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 430

**8:30 AM \*EL09.06.01**

**A Holistic Approach of Enhancing Efficiency and Stability of Perovskite Solar Cells and Their Tandem Solar Cells with Organics** Alex K. Jen; City University of Hong Kong, Hong Kong

**9:00 AM EL09.06.02**

**Thermostable Perovskite Solar Cells Enabling Operational Lifetime Over 25 Years** Zijing Dong<sup>1,2</sup>, Xiao Guo<sup>1,2</sup> and Yi Hou<sup>1,2</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Solar Energy Research Institute of Singapore, National University of Singapore, Singapore

**9:15 AM \*EL09.06.03**

**Perovskite Interfacial Nano-Groove (Perovskite-ING)** Yuanyuan Zhou; HKUST, Hong Kong

**9:45 AM EL09.06.04**

**Amidination of Ligands for Chemical and Field-Effect Passivation Stabilizes Perovskite Solar Cells** Yi Yang, Bin Chen, Mercouri G. Kanatzidis and Edward Sargent; Northwestern University, United States

**10:00 AM BREAK**

**10:30 AM \*EL09.06.05**

**Formamidinium Lead Tri-iodide (FAPbI<sub>3</sub>) with Non-Centrosymmetric Crystal Structure and Atomic Layer Deposited Contact Layers** Hyunjung Shin; Sungkyunkwan University, Korea (the Republic of)

**11:00 AM \*EL09.06.06**

**Constructing Efficient and Stable Formamidinium-Based Perovskite Photovoltaics** Rui Wang; Westlake University, China

**11:30 AM EL09.06.07**

**Inducing Octahedral Tilting via Organic Molecule Templating for Highly Stable Photoactive Formamidinium Lead Triiodide** Benjamin Gallant<sup>1</sup>, Satyawan D. Nagane<sup>2</sup>, Dominik Kubicki<sup>1</sup> and Samuel D. Stranks<sup>2</sup>; <sup>1</sup>University of Birmingham, United Kingdom; <sup>2</sup>University of Cambridge, United Kingdom

SESSION EL09.07: Interface Stability of Perovskite Devices

Session Chairs: Lethy Krishnan Jagadamma and Shijing Sun

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 430

**1:30 PM \*EL09.07.01**

**Rational Design of Two-Dimensional Halide Perovskites for Stabilizing FAPbI<sub>3</sub> and CsPbI<sub>3</sub> Pure Phases** Aditya D. Mohite; Rice University, United States

**2:00 PM \*EL09.07.02**

**The Stability of Organochalcogenide-Halide Perovskites with Covalently Attached A-Site Cations** Jiayi Li<sup>1</sup>, Robert Stolz<sup>1</sup>, Christina Deschene<sup>1</sup>, Yu Lin<sup>2</sup> and Hemamala Karunadasa<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EL09.07.03**

**The Role of Double Transport Layers on the Stability and Performance of Perovskite Solar Cells** [Joseph Luther](#); National Renewable Energy Laboratory, United States

**4:00 PM EL09.07.04**

**Interlayer Engineering Improves Reverse Bias Stability in Halide Perovskite Photovoltaics** [Fangyuan Jiang](#) and David S. Ginger; University of Washington, United States

**4:15 PM \*EL09.07.05**

**Enhancing Stability Through Interface Engineering in Halide Perovskite Photovoltaics—Fundamental Insights** [Zonglong Zhu](#); City University of Hong Kong, Hong Kong

**4:45 PM EL09.07.06**

**Carboxyl-Functionalized Perovskite Enables ALD Growth of a Compact and Uniform Ion Migration Barrier** [Deokjae Choi](#)<sup>1</sup>, Donghoon Shin<sup>1</sup>, Chongwen Li<sup>1</sup>, Yuan Liu<sup>1</sup>, Abdulaziz S. Bati<sup>1</sup>, Dana E. Kachman<sup>1</sup>, Yi Yang<sup>1</sup>, Jiachen Li<sup>1</sup>, Yoon Jung Lee<sup>1</sup>, Muzhi Li<sup>2</sup>, Saivineeth Penukula<sup>2</sup>, Da Bin Kim<sup>3</sup>, Heejong Shin<sup>1</sup>, Chiung-Han Chen<sup>1</sup>, So Min Park<sup>4</sup>, Kunmo Koo<sup>1</sup>, Cheng Liu<sup>1</sup>, Aidan Maxwell<sup>3</sup>, Haoyue Wan<sup>1</sup>, Nicholas Rolston<sup>2</sup>, Edward Sargent<sup>1</sup> and Bin Chen<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Arizona State University, United States; <sup>3</sup>University of Toronto, Canada; <sup>4</sup>National University of Singapore, Singapore

SESSION EL09.08: Structural and Phase Stability of Perovskite and Perovskite-Inspired Materials I

Session Chairs: Aram Amassian and Giulia Grancini

Thursday Morning, April 10, 2025

Summit, Level 4, Room 430

**8:30 AM \*EL09.08.01**

**Imaging Toolsets to Elucidate Degradation Pathways in Perovskite Optoelectronic Devices** [Samuel D. Stranks](#); University of Cambridge, United Kingdom

**9:00 AM EL09.08.02**

**Phase Segregation of Mixed-Halide Perovskites Revealed by Cryogenic Electron Microscopy** [Yi Cui](#), Qingyuan Fan, Julian A. Vigil, Hemamala Karunadasa, Yi Cui and Aaron Lindenberg; Stanford University, United States

**9:15 AM \*EL09.08.03**

**Combinatorial Probes of Stability and Performance in Metal Halide Perovskites** [Laura Herz](#); University of Oxford, United Kingdom

**9:45 AM EL09.08.04**

**Light-Induced Metallic Lead Formation in Mixed-Cation, Mixed-Halide Perovskite— Observed Rates and Effects of Oxygen** [Spencer G. Cirra](#), Wiley Dunlap-Shohl, Yuhuan Meng, Preetham P. Sunkari, Jordi H. Folch and Hugh W. Hillhouse; University of Washington, United States

**10:00 AM BREAK**

**10:30 AM \*EL09.08.05**

**Shedding Light on Wide Bandgap Perovskites** [Michael Saliba](#); University of Stuttgart, Germany

**11:00 AM EL09.08.06**

**Suppressing Halide Phase Segregation in Wide-Bandgap Perovskite for Perovskite-Organic Tandem Solar Cells** [Xiao Guo](#)<sup>1,2</sup>, Zhenrong Jia<sup>1,2</sup>, Zijing Dong<sup>1,2</sup> and Yi Hou<sup>1,2</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Solar Energy Research Institute of Singapore, National University of Singapore, Singapore

**11:15 AM EL09.08.07**

**Methods to Predict the Real-World Stability of Commercial Perovskite-on-Si Tandem Photovoltaics** [Benjamin Daiber](#), Benjamin L. Williams and Christopher Case; Oxford PV, United Kingdom

**11:30 AM \*EL09.08.08**

**Foldable/Ultra-flexible Perovskite Optoelectronic Devices with Good Mechanical-Electrical-Moisture Stability for Extending Perovskite**

**Applications** Wallace C. Choy; University of Hong Kong, China

SESSION EL09.09: Structural and Phase Stability of Perovskite and Perovskite-Inspired Materials II

Session Chairs: Lethy Krishnan Jagadamma and Zonglong Zhu

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 430

**1:30 PM \*EL09.09.01**

**Stability in Perovskite-Inspired Materials for Light Conversion and Harvesting Devices** Robert Hoyer; University of Oxford, United Kingdom

**2:00 PM EL09.09.02**

**Chiroptical Properties and Ambient Air Stability of Low-Dimensional Chiral Hybrid Organic-Inorganic Perovskites** Lan-Sheng Yang, Chun-Yao Huang and Yu-Chiang Chao; National Taiwan Normal University, Taiwan

**2:15 PM EL09.09.03**

**Field-Enhanced Selective Contact for Suppressed Photooxidation in PbSn Perovskite Solar Cells** Yuan Liu, Chongwen Li, Bin Chen and Edward Sargent; Northwestern University, United States

**2:30 PM EL09.09.04**

**Improve the Stability of Doped Spiro-OMeTAD** Feng Wang; Linköping University, Sweden

**2:45 PM EL09.09.05**

**Intralayer Bidentate Ligand Design for Enhanced Stability in 2D Perovskites** Chenjian Lin<sup>1</sup>, Yuanhao Tang<sup>1</sup>, Zhichen Nian<sup>2</sup>, Brett Savoie<sup>2</sup> and Letian Dou<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Notre Dame, United States

**3:00 PM BREAK**

**3:30 PM \*EL09.09.06**

**Design and Stabilization of Low-Dimensional Hybrid Perovskite Structures** David B. Mitzi; Duke University, United States

**4:00 PM EL09.09.07**

**Revealing Degradation Mechanisms in 3D/2D Perovskite Solar Cells Under Photothermal Accelerated Ageing** Zijian Peng<sup>1,1</sup>, Larry Luer<sup>1</sup> and Christoph J. Brabec<sup>1,2</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; <sup>2</sup>Helmholtz-Institute Erlangen-Nürnberg (HI ERN), Germany

**4:15 PM \*EL09.09.08**

**Dynamic Structures of Halide Perovskites—From Synthesis to Recycling** Lina Quan; Virginia Tech, United States

**4:45 PM EL09.09.09**

**Phase-Stabilized 2D/3D Heterobilayers via Lattice Matching for Efficient and Stable Inverted Solar Cells** Shripathi Ramakrishnan, Baitao Chen, Xiaoyu Zhang and Qiuming Yu; Cornell University, United States

SESSION EL09.10: Poster Session II

Session Chairs: Benjamin Daiber and Fangyuan Jiang

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL09.10.01**

**Grain Boundary Management in Perovskite Solar Cells: Enhancing Carrier Dynamics and Long-Term Stability through 2D/3D Heterostructure Construction** Ramkrishna Das Adhikari, Deepak Yadav and Parameswar K. Iyer; Indian Institute of Technology Guwahati, India



**EL09.10.02**

**Polar-Resistance Perovskite Quantum Dots Based on Silane Network Passivation with Pb-S Interaction Generated via X-Type Ligand Exchange** Jin Young Kim, Ji Hyun Lim, Woongsik Jang and Dong Hwan Wang; Chung-Ang University, Korea (the Republic of)

**EL09.10.03**

**In-Situ Passivation of Sn-Based Perovskite for Enhanced Stability and Efficiency in Near-Infrared Light-Emitting Diodes** Eom Dongyun and Jae Woong Jung; Kyung Hee University, Korea (the Republic of)

**EL09.10.04**

**Stability Investigations of Triple Halide Perovskite: A Detailed Study Using Angle Resolved XPS** Md Mahamudujjaman, Wilhelmus Geerts and Sujan Pyakurel; Texas State University, United States

**EL09.10.05**

**Interfacial Modification for Enhancement of Stability and Efficiency of Perovskite Solar Cells** Sukanya Ghosh; Indian Institute of Technology Bombay, India

**EL09.10.06**

**Interfacial Stability of Perovskite Solar Cell Layers** Eleanor Sternberg and Zhihua Xu; University of Minnesota Duluth, United States

**EL09.10.07**

**Bottom-up Approach to Construct Heterojunction for Bidentate Modification at the Buried Interface enables Fill Factor over 85% in Inverted Perovskite Solar Cells.** Himangshu Baishya, Mayur J. Patel, Ramkrishna D. Adhikari, Deepak Yadav and Parameswar K. Iyer; Indian Institute of Technology Guwahati, India

**EL09.10.08**

**Controlling Lead Halide Residue in Perovskite Solar Cells: A Method to Improve the Photostability and Hysteresis** Nikhil Kalasariya<sup>1</sup>, Akhil Alexander<sup>1</sup>, Prithwish K. Bhunia<sup>1</sup>, Emilio Gutierrez-Partida<sup>2</sup>, Roshni Benny<sup>1</sup>, Martin Stolterfoht<sup>1</sup> and Manoj A. Namboothiry<sup>1</sup>; <sup>1</sup>Indian Inst of Science, India; <sup>2</sup>University of Potsdam, Germany

**EL09.10.09**

**Additive and Interface Engineering for High-Efficiency Methylammonium-free Wide-bandgap Perovskite Solar Cells** Prithwish K. Bhunia, Akhil Alexander, Alvin Joseph and Manoj A. Namboothiry; Indian Institute of Science Education and Research Thiruvananthapuram, India

**EL09.10.10**

**Stabilizing the  $\alpha$ -phase: additive engineering for stable FAPbI<sub>3</sub>** Ruohan Zhao, Sheader Alexandra, Henry Snaith and Nakita K. Noel; University of Oxford, United Kingdom

**EL09.10.11**

**Unveiling Surface-Driven Degradation in Perovskite Solar Cells: A Novel Spatially Resolved Imaging Approach** Akash Dasgupta<sup>1,2</sup>, Robert Oliver<sup>3</sup>, Yen-Hung Lin<sup>4</sup>, Manuel Kober-Czerny<sup>1</sup>, Alexandra Ramadan<sup>3</sup> and Henry Snaith<sup>1</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>University of Washington, United States; <sup>3</sup>The University of Sheffield, United Kingdom; <sup>4</sup>State Key Laboratory of Advanced Displays and Optoelectronics Technologies, Hong Kong

**EL09.10.12**

**Enhancing the Performance of Quadruple Cation Perovskite Solar Cells by N-bromosuccinimide** Hassen Dhifaoui, Jennifer Dewalque, Pierre Colson and Rudi Cloots; University of Liege, Belgium

**EL09.10.13**

**Plasma Polymer Passivation of Perovskite Solar Cells for Improved Stability and Reproducibility** Jose M. Obrero<sup>1,1</sup>, Lidia Contreras-Bernal<sup>1,1</sup>, Mahmoud N. Hassan<sup>2</sup>, Fernando Nunez-Galvez<sup>1,1</sup>, Javier K. Castillo-Seoane<sup>1,1</sup>, Francico Aparicio<sup>1,1</sup>, Juan A. Anta<sup>2</sup>, Juan Sanchez-Valencia<sup>1,1</sup>, Ana Borrás<sup>1,1</sup> and Angel Barranco<sup>1,1</sup>; <sup>1</sup>CSIC, Spain; <sup>2</sup>Universidad Pablo de Olavide, Spain

**EL09.10.14**

**Long-term Stability Improvement in Perovskite Solar Cell through Low Temperature Thin Film Encapsulation with Nanoparticles Embedded PMMA-PU Interpenetrating Polymer Composite** Youngsoo Jung<sup>1</sup>, Seongha Lee<sup>1</sup>, Vishal Pal<sup>1</sup>, Sangho Ye<sup>1</sup>, Giryong Kwon<sup>2,3</sup>, Doh-Kwon Lee<sup>2,3</sup> and Jung-Kun Lee<sup>1</sup>; <sup>1</sup>University of Pittsburgh, United States; <sup>2</sup>Advanced Photovoltaics Research Center, Korea Institute of Science and Technology (KIST), Korea (the Republic of); <sup>3</sup>School of Advanced Materials Science and Engineering, Sungkyunkwan University, Korea (the Republic of)

**EL09.10.15**

**Light Induced Stability in FA-Rich Mixed Halide Double and Triple Cation Perovskite Absorber Layers and Efficient Inverted p-i-n Perovskite Solar Cells** [Tanwistha Chakrabarti](#) and Ajay Perumal; IISER Berhampur, India

**EL09.10.16**

**Does Cu-doping improve the performance of CsPbI<sub>3</sub>-based LEDs?** [Shaona Bose](#), Baidyanath Roy, Satayender K. Sangwan, Sanjeev Kumar Srivastava and Samit K Ray; Indian Institute of Technology Kharagpur, India

**EL09.10.17**

**Magnetic Field-Induced Improvements in Photoelectrochemical Activity of Cs<sub>2</sub>RuX<sub>6</sub> (X: Cl, Br) Halide Perovskites** [Abhishek Anand](#), Jigar S. Halpati and Aravind K. Chandiran; Indian Institute of Technology Madras, India

**EL09.10.18**

**A Green Solvent System for Precursor Phase-Engineered Sequential Deposition of Stable Formamidinium Lead Triiodide for Perovskite Solar Cells** [Benjamin Gallant](#)<sup>1,2</sup>, Philippe Holzhey<sup>2</sup>, Joel Smith<sup>2</sup>, Dominik Kubicki<sup>1</sup> and Henry Snaith<sup>2</sup>; <sup>1</sup>University of Birmingham, United Kingdom; <sup>2</sup>University of Oxford, United Kingdom

SESSION EL09.11: Mechanical Reliability of Perovskites

Session Chairs: Holger Roehm and Yi Yang

Friday Morning, April 11, 2025

Summit, Level 4, Room 430

**8:30 AM \*EL09.11.01**

**Connecting Mechanical Properties, Durability and Reliability of High-Performance Perovskite Solar Photovoltaics** [Nitin P. Padture](#); Brown University, United States

**9:00 AM EL09.11.02**

**In Situ Film Stress Measurements Capture Increased Photostability in Additive Engineered Wide Bandgap Perovskites** [Muneeza Ahmad](#)<sup>1</sup>, Erin Burgard<sup>1</sup>, Madison Dodd<sup>2</sup> and Nicholas Rolston<sup>1</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Brown University, United States

**9:15 AM \*EL09.11.03**

**Mitigating Mechanical Failure—Improving the Mechanical Robustness of Metal Halide Perovskites** [Nicholas Rolston](#), Saivineeth Penukula, Marco Casareto, David Machbitz, Abhijit Prekash and Muzhi Li; Arizona State University, United States

**9:45 AM EL09.11.04**

**Enhanced Binding of Self-Assembled Monolayers for Efficient and Stable Inverted Perovskite Solar Cell** [Chuying Huang](#), Bin Chen, Lin X. Chen and Edward Sargent; Northwestern University, United States

**10:00 AM BREAK**

**10:30 AM \*EL09.11.05**

**Revealing the Stress-Stability Relationship in Perovskite Thin Films—An In Situ Perspective** [Aram Amassian](#); North Carolina State University, United States

**11:00 AM EL09.11.06**

**Thermally Driven Microstructural Evolution Impacting Stability of Perovskite Solar Cells** Alexander D. Schulz, Kerstin Märkle, Tobias Leonhard, Alexander Colsmann and [Holger Roehm](#); Karlsruhe Institute of Technology, Germany

**11:15 AM EL09.11.07**

**Microstrain Regulation for Improving Phase Stability of Formamidinium Lead Iodide via Alkali Metal Chloride Interlayer** [Do-Kyoung Lee](#)<sup>1,2</sup>, Kostas Fykouras<sup>3</sup>, Tim Kodalle<sup>2,2</sup>, Raphael F. Moral<sup>1,2</sup>, Craig Schwartz<sup>1</sup>, Linn Leppert<sup>3</sup>, Keith Lawler<sup>1</sup>, Nobumichi Tamura<sup>2</sup> and Carolin M. Sutter-Fella<sup>2</sup>; <sup>1</sup>University of Nevada, Las Vegas, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>University of Twente, Netherlands

**11:30 AM EL09.11.08**

**Mechanically Robust and Electrically Conductive C60-SnO<sub>2</sub> Electron Transporting Bi-Layer for Perovskite Solar Cells** [Urasawadee](#)

Amornkitbamrung, Yinyan Xu, Canjie Wang, Yongjae In and Hyunjung Shin; Sunkyunkwan University, Korea (the Republic of)

**11:45 AM EL09.11.09**

**Quantifying Non-Radiative Recombination in Metal Halide Perovskites Using Absolute Photoluminescence Spectroscopy** Willemijn H. Remmerswaal<sup>1</sup>, Bas van Gorkom<sup>1</sup>, Lana M. Kessels<sup>1</sup>, Dong Zhang<sup>2</sup>, Martijn M. Wienk<sup>1</sup> and Rene A. Janssen<sup>1,3</sup>; <sup>1</sup>Eindhoven University of Technology, Netherlands; <sup>2</sup>TNO, Netherlands; <sup>3</sup>Dutch Institute for Fundamental Energy Research, Netherlands

SESSION EL09.12: High Performance Perovskite Devices III

Session Chairs: Cheng Liu and Nicholas Rolston

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 430

**1:45 PM EL09.12.01**

**Probing Photostability of Tin-Containing Mixed Halide Perovskites—The Good and the Bad** Krishanu Dey<sup>1,2</sup> and Samuel D. Stranks<sup>2</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>University of Cambridge, United Kingdom

**2:00 PM EL09.12.02**

**Maximum Stability Point Tracking for Wide Bandgap Perovskite Solar Cells** Geon Kim<sup>1,2</sup>, Seongheon Kim<sup>2,3</sup>, Mansoo Choi<sup>2</sup>, Yun S. Lee<sup>2,3</sup> and Namyong Ahn<sup>1,2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Global Frontier Center for Multiscale Energy Systems, Seoul National University, Korea (the Republic of); <sup>3</sup>Seoul National University, Korea (the Republic of)

**2:15 PM EL09.12.03**

**The Impact of Processing Atmosphere on the Morphology of Two-Step Formamidinium Lead Iodide Films and the Performance of Solar Cells Comprising Them** Elizabeth Wall, Alan Kaplan, Quinn C. Burlingame and Lynn Loo; Princeton University, United States

**2:30 PM EL09.12.04**

**Investigating Open-Circuit Voltage (In)stability of Ethane-1,2-diammonium Derivatives for Narrow Bandgap Perovskites** Lana M. Kessels<sup>1</sup>, Nicolas Daub<sup>1</sup>, Willemijn H. Remmerswaal<sup>1</sup>, Laura Bellini<sup>1</sup>, Martijn M. Wienk<sup>1</sup> and Rene A. Janssen<sup>1,2</sup>; <sup>1</sup>University of Technology Eindhoven, Netherlands; <sup>2</sup>Dutch Institute for Fundamental Energy Research, Netherlands

**2:45 PM EL09.12.05**

**Cross Sectional Potential Profile Dependent on Device Architecture in Reverse Bias for Perovskite Solar Cells** Hannah Contreras, Fangyuan Jiang, Madeleine Breshears, Rajiv Giridharagopal, Haruka Koizumi, Justin Pothoof, Aidan O'Brien and David S. Ginger; University of Washington, United States

**3:00 PM BREAK**

**3:30 PM EL09.12.06**

**Elucidating and Resolving the Bonding-Degradation Trade-Off at Heterointerfaces for Increased Efficiency and Durability of Perovskite Solar Cells** Jinxi Chen and Yi Hou; National University of Singapore, Singapore

**3:45 PM EL09.12.07**

**Scalable Deposition of Lead-Tin Perovskite Solar Cells** Maria Antonietta Loi and Lijun Chen; University of Groningen, Netherlands

**4:00 PM EL09.12.08**

**Interfacial Modification of Atomic Layer Deposition (ALD)-NiO for Highly Efficient (~24.5%) and Stable Inverted Perovskite Solar Cells** Yinyan Xu<sup>1</sup>, Urasawadee Amornkitbamrung<sup>1</sup>, Yongjae In<sup>1</sup>, Hyeon Jun Jeong<sup>1</sup>, Atsushi Wakamiya<sup>2</sup> and Hyunjung Shin<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Kyoto University, Japan

**4:15 PM EL09.12.09**

**Generating a Stable Ambient Higher-Symmetry CsPbI<sub>3</sub> Black Phase** Rafikul Ali Saha<sup>1</sup>, Athina Papadopoulou<sup>2</sup>, Giedrius Degutis<sup>2</sup> and Maarten Roeffaers<sup>1</sup>; <sup>1</sup>KU Leuven, Belgium; <sup>2</sup>imec, Belgium

**4:30 PM EL09.12.10**

**Rationalizing Perovskite Crystal Growth on Industrial CZ Silicon Wafers for Efficient Tandem Solar Cells** Qilin Zhou<sup>1,2</sup> and Yi Hou<sup>1,2</sup>; <sup>1</sup>National

University of Singapore, Singapore; <sup>2</sup>Solar Energy Research Institute of Singapore, Singapore

**4:45 PM EL09.12.11**

**Piezoreflectance of Metal Halide Films—A Sensitive Method for Studying Optical and Phase Transitions** [Monika Welna](#)<sup>1</sup>, Jan Kopaczek<sup>1</sup>, Lukasz Przypis<sup>1,2,3</sup>, Barbara Wilk<sup>3</sup>, Rafal Bartosiewicz<sup>1</sup>, Artur Herman<sup>1</sup> and Robert Kudrawiec<sup>1</sup>; <sup>1</sup>Wroclaw University of Science and Technology, Poland; <sup>2</sup>Saule Research Institute, Poland; <sup>3</sup>Saule Technologies, Poland

# SYMPOSIUM EL10

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Advances in the Fundamental Understanding of Halide Perovskites

April 7 - April 11, 2025

## Symposium Organizers

Sascha Feldmann, Harvard University

Xiwen Gong, University of Michigan

Peijun Guo, Yale University

Lina Quan, Virginia Institute of Technology

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL10.01: New Perovskite Materials I

Session Chair: Connor Bischak

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 434

**1:30 PM \*EL10.01.01**

**Supramolecular Assembly and Light-Emission in Organic Semiconductor-incorporated Perovskite (OSiP)** [Letian Dou](#); Purdue University, United States

**2:00 PM EL10.01.02**

**Two-Dimensional Perovskites with Maximum Symmetry Enable Exciton Diffusion Length Exceeding 2 Micrometers** [Jin Hou](#)<sup>1,2</sup>, Jared Fletcher<sup>2</sup>, Siedah J. Hall<sup>3</sup>, Claudine Katan<sup>4</sup>, Jacky Even<sup>4</sup>, Matthew Sfeir<sup>3</sup>, Mercuri G. Kanatzidis<sup>2</sup> and Aditya D. Mohite<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>The City University of New York, United States; <sup>4</sup>Université de Rennes, France

**2:15 PM EL10.01.03**

**Self-Trapped Exciton Diffusion in a Lead-Free Two-Dimensional Hybrid Perovskite** [Philip Klement](#)<sup>1</sup>, Lukas Gümbel<sup>1</sup>, Meng Yang<sup>2</sup>, Johanna Heine<sup>2</sup> and Sangam Chatterjee<sup>1</sup>; <sup>1</sup>Justus-Liebig-Universität Giessen, Germany; <sup>2</sup>Philipps-Universität Marburg, Germany

**2:30 PM \*EL10.01.04**

**Understanding the Fundamentals of Perovskites and Perovskitoids** [Mercuri G. Kanatzidis](#); Northwestern University, United States

**3:00 PM BREAK**

**3:30 PM \*EL10.01.05**

**Tailoring Molecular Space to Navigate Phase Complexity in 2D and Quasi-2D Halide Perovskites** [Mahshid Ahmadi](#); University of Tennessee, Knoxville, United States

**4:00 PM EL10.01.06**

**Illuminating Interactions—Light-Driven Dynamic Control of FRET in Perovskite-Chromophore Hybrids** Siddharth Singh, Debarjya Ganguly, Pooja Aggarwal and Vishal Govind Rao; Indian Institute of Technology Kanpur, India

**4:15 PM EL10.01.07**

**Observation of Extraordinary Vibration Scatterings Induced by Strong Anharmonicity in Lead-Free Halide Double Perovskites** Guang Wang and Yanguang Zhou; HKUST, Hong Kong

**4:30 PM EL10.01.08**

**Novel Low-Temperature Properties of CsSnI<sub>3</sub> Nanocrystals** Kyle Kluherz<sup>1</sup>, Jacob Shelton<sup>1</sup>, Nicholas J. Weadock<sup>2</sup> and Matthew C. Beard<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>University of Colorado Boulder, United States

**4:45 PM EL10.01.09**

**Understanding the Fundamentals of Low-Dimensional Ruddlesden-Popper and Dion-Jacobson Metal Halide Perovskites for Optoelectronics** Abhishek Yadav and Shahab Ahmad; Indian Institute of Technology Jodhpur, India

SESSION EL10.02: Chirality, Spin and Magnetism in Perovskites I

Session Chairs: Wei Bao and Sascha Feldmann

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 434

**10:30 AM \*EL10.02.01**

**Designing Noncentrosymmetric Hybrid Halide Perovskites for Ferroelectricity and Rashba Physics** Song Jin; University of Wisconsin-Madison, United States

**11:00 AM EL10.02.02**

**Hydrogen Bonding Analysis of Structural Transition-Induced Symmetry Breaking and Spin Splitting in a Hybrid Perovskite Employing a Synergistic Diffraction-DFT Approach** Yi Xie<sup>1</sup>, Gabrielle Koknat<sup>1</sup>, Nicholas J. Weadock<sup>2</sup>, Xiaoping Wang<sup>3</sup>, Ruyi Song<sup>1</sup>, Michael F. Toney<sup>2</sup>, Volker Blum<sup>1</sup> and David B. Mitzi<sup>1</sup>; <sup>1</sup>Duke University, United States; <sup>2</sup>University of Colorado Boulder, United States; <sup>3</sup>Oak Ridge National Laboratory, United States

**11:15 AM EL10.02.03**

**Local Centro-Symmetry Breaking of Preferred Oriented Grains in Formamidinium Lead Tri-Iodide (FAPbI<sub>3</sub>) Thin Films** Hyeon Jun Jeong<sup>1</sup>, Xu Yinyan<sup>1</sup>, Bora Kim<sup>2</sup>, Ryosuke Nishikubo<sup>3</sup>, Wookjin Chung<sup>2</sup>, Canjie Wang<sup>1</sup>, Akinori Saeki<sup>3</sup>, Jooyoung Sung<sup>2</sup> and Hyunjung Shin<sup>1,1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Osaka University, Japan

**11:30 AM \*EL10.02.04**

**Manipulating Chiroptoelectronic Properties of Chiral Low-Dimensional Hybrid Perovskites** Qiuming Yu; Cornell University, United States

SESSION EL10.03: Chirality, Spin and Magnetism in Perovskites II

Session Chairs: Peijun Guo and Tze Chien Sum

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 434

**1:30 PM \*EL10.03.01**

**Chiral Induced Spin Selectivity in Lead-Halide Hybrid Semiconductors and Semiconductor Interfaces** Matthew C. Beard; National Renewable Energy Laboratory, United States

**2:00 PM EL10.03.02**

**Remote Stereocontrol and Spin Selective Transport in Chiral Metal Halide Semiconductors** Md Azimul Haque<sup>1</sup>, Dali Sun<sup>2</sup>, Matthew C. Beard<sup>1</sup> and Joseph Luther<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>North Carolina State University, United States

**2:15 PM EL10.03.03**

**Revealing Ferroelectric Domain Wall Configurations in MAPbI<sub>3</sub> Thin Films via Vector Piezoresponse Force Microscopy** Kerstin Märkle, Alexander D. Schulz, Tobias Leonhard, Alexander Colsmann and [Holger Roehm](#); Karlsruhe Institute of Technology, Germany

**2:30 PM EL10.03.04**

**Compositional Engineering in CVD-Grown Bismuth Halide Perovskites for Photonics and Spin Couplings** [Yifeng Liu](#)<sup>1</sup>, Jingang Li<sup>2</sup>, Gaihua Ye<sup>3</sup>, Hanyu Zhu<sup>1</sup>, Rui He<sup>3</sup>, Costas Grigoropoulos<sup>2</sup>, Haeyeon Lee<sup>1</sup> and Jun Lou<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>University of California, Berkeley, United States; <sup>3</sup>Texas Tech University, United States

**2:45 PM EL10.03.05**

**Circular Dichroism Engineering via Bismuth Doping and Cation Substitution in 2D Lead-Halide Perovskites** [Philip Klement](#)<sup>1</sup>, Jan-Heinrich Littmann<sup>1</sup>, Keito Mizukami<sup>1,2</sup>, Henrik Spielvegel<sup>1</sup>, Satoko Fukumori<sup>2</sup>, Hirokazu Tada<sup>2</sup> and Sangam Chatterjee<sup>1</sup>; <sup>1</sup>Justus-Liebig-Universität Giessen, Germany; <sup>2</sup>Osaka University, Japan

**3:00 PM BREAK**

**3:30 PM \*EL10.03.06**

**Understanding Exciton Effects in Optical Absorption and Circular Dichroism of Chiral 2D Hybrid Perovskites** [Diana Qiu](#); Yale University, United States

**4:00 PM EL10.03.07**

**Ultrafast Spin-to-Charge Conversion in Chiral Hybrid Organic-Inorganic Perovskites** [Yifan Dong](#)<sup>1</sup>, Aeron McConnell<sup>2</sup>, Matthew Hautzinger<sup>1</sup>, Md Azimul Haque<sup>1</sup>, Andrew Comstock<sup>2</sup>, Joseph Luther<sup>1</sup> and Matthew C. Beard<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>North Carolina State University, United States

**4:15 PM EL10.03.08**

**Spontaneous Formation of Single-Crystalline Spherulites in a Chiral 2D Hybrid Perovskite** [Shunran Li](#)<sup>1</sup>, Du Chen<sup>1</sup>, Bowen Li<sup>1</sup>, Hanfei Yan<sup>2</sup>, Benjamin Lawrie<sup>3</sup>, Suchismita Sarker<sup>4</sup> and Peijun Guo<sup>1</sup>; <sup>1</sup>Yale University, United States; <sup>2</sup>Brookhaven National Laboratory, United States; <sup>3</sup>Oak Ridge National Laboratory, United States; <sup>4</sup>Cornell University, United States

**4:30 PM \*EL10.03.09**

**Tuning Spin Polarized Lifetime in Two-Dimensional Perovskites** [Xihan Chen](#); Southern University of Science and Technology, China

SESSION EL10.04: Device Physics and Applications I

Session Chairs: Sascha Feldmann and Amita Ummadisingu

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 434

**8:00 AM EL10.04.01**

**Molecular Passivation of Wide Bandgap Tin Perovskite Solar Cells Using Fluorinated Solvent and Multifunctional Hydrazide Derivative** [Dhruba B. Khadka](#), Masatoshi Yanagida and Yasuhiro Shirai; National Institute for Materials Science, Japan

**8:15 AM EL10.04.02**

**Reveal Activated Corrosion Pathways in Lead Mixed-Halide Perovskites Using X-Ray-Based Methods** [Michel De Keersmaecker](#)<sup>1,2</sup>, Neal R. Armstrong<sup>2</sup>, Paul Dietrich<sup>3</sup>, Nobumichi Tamura<sup>4</sup>, Carolin M. Sutter-Fella<sup>4</sup> and Erin L. Ratcliff<sup>1,2,1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>The University of Arizona, United States; <sup>3</sup>SPECS Surface Nano Analysis GmbH, Germany; <sup>4</sup>Lawrence Berkeley National Laboratory, United States

**8:30 AM \*EL10.04.03**

**Structural and Electronic Properties of Lead Halide Perovskite Thin Film Surfaces** [Annamaria Petrozza](#); Istituto Italiano di Tecnologia, Italy

**9:00 AM \*EL10.04.04**

**Defects Repairing in Lead Tribromide Perovskites** [Jinsong Huang](#); University of North Carolina at Chapel Hill, United States

**9:30 AM EL10.04.05**

**Uncovering the Role of Guanidinium in Enhancing Charge Extraction in p-i-n Perovskite Solar Cells** Weidong Xu<sup>1,1,2</sup>, Ganghong Min<sup>3,2</sup>, Felix Kosasih<sup>1</sup>, Ziyuan Ge<sup>2</sup>, Qichun Gu<sup>1</sup>, Muzi Chen<sup>2</sup>, Artem Bakulin<sup>2</sup>, Caterina Ducati<sup>1</sup>, James R. Durrant<sup>2</sup>, Thomas Macdonald<sup>3,2</sup> and Samuel D. Stranks<sup>1,1</sup>;  
<sup>1</sup>University of Cambridge, United Kingdom; <sup>2</sup>Imperial College London, United Kingdom; <sup>3</sup>University College London, United Kingdom

**9:45 AM EL10.04.06**

**Device Physics of Perovskite Light-Emitting Diodes** Yuqi Sun, Si Chen and Neil Greenham; University of Cambridge, United Kingdom

**10:00 AM BREAK**

**10:30 AM EL10.04.07**

**Decoding Perovskite Ion Dynamics—The Impedance Spectroscopy Puzzle** Clara Aranda Alonso; Universidad Pablo de Olavide, Spain

**10:45 AM EL10.04.08**

**Mobile Ions as a Researcher's Ally—Identifying Performance Limiting Factors in Halide Perovskite Solar Cells** Davide Moia<sup>1</sup>, Ennio L. Comi<sup>2</sup>, Mattia Battaglia<sup>2</sup>, Roland Wirth<sup>2</sup>, Evelyne Knapp<sup>2</sup>, Sandra Jenatsch<sup>1</sup> and Beat Ruhstaller<sup>1,2</sup>; <sup>1</sup>Fluxim AG, Switzerland; <sup>2</sup>ZHAW, Switzerland

**11:00 AM EL10.04.09**

**Advanced Transmission Electron Microscopy (TEM) for Beam-Sensitive Materials (Perovskite, C<sub>60</sub>) in Solar Cell Application** Badri Vishal and Stefaan De Wolf; King Abdullah University of Science and Technology, Saudi Arabia

**11:15 AM EL10.04.10**

**Strategic Defect Passivation in Two-Dimensional Halide Perovskite Field-Effect Transistors via Molecular Engineering** Hyeonmin Choi<sup>1</sup>, Joonha Jung<sup>1</sup>, Yeeun Kim<sup>1</sup>, Yong-Young Noh<sup>2</sup>, Takhee Lee<sup>1</sup> and Keehoon Kang<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of)

**11:30 AM EL10.04.11**

**Understanding the Role of the Subcells in Two Terminal All-Perovskite Tandem Solar Cells Using Absolute Hyperspectral Imaging in Electroluminescence Mode** Hurriyet Yuce Cakir<sup>1,2</sup>, Haoran Chen<sup>3</sup>, Tingting Zhu<sup>3</sup>, Susanna M. Thon<sup>2,2</sup>, Yanfa Yan<sup>3</sup>, Zhaoning Song<sup>3</sup> and Behrang Hamadani<sup>1</sup>; <sup>1</sup>National Institute of Standards & Technology, United States; <sup>2</sup>Johns Hopkins University, United States; <sup>3</sup>University of Toledo, United States

**11:45 AM EL10.04.12**

**Nanoscale Performance Disorder Dictates Perovskite Solar Cell Performance and Stability** Kyle Frohna<sup>1,2</sup>, Cullen Chosy<sup>1</sup>, Amran Al-Ashouri<sup>3</sup>, Florian Scheler<sup>3</sup>, Yu-Hsien Chiang<sup>1</sup>, Milos Dubajic<sup>1</sup>, Julia E. Parker<sup>4</sup>, Jessica M. Walker<sup>4</sup>, Lea Zimmerman<sup>3</sup>, Thomas A. Selby<sup>1</sup>, Yang Lu<sup>1</sup>, Bart Roose<sup>1</sup>, Steve Albrecht<sup>3</sup>, Miguel Anaya<sup>1,5</sup> and Samuel D. Stranks<sup>1</sup>; <sup>1</sup>University of Cambridge, United Kingdom; <sup>2</sup>Stanford University, United States; <sup>3</sup>Helmholtz-Zentrum Berlin, Germany; <sup>4</sup>Diamond Light Source, United Kingdom; <sup>5</sup>University of Seville, Spain

SESSION EL10.05: Device Physics and Applications II

Session Chairs: Suchismita Guha and Peijun Guo

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 434

**1:30 PM \*EL10.05.01**

**Perovskite Intra-Crystal Disorder (Perovskite-ICD)** Yuanyuan Zhou; HKUST, Hong Kong

**2:00 PM EL10.05.02**

**Revisiting Efficiency Limits in Si-Perovskite Tandem Solar Cells—Pushing Theoretical Boundaries by Considering Radiative Efficiency and Precise Optical Modeling** Akash Dasgupta and Henry Snaith; University of Oxford, United Kingdom

**2:15 PM EL10.05.03**

**Correlation of Mobile Ion Concentration to the Stability and Performance of Perovskite Solar Cells** Saivineeth Penukula<sup>1</sup>, Shrinivas Balwadkar<sup>1</sup>, Urs Aeberhard<sup>2</sup>, Mohin Sharma<sup>3</sup>, Mritunjaya Parashar<sup>3</sup>, Ross Kerner<sup>4</sup>, Min Chen<sup>4</sup>, Rafikul Ali Saha<sup>5</sup>, Eduardo Solano<sup>6</sup>, Maarten Roeffaers<sup>5</sup>, Ian Sellers<sup>7</sup>, Joseph Berry<sup>4</sup>, Joseph Luther<sup>4</sup>, Julian Steele<sup>8</sup>, Axel F. Palmstrom<sup>4</sup>, Bibhudutta Rout<sup>3</sup> and Nicholas Rolston<sup>1</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Fluxim AG, Switzerland; <sup>3</sup>University of North Texas, United States; <sup>4</sup>National Renewable Energy Laboratory, United States; <sup>5</sup>KU Leuven, Belgium; <sup>6</sup>ALBA Synchrotron,

Spain; <sup>7</sup>University at Buffalo, The State University of New York, United States; <sup>8</sup>The University of Queensland, Australia

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM EL10.05.04**

**Quality Control of Metal Halide Perovskites Through Rapid Microscopic Characterization** [Sofia Kosar](#), Anil R. Pininti, José P. Jurado, Helen Bristow, Frédéric Laquai and Stefaan De Wolf; King Abdullah University of Science and Technology, Saudi Arabia

**3:45 PM EL10.05.05**

**Are Reverse-Bias Instabilities in Perovskite Solar Cells Due to Electrochemistry or Pre-Existing Defects?** [Ryan DeCrescent](#), Kell Fremouw, Samuel A. Johnson, Daniel A. Morales and Michael D. McGehee; University of Colorado Boulder, United States

**4:00 PM \*EL10.05.06**

**Exciton-Polaritons with Halide Perovskites** [Wei Bao](#); Rensselaer Polytechnic Institute, United States

**4:30 PM EL10.05.07**

**Resistance-Switching Mechanisms in Halide Perovskite—Differentiating Filament, Inductive and Capacitive Behaviors** [Agustin Alvarez](#), Jeroen J. de Boer, Lars Sonneveld, Yorick Bleijl and Bruno Ehrler; AMOLF, Netherlands

**4:45 PM EL10.05.08**

**TOF-SIMS Analysis of Hybrid Perovskite Materials—Elucidating Dopant Incorporation vs Measurement Artifacts and Investigating Ion Migration via *In Situ* Bias During TOF-SIMS Analysis** [Steven P. Harvey](#)<sup>1</sup>, Fengjiu Yang<sup>1</sup>, Michael D. McGehee<sup>2</sup> and Kai Zhu<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>University of Colorado Boulder, United States

SESSION EL10.06: Ultrafast Spectroscopy, Lattice Dynamics and Photophysics I

Session Chairs: Diana Qiu and Lina Quan

Thursday Morning, April 10, 2025

Summit, Level 4, Room 434

**8:15 AM EL10.06.01**

**Locating the Non-Radiative Recombination Losses of Perovskite Solar Cells During Accelerated Ageing** [Zijian Peng](#)<sup>1,1</sup>, Larry Lüer<sup>1</sup> and Christoph J. Brabec<sup>1,2</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; <sup>2</sup>Helmholtz-Institute Erlangen-Nürnberg (HI ERN), Germany

**8:30 AM \*EL10.06.02**

**Understanding Static and Dynamic Local Structure—Metal Halide Perovskites** [Michael F. Toney](#); University of Colorado Boulder, United States

**9:00 AM EL10.06.03**

**Laser Interferometric Rate Measurements of Light-Induced Deformation of Lead-Halide Perovskite Crystals Provide Insights into Ionic Vacancy Formation and Diffusion** [Christopher Petroff](#), Emily Hiralal, Kuan-Ting Liu, Lara A. Estroff and John A. Marohn; Cornell University, United States

**9:15 AM EL10.06.04**

**Carrier Dynamics and Relaxation in Chemical-Vapor-Deposited Two-Dimensional Hybrid Halide Perovskites** Dallar Babaian, Daniel Hill, Ping Yu and [Suchismita Guha](#); University of Missouri, United States

**9:30 AM EL10.06.05**

**Shining Light on Shallow Defects—Temperature-Dependent Transient Photoluminescence of Metal-Halide Perovskites.** [Guus J. Aalbers](#), Martijn M. Wienk and Rene A. Janssen; Eindhoven University of Technology, Netherlands

**9:45 AM EL10.06.06**

**Modulating Singlet and Triplet Energy Transfer Pathways in Halide Perovskite-Cyanine Dye Hybrids Through Mn-Doping** [Akshaya Chemmangat](#) and Prashant Kamat; University of Notre Dame, United States

**10:00 AM BREAK**



**10:30 AM \*EL10.06.07**

**Phase Transformations in Metal Halide Perovskites** [Juan-Pablo Correa-Baena](#); Georgia Institute of Technology, United States

**11:00 AM EL10.06.08**

**Understanding the Relationship Between Grain-Size, Stoichiometry and Conductivity in Evaporated CsPbBr<sub>3</sub> Perovskite Thin-films via Non-Contact Characterization Techniques** [Virginia E. McGhee](#)<sup>1,2</sup>, Robert Witteck<sup>2</sup>, Christopher A. Petroff<sup>1</sup>, David T. Moore<sup>2</sup> and John A. Marohn<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>National Renewable Energy Laboratory, United States

**11:15 AM EL10.06.09**

**Visualizing Bulk Heterogeneities in CsPbBr<sub>3</sub> Single Crystals via Two-Photon Photoluminescence Microscopy** [Zimu Wei](#)<sup>1</sup>, Khasim Saheb Bayikadi<sup>2</sup>, Ganbaatar Tumen-Ulzii<sup>1</sup>, Mercuri G. Kanatzidis<sup>2</sup> and Samuel D. Stranks<sup>1</sup>; <sup>1</sup>University of Cambridge, United Kingdom; <sup>2</sup>Northwestern University, United States

**11:30 AM EL10.06.10**

**Probing Mechanical Properties of Various Halide Perovskite Single Crystals by Nanoindentation** [Ruitian Chen](#) and Yu Zou; University of Toronto, Canada

**11:45 AM EL10.06.11**

**Negative Photoconductivity in Tin-Based Organic-Inorganic Hybrid Perovskites** [Jinkyu Lee](#) and Young-Hoon Kim; Hanyang University, Korea (the Republic of)

SESSION EL10.07: New Perovskite Materials II

Session Chairs: Yifan Dong and Xiwen Gong

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 434

**1:30 PM \*EL10.07.01**

**The First Decade of Perovskite Quantum Dots (In Our Lab)** [Maksym V. Kovalenko](#)<sup>1,2</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**2:00 PM EL10.07.02**

**Continuous Injection Synthesis of Large Perovskite Nanocrystals for Bright and Fast Emission at Low Temperature** [Kaelyn McFarlane-Connelly](#), Niamh Brown, Hua Zhu, Oliver Nix and Mounqi Bawendi; Massachusetts Institute of Technology, United States

**2:15 PM EL10.07.03**

**Defect Engineering in Perovskites for Optoelectronic Devices: Use of Perovskite Polytypes** [Hobeom Kim](#); Gwangju Institute of Science and Technology, Korea (the Republic of)

**2:30 PM BREAK**

**3:00 PM EL10.07.04**

**Acoustic Modification of Halide Perovskite Thin Films for Enhanced Crystal Quality and Device Performance** [Arkita Chakrabarti](#)<sup>1</sup>, Kelly Vences<sup>2</sup>, Farzaneh Rezaei<sup>1</sup>, Connor J. Dolan<sup>2</sup>, Niranjana Mohan Kumar<sup>1</sup>, Paulo E. Marchezi<sup>2</sup>, David Fenning<sup>2</sup> and Mariana I. Bertoni<sup>1</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>University of California, San Diego, United States

**3:15 PM EL10.07.05**

**Elucidating the Multi-Length Scale Structure of Two-Dimensional Perovskite Materials** [Amita Ummadisingu](#); University College London, United Kingdom

**3:30 PM EL10.07.06**

**Connecting Optical Properties and Phase Transitions in Ruddlesden-Popper 2D Perovskites** Perry Martin, Emily Dalley and [Connor G. Bischak](#); The University of Utah, United States

**3:45 PM EL10.07.07**

**Atomic-Level Studies on Transition Metal Ion Incorporation in Lead-Free Halide Double Perovskite Crystals for NIR-Emission** Anna Dávid;  
Linköping University, Sweden

**4:00 PM \*EL10.07.08**

**Perovskite Quantum Emitters** Tze Chien Sum; Nanyang Technological University, Singapore

**4:30 PM EL10.07.09**

**Efficient Mn<sup>2+</sup> Doping in Non-Stoichiometric Cesium Lead Bromide Perovskite Quantum Dots** Yitong Dong; University of Oklahoma, United States

SESSION EL10.08: Poster Session: Advances in the Fundamental Understanding of Halide Perovskites

Session Chairs: Sascha Feldmann, Xiwen Gong, Peijun Guo and Lina Quan

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL10.08.01**

**All-Optical Probing of Phase Transition Dynamics in 2D Lead Halide Perovskites** Shunran Li, Bowen Li, Linqi Chen and Peijun Guo; Yale University, United States

**EL10.08.02**

**Electron-Hole Liquid formation and Relaxation in Formamidinium Lead Bromide Perovskite** Giuseppe Ammirati<sup>1</sup>, Daniele Catone<sup>1</sup>, Patrick O'Keeffe<sup>1</sup>, Francesco Toschi<sup>1</sup>, Alessandra Paladini<sup>1</sup>, Stefano Turchini<sup>1</sup>, Fabio Matteocci<sup>2</sup>, Jessica Barichello<sup>1,2</sup>, Aldo Di Carlo<sup>1,2</sup> and Faustino Martelli<sup>1</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Università degli Studi di Roma Tor Vergata, Italy

**EL10.08.03**

**Understanding Back Electron Transfer in Lead Halide Perovskites** Manish Mukherjee and Prashant Kamat; University of Notre Dame, United States

**EL10.08.04**

**Negative Thermal Expansion and Temperature-Dependent Phase Transitions in (PEA)<sub>2</sub>MCl<sub>4</sub> (M=Cu, Mn) Crystals Studied by Raman Spectroscopy** Eunseo Lee<sup>1</sup>, Seoyeon Ko<sup>1</sup>, Myeongjun Kang<sup>2</sup>, Jongmok Ok<sup>2</sup> and Seokhyun Yoon<sup>1</sup>; <sup>1</sup>Ewha Womans University, Korea (the Republic of); <sup>2</sup>Pusan National University, Korea (the Republic of)

**EL10.08.05**

**Photoluminescence Lifetime of Perovskites on Modified Substrates** Xavier T. Vorhies<sup>1</sup>, Jessica M. Andriolo<sup>1</sup>, Joseph J. Thiebes<sup>2</sup>, Emma K. Orcutt<sup>2</sup>, Erik Grumstrup<sup>2</sup> and Jack Skinner<sup>1</sup>; <sup>1</sup>Montana Technological University, United States; <sup>2</sup>Montana State University, United States

**EL10.08.06**

**Heterostructure Engineering of 0D/1D Lead-Free Metal Halide Perovskites for Bright White Light Emission** Jaeyoon Cho<sup>1</sup>, Yongjin Kim<sup>1</sup>, Jae Il Kim<sup>1</sup>, Kyeong-Yoon Baek<sup>2</sup>, Takhee Lee<sup>1</sup> and Keehoon Kang<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Harvard University, United States

**EL10.08.07**

**Design Principles for Surface-Passivating Ligands of Cesium Lead Halide Perovskite Nanocrystals in the Strongly Quantum-Confined Regime** Seungjun Cha<sup>1</sup>, Courtney Brea<sup>2</sup> and Aaron S. Malinoski<sup>2</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>The City University of New York, United States

**EL10.08.08**

**Transistor-Type Tin Halide Perovskite Memory with Heterostructure Induced by Ethylenediammonium** Soothan Yoo and Yong-Young Noh; Pohang University of Science and Technology, Korea (the Republic of)

**EL10.08.09**

**Extended Honeycomb Metal Chloride with Tunable Antiferromagnetic Correlations** Jie Xue<sup>1</sup>, Ruyi Song<sup>2</sup>, Zhu Guo<sup>3</sup>, Herman H. Y. Sung<sup>1</sup>, Rolf Lortz<sup>1</sup>, Ian D. Williams<sup>1</sup> and Haipeng Lu<sup>1</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>Duke University, United States; <sup>3</sup>Southern University of Science and Technology, China

**EL10.08.10**

**Harnessing Vibrationally Assisted Delayed Fluorescence for Enhanced Energy Transfer in Mn-Doped CsPbBr<sub>3</sub> Nanocrystals** Subham Das, Sudipa Aich, Aswathy M and Ranjani Viswanatha; Jawaharlal Nehru Centre For Advanced Scientific Research, India

**EL10.08.11**

**Novel Efficient Hole Transport Layers for Perovskite Solar Cells** Nicolas Daub, Guus J. Aalbers, Daan Beerkens and Rene A. Janssen; Eindhoven University of Technology, Netherlands

**EL10.08.12**

**Impact of Halogen Groups on the Properties of PEA-Based 2D Pb-Sn Halide Perovskites** Elham Foadian<sup>1</sup>, Sheryl Sanchez<sup>1</sup>, Sumner B. Harris<sup>2</sup>, Jonghee Yang<sup>3</sup> and Mahshid Ahmadi<sup>1</sup>; <sup>1</sup>The University of Tennessee, Knoxville, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>Yonsei University, Korea (the Republic of)

**EL10.08.13**

**Stable and Pure-Red Perovskite Emission in Polymer-Perovskite Blend Enabled by FRET** Jyoti Saxena<sup>1</sup>, Rahul Murali<sup>2</sup>, Sai Santosh K. Raavi<sup>2</sup> and Aditya Sadhanala<sup>1</sup>; <sup>1</sup>Indian Institute of Science Bangalore, India; <sup>2</sup>Indian Institute of Technology Hyderabad, India

**EL10.08.14**

**Optimizing Slot Die Coating Process for High Quality Perovskite Thin Films** Muhammad Mohsin Saeed, Tao Zhu, You Li, Jaehoon Chung, Manoj Rajakaruna, Amirhossein Rahimi, Abasi Abudulimu, Tamanna Mariam, Sheng Fu, Randy Ellingson, Michael J. Heben, Zhaoning Song and Yanfa Yan; The University of Toledo, United States

**EL10.08.15**

**Charge Carrier Dynamics in Chiral 2D/3D Halide Perovskites** Margherita Taddei; National Renewable Energy Laboratory, United States

**EL10.08.16**

**Understanding Diamino-Silane Molecule for Perovskite Passivation** Zixu Huang; University of Washington, United States

SESSION EL10.09: Machine Learning and Computational Approaches

Session Chair: Shunran Li

Friday Morning, April 11, 2025

Summit, Level 4, Room 434

**8:15 AM \*EL10.09.01**

**Excitons in Low-Dimensional Metal-Halide Perovskites from First-Principles Calculations** Linn Leppert; University of Twente, Netherlands

**8:45 AM EL10.09.02**

**Excited-State Neuromorphic Computing Using a Luminescent Opto-Ionic Reservoir** Philipp Kollenz<sup>1</sup>, Tom Wickenhäuser<sup>2</sup>, Garrett May<sup>1</sup>, Hendrik J. Brockmann<sup>1</sup>, Julia Anthea Gessner<sup>1</sup>, Luca Bischof<sup>2</sup>, Rüdiger Klingeler<sup>2</sup> and Felix Deschler<sup>1</sup>; <sup>1</sup>Physikalisch-Chemisches Institut, Universität Heidelberg, Germany; <sup>2</sup>Universität Heidelberg, Germany

**9:00 AM EL10.09.03**

**Excitons, Fine Structure Splitting, Spin and Chirality—The Exciting Optical Properties of 2D Halide Perovskites from Combined Symmetry Analysis and Green-Function Based Simulations** Claudio Quarti<sup>1</sup>, Giacomo Giorgi<sup>2,3,4</sup>, Claudine Katan<sup>5,6,7</sup>, Jacky Even<sup>5,8,7</sup> and Maurizia Palummo<sup>9</sup>; <sup>1</sup>University of Mons, Belgium; <sup>2</sup>University of Perugia, Italy; <sup>3</sup>SCITEC, France; <sup>4</sup>CNR, Italy; <sup>5</sup>University of Rennes, France; <sup>6</sup>Institut de Sciences Chimiques de Rennes, France; <sup>7</sup>CNRS, France; <sup>8</sup>Institut National des Sciences Appliquées, France; <sup>9</sup>Università degli Studi di Roma Tor Vergata, Italy

**9:15 AM EL10.09.04**

**Excitonic Effects in Perovskite LEDs—Self Consistent Back Extraction of Recombination Parameters from Photoluminescence Measurements** Pradeep Nair; Indian Institute of Technology Bombay, India

**9:30 AM \*EL10.09.05**

**Harnessing Machine Learning and Molecular Design to Advance Low-Dimensional Organic-Inorganic Lead Halides** Yiyang Wu; The Ohio State University, United States

**10:00 AM BREAK**

**10:30 AM \*EL10.09.06**

**Tailoring Structure, Energy Levels and Spin Properties of Hybrid Perovskites with Help from Large-Scale Hybrid DFT** Volker Blum; Duke University, United States

**11:00 AM EL10.09.07**

**Machine-Learning-Aided Spin-Splitting Analysis and Prediction in 2D Perovskites** Ruyi Song<sup>1,2</sup>; <sup>1</sup>DP Technology, United States; <sup>2</sup>Duke University, United States

**11:15 AM EL10.09.08**

**Adapting Explainable Machine Learning to Study Mechanical Properties of Two-Dimensional Hybrid Halide Perovskites** Dan Han<sup>1,2,3</sup>, Yuxuan Yao<sup>4</sup>, Kieran B. Spooner<sup>2</sup>, Xiaoyu Jia<sup>5</sup>, Hubert Ebert<sup>3</sup>, David Scanlon<sup>2</sup> and Harald Oberhofer<sup>6</sup>; <sup>1</sup>Jilin University, China; <sup>2</sup>University of Birmingham, United Kingdom; <sup>3</sup>Ludwig-Maximilians-Universität München, Germany; <sup>4</sup>Technische Universität München, Germany; <sup>5</sup>University College London, United Kingdom; <sup>6</sup>University of Bayreuth, Germany

**11:30 AM EL10.09.09**

**Vibrational Structure and Electron-Phonon Interactions in Halide Perovskite CsPbBr<sub>3</sub>** Simon Thebaud<sup>1</sup>, Zeli Xu<sup>1</sup>, Antoine Létoublon<sup>1</sup>, Olivier Durand<sup>1</sup>, Marios Zacharias<sup>1</sup>, George Volonakis<sup>2</sup>, Laurent Pedesseau<sup>1</sup>, Mikael Kepenekian<sup>2</sup>, Xinyuan Zhang<sup>3</sup>, Duck Young Chung<sup>4</sup>, Osman M. Bakr<sup>3</sup>, Mercuri G. Kanatzidis<sup>4,5</sup>, Stéphane Raymond<sup>6</sup>, Alexandre Ivanov<sup>7</sup>, Jacques Ollivier<sup>7</sup>, Claudine Katan<sup>2</sup>, Philippe Bourges<sup>8</sup> and Jacky Even<sup>1</sup>; <sup>1</sup>INSA Rennes, Institut FOTON, France; <sup>2</sup>Institut des Sciences Chimiques de Rennes, Université de Rennes, France; <sup>3</sup>King Abdullah University of Science and Technology, Saudi Arabia; <sup>4</sup>Argonne National Laboratory, United States; <sup>5</sup>Northwestern University, United States; <sup>6</sup>Université Grenoble Alpes, CEA, France; <sup>7</sup>Institut Laue-Langevin, France; <sup>8</sup>Université Paris-Saclay, CEA, Laboratoire Léon Brillouin, France

SESSION EL10.10: Ultrafast Spectroscopy, Lattice Dynamics and Photophysics II

Session Chairs: Xiwen Gong and Yuanyuan Zhou

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 434

**2:00 PM EL10.10.02**

**Towards Resolving Vibronic Coupling in FAPbBr<sub>3</sub> by Coherent Infrared Hyper-Raman Spectroscopy** Ryan P. McDonnell, David P. Lafayette, Daniel D. Kohler, Jason M. Scheeler, Jalianet Román-Matías, Willa Mihalyi-Koch, Song Jin and John C. Wright; University of Wisconsin, United States

**2:15 PM EL10.10.03**

**Speed of Sound in Single Crystals of Lead-Free Iodide Perovskites Measured by Femtosecond Transient Reflectivity** Faustino Martelli<sup>1</sup>, Giuseppe Ammirati<sup>1</sup>, Patrick O'Keeffe<sup>1</sup>, Stefano Turchini<sup>1</sup>, Daniele Catone<sup>1</sup>, Alessandra Paladini<sup>1</sup>, Francesco Toschi<sup>1</sup>, Stevan Gavranovic<sup>2</sup>, Jan Pospisil<sup>2</sup>, Giovanni Mannino<sup>1</sup> and Salvatore Valastro<sup>1</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Brno University of Technology, Czechia

**2:30 PM EL10.10.04**

**The Relationship Between Local Structural Order and Optoelectronic Performance of Lead Halide Perovskites** Milos Dubajic; University of Cambridge, United Kingdom

**2:45 PM EL10.10.05**

**Insight into Charge Carrier Separation in 2D Perovskites via Spatially Resolved Photocurrent Measurement** Tamara E. Czerny and Franziska E. Muckel; Universität Duisburg-Essen, Germany

**3:00 PM BREAK**

**3:30 PM EL10.10.06**

**Charge Transfer Dynamics in Layered Hybrid Quasi 2D-Perovskites** Daniele Catone<sup>1</sup>, Giuseppe Ammirati<sup>1</sup>, Patrick O'Keeffe<sup>1</sup>, Alessandra Paladini<sup>1</sup>, Stefano Turchini<sup>1</sup>, Francesco Toschi<sup>1</sup>, Faustino Martelli<sup>1</sup>, Antonio Agresti<sup>2</sup>, Sara Pescetelli<sup>2</sup>, Ree Khanfar<sup>2</sup> and Daimiota Takhellambam<sup>2</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Università degli Studi di Roma Tor Vergata, Italy

**3:45 PM EL10.10.07**

**Interrogating the Effects of Surface Passivation on Electronic and Ionic Carrier Dynamics in Lead Halide Perovskite via Sub-Diffraction-Limited Imaging** Justin Pothoof, Madeleine Breshears, Rajiv Giridharagopal and David S. Ginger; University of Washington, United States

**4:00 PM EL10.10.08**

**On the Impact of Different Interfaces on the Charge Carrier Transport in Perovskite Solar Cells** Ilka Hermes<sup>1</sup> and Stefan A. Weber<sup>2</sup>; <sup>1</sup>Leibniz Institute for Polymer Research Dresden e.V., Germany; <sup>2</sup>University of Stuttgart, Germany

**4:15 PM EL10.10.09**

**Morphological Engineering of Metal Halide Perovskite Films Using Nanoparticle Integration—Impact on Film Quality and Emission Properties** Asmitha Mekala<sup>1</sup>, Jorge Arteaga<sup>1</sup>, Heng Zhang<sup>2</sup>, Jin Zhang<sup>2</sup> and Sayantani Ghosh<sup>1</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>University of California, Santa Cruz, United States

**4:30 PM \*EL10.10.10**

**Exciton and Charge Transport in Halide Perovskites** William Tisdale; Massachusetts Institute of Technology, United States

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# SYMPOSIUM EL11

Wide and Ultrawide Bandgap Materials, Devices and Applications  
April 7 - April 11, 2025

Symposium Organizers

Motoaki Iwaya, Meijo University  
Robert Kaplar, Sandia National Laboratories  
Sriram Krishnamoorthy, University of California, Santa Barbara  
Filip Tuomisto, University of Helsinki

Symposium Support

**Silver**

Taiyo Nippon Sanso

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL11.01: Ultrawide Bandgap Properties and Characterization

Session Chairs: Robert Kaplar and Georges Pavlidis

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 435

**1:30 PM \*EL11.01.01**

**Advancing Maturity of Wide Bandgap Semiconductor Ecosystems** John Muth; North Carolina State University, United States

**2:00 PM EL11.01.02**

**Design Optimization of Ultra-Wide Bandgap Power Diodes—A Co-Design Approach to Understanding the Influence of Self-Heating on UWBG Power Device Performance** Jonah Shoemaker<sup>1</sup>, Robert J. Kaplar<sup>2</sup>, Stephen M. Goodnick<sup>1</sup>, Jack Flicker<sup>2</sup>, Andrew Binder<sup>2</sup>, Mihai Negoita<sup>2</sup> and Srabanti Chowdhury<sup>3</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Sandia National Laboratories, United States; <sup>3</sup>Stanford University, United States

**2:15 PM EL11.01.03**

**Atomic and Electronic Structures of Rocksalt-Wurtzite Interfaces with Ultra-Wide Bandgap Nitrides** [Sharad Mahatara](#) and Stephan Lany; National Renewable Energy Laboratory, United States

**2:30 PM EL11.01.04**

**Catalyst-Free Synthesis of Sub-5 nm Silicon Nanowire Arrays with Massive Lattice Contraction and Ultra-Wide Bandgap—Toward Quantum Confined, High-Aspect Ratio and Nano-Micro Hierarchical Silicon Architectures** [Juyeon Seo](#)<sup>1</sup>, Sen Gao<sup>1</sup>, Sanghyun Hong<sup>1</sup>, Jianlin Li<sup>1</sup>, Peiyun Feng<sup>1</sup>, Soohyung Park<sup>2</sup>, Ji Young Byun<sup>2</sup> and Yung Joon Jung<sup>1</sup>; <sup>1</sup>Northeastern University, United States; <sup>2</sup>Korea Institute of Science and Technology, Korea (the Republic of)

**2:45 PM EL11.01.05**

**1D CsCu<sub>2</sub>I<sub>3</sub> and 0D Cs<sub>3</sub>Cu<sub>2</sub>I<sub>5</sub> Wide-Bandgap Perovskite Single Crystals—Optical and Scintillation Properties** [Bhavika Bansal](#), Vivek Anand and Anil Kumar Gourishetty; Indian Institute of Technology Roorkee, India

**3:00 PM BREAK**

**3:30 PM \*EL11.01.06**

**Characterization of GaN Materials for Power Electronics Applications** [Michael Dudley](#) and Balaji Raghothamachar; Stony Brook University, United States

**4:00 PM \*EL11.01.07**

**Probing the Channel Temperature in Poor Thermally Conductive Ultra-Wide Bandgap Semiconductor Devices** [Georges Pavlidis](#), Francis Vasquez-Aza, Dominic Myren and Saad Muhammad Jamil; University of Connecticut, United States

**4:30 PM EL11.01.08**

**Tabletop Deep-Ultraviolet Transient Grating to Characterize Ultrawide Bandgap Semiconductors** [Emma Nelson](#)<sup>1</sup>, Brendan McBennett<sup>1</sup>, Theodore Culman<sup>1</sup>, Albert Beardo Ricol<sup>1</sup>, Henry Kapteyn<sup>1,2</sup>, Margaret M. Murnane<sup>1</sup> and Joshua Knobloch<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>KM Labs Inc., United States

**4:45 PM EL11.01.09**

**Multimodal Microscopy to Classify Structural Defects Impeding Charge Transport in Power Electronics** [Wei-Chang David Yang](#)<sup>1</sup>, Min-Yeong Kim<sup>1,2,3</sup>, Andrew Winchester<sup>1</sup>, Alline F. Myers<sup>1</sup>, Sang-Mo Koo<sup>2</sup>, Qiliang Li<sup>3</sup> and Sujitra Pookpanratana<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>Kwangwoon University, Korea (the Republic of); <sup>3</sup>George Mason University, United States

SESSION EL11.02: Hexagonal BN

Session Chairs: Motoaki Iwaya and Jong Kyu Kim

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 435

**10:30 AM \*EL11.02.01**

**Growth of Hexagonal Boron Nitrides by MOCVD and Their Applications** Seokho Moon, Jiye Kim, Jaesub Song, Semi Im, Jawon Kim and [Jong Kyu Kim](#); Pohang University of Science and Technology, Korea (the Republic of)

**11:00 AM \*EL11.02.02**

**Efficient Second Harmonic Generation in Specific Polytypes of Hexagonal Boron Nitride** [Bernard Gil](#)<sup>1,2</sup>; <sup>1</sup>Montpellier University, France; <sup>2</sup>CNRS, France

**11:30 AM EL11.02.03**

**DUV Excitonic Emission from Monolayer h-BN Studied by Cathodoluminescence Performed in a Scanning Tunneling Microscope** Victor Feitosa<sup>1</sup>, Fabio Costa<sup>1</sup>, Juliette Plo<sup>2</sup>, Pierre Valvin<sup>2</sup>, Guillaume Cassabois<sup>2</sup>, Tin Cheng<sup>3</sup>, Jonathan Bradford<sup>3</sup>, Christopher Mellor<sup>3</sup>, Peter Beton<sup>3</sup>, Sergei Novikov<sup>3</sup>, Bernard Gil<sup>2</sup> and [Luiz F. Zagonel](#)<sup>1</sup>; <sup>1</sup>University of Campinas, Brazil; <sup>2</sup>Université de Montpellier, France; <sup>3</sup>University of Nottingham, United Kingdom

**11:45 AM EL11.02.04**

**Poly-Crystalline Boron Nitride Memristor with Ultra-Low Set Voltage** Kyung Jin Ahn<sup>1,2</sup>, Do Kyeong Yun<sup>1</sup>, Mihyang Park<sup>1</sup>, Van Tu Vu<sup>1</sup>, [Pallavi Aggarwal](#)<sup>1</sup> and Woojong Yu<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Samsung Electronics, Korea (the Republic of)

SESSION EL11.03: Diamond and Cubic BN

Session Chairs: Timothy Grotjohn and Motoaki Iwaya

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 435

**1:30 PM EL11.03.01**

**Growth of Cubic Boron Nitride by Plasma Assisted Chemical Vapor Deposition on Silicon, Silicon Carbide and Diamond Substates** Jahangir Alam, Christopher Thomas, Sheikh Mahtab, Kishak Z. Cinfwat, MVS Chandrashekhar, Peker Milas, Birol Ozturk and Michael G. Spencer; Morgan State University, United States

**1:45 PM EL11.03.02**

**Advances in Phosphorus Doping of Diamond via Pulsed Deposition Techniques** Franz A. Koeck and Robert J. Nemanich; Arizona State University, United States

**2:00 PM EL11.03.03**

**Role of Q-Carbon in the Wafer-Scale Growth of High-Quality Diamond Films** Naveen Narasimhachar Joshi, Pranay Kalakonda, Roger Narayan and Jagdish Narayan; North Carolina State University, United States

**2:15 PM EL11.03.04**

**DFT Analysis of Metal and Metal-Carbide Contacts on Diamond (100)—Structural and Electronic Properties** Alyana A. Carrell, Michael Groves, Ariana Guzman and Dai Tran; California State University Fullerton, United States

**2:30 PM BREAK**

**3:00 PM \*EL11.03.05**

**Controlling Defects and Doping in CVD Grown Diamond Epi-Layers** Timothy A. Grotjohn; Michigan State University, United States

**3:30 PM EL11.03.06**

**<100> Homoepitaxial Diamond Metal-Insulator-Semiconductor Schottky Diodes Towards High-Power RF Limiters** Brian Bersch, Noah Sauber, Thomas Adam, Brant Hempel, Alec Federice, Victor Hu, Nathaniel Rogers, Harlan Cramer, Bettina Nechay, Sara Taylor, Ugonna C. Ohiri, Robert Howell, Matthew Doerflein and Josephine Chang; Northrop Grumman, United States

**3:45 PM EL11.03.07**

**First Ampere-Class Double Pulse Testing on Half-Inch Diamond MOSFET Chip** Keita Takaesu<sup>1</sup>, Daisuke Sano<sup>1</sup>, Iku Ota<sup>1</sup>, Keiko Otsuka<sup>1</sup>, Daisuke Takeuchi<sup>2</sup>, Toshiharu Makino<sup>2</sup> and Hitoshi Umezawa<sup>2</sup>; <sup>1</sup>Honda R&D Co., Ltd., Japan; <sup>2</sup>AIST, Japan

**4:00 PM EL11.03.08**

**Integration of Monolayer n-MoS<sub>2</sub> with p-Type Boron Doped Diamond for Near Ideal 2D/3D p-n Heterojunction Rectifiers Operating at Room Temperature** Akshay Wali<sup>1,2</sup>, Roshan Padhan<sup>2</sup>, Ralu Divan<sup>1</sup>, Pierre T. Darancet<sup>1</sup>, Nihar Pradhan<sup>2</sup> and Anirudha Sumant<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Jackson State University, United States

**4:15 PM EL11.03.09**

**Effects of Doping on Valence Band Offset in Al<sub>2</sub>O<sub>3</sub>-Deposited on H-Terminated Doped Diamond** Md Sahadat Alam, Parker Steenblik, Kevin Hatch, Franz Koeck and Robert J. Nemanich; Arizona State University, United States

SESSION EL11.04: AlN/AlGaN Electronics

Session Chairs: Andrew Armstrong and Robert Kaplar

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 435

**8:15 AM \*EL11.04.01**

**Fundamental electronic and optical properties of AlN as an ultrawide bandgap material** Ryota Ishii, Mitsuru Funato and Yoichi Kawakami; Kyoto University, Japan

**8:45 AM \*EL11.04.02**

**Characteristics of Heavily Doped AlGa<sub>N</sub> and GaN Prepared by Pulsed Sputtering and Their Applications** Hiroshi Fujioaka; The University of Tokyo, Japan

**9:15 AM \*EL11.04.03**

**Unexpected Origin of Deep Level Compensation by Proton Irradiation in Al-Rich AlGa<sub>N</sub>** Andrew M. Armstrong<sup>1</sup>, A. A. Allerman<sup>1</sup>, Christine M. Jackson<sup>2</sup>, Aaron R. Arehart<sup>2</sup> and Steven Ringel<sup>2</sup>; <sup>1</sup>Sandia National Laboratories, United States; <sup>2</sup>The Ohio State University, United States

**9:45 AM EL11.04.04**

**Silicon-Related Defects in AlN from First Principles** Igor Prozhnev<sup>1</sup>, Mark Turiansky<sup>2</sup>, Ilja Makkonen<sup>1</sup>, Filip Tuomisto<sup>1</sup> and Chris G. Van de Walle<sup>2</sup>; <sup>1</sup>University of Helsinki, Finland; <sup>2</sup>University of California, Santa Barbara, United States

**10:00 AM BREAK**

**10:30 AM \*EL11.04.05**

**2D Hole Gas at GaN/AlN Interface—An Unprecedented Platform to Probe the Valence Band of GaN** Huili Grace G. Xing; Cornell University, United States

**11:00 AM \*EL11.04.06**

**High-Performance Ultra-Wide Bandgap Semiconductor AlGa<sub>N</sub> and Ga<sub>2</sub>O<sub>3</sub> Devices** Siddharth Rajan; The Ohio State University, United States

**11:30 AM EL11.04.07**

**High Permittivity Epitaxial BaTiO<sub>3</sub> Thin Films on AlGa<sub>N</sub>/GaN Heterostructures for RF Electronics** Eric N. Jin<sup>1</sup>, Vikrant Gokhale<sup>1</sup>, James G. Champlain<sup>1</sup>, James Hart<sup>2</sup>, Andrew C. Lang<sup>1</sup>, Brian P. Downey<sup>1</sup>, Matthew T. Hardy<sup>1</sup>, Neeraj Nepal<sup>1</sup>, D. Scott Katzer<sup>1</sup> and Virginia D. Wheeler<sup>1</sup>; <sup>1</sup>U.S. Naval Research Laboratory, United States; <sup>2</sup>NOVA Research, Inc., United States

**11:45 AM EL11.04.08**

**Infrared Dielectric Function of Single Crystal Homoepitaxial AlN** Kishak Z. Cinfwat<sup>1</sup>, David Lothers<sup>2</sup>, Ahamed Raihan<sup>1</sup>, Grigory Simin<sup>2</sup>, Avi Bergman<sup>3</sup>, A. A. Allerman<sup>4</sup>, Michael G. Spencer<sup>1</sup> and MVS Chandrashekar<sup>1</sup>; <sup>1</sup>Morgan State University, United States; <sup>2</sup>University of South Carolina, United States; <sup>3</sup>Johns Hopkins University, United States; <sup>4</sup>Sandia National Laboratories, United States

SESSION EL11.05: GaN Electronics

Session Chair: Robert Kaplar

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 435

**1:45 PM EL11.05.01**

**Defects in Ammonothermal-Based GaN Vertical Power Devices** Andrew Winchester<sup>1</sup>, Dara E. Weiss<sup>1</sup>, Michael Mastro<sup>2</sup>, Travis Anderson<sup>2,3</sup>, Jennifer Hite<sup>2,3</sup>, Behrang Hamadani<sup>1</sup> and Sujitra Pookpanratana<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>U.S. Naval Research Laboratory, United States; <sup>3</sup>University of Florida, United States

**2:00 PM EL11.05.02**

**Temperature Dependence Cross-Sectional Study of Ammonothermal Gallium Nitride** Hossein Zandipour<sup>1</sup>, Mohit Pradhan<sup>1</sup>, Aditha Senarath<sup>2</sup>, Matthew Wortel<sup>1</sup>, Thomas G. Folland<sup>1</sup> and Joshua D. Caldwell<sup>2</sup>; <sup>1</sup>The University of Iowa, United States; <sup>2</sup>Vanderbilt University, United States

**2:15 PM EL11.05.03**

**Near-Field Investigation of Hybrid Surface-Phonon-Plasmon Polariton in Doped Gallium Nitride for Enhanced Infrared Characterization** Aditha Senarath<sup>1</sup>, Katja Diaz-Granados<sup>1</sup>, Maximilian Obst<sup>2</sup>, Felix Kaps<sup>2</sup>, Jakob Wetzel<sup>2</sup>, Raghunandan Iyer<sup>3</sup>, Giulia Carini<sup>4</sup>, Gonzalo Álvarez-Pérez<sup>4</sup>, Ryan Kowalski<sup>1</sup>, Saurabh Dixit<sup>1</sup>, Richarda Niemann<sup>1</sup>, Niclas Mueller<sup>4</sup>, Mohit Pradhan<sup>3</sup>, Hossein Zandipour<sup>3</sup>, Owen Meilander<sup>1</sup>, J. Michael Klopf<sup>5</sup>, Lukas Eng<sup>2</sup>, Susanne Kehr<sup>2</sup>, Alexander Paarmann<sup>4</sup>, Ronald Schrimpf<sup>1</sup>, Thomas Folland<sup>3</sup> and Joshua D. Caldwell<sup>1</sup>; <sup>1</sup>Vanderbilt University, United States; <sup>2</sup>Technische



Universität Dresden, Germany; <sup>3</sup>The University of Iowa, United States; <sup>4</sup>Fritz Haber Institute, Germany; <sup>5</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany

## 2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT

SESSION EL11.06: Ga<sub>2</sub>O<sub>3</sub> Devices

Session Chairs: Sriram Krishnamoorthy and Siddharth Rajan

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 435

### 3:30 PM \*EL11.06.01

**Gallium Oxide Microelectronics** Andrew Green; Air Force Research Laboratory, United States

### 4:00 PM EL11.06.02

**Sn-Doped  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> Lateral Schottky Barrier Diode Fabrication by Mist-CVD** Jang Hyeok Park<sup>1</sup>, Ho Jung Jeon<sup>1</sup>, Jung Yeop Hong<sup>2</sup>, Jung Hee Park<sup>2</sup>, Young Kyun Jung<sup>2</sup> and You Seung Rim<sup>1</sup>; <sup>1</sup>Sejong University, Korea (the Republic of); <sup>2</sup>Hyundai, Korea (the Republic of)

### 4:15 PM EL11.06.03

**Mist-CVD Grown NiO/Ga<sub>2</sub>O<sub>3</sub> pn Heterojunctions for High Power Electronics** Hemant Gulupalli<sup>1</sup>, Takumi Ikenoue<sup>2,1</sup>, Bennett Cromer<sup>1</sup>, Huili Grace G. Xing<sup>1,1</sup> and Michael Thompson<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Kyoto University, Japan

### 4:30 PM EL11.06.04

**Modeling SiC Deposition on Off-Axis 4H-SiC Substrates with Surface Steps—Insights into Temperature and Angular Dependency in Vapor Phase Growth** Kevin Kayang, Balaji Raghoothamachar, Michael Dudley and Dilip Gersappe; Stony Brook University, United States

### 4:45 PM EL11.06.05

**Transferrable Ultra-Thin AlGaIn/GaN HEMTs over 1,000 V Breakdown Voltages** Hyeon-Tak Kwak, Hoe-Min Kwak, Sung-Bum Bae and Hyung-Seok Lee; Electronics and Telecommunications Research Institute, Korea (the Republic of)

SESSION EL11.07: Poster Session: Ultrawide Bandgap

Session Chairs: Robert Kaplar and Sriram Krishnamoorthy

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

### EL11.07.01

**Advanced Deposition Processes for High-Aspect-Ratio Trench Capacitors in DRAM Using Remote Plasma ALD of HfO<sub>2</sub>** Jiwon Kim, Inkook Hwang, Hyosil Yang and Changbun Yoon; Tech University of Korea, Korea (the Republic of)

### EL11.07.02

**Self-Heating Effects in AlGaIn/GaN High Electron Mobility Transistors (HEMT)** Jerry G. Comanescu<sup>1</sup>, Albert V. Davydov<sup>1</sup> and Michael Shur<sup>2,3</sup>; <sup>1</sup>National Institute for Standards and Technology, United States; <sup>2</sup>Theiss Research Inc., United States; <sup>3</sup>Rensselaer Polytechnic Institute, United States

### EL11.07.03

**Structural and Electronic Properties of Metals (Ti, Zr, Hf, Mo, and Al) Terminated Diamond (100) Surfaces** Ariana Guzman, Alyana A. Carrell, Dai Tran and Michael Groves; California State University, Fullerton, United States

### EL11.07.04

**Wide Bandgap Amorphous Oxide Semiconducting Thin Film Transistor Inverter Fabricated by Pulsed Laser Deposition** JuYoung Lee, Hyeondong Kim, Vivekanandan Janakiraman, SangJi Kim, TaeHo Kim, Seong Eun Song, Seungwook Choi and Sangyeol S. Lee; Gachon University, Korea (the Republic of)

**EL11.07.05**

**Electrochemical Etching Lithography-Based Lateral AlGa<sub>N</sub>/Ga<sub>N</sub> Nanowire Transistors** Yejin Choi<sup>1</sup>, Mikiyas M. Meshesha<sup>1</sup>, Manal Zafar<sup>1</sup>, Mallem P. Siva<sup>1</sup>, Ki-Sik Im<sup>2</sup> and Sungjin An<sup>1</sup>; <sup>1</sup>Kumoh National Institute of Technology, Korea (the Republic of); <sup>2</sup>Daegu Campus, Korea Polytechnics, Korea (the Republic of)

**EL11.07.06**

**Nitrogen Vacancies Cause Thermal Breakdown in Ferroelectric Al<sub>1-x</sub>B<sub>x</sub>N** Walter Smith<sup>1,1</sup>, Betul Akkopru-Akgun<sup>2</sup> and Erdem Ozdemir<sup>2</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>The Pennsylvania State University, United States

**EL11.07.07**

**Band Offset of PECVD h-BN Film on Doped-Diamond** Rajesh Shrestha, Ali E. Yekta, Franz Koeck and Robert J. Nemanich; Arizona State University, United States

**EL11.07.08**

**Influence of Interstitial Cluster Families on Post-Synthesis Defect Manipulation and Purification of Oxides Using Submerged Surfaces** Heonjae Jeong<sup>1,2</sup> and Edmund Seebauer<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>University of Illinois at Urbana-Champaign, United States

**EL11.07.09**

**Electrical Characteristics of III-Nitride Based Vertical Schottky Barrier** Jae-Sung Yoo, Chang-Yong Kim, Gyeong-Hun Jung, MinWoo Park and Kyoung-kook Kim; Tech University of Korea, Korea (the Republic of)

**EL11.07.10**

**Chlorine-Induced Degradation in a-IGZO Thin-Film Transistors—A Study of Hot NaCl Water Soaking** Giyoong Chung<sup>1,2</sup> and Yong-Sang Kim<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Samsung Research institute, Korea (the Republic of)

**EL11.07.11**

**Tuning Optoelectronic Properties of WO<sub>3</sub> Thin Films Through Reduction Annealing** Md Zulkernain Haider, Fahad Munshe, Sandipani Ghosh and Kartik Ghosh; Missouri State University, United States

**EL11.07.12**

**Nanostructured Catalytic Filter-Assisted Nanotube Array Sensor for Selective NO<sub>2</sub> Detection** WeiQi Zhang and Zhiyong Fan; Hong Kong University of Science and Technology, Hong Kong

**EL11.07.13**

**Electrical Transport in Atomically Precise Graphene Nanoribbon Transistors with Transferred Electrodes** Richard T. Sweepe, Kentaro Yumigeta, Muhammed Yusufoglu and Zafer Mutlu; The University of Arizona, United States

**EL11.07.14**

**Cost-Efficient and Accurate Modeling of Semiconductor Junctions Using DFT-1/2 Method** Seungchul Kim; Korea Institute of Science and Technology, Korea (the Republic of)

**EL11.07.15**

**Crystal Growth and Characterization of Ta<sub>0.8</sub>Hf<sub>0.2</sub>C, an Ideal Substrate for Al/GaN High Power Electronics** Evan Crites<sup>1,1</sup>, Joshua R. Hummel<sup>1</sup>, Satya Kushwaha<sup>1,1</sup>, MVS Chandrashekhara<sup>2</sup>, Michael G. Spencer<sup>2,2</sup> and Tyrel McQueen<sup>1,1,1</sup>; <sup>1</sup>Johns Hopkins University, United States; <sup>2</sup>Morgan State University, United States

**EL11.07.16**

**Enhancing Thin-Film Properties of Hetero-Epitaxial  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> for Scalable UV Photodetectors** Yongki Kim<sup>1</sup>, Myunghun Shin<sup>1</sup>, Sunjae Kim<sup>2,1</sup>, Dae-Woo Jeon<sup>2</sup> and Ji-Hyeon Park<sup>2</sup>; <sup>1</sup>Korea Aerospace University, Korea (the Republic of); <sup>2</sup>Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of)

SESSION EL11.08: Ga<sub>2</sub>O<sub>3</sub> Growth I

Session Chairs: Masataka Higashiwaki and Sriram Krishnamoorthy

Thursday Morning, April 10, 2025

Summit, Level 4, Room 435

**8:15 AM EL11.08.01**

**Multiscale Green's Function Based Model for Isotopic Defects and Their Thermodynamic Interactions in Diamond** Vinod K. Tewary and Edward J. Garboczi; National Institute of Standards and Technology, United States

**8:30 AM \*EL11.08.02**

**Nitrogen Doping into Ga<sub>2</sub>O<sub>3</sub> by Molecular Beam Epitaxy** Masataka Higashiwaki<sup>1,2</sup>, Kura Nakaoka<sup>1</sup>, Shoki Taniguchi<sup>1</sup>, Shota Sato<sup>1</sup>, Kohki Eguchi<sup>1</sup>, Jin Inajima<sup>1</sup>, Tomoki Uehara<sup>1</sup>, Yusuke Teramura<sup>1</sup>, Kohki Tsujimoto<sup>1</sup>, Zhenwei Wang<sup>2</sup> and Satoko Honda<sup>1</sup>; <sup>1</sup>Osaka Metropolitan University, Japan; <sup>2</sup>National Institute of Information and Communications Technology, Japan

**9:00 AM \*EL11.08.03**

**Control of n-Type Conductivity of MOVPE-Grown  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> by Intentional Si Doping** Yoshinao Kumagai<sup>1</sup>, Junya Yoshinaga<sup>1,2</sup>, Kazutada Ikenaga<sup>2</sup>, Takeyoshi Onuma<sup>3</sup>, Masataka Higashiwaki<sup>4,5</sup> and Yuzaburo Ban<sup>6</sup>; <sup>1</sup>Tokyo University of Agriculture and Technology, Japan; <sup>2</sup>Taiyo Nippon Sanso Corporation, Japan; <sup>3</sup>Kogakuin University, Japan; <sup>4</sup>Osaka Metropolitan University, Japan; <sup>5</sup>National Institute of Information and Communications Technology, Japan; <sup>6</sup>Taiyo Nippon Sanso ATI Corporation, Japan

**9:30 AM EL11.08.04**

**Computational Prediction of the Photoluminescence Properties of  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub> with Si, Sn and Ge-Doping** Ke Li<sup>1</sup> and David Scanlon<sup>2</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>University of Birmingham, United Kingdom

**9:45 AM EL11.08.05**

**Vacancy Defects in Si-doped  $\beta$ -(Al,Ga)<sub>2</sub>O<sub>3</sub>** Iuliia Zhelezova<sup>1</sup>, Ilja Makkonen<sup>1</sup>, Zbigniew Galazka<sup>2</sup> and Filip Tuomisto<sup>1</sup>; <sup>1</sup>University of Helsinki, Finland; <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Germany

**10:00 AM BREAK**

**10:30 AM \*EL11.08.06**

**Characterizing and Identifying Vacancy Defects in  $\beta$  and  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub>** Ilja Makkonen, Huan Liu and Filip Tuomisto; University of Helsinki, Finland

**11:00 AM EL11.08.07**

**Single Crystalline  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Epitaxy on (100) Substrate and Low-Dimensional Ga<sub>2</sub>O<sub>3</sub> Fabrication** Wei Kong, Tong Jiang, Huaze Zhu and Hao Wang; Westlake University, China

**11:15 AM EL11.08.08**

**Materials Science/Device Technology for Integrated Super High K Dielectric Oxide Nanolaminates Crystalline Diamond for New Generation High Power Electronics** Orlando Auciello<sup>1,2</sup>, Geunhee Lee<sup>3</sup>, Jiangwei Liu Liu<sup>4</sup> and Yasuo Koide<sup>4</sup>; <sup>1</sup>The University of Texas at Dallas, United States; <sup>2</sup>Original Biomedical Implants, United States; <sup>3</sup>CVE Technology, United States; <sup>4</sup>National Institute for Materials Science, Japan

SESSION EL11.09: Ga<sub>2</sub>O<sub>3</sub> Growth II

Session Chairs: Sriram Krishnamoorthy and Jacob H Leach

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 435

**1:30 PM \*EL11.09.01**

**Development of Thick Ga<sub>2</sub>O<sub>3</sub> Epilayers by Halide Vapor Phase Epitaxy for Power Applications** Jacob H Leach, Caroline Reilly, Heather Splawn and Kevin Udway; Kyma Technologies, United States

**2:00 PM \*EL11.09.02**

**Hole-Polaron Migration and Thermal Quenching of the UV Luminescence in  $\alpha$ -Ga<sub>2</sub>O<sub>3</sub>** Lasse Vines<sup>1</sup>, Nima Hajizadeh<sup>2</sup>, Benjamin Janzen<sup>2</sup>, Ymir Frodason<sup>1</sup>, Clemens Petersen<sup>3</sup>, Holger von Wenckstern<sup>3</sup>, Felix Nippert<sup>2</sup>, Marius Grundmann<sup>3</sup> and Markus R. Wagner<sup>2</sup>; <sup>1</sup>University of Oslo, Norway; <sup>2</sup>Technische Universität Berlin, Germany; <sup>3</sup>Leipzig University, Germany

**2:30 PM EL11.09.03**

**Activation of Ge in Ga<sub>2</sub>O<sub>3</sub>—Role of Capping Layer, Ambient and Defect Formation** [Tianhai Luo](#)<sup>1</sup>, Katie R. Gann<sup>1</sup>, Cameron Gorsak<sup>1</sup>, Prescott Evans<sup>2</sup>, Thaddeus Asel<sup>2</sup>, Hari P. Nair<sup>1</sup> and Michael Thompson<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Air Force Research Laboratory, United States

**2:45 PM EL11.09.04**

**Ultrahigh Breakdown Field of Ga<sub>2</sub>O<sub>3</sub> Film with Single Layer via Novel Aerosol Deposition Process** [Jun-Woo Lee](#)<sup>1</sup>, Jong Ho Won<sup>2</sup>, Kanghee Won<sup>3</sup>, Sang-Mo Koo<sup>1</sup> and Jong-Min Oh<sup>1</sup>; <sup>1</sup>Kwangwoon University, Korea (the Republic of); <sup>2</sup>Dankook University, Korea (the Republic of); <sup>3</sup>Kyung Hee University, Korea (the Republic of)

**3:00 PM BREAK**

**3:30 PM \*EL11.09.05**

**MOCVD Synthesis and *In Situ* Processing of Gallium Oxide Based Heterostructures** [Hari P. Nair](#); Cornell University, United States

**4:00 PM EL11.09.06**

**Alternate Assignment for the 250 cm<sup>-1</sup> Raman Mode in β-Ga<sub>2</sub>O<sub>3</sub>** [Matthew D. McCluskey](#)<sup>1</sup>, Jesse Huso<sup>2</sup>, Benjamin L. Dutton<sup>1</sup>, Cassandra Remple<sup>1</sup>, John S. McCloy<sup>1</sup>, Arkka Bhattacharyya<sup>3</sup>, Sriram Krishnamoorthy<sup>3</sup>, Steve Rebollo<sup>3</sup>, James Speck<sup>3</sup>, Joel B. Varley<sup>4</sup> and Lars F. Voss<sup>4</sup>; <sup>1</sup>Washington State University, United States; <sup>2</sup>Klar Scientific, United States; <sup>3</sup>University of California, Santa Barbara, United States; <sup>4</sup>Lawrence Livermore National Laboratory, United States

**4:15 PM EL11.09.07**

**Predictive Analysis of Gas-Sensing Properties in a Novel 2D Gallium Oxide Phase** [Afreen Anamul Haque](#) and Aniket Singha; Indian Institute of Technology Kharagpur, India

SESSION EL11.10: Oxides and Oxide Devices

Session Chairs: Julita Smalc-Koziorowska and Filip Tuomisto

Friday Morning, April 11, 2025

Summit, Level 4, Room 435

**8:15 AM EL11.10.01**

**Temperature-Dependent Resistivity, Hall Coefficient and Hall Mobility of Heavily Al-Doped 4H-SiC** [Hideharu Matsuura](#); Osaka Electro-Communication University, Japan

**8:30 AM EL11.10.02**

**Synthesis and Characterization of Nanostructured Rutile GeO<sub>2</sub> Polycrystalline Thin Film** [Ahmad Abed](#) and Rebecca L. Peterson; University of Michigan, United States

**8:45 AM EL11.10.03**

**Ab Initio Investigation of Thermal Conductivity of Ge<sub>x</sub>Sn<sub>(1-x)</sub>O<sub>2</sub>** [Xiao Zhang](#)<sup>1</sup> and Emmanouil Kioupakis<sup>1,2</sup>; <sup>1</sup>University of Michigan-Ann Arbor, United States; <sup>2</sup>EPFL STI PRN-MARVEL, Switzerland

**9:00 AM EL11.10.04**

**Computational Prediction of an n-Type Transparent Conducting Oxide F-Doped Sb<sub>2</sub>O<sub>5</sub>** [Ke Li](#)<sup>1</sup>, Joe Willis<sup>1</sup>, Seán R. Kavanagh<sup>2</sup> and David Scanlon<sup>3</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>Harvard University, United States; <sup>3</sup>University of Birmingham, United Kingdom

**9:15 AM EL11.10.05**

**Optical Properties of Rare Earth Doped Molybdenum Trioxide Thin Films** [Jessica Fink](#)<sup>1</sup>, Jacob Berry<sup>1</sup>, Fahad Munshel<sup>1</sup>, Christopher Stevens<sup>2</sup>, Joshua Hendrickson<sup>2</sup> and Kartik Ghosh<sup>1</sup>; <sup>1</sup>Missouri State University, United States; <sup>2</sup>Wright-Patterson Air Force Base, United States

**9:30 AM EL11.10.06**

**One-Step Laser Oxidation and Doping of Al-Doped TiO<sub>2</sub> for Effective p-Type Conversion** [Gyuwon Yang](#), Junil Kim and Hyuk-Jun Kwon; DGIST, Korea (the Republic of)

**9:45 AM EL11.10.07**

**Electrochemical Enhancement of Interstitial-Based <sup>18</sup>O Isotopic Fractionation in TiO<sub>2</sub>** [Ian I. Suni](#)<sup>1</sup>, Heonjae Jeong<sup>2</sup>, Raylin Chen<sup>1</sup>, Joseph Hladik<sup>1</sup>,

Marina Miletic<sup>3</sup>, Xiao Su<sup>1</sup> and Edmund Seebauer<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States; <sup>2</sup>Gachon University, Korea (the Republic of); <sup>3</sup>The University of New Mexico, United States

**10:00 AM BREAK**

**10:30 AM EL11.10.08**

**High-Temperature (100 °C) Operating Multi-Bit  $\beta$ -Ga<sub>2</sub>O<sub>3</sub> Non-Volatile Memory with InSb Quantum Dots Floating Gate** Donggyu Lee<sup>1</sup>, Seungin Jee<sup>2</sup>, Jeongmin Kim<sup>1</sup>, Se-Woong Baek<sup>2</sup> and Jihyun Kim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**10:45 AM EL11.10.09**

**Electrical, Optical and Structural Characterization of Molybdenum Trioxide (MoO<sub>3</sub>) Nano Rods** Saleh S. Aldarmaki, Ayman Rezk, Rami A. Elkaffas, Shanavas Shajahan, Yarjan Abdul Samad and Ammar Nayfeh; Khalifa University, United Arab Emirates

**11:00 AM EL11.10.10**

**Polymer-Electrolyte-Gated Ultra-Low Energy Consumption Synaptic Transistors Based IGZO with Aluminum Nanoparticles** Yoonseok Song<sup>1</sup>, Jun-Gyu Choi<sup>1</sup>, Jingon Jang<sup>2</sup> and Sungjun Park<sup>1</sup>; <sup>1</sup>Ajou University, Korea (the Republic of); <sup>2</sup>Kwangwoon University, Korea (the Republic of)

**11:15 AM EL11.10.11**

**Solution Process Crystalline Metal Oxide TFTs via UV Laser Writing Process** Seokhyeon Baek and Sungjun Park; Ajou University, Korea (the Republic of)

**11:30 AM EL11.10.12**

**Band-Edge DoS from Mid-IR Photoconduction Simulates Mobility Curves for a-IGZO Thin Film Transistors** Måns J. Mattsson, Jared Parker, John F. Wager and Matthew Graham; Oregon State University, United States

**11:45 AM EL11.10.13**

**Development on High Mobility of Amorphous Oxide Wide Bandgap SiZnSnO Thin Film Transistor for Next Generation Electronic Applications** Sangyeol S. Lee<sup>1</sup> and Ji Ye Lee<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

SESSION EL11.11: Ultrawide Bandgap Optoelectronics

Session Chairs: Hideto Miyake and Filip Tuomisto

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 435

**1:30 PM \*EL11.11.01**

**230 nm LEDs Fabricated on the Face-to-Face Annealed Sputter-Deposited AlN Templates** Hideto Miyake, Ryota Akaike, Hiroki Yasunaga and Takao Nakamura; Mie University, Japan

**2:00 PM EL11.11.02**

**Full-Color Directional Emission in Gallium Nitride Light-Emitting Diodes via Heterogeneous Integration for Augmented Reality Displays** Jaesang Lee; Seoul National University, Korea (the Republic of)

**2:15 PM EL11.11.03**

**Wideband Gap Semiconductors-Based Spatial Light Modulator for Metal 3D Area Printing** Selim Elhadj; Seurat Technologies, Inc., United States

**2:30 PM EL11.11.04**

**Development and Design of Diamond Metal-Semiconductor-Metal Devices for Deep Ultraviolet Based Applications** Ugonna C. Ohiri<sup>1</sup>, Tony Guo<sup>1</sup>, Brian Bersch<sup>1</sup>, Nicholas Simonson<sup>1</sup>, Brant Hempel<sup>1</sup>, Nicholas Roth<sup>1</sup>, Victor Hu<sup>1</sup>, Jung-Hun Seo<sup>2</sup>, Matthew Doerflein<sup>1</sup> and Josephine Chang<sup>1</sup>; <sup>1</sup>Northrop Grumman Corporation, United States; <sup>2</sup>University at Buffalo, The State University of New York, United States

**2:45 PM EL11.11.05**

**Ni-Contact Ga<sub>2</sub>S<sub>3</sub> Nanobelt Fabrication and Its Optoelectronic Properties** Yu-Chen Yen and Chiu-Yen Wang; National Taiwan University of Science and Technology, Taiwan

**3:00 PM BREAK**

**3:30 PM \*EL11.11.06**

**Developing InGaN Pseudo-Substrates for Tailoring Red and Longer-Wavelength Nitride-Based Devices** [Julita Smalc-Koziorowska](#)<sup>1</sup>, Joanna Moneta<sup>1</sup>, Grzegorz Muziol<sup>1</sup>, Henryk Turski<sup>1</sup>, Grzegorz Kamler<sup>1</sup>, Marcin Krysko<sup>1</sup>, Robert Kernke<sup>2</sup>, Martin Albrecht<sup>2</sup> and Tobias Schulz<sup>2</sup>; <sup>1</sup>Institute of High Pressure Physics PAS, Poland; <sup>2</sup>Leibniz Institute for Crystal Growth, Germany

**4:00 PM EL11.11.07**

**Recent Advances in Non-Contact Electrical Metrology for Manufacturing Needs and Development of WBG and UWBG Semiconductors** [Marshall Wilson](#), Dmitriy Marinskiy, Ivan Shekerov, Bret Schryer, Adam Wincukiewicz, Bradley Wilson, Liliana Gutierrez, Carlos Almeida and Jacek Lagowski; Semilab SDI, United States

**4:15 PM EL11.11.08**

**Signatures of Polaron Conduction and Trapping in the dc Performance of Thin-Film Lithium Niobate Electro-Optic Modulators** [Matthew Yeh](#), David R. Barton, Benjamin Fortuin, C.J. Xin, Evelyn L. Hu and Marko Loncar; Harvard University, United States

**4:30 PM EL11.11.09**

**Multifunctional c-GaN Optoelectronic Artificial Synapse and Volatile Photomemristor for Applications in Neuromorphic Computing** [Deependra Kumar Singh](#)<sup>1,2</sup>, Pukhraj Prajapat<sup>1</sup> and Govind Gupta<sup>1</sup>; <sup>1</sup>CSIR-National Physical Laboratory, India; <sup>2</sup>National Institute of Technology Raipur, India

**4:45 PM EL11.11.10**

**Multifunctional Synaptic and Reliable Resistive Switching Behavior in Al/Ga<sub>2</sub>O<sub>3</sub> Based Memristors for Neuromorphic Computing** [Raj Wali Khan](#); United Arab Emirates University, United Arab Emirates

## SYMPOSIUM EL12

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Emerging Material Platforms and Fundamental Approaches for Plasmonics, Nanophotonics and Metasurfaces  
April 7 - April 11, 2025

Symposium Organizers

Ho Wai (Howard) Lee, University of California, Irvine  
Qitong Li, Stanford University  
Yu-Jung Lu, Academia Sinica  
Pin Chieh Wu, National Cheng Kung University

Symposium Support

**Bronze**

LiveStrong Optoelectronics Co., Ltd.  
Nanophotonics  
RAITH America, Inc.

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL12.01: Plasmonics/Metasurfaces

Session Chairs: Ho Wai (Howard) Lee and Qitong Li

Monday Morning, April 7, 2025

Summit, Level 4, Room 436

**8:30 AM \*EL12.01.01**

**Plasmonics for Vibrational Strong Coupling and Resonant Thermal Energy Transport** [Matthew T. Sheldon](#); University of California, Irvine, United States

**9:00 AM \*EL12.01.02**

**Silicon Carbide as a Platform for Mid-IR Metasurfaces** [Stefan A. Maier](#)<sup>1,2</sup>; <sup>1</sup>Monash University, Australia; <sup>2</sup>Imperial College London, United Kingdom

**9:30 AM \*EL12.01.03**

**Active Chiroptical Responses in Plasmonic Metastructures** [Wenshan Cai](#); Georgia Institute of Technology, United States

**10:00 AM BREAK**

**10:30 AM \*EL12.01.04**

**Light-Driven Nanoscale Vectorial Currents from Optoelectronic Metasurfaces** [Hou-Tong Chen](#); Los Alamos National Laboratory, United States

**11:00 AM \*EL12.01.05**

**Self-Organizing Approaches to All-Glass Metasurfaces for High Power Laser Optics** [Eyal Feigenbaum](#); Lawrence Livermore National Laboratory, United States

**11:30 AM \*EL12.01.06**

**Nonlinear and Extreme Photonics at the Fraction of a Wavelength** [Artur Davoyan](#); University of California, Los Angeles, United States

SESSION EL12.02: Tunable Metasurfaces

Session Chairs: Wenshan Cai and Yu-Jung Lu

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 436

**1:30 PM \*EL12.02.01**

**Tunable Free-Space Optics via Phase Change Materials** [Arka Majumdar](#); University of Washington, Seattle, United States

**2:00 PM EL12.02.02**

**Electro-Optically Tunable Transmissive Metasurfaces Based on Lithium Niobate** [Martin Thomaschewski](#), Ruzan Sokhoyan, Morgan D. Foley and Harry A. Atwater; California Institute of Technology, United States

**2:15 PM EL12.02.03**

**Cephalopod-Inspired Soft Photonic Skins with Dynamic Texture and Color Control** [Siddharth Doshi](#), Nicholas A. Gusken, Johan Carlstrom, Gerwin Dijk, Shaswat Mohanty, Bohan Li, Wei Cai, Alberto Salleo, Nicholas Melosh and Mark L. Brongersma; Stanford University, United States

**2:30 PM EL12.02.04**

**MEMS Micro-Mirror Switch for Thermal Emissivity Control** [Mozakkar Hossain](#), Hanseong Jo, Pavel Shafirin and Artur Davoyan; University of California, Los Angeles, United States

**2:45 PM BREAK**

**3:15 PM \*EL12.02.05**

**Dynamic Conducting Polymer Optics and Plasmonics** [Magnus P. Jonsson](#); Linkoping University, Sweden

**3:45 PM EL12.02.06**

**Electro-Optically Tunable Barium Titanate Metasurfaces Operating in the Visible** Prachi Thureja, [Martin Thomaschewski](#), Andrew Nyholm, Julie Belleville and Harry A. Atwater; California Institute of Technology, United States

**4:00 PM EL12.02.07**

**High-Q Active Metasurfaces Enabled by ITO Integration** [Ruzan Sokhoyan](#)<sup>1</sup>, Ju Young Kim<sup>2,1</sup>, Min Seok Jang<sup>2,1</sup> and Harry A. Atwater<sup>1</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**4:15 PM EL12.02.08**

**Semimetal-Based Active Perfect Absorbers for Photonics and Optical Computing** [Fernando Chacón-Sánchez](#) and Rosalia Serna; Instituto de Óptica-CSIC, Spain

**4:30 PM \*EL12.02.09**

**Longitudinal Brain Activity Tracking with a Wireless Implantable Sensor Enabled by Wearable Metasurfaces** [Yang Zhao](#); University of Illinois at Urbana-Champaign, United States

SESSION EL12.03: Nonlinear and Epsilon-Near-Zero Materials in Nanophotonics

Session Chairs: Ho Wai (Howard) Lee and Stefan Maier

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 436

**10:30 AM \*EL12.03.01**

**Salient Features of Four-Dimensional Metastructures** [Nader Engheta](#); University of Pennsylvania, United States

**11:00 AM EL12.03.02**

**Enhanced Cryogenic Piezoelectric and Electrooptic Nonlinearities with Materials Engineering** [Christopher P. Anderson](#)<sup>1,2</sup>, Giovanni Scuri<sup>2</sup>, Aaron Chan<sup>3</sup>, Lu Li<sup>3</sup> and Jelena Vuckovic<sup>2</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States; <sup>2</sup>Stanford University, United States; <sup>3</sup>University of Michigan, United States

**11:15 AM EL12.03.03**

**Modeling Nanosecond Thermo-Optic Coupling Dynamics in Nanoscale Resonators** [Pavel Shafirin](#), Pengli Feng and Artur Davoyan; University of California, Los Angeles, United States

**11:30 AM EL12.03.04**

**Ultrafast Plasmon Dynamics of Low-Loss Sodium Metasurfaces** [Conrad A. Kocaj](#)<sup>1,2</sup>, Xinran Xie<sup>3</sup>, Hongyu Jiang<sup>3</sup>, Suchismita Sarker<sup>4</sup>, Ankun Yang<sup>3</sup> and Peijun Guo<sup>1,2</sup>; <sup>1</sup>Yale University, United States; <sup>2</sup>Energy Sciences Institute, Yale University, United States; <sup>3</sup>Oakland University, United States; <sup>4</sup>Cornell High Energy Synchrotron Source, United States

SESSION EL12.04: Nanophotonic Lasers, LEDs, Photodetectors and Imaging Systems

Session Chairs: Qitong Li and Yu-Jung Lu

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 436

**1:30 PM \*EL12.04.01**

**Singular Nanolasers—Breaking Diffraction Limit in Dielectrics** [Ren-Min Ma](#); Peking University, China

**2:00 PM EL12.04.02**

**Synthetic Photonic Zeeman Splitting from a Light-emitting Moiré Meta-Cavity** [Yixin Chen](#) and Shoufeng Lan; Texas A&M University, United States

**2:15 PM EL12.04.03**

**Optoelectronic Properties of Cu-Contact GaSe Nanobelts Based Photodetector** [Cynthia Chew](#) and Chiu-Yen Wang; National Taiwan University of Science and Technology, Taiwan

**2:30 PM \*EL12.04.04**

**Three-Dimensional Metasurface for High-Sensitive Infrared Spectroscopy** [Takuo Tanaka](#)<sup>1,2,3</sup>; <sup>1</sup>RIKEN Center for Advanced Photonics, Japan; <sup>2</sup>RIKEN Cluster for Pioneering Research, Japan; <sup>3</sup>Tokushima University, Japan

**3:00 PM BREAK**



**3:30 PM \*EL12.04.05**

**Nature-Inspired Metasurfaces for Next-Generation Imaging and Diagnostics** [Lisa Poulidakos](#); University of California, San Diego, United States

**4:00 PM EL12.04.06**

**Self-Powered Refractory NIR Plasmonic Photodetection and Spectroscopy** [Eslam N. Abubakr](#)<sup>1</sup>, Shiro Saito<sup>2</sup>, Hironori Suzuki<sup>2</sup> and Tetsuo Kan<sup>1</sup>; <sup>1</sup>The University of Electro-Communications, Japan; <sup>2</sup>IMRA JAPAN CO., LTD., Japan

**4:15 PM \*EL12.04.07**

**Biomedical Imaging Applications of Metasurfaces** [Yuan Luo](#); National Taiwan University, Taiwan

SESSION EL12.05: Poster Session I: Emerging Material Platforms and Fundamental Approaches for Plasmonics, Nanophotonics and Metasurfaces

Session Chairs: Ho Wai (Howard) Lee and Qitong Li

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL12.05.01**

**Traveling Surface Phonon Polariton Modes in One-Dimensional Gratings** [Nazli Rasouli Sarabi](#)<sup>1,1</sup>, Vincent R. Whiteside<sup>1,1,2</sup>, Eric Seabron<sup>3,4</sup>, Erin R. Cleveland<sup>3,5</sup>, Chase T. Ellis<sup>3</sup> and Joseph G. Tischler<sup>1,1</sup>; <sup>1</sup>The University of Oklahoma, United States; <sup>2</sup>University at Buffalo, The State University of New York, United States; <sup>3</sup>U.S. Naval Research Laboratory, United States; <sup>4</sup>Howard University, United States; <sup>5</sup>Laboratory for Physical Sciences, United States

**EL12.05.02**

**Mapping Phonon Polaritons with Visible Light** [Kiernan E. Arledge](#)<sup>1</sup>, Chase Ellis<sup>2</sup>, Nazli Rasouli<sup>1</sup>, Vincent Whiteside<sup>1</sup>, Chul Soo Kim<sup>2</sup>, Mijin Kim<sup>2</sup>, Daniel Ratchford<sup>2</sup>, Michael Meeker<sup>2,3</sup>, Binbin Weng<sup>1</sup> and Joseph G. Tischler<sup>1</sup>; <sup>1</sup>University of Oklahoma, United States; <sup>2</sup>U.S. Naval Research Laboratory, United States; <sup>3</sup>The City University of New York, United States

**EL12.05.03**

**Achieving 3D Motion at the Microscale—Metajet Propulsion Using Phase-Gradient Metasurfaces** [Kaushik Kudtarkar](#)<sup>1</sup>, Yixin Chen<sup>1</sup>, Ziqiang Cai<sup>2</sup>, Preston Cunha<sup>1</sup>, Zi J. Wong<sup>1</sup>, Yongmin Liu<sup>2</sup> and Shoufeng Lan<sup>1</sup>; <sup>1</sup>Texas A&M University, United States; <sup>2</sup>Northeastern University, United States

**EL12.05.04**

**Battery-Less Cellulose Based Flexible Radio Frequency Coupled Distant Humidity and Environmental Sensor** [Morteza Lotfi Neyestanak](#), Jiaying Zhu, Feng Jiang and Peyman Servati; The University of British Columbia, Canada

**EL12.05.05**

**NIR Long-lived Luminescent Upconversion Nanoparticle-Based Time-Gated LRET for Ultrasensitive Detection of MicroRNAs** [Suyeon Kim](#), Sung Hyun Park, Sohyung Kim and Joonseok Lee; Hanyang University, Korea (the Republic of)

**EL12.05.06**

**Anti-Reflective TiO<sub>2</sub>-PDMS Nanopatterned Nanocomposite Coating for Omnidirectional Improvement of Silicon Solar Cells** [Devin Krystek](#) and Hui Zhao; University of Nevada, Las Vegas, United States

**EL12.05.07**

**Investigation of Ultrafast Optical Limiting in a Doped-CdO Based Device** [Daniel M. Hirt](#), William D. Hutchins and Patrick E. Hopkins; University of Virginia, United States

**EL12.05.08**

**Second Harmonic Generation in 3R-MoS<sub>2</sub> Metasurfaces Around Exitonic Wavelengths** Haonan Ling<sup>1</sup>, Yuankai Tang<sup>2</sup>, Xinyu Tian<sup>2</sup>, [Pavel Shafirin](#)<sup>1</sup>, Mozakkar Hossain<sup>1</sup>, Polina Vabishchevich<sup>3</sup>, Hayk Harutyunyan<sup>2</sup> and Artur Davoyan<sup>1</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>Emory University, United States; <sup>3</sup>University of Maryland, United States

**EL12.05.09**

**Plasmon Dynamics Under High Intensity Illumination** Durga P. Khatua, [Pavel Shafirin](#), Tom Joly-Jehenne and Artur Davoyan; University of California,

Los Angeles, United States

**EL12.05.10**

**Transmission Characteristics and Anisotropy of Epsilon Near Zero Behavior in Photonic Hypercrystal** [Munazza Z. Ali](#); Punjab University, Pakistan

**EL12.05.11**

**Full Optical Spectra of Strongly-Coupled Plasmonic Nanoparticle Ensembles Using a Single Low-Frequency Measurement** [Kenny K. Lam](#) and Zachary Sherman; University of Washington, United States

**EL12.05.12**

**Vanadium Dioxide Switchable Metasurface for Sub-THz Intelligent Reflective Surface** [Sungjoon Lim](#), Eiyong Park and Junghyeon Kim; Chung-Ang University, Korea (the Republic of)

**EL12.05.13**

**Absorptivity Enhancement of Monolayer MoS<sub>2</sub> by Light Trapping** [Myeongok Kim](#)<sup>1</sup>, Dangrong Xie<sup>1</sup>, Paul Jacquet<sup>2</sup>, Antoine Faugère<sup>2</sup>, Yusuke Oteki<sup>1</sup> and Yoshitaka Okada<sup>1</sup>; <sup>1</sup>Research Center for Advanced Science and Technology, The University of Tokyo, Japan; <sup>2</sup>Ecole Polytechnique, France

**EL12.05.14**

**Plasmon-Enhanced Light Absorption and Suppressed Carrier-Phonon Scattering in Ag-Doped WS<sub>2</sub> Photodetector** [Mohd Samim Reza](#)<sup>1</sup>, Henam Sylvia Devi<sup>1,2</sup>, Shubhangi Majumdar<sup>1</sup>, Prमित Kumar Chowdhury<sup>1</sup> and Madhusudan Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi, India; <sup>2</sup>Dhanamanjuri University, India

SESSION EL12.06: Photonics with Two-Dimensional Materials

Session Chairs: Qitong Li and Yu-Jung Lu

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 436

**8:30 AM \*EL12.06.01**

**Excitonic Metamaterials from Low-Dimensional Semiconductors** [Deep M. Jariwala](#); University of Pennsylvania, United States

**9:00 AM EL12.06.02**

**Electro-Optical Properties of Chiral-Pure, Excitonic Single-Walled Carbon Nanotubes** [Jason Lynch](#)<sup>1</sup>, Pavel Shapturenka<sup>2</sup>, Zoey Liu<sup>1</sup>, Jeffrey Fagan<sup>2</sup> and Deep M. Jariwala<sup>1</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>National Institute of Standards & Technology, United States

**9:15 AM EL12.06.03**

**Wafer-Scale Roll-Printing Process for van der Waals Multilayer-Based Optoelectronics** [Naoki Higashitarumizu](#)<sup>1,2,3</sup>, Kyuho Lee<sup>1,2,4</sup>, Cheolmin Park<sup>4</sup> and Ali Javey<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>JST PRESTO, Japan; <sup>4</sup>Yonsei University, Korea (the Republic of)

**9:30 AM \*EL12.06.04**

**Van der Waals Material Photonic Devices—Optical Vortex Generator** [Sejeong Kim](#); The University of Melbourne, Australia

**10:00 AM BREAK**

**10:30 AM \*EL12.06.05**

**Terahertz Spectroscopy of van der Waals Heterostructures** [Feng Wang](#)<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**11:00 AM EL12.06.06**

**Gate-Tunable Emission in Scalable Monolayer MoS<sub>2</sub> Integrated with Nitride-Based Plasmonic Heterostructures** [Tzu-Yu Peng](#)<sup>1,2</sup>, Cheng-Han Lin<sup>1,2</sup>, Jia-Wern Chen<sup>2</sup>, Chen-Yu Wang<sup>1,2</sup>, Kai Qi<sup>3</sup>, Jui-Han Fu<sup>3</sup>, Vincent Tung<sup>3</sup> and Yu-Jung Lu<sup>1,2</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan; <sup>3</sup>The University of Tokyo, Japan

**11:15 AM \*EL12.06.07**

**Spin-Valley Rashba Monolayer Laser** [Erez Hasman](#); Technion-Israel Institute of Technology, Israel

SESSION EL12.07: Chemical/Biological Sensing and Quantum/thermal applications with Plasmonics and Metasurfaces

Session Chairs: Ho Wai (Howard) Lee and Takuo Tanaka

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 436

**1:30 PM \*EL12.07.01**

**Injectable Plasmonic Nanolasers—From Miniaturization to Single-Cell Barcoding Applications** [Sangyeon Cho](#)<sup>1,2</sup> and Seok Hyun Yun<sup>1,2</sup>; <sup>1</sup>Harvard Medical School, United States; <sup>2</sup>Massachusetts General Hospital, United States

**2:00 PM EL12.07.02**

**Visual and Quantitative Evidence of Drug Release from Curcumin-Polyrhodanine Nanoparticles Using Hyperspectral Imaging** [Jun-Won Kook](#); Ajou University, Korea (the Republic of)

**2:15 PM EL12.07.03**

**Diffusion-Limited-Aggregation(DLA)-Induced Highly Porous Structure of Metals and Metal Oxides—Formation Mechanism and Application to Sensors and Catalysts** [Sangwoo Ryu](#), Yoonseo Huh, Soohyun Lee and Bona Lee; Kyonggi University, Korea (the Republic of)

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EL12.07.04**

**Nanophotonic Chip-Based Approach to Quantum Imaging by Photon Addition** [Harry A. Atwater](#); California Institute of Technology, United States

**4:00 PM EL12.07.05**

**Observation of Collective Behavior of SiC Phonon Polariton Resonators with Sum-Frequency Generation Microscopy** [Richarda Niemann](#)<sup>1,2</sup>, Sören Wasserth<sup>2</sup>, Guanyu Lu<sup>1</sup>, Christopher Gubbin<sup>3</sup>, Martin Wolf<sup>2</sup>, Simone De Liberato<sup>3</sup>, Joshua D. Caldwell<sup>1</sup> and Alexander Paarmann<sup>2</sup>; <sup>1</sup>Vanderbilt University, United States; <sup>2</sup>Fritz Haber Institute of the Max Planck Society, Germany; <sup>3</sup>University of Southampton, United Kingdom

**4:15 PM EL12.07.06**

**Surface Effects on Phonon Polariton-Mediated Thermal Conductivity** [Xiaomeng Zhang](#), Zhiliang Pan, Xiaoyuan Huang, Joshua D. Caldwell and Deyu Li; Vanderbilt University, United States

**4:30 PM EL12.07.07**

**Thermally tunable angular selectivity of broadband directional thermal emission** [Jae S. Hwang](#), Jin Xu and Aaswath Raman; University of California, Los Angeles, United States

SESSION EL12.08: Poster Session II: Emerging Material Platforms and Fundamental Approaches for Plasmonics, Nanophotonics and Metasurfaces

Session Chairs: Ho Wai (Howard) Lee and Pin Chieh Wu

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL12.08.01**

**Thermo-Mechanically Tuneable Plasmon-Hybridised Liquid-Metal Nanodroplets** [Renu R. Sahu](#), Aravindkumar Yelashetty and Tapajyoti Das Gupta; Indian Institute of Science Bangalore, India

**EL12.08.02**

**Pixelated Control of Tunable VO<sub>2</sub> Metasurfaces** [Afeez A. Lukmon](#), Siddharth Padmanabha, Elizabeth Itskovich, Jacques Gachassin and Matthew D. Escarra; Tulane University, United States

**EL12.08.03**

**Xanthate-POx-Gold Nanoparticles for Thermoresponsive Applications in Nanophotonics and Nanomedicine** [Oleg Yeshchenko](#)<sup>1</sup>, Lea Daoud<sup>2</sup>, Pavlo Khort<sup>1</sup>, Oles Fedotov<sup>1</sup>, Julien-Bilal Zinoune<sup>3</sup>, Georges Boudebs<sup>3</sup>, Catherine Passirani<sup>2</sup>, Patrick Saulnier<sup>2</sup> and Oksana Krupka<sup>2</sup>; <sup>1</sup>Taras Shevchenko National University of Kyiv, Ukraine; <sup>2</sup>University of Angers, France; <sup>3</sup>Univ Angers, France

**EL12.08.04**

**Gigahertz Beam Steering with Electro-Optic Metasurfaces** [Sam Lin](#), Yixin Chen, Taeseung Hwang, Ramy Rady, Samuel Palermo, Christi Madsen, Kamran Entesari, Shoufeng Lan and Zi Jing Wong; Texas A&M University, United States

**EL12.08.05**

**Color Shifting Properties of Glasses by Copper Nanoparticles for Tuning Emission** [Gerardo Toscano](#), Janet Elias and Miguel Vallejo; Universidad de Guanajuato, Mexico

**EL12.08.06**

**SAE of Ge and GeSn Nanowires for Photonic Applications on Si Platform** [Nuño Amador Mendez](#), Santhanu P. Ramanandan, Andrea Giunto, Leo Webb, Shelly Ben-David, Samuel Desmurs, Antonin Mignot, Alok Rudra and Anna Fontcuberta i Morral; EPFL, Switzerland

**EL12.08.07**

**MoO<sub>3</sub>-Based Optical Fiber Notch Filters for Selective UV Filtering** [Israr Ahmed](#), Haider Butt and Yarjan Abdul Samad; Khalifa University, United Arab Emirates

**EL12.08.08**

**Comparative analysis of magnetodependent photovoltages in permalloy and gold-permalloy bilayer metasurfaces** [MD Afzalur Rab](#), Terence Baker and Natalia Noginova; Norfolk State University, United States

**EL12.08.09**

**Advancing Integrated Photonics with Titanium-Based Microstructures Fabricated via Femtosecond Laser Lithography** [Aman Singhal](#), Shobha Shukla and Sumit Saxena; Indian Institute of Technology Bombay, India

SESSION EL12.09: Topological, Chiral and PT-Symmetry Photonics

Session Chairs: Pin Chieh Wu and Yang Zhao

Thursday Morning, April 10, 2025

Summit, Level 4, Room 436

**8:30 AM \*EL12.09.01**

**Bound State in the Continuum with Dielectric Metasurface** [Wen-Hui \(Sophia\) Cheng](#); National Cheng Kung University, Taiwan

**9:00 AM EL12.09.02**

**Strong Coupling of Chiral Surface Plasmons with Chiral Quantum Emitters** [Sang Hyun Park](#), Phaeton Avouris and Tony Low; University of Minnesota, United States

**9:15 AM EL12.09.03**

**Topological Darkness and Goos-Hänchen Effect in Transdimensional Plasmonic Film Systems** [Igor Bondarev](#)<sup>1</sup> and Svend-Age Biehs<sup>2</sup>; <sup>1</sup>North Carolina Central University, United States; <sup>2</sup>University of Oldenburg, Germany

**9:30 AM \*EL12.09.04**

**Non-volatile Tuning of 2D Excitons in Rhombohedral MoS<sub>2</sub> Through Sliding Ferroelectricity** [Ziliang Ye](#); The University of British Columbia, Canada

**10:00 AM BREAK**

SESSION EL12.10: Nanophotonics with Artificial Intelligence and Machine Learning

Session Chairs: Ho Wai (Howard) Lee and Qinghua Song

Thursday Morning, April 10, 2025  
Summit, Level 4, Room 436

**10:30 AM \*EL12.10.01**

**Freeform Metasurface-enhanced Optical Systems for Imaging and Additive Manufacturing** [Jonathan A. Fan](#); Stanford University, United States

**11:00 AM EL12.10.02**

**Photonic Neuromorphic Computing with an Optically-Programmable Processing Unit** [Hendrik J. Brockmann](#)<sup>1</sup>, Philipp Kollenz<sup>1</sup>, Julia Anthea Gessner<sup>1</sup>, Garret May<sup>1</sup>, Thomas Pfeifer<sup>2</sup> and Felix Deschler<sup>1</sup>; <sup>1</sup>Physikalisch-Chemisches Institut, Germany; <sup>2</sup>Max-Planck-Institut für Kernphysik, Germany

**11:15 AM EL12.10.03**

**Mesoporous Aerogel-Based Infrared Metamaterials for Radiative Cooling of Windows** [Aryan Zaveri](#) and Aaswath Raman; University of California, Los Angeles, United States

**11:30 AM \*EL12.10.04**

**Plasmonics and Deep Learning for Super-Resolution Imaging** [Zhaowei Liu](#); University of California, San Diego, United States

SESSION EL12.11: Nanophotonic Photovoltaics  
Session Chairs: Jonathan Fan and Pin Chieh Wu  
Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 436

**1:30 PM \*EL12.11.01**

**Nanophotonic Opportunities in Thermophotovoltaics** [Jeremy N. Munday](#); University of California, Davis, United States

**2:00 PM EL12.11.02**

**Increasing Broadband Absorption in Thin Film Solar Cells with Reverse-Engineered Correlated Disorder Patterns** [Anja Tiede](#)<sup>1</sup>, Nick Feldman<sup>2,3</sup>, Alexander Lambert<sup>3</sup>, Femius Koenderink<sup>3,4</sup>, Esther Alarcon-Llado<sup>3,4</sup> and Anna Fontcuberta i Morral<sup>1</sup>; <sup>1</sup>École Polytechnique Fédérale de Lausanne, Switzerland; <sup>2</sup>ARCNL, Netherlands; <sup>3</sup>AMOLF, Netherlands; <sup>4</sup>University of Amsterdam, Netherlands

**2:15 PM EL12.11.03**

**Nanophotonic Agrivoltaics with InP and m-cSi Nanopillars for Hybrid Energy Harvesting** [Amrit Kumar Thakur](#)<sup>1</sup>, Wayesh Qarony<sup>2</sup>, Saif Islam<sup>1</sup> and Md Shamim Ahamed<sup>1</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>University of Central Florida, United States

**2:30 PM EL12.11.04**

**Interface Charge Transfer Characterization of Nicotine, Chlorophyll and Sodium Copper Chlorophyllin Using Dielectric Gradient Photovoltaic Cells** [Charles M. Fortmann](#)<sup>1,2</sup>, Julie Liu<sup>3</sup>, Reid Vorbach<sup>4</sup>, Amina Exlhomme<sup>5</sup>, Lily Lin<sup>5</sup>, Matthew Frageau<sup>1</sup>, John Patterson<sup>6</sup>, Hajin Choi<sup>6</sup>, Yuan-Hao Li<sup>6</sup> and Maria Garcia<sup>6</sup>; <sup>1</sup>The Knox School, United States; <sup>2</sup>Controlled Micro Fusion LLC, United States; <sup>3</sup>The City University of New York, United States; <sup>4</sup>Brookhaven National Laboratory, United States; <sup>5</sup>St. John's University, United States; <sup>6</sup>Knox School, United States

**2:45 PM EL12.11.05**

**Fabrication of Asymmetrical Micro/Nanohole Arrays for Translucent Solar Cells** Ashif Chowdhury and [Heayoung Yoon](#); University of Utah, United States

**3:00 PM BREAK**

SESSION EL12.12: Breaking News I  
Session Chairs: Qitong Li and Zhaowei Liu  
Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 436

**3:30 PM +EL12.12.01**

**Quantum Photonic Integrated Circuits with Tailored Single-Photon Emitters** [Vladimir Shalaev](#)<sup>1,2</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**4:00 PM EL12.12.02**

**Optomechanical Characterization of Laser-Driven Nanostructured Lightsails** [Ramon Gao](#), Lior Michaeli, Michael Kelzenberg, John E. Sader and Harry A. Atwater; California Institute of Technology, United States

**4:15 PM EL12.12.03**

**Nanoscale Imaging of Infrared Plasmons with Monochromated STEM-EELS** [Hongbin Yang](#); Cornell University, United States

**4:30 PM \*EL12.12.04**

**Ultra-Thin Materials—From Tailorable Photonics to New Physics** [Alexandra Boltasseva](#); Purdue University, United States

SESSION EL12.13: Poster Session III: Emerging Material Platforms and Fundamental Approaches for Plasmonics, Nanophotonics and Metasurfaces

Session Chairs: Qitong Li and Pin Chieh Wu

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL12.13.01**

**Plasmonic Metasurfaces as Solar Absorber for the Perovskite Thin Film Solar Cells** [Sergii Mamykin](#)<sup>1</sup>, Iryna Mamontova<sup>1</sup>, Roman Redko<sup>1</sup>, Olexandr Shtykalo<sup>1</sup>, Tetiana Lunko<sup>1</sup>, Igor Dmytruk<sup>2</sup>, Oleg Yeshchenko<sup>2</sup>, Natalia Berezovska<sup>2</sup> and Anatoliy Pinchuk<sup>3</sup>; <sup>1</sup>V.E. Lashkaryov Institute of Semiconductor Physics of NAS of Ukraine, Ukraine; <sup>2</sup>Taras Shevchenko National University of Kyiv, Ukraine; <sup>3</sup>University of Colorado at Colorado Springs, United States

**EL12.13.02**

**Comparative Analysis of Monocrystalline, Polycrystalline and PERC Solar Cells—Evaluating Efficiency and Power Output Under Variable Conditions** Brian Stefanus, Austin Zhang, Yuanjie Zou, Kevin Liu, Brandon Ng, Sean Ning, Ethan Fahy, Joseph Charik, Vidya Raswamy, Simon Bott-Suzuki and [Zhixia Shi](#); University of California, San Diego, United States

**EL12.13.03**

**Studying the Dielectric Spacer Media of Nanophotonic Devices for Molecular Sensing Applications** [David A. Flores](#)<sup>1</sup>, Saurabh Dixit<sup>2</sup>, John Buchner<sup>2</sup> and Joshua D. Caldwell<sup>2</sup>; <sup>1</sup>The Pennsylvania State University, United States; <sup>2</sup>Vanderbilt University, United States

**EL12.13.04**

**Multi-Resonant Tamm-Plasmon-Based Infrared Gas Sensor for Improved Sensitivity and Selectivity** [Emma R. Bartelsen](#)<sup>1,1</sup>, Ryan Nolen<sup>2</sup>, Mingze He<sup>1,1</sup> and Joshua D. Caldwell<sup>1,1,2</sup>; <sup>1</sup>Vanderbilt University, United States; <sup>2</sup>Sensorium Technological Laboratories, United States

**EL12.13.05**

**Energy-Free Thermal Management for Low Temperature with Dual Resonance Radiative Energy Dissipation** [Kyum An](#)<sup>1</sup>, Taehwan Kim<sup>2</sup>, Je Gyung Lee<sup>1</sup> and Namkyu Lee<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Samsung Electronics Co., Ltd., Korea (the Republic of)

**EL12.13.06**

**Strain and Defect Dynamics in (Si)GeSn Alloys Epitaxially Grown Around Free Standing Ge Nanowires for CMOS Compatible Optical Interconnects** [Ashildur Fridriksdottir](#)<sup>1</sup>, Anis Attiaoui<sup>1,2</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**EL12.13.07**

**Boosting the Performance of Flexible Perovskite Photodetectors Using Hierarchical Plasmonic Nanostructures** [Sang Hyuk Lee](#)<sup>1</sup>, Yoonho Lee<sup>2</sup> and Joon Hak Oh<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Sungshin Women's University, Korea (the Republic of)

**EL12.13.08**

**Synthesis and Optimization of Sol-Gel Porous Silica for UV Transparent Thin Film Packaging** Rumysa Manzoor, Henam S. Devi and Bhaskar Mitra; Indian Institute of Technology Delhi, India

**EL12.13.09**

**Effects of Thin Films on the Dynamics of Nanosecond Laser Ablation** Pavel Shafirin, Durga P. Khatua and Artur Davoyan; University of California, Los Angeles, United States

**EL12.13.10**

**Direct-Imprinting Nanofabrication Process of Large-Area Gold Nanohole Arrays for Plasmonic Applications** Potejanasak Potejana; University of Phayao, Thailand

**EL12.13.11**

**Strong Coupling Between Surface Plasmon and Excitons in Plasmonic Gratings** Farzana Alam, MD Afzalur Rab, Shamaar Howard, Ashleigh K. Wilson and Natalia Noginova; Norfolk State University, United States

**EL12.13.12**

**Magneto-Optical Evaluation of Q-Carbon Thin Films** Naveen Narasimhachar Joshi, Pranay Kalakonda, Roger Narayan and Jagdish Narayan; North Carolina State University, United States

SESSION EL12.14: Breaking News II

Session Chairs: Qitong Li and Pin Chieh Wu

Friday Morning, April 11, 2025

Summit, Level 4, Room 436

**10:00 AM \*EL12.14.01**

**Monocular Metasurface Camera for Single-Shot Multi-Dimensional Imaging** Yuanmu Yang; Tsinghua University, China

**10:30 AM \*EL12.14.02**

**Metadevices for DUV Molecular Sensing and Light Manipulation** Bo Ray Lee<sup>1</sup>, Jia Hua Lee<sup>1</sup>, Kuan-Heng Chen<sup>1</sup>, Yu Hung Lin<sup>1</sup>, Haruyuki Sakurai<sup>2</sup>, Ray-Hua Horng<sup>1</sup>, Kuniaki Konishi<sup>2</sup> and Ming Lun Tseng<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>2</sup>The University of Tokyo, Japan

**11:00 AM EL12.14.03**

**Implosion Carving (ImpCarv) Enables Nanoprecise 3D Metastructures for Visible-Light Optical Computing** Quansan Yang<sup>1,2</sup>, Peter T. So<sup>2</sup> and Edward S. Boyden<sup>2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Massachusetts Institute of Technology, United States

**11:15 AM EL12.14.04**

**Giant Optical Nonlinearity from Self-Hybridized Exciton Polaritons in Perovskite Quasi-BIC Metasurfaces** Jie Fang, Abhinav Kala and Arka Majumdar; University of Washington, United States

SESSION EL12.15: Novel Materials, Fabrications and Characterizations in Nanophotonics

Session Chairs: Ho Wai (Howard) Lee and Yuanmu Yang

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 436

**1:30 PM EL12.15.01**

**Versatile Nanoring Fabrication Assisted by Hole-Mask Colloidal Lithography for Building Thermal Management** Xavier Baami González and Duncan Sutherland; iNANO - Aarhus University, Denmark

**1:45 PM \*EL12.15.02**

**Dynamic Designer Strain Distributions in Two-Dimensional Materials** Xi Wang; University of Delaware, United States

**2:15 PM EL12.15.03**

**Bragg Band Gap Engineering in Surface Acoustic Wave Devices for Tunable Phononic Topological Devices** [Howard J. Yawit](#) and Zafer Mutlu; The University of Arizona, United States

**2:30 PM EL12.15.04**

**Group-IV Asymmetric Kagome Lattice Optical Metasurfaces** [Anis Attiaoui](#)<sup>1,2</sup>, Ali Abdulla<sup>3</sup>, Sudip Acharya<sup>3</sup>, Lilian Vogl<sup>4</sup>, Andrew M. Minor<sup>4</sup>, Fisher Yu<sup>3</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>University of Arkansas, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States

**2:45 PM EL12.15.05**

**Towards Nanoscale OLED Pixels Based on Plasmonic Electrodes** [Björn Ewald](#), Cheng Zhang, Leo Siebigs, Luca Steinbrecher, Maximilian Rödel, Monika Emmerling, Jens Pflaum and Bert Hecht; University of Würzburg, Am Hubland, Germany

## SYMPOSIUM EL13

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Frontiers in Electrochromic Materials and Devices

April 8 - April 9, 2025

Symposium Organizers

Jianguo Mei, Purdue University

Anna Österholm, Georgia Institute of Technology

Aline Rougier, Institut de Chimie de la Matière Condensée de Bordeaux

Shanxin Xiong, Xi'an University of Science and Technology

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL13.01: Electrochromics I

Session Chairs: Jianguo Mei and Anna Österholm

Tuesday Morning, April 8, 2025

Summit, Level 5, Olympic View Lounge

**10:30 AM \*EL13.01.01**

**Progress in Aerodynamically Focused Color Tunable Patterns** [Caroline Sunyong S. Lee](#) and Minseok Kim; Hanyang University, Korea (the Republic of)

**11:00 AM EL13.01.02**

**Near-IR Electrochromic Metallosupramolecular Polymers and Their Device Application** [Masayoshi Higuchi](#); National Institute for Materials Science, Japan

**11:15 AM EL13.01.03**

**Electrochromic Viologen-Based 2D Cationic Porous Organic Polymer with Tunable Redox Potential** [Jae Uk Choi](#), Teck Lip Dexter Tam and Pooi See Lee; Nanyang Technological University, Singapore

**11:30 AM \*EL13.01.04**

**Electrochromic Transition Metal Oxide Nanocrystals** [Delia Milliron](#); The University of Texas at Austin, United States



SESSION EL13.02: Electrochromics II

Session Chairs: Marco Schott and Anna Österholm

Tuesday Afternoon, April 8, 2025

Summit, Level 5, Olympic View Lounge

**1:30 PM \*EL13.02.01**

**Ion Transport Modulation for Enhanced Color Contrast in All-Solid-State Polymeric Electrochromic Devices** Eunyoung Kim, Jinbo Kim and Siyong Park; Yonsei University, Korea (the Republic of)

**2:00 PM EL13.02.02**

**Robust, Fast Switching, Black Electrochromic Windows Based on Transparent Mixed Conductor n-Doped Poly(Benzodifurandione) (n-PBDF)** Won-June Lee<sup>1</sup>, Palak Mehra<sup>1</sup>, Jonathan R. Thurston<sup>2</sup>, Sanket Samal<sup>1</sup>, Liyan You<sup>1</sup>, Inho Song<sup>1</sup>, Michael F. Toney<sup>2</sup> and Jianguo Mei<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Colorado Boulder, United States

**2:15 PM EL13.02.03**

**Flexible Dual-Functional Electrochromic Devices with Viologen Derivatives** Jong Seung Park; Pusan National University, Korea (the Republic of)

**2:30 PM \*EL13.02.04**

**Photostability of Conjugated Polymers—A Survey of Factors Impacting the Rates of Photodegradation** Eric Shen<sup>1</sup>, Augustus Lang<sup>1</sup>, Graham Collier<sup>2</sup>, Anna Österholm<sup>1</sup>, Aimée Tomlinson<sup>3</sup> and John R. Reynolds<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>The University of Southern Mississippi, United States; <sup>3</sup>University of North Georgia, United States

**3:00 PM BREAK**

**3:30 PM \*EL13.02.05**

**Robust Dynamic Windows Based on Nonaqueous Reversible Zinc Electrodeposition** Christopher Barile and Nikhil Bhoumik; University of Nevada, Reno, United States

**4:00 PM EL13.02.06**

**Energy Efficient Windows with Adjustable Tinting Based on Reversible Metal Electrodeposition** Michael D. McGehee; University of Colorado, United States

**4:15 PM EL13.02.07**

**Dynamic Windows Based on Reversible Silver Electrodeposition with Improved Resting Stability and Cyclability** Yuchun Cai<sup>1</sup>, Ziliang Li<sup>1</sup>, Tyler Hernandez<sup>2</sup>, Gabriel McAndrews<sup>1</sup>, Yihan Wu<sup>1</sup>, Christopher Barile<sup>3</sup> and Michael D. McGehee<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Tynt Technologies, United States; <sup>3</sup>University of Nevada, Reno, United States

**4:30 PM EL13.02.08**

**Pulsed Electrodeposition for Dynamic Windows Based on Reversible Metal Electrodeposition** Ziliang Li<sup>1</sup>, Andrew Yeang<sup>1</sup>, Gabriel McAndrews<sup>1</sup>, Yuchun Cai<sup>1</sup>, Christopher Barile<sup>2</sup> and Michael D. McGehee<sup>1,1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>University of Nevada, Reno, United States

**4:45 PM EL13.02.09**

**Harnessing Electrochromic Heterostructured Nickel–Cobalt Phosphate for High-Performance Asymmetric Quasi-Solid-State Supercapacitors** Nageh K. Allam; American University in Cairo, Egypt

SESSION EL13.03: Poster Session: Electrochromics

Session Chairs: Brandon Faceira and Aline Rougier

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL13.03.01**

**Comparison of the Electrochemical Detection of Paraquat Using a Flexible Electrode Modified with Different Layer-by-Layer Film Coatings**

Marystela Ferreira, Stefanny Amaro and Amanda .; Federal University of São Carlos, Brazil

**EL13.03.09**

**Design and Optimization of Reflective Narrow-Band Infrared Polymer-Dispersed Cholesteric Liquid Crystals for Advanced Electronic Writing Displays** Liang Zhang and Chul Gyu Jhun; Hoseo University, Korea (the Republic of)

**EL13.03.02**

**Electropolymerization as a Method to Create Irreversible Electrochromic Indicators** Divya Iyer<sup>1</sup>, Anna Österholm<sup>1</sup>, Eric Shen<sup>1</sup>, John R. Reynolds<sup>1</sup> and Carlos Pinheiro<sup>2</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>Ynvisible Interactive Inc., Germany

**EL13.03.03**

**Enhanced Long-Term Stability of Electrochromic Devices Composed of Slot-Die Coated Niobium Tungsten Oxide Films** Yoon-Chae Nah, Kwang-Mo Kang and Ji H. Lee; Korea University of Technology and Education, Korea (the Republic of)

**EL13.03.04**

**Multicolor Electrochromic Behavior of Reversible Metal Electrodeposition Devices Based on ITO Nanotree Electrodes** Yoon-Chae Nah, Ji H. Lee and Kwang-Mo Kang; Korea University of Technology and Education, Korea (the Republic of)

**EL13.03.05**

**Exploring the Potential of Dual Redox Organic Compounds for the Development of Redox Flow Batteries** Jisang Yeom and Bright Walker; Kyung Hee University, Korea (the Republic of)

**EL13.03.06**

**SIZO/Ag/SIZO/NiO Sandwich Film Smart Window with Hybrid Low Emissivity and Electrochromism for Dynamic Solar Radiation Management.** SangJi Kim, Hyeondong Kim, Usha Krishnan Sundaram, TaeHo Kim, JuYoung Lee, Seong Eun Song and Sangyeol S. Lee; Gachon University, Korea (the Republic of)

**EL13.03.07**

**Flexible Metal Mesh Electrode for Infrared Variable Electrochromic Device** Ju Hyun Park<sup>1,2</sup>, Jiyoung Oh<sup>2</sup>, Chil Seong Ah<sup>2</sup>, Yongjun Lee<sup>2</sup>, Juhee Song<sup>2</sup>, Jisu Han<sup>2</sup>, Byeong-Kwon Ju<sup>1</sup> and Tae-Youb Kim<sup>2</sup>; <sup>1</sup>Korea University, Korea (the Republic of); <sup>2</sup>Electronics and Telecommunications Research Institute, Korea (the Republic of)

**EL13.03.08**

**Multi-Cell Designs for Energy Efficient Electrochromic Devices** Harsimrat Kaur and Loren G. Kaake; Simon Fraser University, Canada

SESSION EL13.04: Electrochromics III

Session Chairs: Jongwook Kim, Aline Rougier and Anna Österholm

Wednesday Morning, April 9, 2025

Summit, Level 5, Olympic View Lounge

**8:45 AM \*EL13.04.01**

**Polymer Electrolytes for Electrochromics and Electrochemical Devices** Pooi See Lee; Nanyang Technological University, Singapore

**9:15 AM EL13.04.02**

**Photo-Patternable Acrylate Viologen Derivatives for Intrinsically Stretchable Multi-Color Electrochromic Devices** Kang Sik Kim<sup>1</sup>, Seong Hwan Yang<sup>1</sup>, Soo Yeon Eom<sup>2</sup>, Sung Kyu Park<sup>1</sup> and Jong Seung Park<sup>2</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Pusan National University, Korea (the Republic of)

**9:30 AM EL13.04.03**

**Influence of Back Injection Molding on Electrochromic Multilayer Films on Polycarbonate Substrates and Their Aging-Behavior** Miriam S. Meyer, Michael Hartung and Hans-Peter Heim; University of Kassel, Germany

**9:45 AM EL13.04.04**

**Enhancing Chromogenic Research Tools—A Cost-Effective Neural Network-Assisted Digital Camera for Spectrophotometric Analysis** Antonio

Canovas Saura<sup>1</sup>, Javier Padilla<sup>1</sup>, Lucia Serrano-Lujan<sup>2</sup> and Victoria Beltran<sup>1</sup>; <sup>1</sup>Universidad Politécnica de Cartagena, Spain; <sup>2</sup>Rey Juan Carlos University, Spain

**10:00 AM BREAK**

**10:30 AM \*EL13.04.05**

**Sustainable Printed Smart Labels Enabled by Electrochromic Display Elements** Liisa Hakola; VTT Technical Research Centre of Finland, Finland

**11:00 AM EL13.04.06**

**Xanthene-Based Dyes and Polymers as Efficient Electrochromic Materials** Colleen N. Scott<sup>1</sup>, Roberto Venta<sup>1</sup>, Varunprasaath Selvaraju<sup>2</sup>, Stephen Barlow<sup>2</sup> and Seth Marder<sup>2</sup>; <sup>1</sup>Mississippi State University, United States; <sup>2</sup>Colorado University Boulder, United States

**11:15 AM EL13.04.07**

**Development of Patterning Methods for Functional Electrochromic Devices by Using Direct Laser Processing** Jinhyeong Kwon<sup>1</sup> and Junyeob Yeo<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Kyungpook National University, Korea (the Republic of)

**11:30 AM EL13.04.08**

**Opening New Routes for Electrochromic Technology in Agriculture—Opportunities and Challenges for Light Modulation in Greenhouses** Baltasar Miras<sup>1</sup>, Javier Padilla<sup>1</sup> and Carlos Toledo<sup>1,2</sup>; <sup>1</sup>Technical University of Cartagena, Spain; <sup>2</sup>Murcia Institute of Agri-Food Research and Development (IMIDA), Spain

**11:45 AM \*EL13.04.09**

**Polymeric Electrochromics— Large-Scale Processing and Durability Testing** Marco Schott and Lisa Brändler; Fraunhofer Institute for Silicate Research ISC, Germany

SESSION EL13.05: Electrochromics IV

Session Chairs: Sunyoung Lee and Jianguo Mei

Wednesday Afternoon, April 9, 2025

Summit, Level 5, Olympic View Lounge

**3:30 PM \*EL13.05.01**

**Electrochromic Metal Oxides—From Single Layers to Advanced Devices** Brandon Faceira; Polytechnique Montreal, Canada

**4:00 PM EL13.05.02**

**Development of Dual-Band VIS-NIR Electrochromic Materials Based on Plasmonic Metal Oxides and Their Formulations** Virendrakumar G. Deonikar, Florian Gillissen, Gilles Spronck, Rudi Cloots, Pierre Colson and Jennifer Dewalque; University of Liege, Belgium

**4:15 PM EL13.05.03**

**Exploring Li-Ni-O Sputtered Films Through a Combinatorial Approach** Patrice Bras<sup>1</sup>, Mina Brousse<sup>2</sup>, Sabine Lakhroufi-Mathieu<sup>1</sup>, Lionel Teulé-Gay<sup>1</sup>, Helene Le Poche<sup>2</sup>, Stanislav Pechev<sup>1</sup>, Mario Maglione<sup>1</sup>, Frederic Le cras<sup>2</sup> and Aline D. Rougier<sup>1</sup>; <sup>1</sup>Institut de Chimie de la Matière Condensée de Bordeaux, France; <sup>2</sup>CEA, France

**4:30 PM \*EL13.05.04**

**Shape-Control and Assembly of Cs<sub>x</sub>WO<sub>3-y</sub> Nanocrystals for Tuning Near-Infrared Plasmonic Responses** Jongwook Kim; École Polytechnique, France

# SYMPOSIUM EL14

Symposium Organizers

Moon Kee Choi, Ulsan National Institute of Science and Technology

Jin-Hoon Kim, Massachusetts Institute of Technology

Yeongin Kim, University of Cincinnati

Huanyu Zhou, Seoul National University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL14.01: Material Design for Flexible Photovoltaics

Session Chairs: Moon Kee Choi and Huanyu Zhou

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 429

**10:30 AM \*EL14.01.01**

**Mechanically Ductile Electronic and Energy Devices Achieved by Molecular Design and Morphology Tuning** Antonio Facchetti; Georgia Institute of Technology, United States

**11:00 AM \*EL14.01.02**

**Photoactive Material Design for Intrinsically-Stretchable Polymer Solar Cells** Bumjoon Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**11:30 AM EL14.01.03**

**Stretchable Schottky Diode for Wearable Electronics** Jinsu Yoon, Minkyun Kang, Dong Keon Lee and Yongtaek Hong; Seoul National University, Korea (the Republic of)

**11:45 AM EL14.01.04**

**Improving the Mechanical Resilience of Organic Photovoltaics Using Self-Assembled Monolayers** Abdullah Al Shafe, Saqlain Raza, Jun Liu and Brendan T. O'Connor; North Carolina State University, United States

SESSION EL14.03: Flexible and Stretchable Displays I

Session Chairs: Yeongin Kim and Huanyu Zhou

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 429

**10:00 AM EL14.03.01**

**Edge Halogenation Strategy to Construct Efficient Spin-transport Organic Semiconductors** Yunlong Guo; Institute of Chemistry, CAS, China

**10:15 AM EL14.03.02**

**Intrinsic Flexibility—Semiconducting Materials and Transistors** Y.Q. Liu; Institute of Chemistry, Chinese Academy of Sciences, China

**10:30 AM \*EL14.03.03**

**Stretchable Light-Emitting Polymers and OLEDs Based on Thermally Activated Delayed Fluorescence (TADF)** Sihong Wang; University of Chicago, United States

**11:00 AM \*EL14.03.04**

**Light Manipulation of Nanostructured OLEDs** Franky So; North Carolina State University, United States

**11:30 AM EL14.03.05**

**Bright Flexible Electrochemiluminescent Devices** Yu Jun Tan; National University of Singapore, Singapore

**11:45 AM EL14.03.06**

**Stamped Liquid Metal Cathode for High-Efficiency Intrinsically Stretchable OLED** Wonbeom Lee<sup>1</sup>, Wei Liu<sup>2</sup>, Sihong Wang<sup>2</sup> and Himchan Cho<sup>1</sup>;

<sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>The University of Chicago, United States

SESSION EL14.04: Flexible and Stretchable Displays II

Session Chairs: Moon Kee Choi and Jin-Hoon Kim

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 429

**1:30 PM \*EL14.04.01**

**3D Approaches to Stretchable Optoelectronic Devices** Seunghyup Yoo, Su-Bon Kim and Donggyun Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**2:00 PM \*EL14.04.02**

**Mid-Infrared Electrochromics by High Conductivity Conjugated Polymers** Po-Chun Hsu; The University of Chicago, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EL14.04.03**

**Skin-Like Real-Time Health Monitoring Patch Based on Stretchable Organic Optoelectronic System** Yeongjun Lee; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**4:00 PM \*EL14.04.04**

**Materials Design Strategies for Flexible and Stretchable Quantum Dot Light-Emitting Diodes** Jiwoong Yang; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**4:30 PM \*EL14.04.05**

**Robust Full-Surface Bonding for Integrating Flexible Optical Electronics** Tomoyuki Yokota; The University of Tokyo, Japan

SESSION EL14.05: Smart Sensors for Wearable Applications

Session Chairs: Jin-Hoon Kim and Yeongin Kim

Thursday Morning, April 10, 2025

Summit, Level 4, Room 429

**8:30 AM \*EL14.05.01**

**Wearable Electronic Sensors for Health Monitoring** Limei Tian; Texas A&M University, United States

**9:00 AM EL14.05.02**

**Conformal Dry Electrodes for Surface Electrophysiology Monitoring** Yuhan Wen and Ana Claudia Arias; University of California, Berkeley, United States

**9:15 AM EL14.05.03**

**Universal Cryogenic Transfer of Liquid Metal Particles in Polymers for Wafer-Scale Stretchable Integrated Circuits** Seungkyu Lee, Dohoon Lee and Steve Park; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**9:30 AM BREAK**

**10:00 AM \*EL14.05.04**

**Wearable Sweat Sensors—New Sensing Modalities and Form Factors** Ali Javey; University of California, Berkeley, United States

**10:30 AM \*EL14.05.05**

**A Conformable Phased-Array Ultrasound Patch for Bladder Volume Monitoring** Canan Dagdeviren; Massachusetts Institute of Technology, United States

**11:00 AM \*EL14.05.06**

**Stretchable Photodiodes for Long-Term Cardiovascular Monitoring** Zhibin Yu<sup>1,2</sup>, Pengsu Mao<sup>1</sup>, Haoran Li<sup>1</sup> and Melissa Davis<sup>1</sup>; <sup>1</sup>Florida State University, United States; <sup>2</sup>Florida A&M University, United States

SESSION EL14.06: Transistors and Circuits for Wearable Applications

Session Chairs: Moon Kee Choi and Huanyu Zhou

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 429

**1:30 PM \*EL14.06.01**

**Flexible Human-Interactive Sensing and Synaptic Displays** Cheolmin Park; Yonsei University, Korea (the Republic of)

**2:00 PM EL14.06.02**

**Towards In-Fiber Computation and Networked Fabric Systems** Nikhil Gupta and Yoel Fink; Massachusetts Institute of Technology, United States

**2:15 PM EL14.06.03**

**Self-Aligned Inkjet-Printed Capacitors and RC Circuits on Flexible Substrates via a Novel Single-Step Capacitor Fabrication Process** William N. Hartnett, Daniel Frisbie and Lorraine Francis; University of Minnesota Twin Cities, United States

**2:30 PM BREAK**

**3:00 PM EL14.06.04**

**Highly Stable and Conformable Double-Gated Organic Transistor—A Smart Approach for the Development of Flexible Circuits and Sensing Systems** Mattia Concas, Antonello Mascia and Piero Cosseddu; Università degli Studi di Cagliari, Italy

**3:15 PM EL14.06.05**

**Flexible Submicrometer-Channel Organic Transistors for High-Frequency Applications via Low-Resolution Fabrication** Antonello Mascia<sup>1</sup>, Andrea Spanu<sup>2</sup>, Annalisa Bonfiglio<sup>2</sup> and Piero Cosseddu<sup>1</sup>; <sup>1</sup>University of Cagliari, Italy; <sup>2</sup>Scuola Universitaria Superiore, Italy

**3:30 PM \*EL14.06.06**

**Intrinsically Stretchable Polymer Semiconductors for Skin Electronics** Jin Young Oh; Kyung Hee University, Korea (the Republic of)

**4:00 PM \*EL14.06.07**

**MoS<sub>2</sub>-Based Thin Film Transistors for Flexible Displays and Sensors** Jong-Hyun Ahn; Yonsei University, Korea (the Republic of)

**4:30 PM EL14.06.08**

**Flexible Dual-Gate Field-Effect Transistors and Circuits Based on Hybrid MOCVD-Grown WS<sub>2</sub> Monolayers** Jerry A. Yang, Zhepeng Zhang, Andrew J. Mannix and Eric Pop; Stanford University, United States

**4:45 PM EL14.06.09**

**Wafer-Scale Integration of Single-Crystalline MoS<sub>2</sub> for Flexible Electronics Enabled by Oxide Dry-Transfer** Wei Kong, Xiang Xu, Yitong Chen and Bowen Zhu; Westlake University, China

SESSION EL14.07: Poster Session

Session Chairs: Jin-Hoon Kim and Huanyu Zhou

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**EL14.07.01**

**Reconfigurable Three-Dimensional Free-Form Architecture Enabled by Stiffness-Programmable Liquid Metal Bilayers** Woosang You; Seoul National University, Korea (the Republic of)

**EL14.07.02**

**Thermomechanical and Electrical Properties of Doped, Donor/Acceptor Type Ultra-Thin Polymer Films Organic Electronics Applications** Alyssa J. Shaw<sup>1</sup>, Rachel Warner<sup>2</sup>, Kan Tang<sup>1</sup>, Saroj Upreti<sup>1</sup>, Mona Ahmed Guiled<sup>1</sup>, Simon Rondeau-Gagne<sup>2</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>University of Windsor, Canada

**EL14.07.03**

**Stretchable Conductors Based on Hybrid Films Consisting of Copper Nanowires and Carbon Nanotubes** Li-Cheng Jheng<sup>1</sup>, Ji-Yin Fang<sup>2</sup> and Steve Lien-Chung Hsu<sup>2</sup>; <sup>1</sup>National Kaohsiung University of Science and Technology, Taiwan; <sup>2</sup>National Cheng Kung University, Taiwan

**EL14.07.04**

**Textile-Based Stretchable NIR OLED for Wearable Pulse Oximetry Sensor and Neuronal Cell Proliferation in the Human Cerebral Cortex** Ye Ji Shin<sup>1</sup>, Minseong Park<sup>1</sup>, Young Woo Kim<sup>1</sup>, Youjin Cho<sup>1</sup>, Seojin Kim<sup>1</sup>, Chaeyeong Lee<sup>1</sup>, SeoHyeon Kim<sup>1</sup>, Yuhwa Bak<sup>1</sup>, Junpyo Song<sup>1</sup>, Youngjin Song<sup>1</sup>, Moosup Lim<sup>1</sup>, Sang Jik Kwon<sup>2</sup>, Eou-Sik Cho<sup>2</sup> and Yongmin Jeon<sup>1,1</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Gachon University, Korea (the Republic of)

**EL14.07.05**

**ITO-Ag-ITO Annealing Effects During Delamination of Flexible Colorless Polyimide Substrates by Xenon Flash Lamp for Flexible Displays** Won Woo Lee, Yuanrui Qi, Yun Hyeok Jung, Joo Hyun Jeong, Sung Jin Park, Dong Gyun Kim, Jaeyoon Noh, Hyun Seok Oh, Yongmin Jeon, Sang Jik Kwon and Eou-Sik Cho; Gachon University, Korea (the Republic of)

**EL14.07.06**

**Reliability Assessment of Polymeric Photonic Interconnects Printed on Optical Fiber and Silicon Chip** Roberto Aga<sup>1,2</sup>, Laura Davidson<sup>1,2</sup>, Jose Figueroa-Soto<sup>2</sup>, Joseph Suelzer<sup>2</sup> and Carrie Bartsch<sup>2</sup>; <sup>1</sup>KBR, United States; <sup>2</sup>Air Force Research Laboratory, United States

**EL14.07.07**

**Shaping Light with Soft Electrochemically Mutable Metasurfaces** Siddharth Doshi<sup>1</sup>, Anqi Ji<sup>1</sup>, Ali Mahdi<sup>1</sup>, Scott T. Keene<sup>2</sup>, Skyler P. Selvin<sup>1</sup>, Philippe Lalanne<sup>3</sup>, Eric Appel<sup>1</sup>, Nicholas Melosh<sup>1</sup> and Mark L. Brongersma<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>University of Cambridge, United Kingdom; <sup>3</sup>University of Bordeaux, France

**EL14.07.08**

**High Performance Flexible Perovskite Solar Cells on Flexible Glass Substrate** Vishal Pal, Youngsoo Jung and Jung-Kun Lee; University of Pittsburgh, United States

**EL14.07.09**

**Physicochemical Alteration of TiOx Surfaces for Abrupt Enhancement of Optoelectronic Properties of TiOx/Metal (Ag, Cu)/ZnO Transparent Electrodes** Dooho Choi, Tae-Kyong Kim and Kwang Jin Lee; Gachon University, Korea (the Republic of)

**EL14.07.10**

**Layered WS<sub>2</sub> Nanotubes/Graphene Nanocomposite as Lightweight and Flexible Optoelectronic Device** Luca Camilli<sup>1</sup>, Aniello Pelella<sup>1</sup>, Enver Faella<sup>2</sup>, Ofelia Durante<sup>3</sup>, Sebastiano De Stefano<sup>3</sup>, Luca Lozzi<sup>2</sup>, Giulia Fioravanti<sup>2</sup>, Maurizia Palumbo<sup>1</sup>, Alla Zak<sup>4</sup>, Filippo Giubileo<sup>5</sup>, Maurizio Passacantando<sup>2</sup> and Antonio Di Bartolomeo<sup>3</sup>; <sup>1</sup>Università degli Studi di Roma Tor Vergata, Italy; <sup>2</sup>University of L'Aquila, Italy; <sup>3</sup>University of Salerno, Italy; <sup>4</sup>Holon Institute of Technology, Israel; <sup>5</sup>CNR-SPIN, Italy

**WITHDRAWN 12/10/2024 EL14.07.12 Intrinsically Stretchable Neuromorphic Electronic Skins Using Molecular Torsion-Enabled Highly Stretchable Semiconducting Polymer** Kwan-Nyeong Kim<sup>1</sup>, Tae-Woo Lee<sup>1</sup> and Yun-Hi Kim<sup>2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Gyeongsang National University, Korea (the Republic of)

**EL14.07.11**

**Hybrid Multibarrier Thin Film Encapsulation Structure for Enhanced Reliability of Flexible and Wearable OLED Devices** Sun-Woo Lee<sup>1</sup>, Young Hyun Son<sup>2</sup>, Sangmin Lee<sup>1</sup>, Seung Jin Oh<sup>1</sup>, Yongmin Jeon<sup>3</sup>, Hyeunwoo Kim<sup>4</sup>, Jeong Hyun Kwon<sup>5</sup> and Taek-Soo Kim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); <sup>3</sup>Gachon University, Korea (the Republic of); <sup>4</sup>SunMoon University, Korea (the Republic of); <sup>5</sup>Chungbuk National University, Korea (the Republic of)

**EL14.07.12**

**Self-Powered Skin-Attachable Organic Li-Fi Receiver** Jae-Hyun Kim<sup>1</sup>, Jooyeong Kim<sup>2</sup>, Kenjiro Fukuda<sup>3</sup>, Takao Someya<sup>4</sup>, Hyeok Kim<sup>2</sup> and Sungjun Park<sup>1</sup>; <sup>1</sup>Ajou University, Korea (the Republic of); <sup>2</sup>University of Seoul, Korea (the Republic of); <sup>3</sup>RIKEN, Japan; <sup>4</sup>The University of Tokyo, Japan

**EL14.07.13**

**Wavelength-Tunable OLED with High Area-Efficiency for Multifunctional Healthcare Device** Minseong Park<sup>1</sup>, Juchan Kwon<sup>2</sup>, Seongdo Kim<sup>2</sup>, Young Soo Yoon<sup>1</sup>, Eou-Sik Cho<sup>1</sup>, Sang Jik Kwon<sup>1</sup>, Dong-Joo Kim<sup>3</sup> and Yongmin Jeon<sup>1,1</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Mokpo National University, Korea (the Republic of); <sup>3</sup>Auburn University, United States

**EL14.07.14**

**A Highly Flexible, Conductive and Mechanically Robust Electromagnetic Interference Shielding Nanocomposite Based on Doped Carbon Nanotube/Conjugated Polymer with Outstanding Folding Reliability** Min seon Kim<sup>1,2</sup>, Yejin Ahn<sup>2</sup>, Bong-Gi Kim<sup>2</sup> and Sung Woo Hong<sup>1</sup>; <sup>1</sup>Korean Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Konkuk University, Korea (the Republic of)

**EL14.07.15**

**Enhancing Stability of Organic Field-Effect Transistors with Thermally Cleavable Side Chains** Kundu Thapa<sup>1</sup>, Jordan Shanahan<sup>2</sup>, Haoyu Zhao<sup>1</sup>, Guorong Ma<sup>1</sup>, Jacob Meilleur<sup>1</sup>, Ranni Middleton<sup>1</sup>, Megan Black<sup>3</sup>, Sujoy Ghosh<sup>4</sup>, Wei You<sup>2</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>University of North Carolina at Chapel Hill, United States; <sup>3</sup>The University of Tennessee at Chattanooga, United States; <sup>4</sup>Oak Ridge National Laboratory, United States

**EL14.07.16**

**Low-Temperature Cosolvent Engineering of PMMA Gate Dielectric for Flexible Low-Threshold Voltage OFETs** Satayender K. Sangwan, Sk Shaharukh, Samit K Ray and Achintya Dhar; Indian Institute of Technology Kharagpur, India

SESSION EL14.08: Advanced Material Design Strategies

Session Chairs: Jin-Hoon Kim and Huanyu Zhou

Friday Morning, April 11, 2025

Summit, Level 4, Room 429

**8:00 AM \*EL14.08.01**

**Accelerated Polymer Electronics Development Through Artificial Intelligence-Powered Autonomous Experimentation (AI/AE)** Jie Xu; Argonne National Laboratory, United States

**8:30 AM EL14.08.02**

**Approaching Highly Stable Optoelectronic Device Operation at Elevated Temperature by Locking Backbone Torsion of Conjugated Polymers** Zhiqiang Cao<sup>1,2</sup>, Zhaofan Li<sup>3</sup>, Angela Awada<sup>4</sup>, Sara A. Tolba<sup>5</sup>, Madison Mooney<sup>4</sup>, Naresh C. Osti<sup>1</sup>, Yangyang Wang<sup>1</sup>, Yu-Cheng Chiu<sup>6</sup>, Simon Rondeau-Gagne<sup>4</sup>, Wenjie Xia<sup>3</sup>, William Heller<sup>1</sup> and Xiaodan Gu<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>The University of Southern Mississippi, United States; <sup>3</sup>Iowa State University, United States; <sup>4</sup>University of Windsor, Canada; <sup>5</sup>North Dakota State University, United States; <sup>6</sup>National Taiwan University of Science and Technology, Taiwan

**8:45 AM EL14.08.03**

**Elucidating Multiscale Phenomena that Determine the Thermomechanical Response of Organic Semiconductors** Kehinde Fagbohunbe, Connor Callaway and Chad Risko; University of Kentucky, United States

**9:00 AM \*EL14.08.04**

**Self-Softening Polymers for Wearable and Implantable Electronics** Hanxiang Wu and Qibing Pei; University of California, Los Angeles, United States

**9:30 AM EL14.08.05**

**N-Type Thermoelectric Elastomers** Ting Lei; Peking University, China



**9:45 AM BREAK**

SESSION EL14.09: Flexible and Stretchable Displays III

Session Chairs: Yeongin Kim and Huanyu Zhou

Friday Morning, April 11, 2025

Summit, Level 4, Room 429

**10:15 AM \*EL14.09.01**

**Enhanced Stability and Performance in Transparent and Stretchable OLEDs Through Double Seed Layer Cathode Engineering** Changmin Lee, Insung Ha, P.Justin Jesuraj and Seung Yoon Ryu; Dongguk University, Korea (the Republic of)

**10:45 AM EL14.09.02**

**3D-Foldable and Stretchable Quantum Dot LEDs** Kang-Hyun Baek and Dongchan Kim; Gachon University, Korea (the Republic of)

**11:00 AM EL14.09.03**

**An All-Solution-Processed Mid-IR Electrochromic Device** Pei-Jan Hung<sup>1</sup>, Qizhang Li<sup>1</sup>, Ting-Hsuan Chen<sup>1,2</sup>, Ching-Tai Fu<sup>1</sup>, Yu Han<sup>1</sup>, Ronghui Wu<sup>1</sup>, Gangbin Yan<sup>1</sup>, Qingsong Fan<sup>1</sup>, Jiadong Liu<sup>1</sup>, Pin-Ruei Huang<sup>1</sup>, Yuanke Chen<sup>1</sup>, Chenxi Sui<sup>1</sup>, Genesis M. Higueros<sup>2,1</sup>, Alex Flores<sup>1</sup>, Fengyuan Shi<sup>3</sup> and Po-Chun Hsu<sup>1</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Duke University, United States; <sup>3</sup>University of Illinois at Chicago, United States

**11:15 AM EL14.09.04**

**Well-Balanced Hole and Electron Charge Transport in an Organic P-Type-Insulator-N-Type Layered Sandwich Structure** Jaechan Song, Youngmin Han and Hocheon Yoo; Gachon University, Korea (the Republic of)

**11:30 AM EL14.09.05**

**Improving NIR Detection in All-Polymer OPDs with Planar Heterojunction and Waveguide Structures** Joaquin Mogollon Santiana<sup>1</sup>, Adam J. Moule<sup>1</sup> and Meghna Jha<sup>1,2</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>Chalmers University of Technology, Sweden

SESSION EL14.10: Flexible and Stretchable Displays IV

Session Chairs: Jin-Hoon Kim and Huanyu Zhou

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 429

**2:00 PM EL14.10.01**

**All-Solution-Processed Ultraflexible Wearable Sensor Enabled with Universal Trilayer Structure for Organic Optoelectronic Devices** Lulu Sun<sup>1</sup>, Kenjiro Fukuda<sup>1</sup> and Takao Someya<sup>1,2</sup>; <sup>1</sup>RIKEN, Japan; <sup>2</sup>The University of Tokyo, Japan

**2:15 PM EL14.10.02**

**Customized, Skin-Like Electronics Based on Microdevices** Byeongmoon Lee; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**2:30 PM BREAK**

SESSION EL14.11: Skin Optoelectronics

Session Chairs: Jin-Hoon Kim and Huanyu Zhou

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 429

**3:00 PM EL14.11.01**

**Monolithically Integrated Optoelectronic Circuitry for Self-Adaptive Ultraviolet Protection System** [Jongmin Lee](#)<sup>1</sup>, Sung Woon Cho<sup>2</sup>, Eun Chong Ju<sup>1</sup>, Subin Jeon<sup>1</sup>, Dong Hwan Byeon<sup>1</sup>, Jaehyun Kim<sup>3</sup>, Yong-Hoon Kim<sup>4</sup> and Sung Kyu Park<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Sunchon National University, Korea (the Republic of); <sup>3</sup>Dongguk University, Korea (the Republic of); <sup>4</sup>Sungkyunkwan University, Korea (the Republic of)

**3:15 PM EL14.11.02**

**Ultrahigh-Definition Double-Layer Transfer Printing for Highly Efficient Quantum Dot Light-Emitting Diodes** [Kyunghoon Lee](#) and Jiwoong Yang; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**3:30 PM EL14.11.03**

**Tetramerized Small-Molecule Acceptor for Organic Solar Cells with Enhanced Efficiency, Stability and Mechanical Robustness—Impact of Chain Length and Dispersity Effects** [Chulhee Lim](#), Jinwoo Lee and Bumjoon Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

## SYMPOSIUM EL15

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Fundamentals of Mixed Ionic-Electronic Conductors

April 8 - April 11, 2025

Symposium Organizers

Lucas Flagg, National Institute of Standards and Technology

Scott Keene, Rice University

Jenny Nelson, Imperial College London

Jianyong Ouyang, National University of Singapore

Symposium Support

**Bronze**

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL15.01: New Materials for Mixed Conduction I

Session Chairs: Lucas Flagg and Andrew Levin

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 428

**10:30 AM \*EL15.01.01**

**Towards Semiconducting Covalent Organic Frameworks for Electrochemical Transistors** [Iain McCulloch](#); Princeton University, United States

**11:00 AM EL15.01.02**

**Single-Step Fabrication of Poly(3, 4-ethylenedioxythiophene) Integrating Synthesis and Film Formation with Ease** [Jiyun Lee](#)<sup>1</sup>, Sunghwan Lee<sup>2</sup> and Boseok Kang<sup>1,1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Purdue University, United States

**11:15 AM EL15.01.03**

**A General, Scalable and Cost-Effective Synthetic Approach for n-Doped Poly(Benzodifurandione) (n-PBDF) and Its Derivatives** [Guangchao Liu](#), Hsuan-Hao Hsu, Sanket Samal, Won-June Lee, Zhifan Ke, Liyan You, Brett M. Savoie and Jianguo Mei; Purdue University, United States

**11:30 AM \*EL15.01.04**

**n-Type Hybrid Ionic-Electronic Conjugated Polymers for High-Performance Organic Electronics** [Fei Huang](#); South China University of Technology,

China

SESSION EL15.02: Characterization of Mixed Conductors (X-Ray Methods)

Session Chairs: Lucas Flagg and Alexander Giovannitti

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 428

**1:30 PM \*EL15.02.01**

***In Situ and Operando Studies of Organic Mixed Conductors—Do Charges and Electrolyte Alter the Polymer Microstructure?*** Alberto Salleo; Stanford University, United States

**2:00 PM EL15.02.02**

**Resolving Multiscale (Dis)order in Conjugated Polymer Aggregates** Thomas P. Chaney<sup>1</sup>, Christine LaPorte Mahajan<sup>2</sup>, Chamikara D. Karunasena<sup>3</sup>, Masoud Ghasemi<sup>2</sup>, Andrew J. Levin<sup>1</sup>, Scott Milner<sup>2</sup>, Enrique Gomez<sup>2</sup>, Veaceslav Coropceanu<sup>3</sup>, Jean-Luc Bredas<sup>3</sup> and Michael F. Toney<sup>1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>The Pennsylvania State University, United States; <sup>3</sup>The University of Arizona, United States

**2:15 PM EL15.02.03**

**Counterion Condensation Near Conjugated Polymer Backbones at High Doping Potentials** Dilara Meli<sup>1</sup>, Quentin Thomas<sup>2</sup>, Nicolas Rolland<sup>2,3</sup>, Christina Kousseff<sup>4</sup>, Priscila Cavassin<sup>1</sup>, Vincent Lemaire<sup>2</sup>, Guillaume Freychet<sup>5</sup>, Abhijith Surendran<sup>1</sup>, Lucas Flagg<sup>6</sup>, Sophie Griggs<sup>4</sup>, Ruiheng Wu<sup>1</sup>, Rosalba Huerta<sup>1</sup>, Isaiah Duplessis<sup>1</sup>, Bryan D. Paulsen<sup>1,7</sup>, Tobin Marks<sup>1,1</sup>, Lincoln J. Lauhon<sup>1</sup>, Iain McCulloch<sup>4</sup>, Lee Richter<sup>6</sup>, David Beljonne<sup>2</sup> and Jonathan Rivnay<sup>1,1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Université de Mons, Belgium; <sup>3</sup>Université de Lille, France; <sup>4</sup>University of Oxford, United Kingdom; <sup>5</sup>Brookhaven National Laboratory, United States; <sup>6</sup>National Institute of Standards and Technology, United States; <sup>7</sup>University of Notre Dame, United States

**2:30 PM EL15.02.04**

**Revealing Detailed Morphology of Semiconducting Polymers with Simulation-Guided Resonant Soft X-Ray Scattering and Spectroscopy** Andrew J. Levin<sup>1</sup>, Eliot Gann<sup>2</sup>, Dean M. DeLongchamp<sup>3</sup> and Michael F. Toney<sup>1,1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Brookhaven National Laboratory, United States; <sup>3</sup>National Institute of Standards and Technology, United States

**2:45 PM EL15.02.05**

**Implications of Annealing Temperature and Dopant Size on Structure and Electrochemical Properties of PBTTT** Casey M. Davis<sup>1</sup>, Spencer Yeager<sup>2</sup>, Arianna Magni<sup>3</sup>, Lucas Flagg<sup>4</sup>, Henry Kantrow<sup>5</sup>, Natalie Stingelin<sup>5</sup>, Lee Richter<sup>4</sup>, Erin L. Ratcliff<sup>5</sup> and Michael F. Toney<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>The University of Arizona, United States; <sup>3</sup>Stanford University, United States; <sup>4</sup>National Institute of Standards and Technology, United States; <sup>5</sup>Georgia Institute of Technology, United States

**3:00 PM BREAK**

SESSION EL15.03: Theory for Mixed Conductors

Session Chairs: Alexander Giovannitti and Scott Keene

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 428

**3:30 PM \*EL15.03.01**

**Coupling of Ionic and Electronic Dynamics in Doped Semiconducting Polymers** Alessandro Troisi; University of Liverpool, United Kingdom

**4:00 PM EL15.03.02**

**A Data Driven Approach to Enhancing Specific Capacity in n-Type OMEICs for Energy Storage** Iona E. Anderson and Jenny Nelson; Imperial College London, United Kingdom

**4:15 PM EL15.03.03**

**In-Silico EIS Characterization of Supported Lipid Bilayers on PEDOT:PSS Electrodes** Leandro Julian J. Mele, Jeremy Treiber and Alberto Salleo; Stanford University, United States

SESSION EL15.04: Poster Session: Fundamentals of Mixed Ionic-Electronic Conductors

Session Chairs: Lucas Flagg, Scott Keene and Jenny Nelson

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL15.04.01**

**Impact of Counterion Size on the Thermoelectric Properties and Seebeck Coefficient in Conjugated Polymers** Augustine O. Yusuf, Kyle N. Baustert, Carter D. Pryor and Kenneth R. Graham; University of Kentucky, United States

**EL15.04.02**

**Exploration of Charge Transport in Electrochemical Transistors and Thin Film Batteries** Yu-Chieh Lo and Chia-Chin Chen; National Taiwan University, Taiwan

**EL15.04.03**

**Analyzing Parasitic Excitons via *Operando* Electrically Pumped Spectroscopy in Blue Phosphorescent Organic Light-Emitting Diodes** Changmin Lee<sup>1</sup>, Insung Ha<sup>1</sup>, Hyun Jae Lee<sup>2</sup>, Chul Hoon Kim<sup>2</sup> and Seung Yoon Ryu<sup>1</sup>; <sup>1</sup>Dongguk University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**EL15.04.04**

**Investigating the Origin of White Emission in TAPC-Based Exciplex OLEDs with Electron Transport Layers** Changmin Lee<sup>1</sup>, Hyung Joo Lee<sup>2</sup>, Insung Ha<sup>1</sup>, Chul Hoon Kim<sup>2</sup> and Seung Yoon Ryu<sup>1</sup>; <sup>1</sup>Dongguk University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**EL15.04.05**

**Understanding Interfaces of Molybdenum Disulfide and Ionic Liquids Using Electronic Structure Methods** Jake E. DeRiseis<sup>1,2</sup>, Wenzhe Yu<sup>2</sup>, Rosalba Huerta<sup>1</sup>, Siyang Li<sup>1</sup>, Dilara Meli<sup>1</sup>, Heather Kurtz<sup>1</sup>, Mark C. Hersam<sup>1</sup>, Jonathan Rivnay<sup>1</sup>, Lincoln J. Lauhon<sup>1</sup> and Maria K. Chan<sup>2,1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Argonne National Laboratory, United States

**EL15.04.06**

**Effects of Base Strength and Coordinating Solvent on Semiconducting MOF Formation** Laila R. Monroe and Monica So; California State University, Chico, United States

**EL15.04.07**

**Variable Energy Ultraviolet Photoelectron Spectroscopy (VE-UPS) Insights into the Degradation of Conjugated Polymers** Kevin Pedersen, Janangi Liyanage, Lutfun Nahar and Kenneth R. Graham; University of Kentucky, United States

**EL15.04.08**

**The Influence of Alkylthio Side Chains in Polythiophenes for Organic Electrochemical Transistors** Thy Phan, Seth Jackson, Garrett W. Collins and Connor G. Bischak; University of Utah, United States

**EL15.04.09**

**Understanding Polymer-Ion Interactions for Improved OMIECs** Guanchen Wu<sup>1</sup>, Hang Yu<sup>1</sup>, Sachetan M. Tuladhar<sup>1</sup>, Iona Anderson<sup>1</sup>, Adam Marks<sup>2</sup> and Jenny Nelson<sup>1</sup>; <sup>1</sup>Imperial College, United Kingdom; <sup>2</sup>Stanford University, United States

**EL15.04.10**

**Synthesis and Characterisation of Nanoporous Materials for Organic Electrochemical Transistors (OECTs)** Yuyun Yao<sup>1</sup> and Iain McCulloch<sup>1,2</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>Princeton University, United States

**EL15.04.11**

**Understanding the Influence of Side Chains on Molecular Packing and Mobility in Thienothiophene Based Conjugated Polymer Mixed Conductors** Iona E. Anderson<sup>1</sup>, Jyotsana Kala<sup>2,1</sup>, Joost Kimpel<sup>3</sup>, Alexander Giovannitti<sup>3</sup>, Christian Müller<sup>3</sup> and Jenny Nelson<sup>1</sup>; <sup>1</sup>Imperial College London, United Kingdom; <sup>2</sup>Indian Institute of Technology Delhi, India; <sup>3</sup>Chalmers University of Technology, Sweden

**EL15.04.12**

**Potassium-Ion Conducting Chloride Solid Electrolyte with High Voltage Stability** [Changhoon Kim](#)<sup>1</sup>, Juhyoun Park<sup>1</sup>, Hiram Kwak<sup>1</sup>, Jae-Seung Kim<sup>2</sup>, Seungwoo Jun<sup>1</sup>, Jihoon Jeon<sup>1</sup>, Donghyeok Kim<sup>1</sup>, Dong-Hwa Seo<sup>2</sup> and Yoon Seok Jung<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**EL15.04.13**

**Decoding Charge Storage in Ionic Carbon Nitride—Paving the Way for Direct Solar Energy Storage and Dark Photocatalysis** [Deepa Khushalani](#); Tata Institute of Fundamental Research, India

**EL15.04.14**

**Engineering D-A Conjugated Polymers for High-Performance Organic Electrochemical Transistors—Insights into Structural Design and Molecular Organization** [Shinbee Oh](#)<sup>1</sup>, Tae Hoon Kim<sup>2</sup>, Keehoon Kang<sup>2</sup> and Bumjoon Kim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**EL15.04.15**

**Development of Low-Voltage Operating Applications Using Superionic Argyrodite LPSCl and Metal Oxide Semiconductors** [Beop-Gun Son](#); Pukyong National University, Korea (the Republic of)

SESSION EL15.05: Composition-Structure-Property Relationships in Mixed Conductors

Session Chairs: Connor Bischak and Jianyong Ouyang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 428

**8:30 AM \*EL15.05.01**

**Designing PEDOT Polyelectrolyte Complexes for Mixed Ionic-Electronic Conduction** [Laure V. Kayser](#); University of Delaware, United States

**9:00 AM EL15.05.02**

**Surface Oxygen Exchange Rate of Co-Doped SrTi<sub>1-x</sub>Fe<sub>x</sub>O<sub>3-δ</sub> for LT-SOC Electrodes** [Nathawuth Wongwutcharanukoun](#), Akihiro Ishii, Itaru Oikawa and Hitoshi Takamura; Tohoku University, Japan

**9:15 AM EL15.05.03**

**High-Throughput Shape Based Analysis of SAXS for Self-Assembled OMIEC Blends** [Karen Li](#)<sup>1</sup>, Kiran Vaddi<sup>1</sup>, Lilo D. Pozzo<sup>1</sup>, Soenke Seifert<sup>2</sup> and Jitendra Mata<sup>3</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Australian Nuclear Science and Technology Organisation, Australia

**9:30 AM \*EL15.05.04**

**Better Organic Semiconductors Through Liquid Purification** [Alexander Giovannitti](#); Chalmers University of Technology, Sweden

**10:00 AM BREAK**

SESSION EL15.06: New Materials for Mixed Conduction (n-Type)

Session Chairs: Connor Bischak and Jianyong Ouyang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 428

**10:30 AM \*EL15.06.01**

**Advances in Poly(Benzodifurandione) (n-PBDF)—Synthesis, Degradation and Applications** [Jianguo Mei](#); Purdue University, United States

**11:00 AM EL15.06.02**

**Over 20-Year Ambient Air Stability of N-Channel Ladder Polymer Thin-Film Transistors** [Duyen Tran](#) and Samson A. Jenekhe; University of Washington, United States

**11:15 AM EL15.06.03**

**Towards High-Performance, Environmentally Friendly n-Type Polymeric Inks** [Chi-Yuan Yang](#), Qifan Li, Jun-Da Huang, Tiefeng Liu, Tom van der Pol, Han-Yan Wu and Simone Fabiano; Linköping University, Sweden

**11:30 AM EL15.06.04**

**Ladder-Type Conjugated Polymers for High-Performance, Stable Organic Electrochemical Transistors** [Han-Yan Wu](#), Jun-Da Huang, Chi-Yuan Yang and Simone Fabiano; Linköping University, Sweden

**11:45 AM EL15.06.05**

**Mixed Ionic-Electronic Transport Properties in n-Type Conducting Polymers and Their Applications** [Haoran Tang](#); South China University of Technology, China

SESSION EL15.07: Characterization of Mixed Conductors

Session Chairs: Lucas Flagg and Dilara Meli

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 428

**1:30 PM \*EL15.07.01**

**Advanced Electrochemistry of Mixed Conducting Polymers for Optoelectronics and Switchable Devices** [Sabine Ludwigs](#); University of Stuttgart, Germany

**2:00 PM EL15.07.02**

**Resonant Tender X-Ray Diffraction Studies of Organic Mixed Ionic Electronic Conductors** Lucas Flagg<sup>1</sup>, Guillaume Freychet<sup>2,3</sup>, Ruipeng Li<sup>3</sup>, Joel H. Bombile<sup>4</sup>, Chad Risko<sup>4</sup>, Sung-Joo Kwon<sup>5</sup>, David S. Ginger<sup>5</sup>, Justin Neu<sup>6</sup>, Wei You<sup>6</sup> and [Lee Richter](#)<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>University of Grenoble, France; <sup>3</sup>Brookhaven National Laboratory, United States; <sup>4</sup>University of Kentucky, United States; <sup>5</sup>University of Washington, United States; <sup>6</sup>University of North Carolina at Chapel Hill, United States

**2:15 PM EL15.07.03**

**Exploring the Interplay Between Microstructure Evolution, Polaron Formation and Charge Transport in OMIECs** [Arianna Magni](#), Adam Marks, Tyler Quill and Alberto Salleo; Stanford University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EL15.08: Characterization of Mixed Conductors (Spectroscopy)

Session Chairs: Lucas Flagg and Dilara Meli

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 428

**3:30 PM \*EL15.08.01**

**Fundamentals of Electrochemical Doping in OECTs** [Natalie Banerji](#); University of Bern, Switzerland

**4:00 PM EL15.08.02**

**Enhancing Doping Efficiency in Self-Assembled Cylindrical Micelles of Conjugated Polyelectrolytes via Sidechain Engineering** [Xinyu Liu](#); University of California, Los Angeles, United States

**4:15 PM EL15.08.03**

**Controlling Ion Uptake in Carboxylated Mixed Conductors** [Zeyuan Sun](#)<sup>1</sup>, Rajiv Giridharagopal<sup>2</sup>, Mengting Sun<sup>1</sup>, Siyu Qin<sup>1</sup>, Meng Wang<sup>1</sup>, Brian Khau<sup>3</sup>, Thomas Gartner<sup>1</sup>, David S. Ginger<sup>2</sup>, Christopher J Takacs<sup>4</sup> and Elsa Reichmanis<sup>1</sup>; <sup>1</sup>Lehigh University, United States; <sup>2</sup>University of Washington, United States; <sup>3</sup>Georgia Institute of Technology, United States; <sup>4</sup>SLAC National Accelerator Laboratory, United States

**4:30 PM EL15.08.04**

**Revealing Dynamic Lithium Transport Pathways Through Crack Formation in Phase-Separating Materials Using *Operando* Soft X-Ray Microscopy Imaging**

**Chihyun Nam**<sup>1</sup>, Bonho Koo<sup>1</sup>, Juwon Kim<sup>1</sup>, Jinkyu Chung<sup>1</sup>, Jaejung Song<sup>1</sup>, Namdong Kim<sup>2</sup>, Markus Weigand<sup>3</sup>, Jian Wang<sup>4</sup> and Jongwoo Lim<sup>1</sup>;

<sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>3</sup>Helmholtz-Zentrum Berlin, Germany; <sup>4</sup>Canadian Light Source, Canada

**4:45 PM EL15.08.05**

**Electrochemical Doping of Organic Mixed Conductors in the Anti-Ambipolar Regime— In *Operando* Insights**

**Tom van der Pol**<sup>1</sup>, Han-Yan Wu<sup>1</sup>, Silan Zhang<sup>1</sup>, Vincent Lemaur<sup>2</sup>, Demetra Tsokkou<sup>3</sup>, Chiara Musumeci<sup>1</sup>, Arianna Magni<sup>4</sup>, Chi-Yuan Yang<sup>1</sup>, Alberto Salleo<sup>4</sup>, Natalie Banerji<sup>3</sup>, Scott T. Keene<sup>5</sup>, David Beljonne<sup>2</sup> and Simone Fabiano<sup>1</sup>; <sup>1</sup>Linköping University, Sweden; <sup>2</sup>University of Mons, Belgium; <sup>3</sup>University of Bern, Switzerland; <sup>4</sup>Stanford University, United States; <sup>5</sup>Rice University, United States

SESSION EL15.09: Mixed Conduction in Devices

Session Chairs: Micaela Matta and Jianyong Ouyang

Thursday Morning, April 10, 2025

Summit, Level 4, Room 428

**8:30 AM ^EL15.09.01**

**Contact-Limited Behaviours in Organic Electrochemical Transistors** Keehoon Kang; Seoul National University, Korea (the Republic of)

**9:00 AM EL15.09.02**

**On the Effects of Strain in Intrinsically Stretchable OECTs** Carla Volkert<sup>1</sup>, Renan Colucci<sup>1</sup>, Pol Besenius<sup>2</sup>, George G. Malliaras<sup>3</sup> and Ulrike Kraft<sup>1</sup>; <sup>1</sup>Max

Planck Institute for Polymer Research, Germany; <sup>2</sup>Johannes Gutenberg Universität, Germany; <sup>3</sup>University of Cambridge, United Kingdom

**9:15 AM EL15.09.03**

**Influence of Redox Engineering on the Trade-Off Relationship Between Thermopower and Electrical Conductivity in Lanthanum Titanium-Based**

**Transition Metal Oxides** Mohammad E. El Loubani<sup>1</sup>, Gene Yang<sup>1</sup>, Seyed Morteza Taghavi Kouzehkanan<sup>2</sup>, Tae-Sik Oh<sup>2</sup>, Santosh Kiran Balijepalli<sup>1</sup> and

Dongkyu Lee<sup>1</sup>; <sup>1</sup>University of South Carolina, United States; <sup>2</sup>Auburn University, United States

**9:30 AM \*EL15.09.04**

**Advancing Perovskite Solar Cell Development and Stability Using In-Line Electrochemical Methodologies** Erin L. Ratcliff; Georgia Institute of

Technology, United States

**10:00 AM BREAK**

SESSION EL15.10: Transport in Mixed Conductors

Session Chairs: Micaela Matta and Jianyong Ouyang

Thursday Morning, April 10, 2025

Summit, Level 4, Room 428

**10:30 AM \*EL15.10.01**

**Role of Mobile Ions in Mixed Conducting Devices Close to Equilibrium and Under Light or Voltage Bias** Davide Moia<sup>1,2</sup>, Mina Jung<sup>2</sup>, Ya-Ru Wang<sup>2</sup>,

Sandra Jenatsch<sup>1</sup>, Beat Ruhstaller<sup>1</sup> and Joachim Maier<sup>2</sup>; <sup>1</sup>Fluxim AG, Switzerland; <sup>2</sup>Max Planck Institute for Solid State Research, Germany

**11:00 AM EL15.10.02**

**The Effect of Macroscopic Fields and Electrochemical Potential on Ion Transport in Organic Electrochemical Devices** Loren G. Kaake; Simon Fraser

University, Canada

**11:15 AM EL15.10.03**

**Collapse or Enhance—Understanding the Impact of Amphiphilic Side Chains on Charge Transport and Storage in Mixed Conducting Polymers**

Hang Yu<sup>1</sup>, Adam Marks<sup>2,3</sup>, Sachetan M. Tuladhar<sup>1</sup>, Nicholas Siemons<sup>1</sup>, Iona Anderson<sup>1</sup>, Sophia Bidinger<sup>4</sup>, Scott T. Keene<sup>4</sup>, Guanchen Wu<sup>1</sup>, George G.

Malliaras<sup>4</sup>, Iain McCulloch<sup>2,5</sup> and Jenny Nelson<sup>1</sup>; <sup>1</sup>Imperial College London, United Kingdom; <sup>2</sup>University of Oxford, United Kingdom; <sup>3</sup>Stanford University, United States; <sup>4</sup>University of Cambridge, United Kingdom; <sup>5</sup>Princeton University, United States

**11:30 AM \*EL15.10.04**

**Modeling Sensing in Organic Electrochemical Transistors** Luka Bislich, Henrique Frulani de Paula Barbosa, Fabio LaMantia and Bjorn Lussem; Universität Bremen, Germany

SESSION EL15.11: Characterization with Mixed Conductors (Microscopy)

Session Chairs: Davide Moia and Tom van der Pol

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 428

**1:30 PM \*EL15.11.01**

**Visualizing Dynamic Lithium Transport Within Individual Lithium Battery Particles** Jongwoo Lim; Seoul National University, Korea (the Republic of)

**2:00 PM EL15.11.02**

**Nanoscale Correlative Microscopy to Visualize Spatial Distributions of Ionic and Electronic Species in Organic Mixed Conductors** Seth Jackson and Connor G. Bischak; The University of Utah, United States

**2:15 PM EL15.11.03**

***In Situ* Probing of the Effects of Doping on Mechanical Properties in Organic Mixed Ionic-Electronic Materials via Atomic Force Microscopy** Rajiv Giridharagopal, Sung-Joo Kwon and David S. Ginger; University of Washington, United States

**2:30 PM \*EL15.11.04**

**Dissociative Oxygen Adsorption Rates of Co-Based Electronic and Mixed Conducting Oxides—Which is Better?** Hitoshi Takamura; Tohoku University, Japan

**3:00 PM BREAK**

SESSION EL15.12: Modeling for Mixed Conductors

Session Chairs: Davide Moia and Tom van der Pol

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 428

**3:30 PM \*EL15.12.01**

**Non-Ideal Nernstian Behavior in Organic Electrochemical Transistors—Fundamental Processes and Theory** Gregorio C. Faria, Bianca d. Feitosa, Bruno B. Torres, Douglas J. Coutinho and Marcos Luginieski; University of Sao Paulo, Brazil

**4:00 PM EL15.12.02**

**Interrogating the Structure and Dynamics of the Semiconducting Polymer–Electrolyte Interphase** Chad Risko; University of Kentucky, United States

**4:15 PM EL15.12.03**

**Rapid Oxygen Absorption and Transport in Hexagonal Manganites** Sverre M. Selbach; NTNU Norwegian University of Science and Technology, Norway

**4:30 PM \*EL15.12.04**

**Computational Design and Characterisation of Organic Mixed Conductors** Micaela Matta; King's College London, United Kingdom



SESSION EL15.13: Doping in Mixed Conductors

Session Chairs: Scott Keene and Arianna Magni

Friday Morning, April 11, 2025

Summit, Level 4, Room 428

**8:30 AM \*EL15.13.01**

**A Post-Processing Approach to Unlock Mixed Conduction in Organic Semiconductors** Christine Luscombe; Okinawa Institute of Science and Technology, Japan

**9:00 AM EL15.13.02**

**Reversible Proton Control at Pt/VO<sub>2</sub> Interface via Metal-Insulator Transition and Drift-Diffusion Equilibrium** Satoshi Hamasuna, Nada H. Besisa, Kazuya Tsuruda, Yoshihiro Furue and Takeaki Yajima; Kyushu University, Japan

**9:15 AM EL15.13.03**

**Quantifying the Delocalized and Localized Charges Upon Molecular Doping of Conjugated Polymers** Sung-Joo Kwon<sup>1</sup>, Yusuf Olanrewaju<sup>2</sup>, Rajiv Giridharagopal<sup>1</sup>, Justin Neu<sup>3</sup>, Wei You<sup>3</sup>, Franky So<sup>2</sup> and David S. Ginger<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>North Carolina State University, United States; <sup>3</sup>University of North Carolina at Chapel Hill, United States

**9:30 AM EL15.13.04**

**The Role of Polymer Crystallization and Counterions in the Formation of Polarons and Bipolarons in Chemically -Doped Semiconducting Polymers** Kara Lo<sup>1</sup>, Charlene Salamat<sup>1</sup>, Eric Wu<sup>1</sup>, Nesibe Akmansen-Kalayci<sup>1</sup>, Pratyusha Das<sup>2</sup>, Barry C. Thompson<sup>3</sup>, Evan Doud<sup>1</sup>, Alexander Spokoyny<sup>1</sup>, Sarah H. Tolbert<sup>1</sup> and Benjamin Schwartz<sup>1</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>University of California, Santa Barbara, United States; <sup>3</sup>University of Southern California, United States

**9:45 AM EL15.13.05**

**Solvent Swelling in Semiconducting Polymers Dictate Doping Ability** Nesibe Akmansen-Kalayci<sup>1</sup>, Charlene Salamat<sup>1</sup>, Bintao Hu<sup>1</sup>, Germany Diaz De la Cruz<sup>2</sup>, Linnea Shu<sup>1</sup>, Quynh M. Duong<sup>1</sup>, Benjamin Schwartz<sup>1</sup>, Barry C. Thompson<sup>2</sup>, Sri Narayan<sup>2</sup>, Bruce S. Dunn<sup>1</sup> and Sarah H. Tolbert<sup>1,1</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>University of Southern California, United States

**10:00 AM BREAK**

SESSION EL15.14: Advances in Mixed Ionic-Electronic Conductors

Session Chairs: Lucas Flagg and Arianna Magni

Friday Morning, April 11, 2025

Summit, Level 4, Room 428

**10:30 AM EL15.14.01**

**Real-Time Gravimetric and Spectroelectrochemical Analysis of Mixed Ionic-Electronic Conductive Materials Electrosynthesis** Craig Milroy<sup>1</sup>, Zachary Laswick<sup>2</sup>, Priscila Cavassin<sup>2</sup>, Giovanni Maria Matrone<sup>2</sup>, Dilara Meli<sup>2</sup>, Ruiheng Wu<sup>2,3</sup> and Jonathan Rivnay<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>Stanford University, United States

**10:45 AM EL15.14.02**

**Atomic-Scale Investigation of Structural Evolution and Resistive Switching Behaviors in Bismuth Selenium-Based Resistive Random-Access Memory** Yi-Chun Chen<sup>1</sup>, Che-Hung Wang<sup>1</sup>, Yong-Jyun Wang<sup>2</sup>, Ying-Hao Chu<sup>2</sup> and Wen-Wei Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>2</sup>National Tsing Hua University, Taiwan

**11:00 AM EL15.14.03**

**Transport in Doped Polythiophenes and Polythienothiophenes with Alkyl or Glycol Sidechains** Basil Hunger<sup>1</sup>, Demetra Tsokkou<sup>1</sup>, Maximilian Horn<sup>1</sup>, Eva Röck<sup>1</sup>, Lize Byne<sup>2</sup>, Wouter Maes<sup>2</sup> and Natalie Banerji<sup>1</sup>; <sup>1</sup>University of Bern, Switzerland; <sup>2</sup>Hasselt University, Belgium

**11:15 AM EL15.14.04**

**Ionic-Based Electrochemical Gas Sensor for Ultra-Low SO<sub>2</sub> Detection** Francisco J. Lagunas Vargas<sup>1</sup>, Hacksung Kim<sup>2,1</sup>, Gabriella Myslo<sup>3,1</sup> and Zachary D. Hood<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>Princeton University, United States

**11:30 AM EL15.14.05**

**Simultaneous Enhancement in Seebeck Coefficient and Electrical Conductivity in a Doped Conjugated Polymer Under Non-Equilibrium Conditions** [Ian Jacobs](#), Dionisius Hardjo Lukito Tjhe, Xinglong Ren and Henning Sirringhaus; University of Cambridge, United Kingdom

**11:45 AM EL15.14.06**

**Multi-Charge Complexes and Spin Pairing in Electrochemically Doped Conjugated Polymers** [Joel H. Bobile](#)<sup>1</sup>, Megan R. Brown<sup>1</sup>, Zhiting Chen<sup>2</sup>, Erin L. Ratcliff<sup>3</sup>, Kenneth R. Graham<sup>1</sup> and Chad Risko<sup>1</sup>; <sup>1</sup>University of Kentucky, United States; <sup>2</sup>The University of Arizona, United States; <sup>3</sup>Georgia Institute of Technology, United States

## SYMPOSIUM EL16

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Nanogenerators and Piezotronics  
April 8 - April 11, 2025

Symposium Organizers

Till Fromling, Technical University of Darmstadt  
Miso Kim, Sungkyunkwan University  
Xudong Wang, University of Wisconsin--Madison  
Wenzhuo Wu, Purdue University

Symposium Support

**Bronze**

*APL Electronic Devices*

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EL16.01: Medical Applications of Triboelectric Nanogenerators

Session Chairs: Xudong Wang and Wenzhuo Wu

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 437

**10:30 AM \*EL16.01.01**

**Ultrasound-Coupled Sustainable Triboelectric Power Solution for Implantable Medical Devices** [Sang-Woo Kim](#); Yonsei University, Korea (the Republic of)

**11:00 AM EL16.01.02**

**A Self-Expanding and Degradable Biomaterial Enabling Self-Flattening Film-Based Devices for Catheter Delivery** [Ruoxing Wang](#) and Xudong Wang; University of Wisconsin-Madison, United States

**11:15 AM ^EL16.01.03**

**Smart Textiles for Personalized Health Care** [Jun Chen](#); University of California, Los Angeles, United States

**11:45 AM EL16.01.04**

**Ultrasound-Responsive Piezoelectric Aligned Nanofiber Nerve Guidance Conduit for Peripheral Nerve Regeneration** [Sera Jeon](#)<sup>1</sup>, Dabin Kim<sup>1</sup>, Min-Young Jo<sup>2</sup>, Chae-Min Ryu<sup>2</sup>, Jae Kwang Kim<sup>2</sup>, Miso Kim<sup>3</sup> and Sang-Woo Kim<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>University of Ulsan College of Medicine, Korea (the Republic of); <sup>3</sup>Sungkyunkwan University, Korea (the Republic of)

SESSION EL16.02: Piezocatalysis

Session Chairs: Xudong Wang and Wenzhuo Wu

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 437

**1:30 PM \*EL16.02.01**

**Revolutionary Sustainable Energy Production Through Piezocatalysis** Jyh Ming Wu and Hsun-Yen Lin; National Tsing Hua University, Taiwan

**2:00 PM EL16.02.02**

**Zinc Indium Sulfide-Based Nanosheets for Fluid-Mechanical-Energy Driven Piezo-Photocatalytic Simultaneous Hydrogen Evolution and Biomass Valorization** Chih-Ning Tsai<sup>1</sup>, Hong-Kang Tian<sup>1</sup>, Yan-Gu Lin<sup>2</sup> and Jih-Jen Wu<sup>1</sup>; <sup>1</sup>National Cheng Kung University, Taiwan; <sup>2</sup>National Synchrotron Radiation Research Center, Taiwan

**2:15 PM \*EL16.02.03**

**Nanoscale Ferroelectric-Semiconductor Coupling for Enhanced Photovoltaic and Photocatalytic Devices** Joe Briscoe; Queen Mary University of London, United Kingdom

**2:45 PM EL16.02.04**

**Piezoelectric ZnO Nanorod for Piezo-Electrocatalysis** Meng Hao Lee and Wenzhuo Wu; Purdue University, United States

**3:00 PM BREAK**

SESSION EL16.03: Biomaterials Based Piezoelectric and Triboelectric Applications

Session Chairs: Jun Chen and Jyh Ming Wu

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 437

**3:30 PM \*EL16.03.01**

**Piezoelectric Nano-Biomaterials for Next Generation Cochlear Implants** Serena Danti<sup>1,2</sup>, Massimiliano Labardi<sup>2</sup>, Fatemeh Mokhtari<sup>3</sup>, Bahareh Azimi<sup>1</sup> and Stefano Berrettini<sup>1</sup>; <sup>1</sup>University of Pisa, Italy; <sup>2</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>3</sup>KU Leuven, Belgium

**4:00 PM EL16.03.02**

**Advanced Cardiovascular Wearables Through Dispersion-Enhanced Negative Triboelectrification in Lignin-Skin-Integrated Triboelectric Sensors** Robert Ccorahua and Wenzhuo Wu; Purdue University, United States

**4:15 PM \*EL16.03.03**

**Wood-Based Functional Materials for Electronic Applications** Christopher H. Dreimol<sup>1</sup>, Maximilian Ritter<sup>1</sup>, Ingo Burgert<sup>1,2</sup> and Yong Ding<sup>1,2</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**4:45 PM EL16.03.04**

**Bio-MOF-11 as a Highly Stable Positive Triboelectric Agent and Acoustic-Responsive Dissolution for Ultrasound-Driven Transient Triboelectric Nanogenerator** Dabin Kim<sup>1</sup>, Sera Jeon<sup>1</sup>, Cheol Hyoun Ahn<sup>2</sup>, Hyung Koun Cho<sup>3</sup> and Sang-Woo Kim<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Gangneung-Wonju National University, Korea (the Republic of); <sup>3</sup>Sungkyunkwan University, Korea (the Republic of)

SESSION EL16.04: Advanced Manufacturing of Piezoelectric and Triboelectric Technologies

Session Chairs: Simiao Niu and Ruoxing Wang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 437

**8:00 AM EL16.04.01**

**3D-Printed Piezoelectric Stents for Electricity Generation from Pressure Fluctuation** [Fengdan Pan](#)<sup>1</sup>, Jiajie Sui<sup>1</sup>, Zulmari Silva<sup>1,2</sup>, Jack Bontekoe<sup>2</sup>, Corey Carlos<sup>1</sup>, Grace Wu<sup>1,2</sup>, Wenjian Liu<sup>1</sup>, Jinghan Gao<sup>1</sup>, Bo Liu<sup>2</sup> and Xudong Wang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>University of Wisconsin School of Medicine and Public Health, United States

**8:15 AM \*EL16.04.02**

**Electrospun Piezoelectric Fibers for Tissue Engineering and Smart Textiles in Energy Harvesting Applications** [Urszula Stachewicz](#); AGH University of Krakow, Poland

**8:45 AM EL16.04.03**

**Flexible, Low Defect Density and Single-Layer MoS<sub>2</sub> Piezoelectric Sensor for Slippage Detection in Soft Gripper** [Yun Li](#)<sup>1,2</sup> and Pooi See Lee<sup>1,2</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>The Smart Grippers for Soft Robotics (SGSR) Programme, Campus for Research Excellence and Technological Enterprise (CREATE), Singapore 138602, Singapore

**9:00 AM \*EL16.04.04**

**Printed Piezoelectric Transducers for Highly Integrated Motion, Vibration and Magnetic Field Harvesting** [Barbara Stadlober](#), Philipp Schöffner, Asier Alvarez Rueda, Andreas Petritz, Oliver Werzer, Jonas Groten, Krzysztof Krawczyk, Matthias Hammer, Manfred Adler, Elisabeth Schreck, Maria Belegatis, Andreas Tschepp and Martin Zirkl; Joanneum Research Forschungsgesellschaft, Austria

**9:30 AM EL16.04.05**

**A Transparent, Self-Healing Triboelectric Sensor for UV and Cardiovascular Monitoring During Outdoor Activities** [Pedro Henrique de Souza Barbosa](#), Don K. Perera, Nachiket Vatar and Wenzhuo Wu; Purdue University, United States

**9:45 AM BREAK**

SESSION EL16.05: Piezoelectric and Triboelectric Energy Applications

Session Chairs: Yong Ding and Ruoxing Wang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 437

**10:30 AM \*EL16.05.01**

**Liquid Metal Enabled Mechano Catalytic Conversion of Organic Materials** [Kourosh Kalantar-Zadeh](#)<sup>1,2</sup>; <sup>1</sup>University of New South Wales, Australia; <sup>2</sup>University of Sydney, Australia

**11:00 AM EL16.05.02**

**Piezoelectricity in Two-Dimensional Lead-Free Halide Double Perovskite Nanocomposites—The Effect of Large Organic Cation** [Jiamin Amanda Ong](#)<sup>1,2,3</sup>, Yun Li<sup>1,3</sup>, Moria-Ahuva Lighthouse<sup>2</sup>, Xiaodong Chen<sup>1,3</sup>, Pooi See Lee<sup>1,3</sup> and Lioz Etgar<sup>2,3</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>The Hebrew University of Jerusalem, Israel; <sup>3</sup>Campus for Research Excellence and Technological Enterprise (CREATE), Singapore

**11:15 AM \*EL16.05.03**

**2D-Materials and Hydrogels for Energy Harvesting and Self-Powered Sensing** [Giuseppina Pace](#)<sup>1,2</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Istituto Italiano di Tecnologia, Italy

**11:45 AM EL16.05.04**

**Triboelectric Charge Separation and Transfer at Interfaces** [Siowling Soh](#); National University of Singapore, Singapore

SESSION EL16.06: Self-powered Sensing

Session Chairs: Giuseppina Pace and Changsheng Wu

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 437

**1:30 PM \*EL16.06.01**

**A Triboelectric Nanogenerator Based on Waste Plastic and Plasma Printing of 2D Layered Materials Via Modulation of the Electrical and Dielectric Properties** Satheesh Krishnamurthy; University of Surrey, United Kingdom

**2:00 PM +EL16.06.02**

**Self-Powered and Self-Healable Triboelectric Sensors for Soft Robotics Applications** Sohini Kar-Narayan; University of Cambridge, United Kingdom

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EL16.07: Piezoelectric and Triboelectric Sensors

Session Chair: Changsheng Wu

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 437

**3:30 PM ^EL16.07.01**

**A High-Performance Charge Supplement Pump Triboelectric Nanogenerator with 1.34 W Maximum Output Power from Foot Stepping** Changsheng Wu; National University of Singapore, Singapore

**4:00 PM \*EL16.07.02**

**Optimizing Triboelectric Nanogenerators' Structural Design by Surrogate Models and Interpretable Machine Learning** Simiao Niu; Rutgers, The State University of New Jersey, United States

**4:30 PM EL16.07.03**

**Simultaneous Triboelectricity with Mechanoluminescence for Self-Powered Systems** Sugato Hajra and Hoe Joon Kim; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

SESSION EL16.08: Poster Session I: Piezoelectric and Triboelectric Technologies

Session Chairs: Miso Kim and Wenzhuo Wu

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL16.08.01**

**A Compact-Sized Fully Self-Powered Wireless Flowmeter Based on Triboelectric Discharge** Dong Wan and Yunlong Zi; Hong Kong University of Science and Technology, China

**EL16.08.07**

**Tribological Enhancement of Triboelectric Nanogenerator Based on Lubrication** Jongsuk Lee, Seh-Hoon Chung, Sangmin Lee and Sunghan Kim; Chung-Ang University, Korea (the Republic of)

**EL16.08.02**

**Zinc Vanadate Phosphor-Based Triboelectric Nanogenerators for Mechanical Energy Harvesting and Self-Powered Systems** Muddamalla Rakshita, Rakesh Kumar Rajaboina and Haranath Divi; National Institute of Technology Warangal, India

**EL16.08.03**

**Electrostimulation Cell Culture Assembly Incorporated with Chemically Modified Coiled Carbon Nanotube Yarn-Based Twistrion Harvesters** Seongjae Oh<sup>1,2</sup> and Shi Hyeong Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

**EL16.08.04**

**Crystalline Beta Phase as a Function of Temperature in Electrospun and Melt Extruded PVDF** [Keir A. Nathan](#), Sarah Cartmell, Jonny Blaker and Alex Casson; University of Manchester, United Kingdom

**EL16.08.05**

**Hybrid Triboelectric—Hydrovoltaic Generator Based on 2D-Borophene Nanosheets Charge Trapping Layer to Harvest Electrical Energy from Moisture, Sweat and Rainwater for Self-Powering Electronics and Gas Sensor** [Nishat Kumar Das](#), Banalata Maji and Sushmee Badhulika; Indian Institute of Technology, Hyderabad, India

**EL16.08.06**

**Laser-Induced Graphene Skin-Like Triboelectric Sensor for Heart Rate Monitoring** [Tuhina Saxena](#), Pedro Henrique de Souza Barbosa and Wenzhuo Wu; Purdue University, United States

**EL16.08.08**

**Stabilization of FAPbI<sub>3</sub> with PVDF and the Enhanced Piezoelectric Behavior for Energy Harvesting and Multifarious Smart Sensing Applications** [Chandra Mouli Nannapaneni](#), Niloy Mridha and Aswani Yella; Indian Institute of Technology, Bombay, India

**EL16.08.09**

**Harvesting Electrical Energy Based on Carbon Nanotube Yarn by Flow-Induced Mechanical Energy** [Ji Hwan Moon](#), Jae Sang Hyeon and Seon Jeong Kim; Hanyang University, Korea (the Republic of)

**EL16.08.10**

**Investigation of Flexible Circuit Board Origami-TENG for Wave Energy Conversion Module** [Tavis Peterson](#) and Calum Kenny; National Renewable Energy Laboratory, United States

**EL16.08.11**

**Integration of Seawater Batteries and Wave Energy Harvesters for Autonomous Marine Power Systems** [João P. Ferreira](#)<sup>1,2,3</sup>, Joao Ventura<sup>1</sup>, Candido Duarte<sup>1,3</sup> and Joana E. Oliveira<sup>1,2</sup>; <sup>1</sup>University of Porto, Portugal; <sup>2</sup>LAETA, Portugal; <sup>3</sup>INESC TEC, Portugal

**EL16.08.12**

**Energy Harvesting Based on TPU-Ecoflex/ZnO/MWCNT Triboelectric Nanogenerator** Md. Arafat Hossain, Md. Wasikur Rahman and [Jasim Uddin](#); The University of Texas Rio Grande Valley, United States

**EL16.08.13**

**Transformative Nanofiber-Based Triboelectric Nanogenerator—Utilizing Recycled Polystyrene and Dual Nanoparticle Doping for Enhanced Performance in Energy Harvesting** Andrea K. Quezada, Luke Franco and [Jasim Uddin](#); The University of Texas Rio Grande Valley, United States

**EL16.08.14**

**High-Performance Triboelectric Stent Sensor with Nitinol-Based Chemical Design** Ulises Vidaurri J. Romero, Jianzhi Li, Md. Wasikur Rahman and [Jasim Uddin](#); The University of Texas Rio Grande Valley, United States

**EL16.08.15**

**Poly (Methyl Methacrylate) (PMMA) and Polydimethylsiloxane (PDMS) Based Electrospun Scaffolds for Piezoelectric Applications in Electrical and Biomedical Engineering** Noor Khattak, Jacob Bornstein and [Isaac Macwan](#); Fairfield University, United States

**EL16.08.16**

**Tuning Ferroelectric and Spin Polarizations in 2D CuInP2S6 Crystals for Enhanced Photocatalytic CO<sub>2</sub> Reduction** [Chia-Chun Chen](#)<sup>1</sup>, Chun-Wei Chen<sup>2</sup>, Di-Yan Wang<sup>1</sup> and Yi-Chun Wu<sup>2</sup>; <sup>1</sup>National Taiwan Normal University, Taiwan; <sup>2</sup>National Taiwan University, Taiwan

**EL16.08.17**

**Effect of Urea Concentration on Lithium Tantalate Solid-State Synthesis** [Chinenye Eze](#), Partha Chowdhury, Zackary McCray and Sheena M. Reeves; Prairie View A&M University, United States

**EL16.08.18**

**Water-Droplet Triboelectric Nanogenerators Based on PDMS@TiO<sub>2</sub> Nanostructures** [Fernando Núñez Gálvez](#)<sup>1,2</sup>, Xabier Garcia-Casas<sup>1</sup>, Jorge Budagosky<sup>1,2</sup>, Hari K. Mishra<sup>1</sup>, Juan Sanchez-Valencia<sup>1</sup>, Angel Barranco<sup>1</sup>, Carmen Lopez-Santos<sup>1,2</sup> and Ana Borrás<sup>1</sup>; <sup>1</sup>Instituto de Ciencia de Materiales de Sevilla, Spain; <sup>2</sup>University of Seville, Spain

**EL16.08.19**

**Characterization of Lithium Tantalate Powder Synthesized for Application in Nanogenerators** [Partha Chowdhury](#), Sheena M. Reeves and Chinenye Eze; Prairie View A&M University, United States

**EL16.08.20**

**Antiferroelectric-to-Ferroelectric Transition—A New Means for Efficient Piezocatalysis** [Wafa Amdouni](#)<sup>1</sup>, Krina Parmar<sup>2</sup>, Nicolas Guiblin<sup>1</sup>, Jens Kreisel<sup>3</sup>, Thomas Maroutian<sup>4</sup>, Mojca Otoničar<sup>5</sup>, Stephane Fusil<sup>2</sup>, Vincent Garcia<sup>2</sup>, Sebastjan Glinsek<sup>6</sup> and Brahim Dkhil<sup>1</sup>; <sup>1</sup>CentraleSupélec, Université Paris-Saclay, France; <sup>2</sup>Laboratoire Albert Fert, CNRS, Thales, Université Paris-Saclay, France; <sup>3</sup>University of Luxembourg, Luxembourg; <sup>4</sup>Centre de Nanosciences et Nanotechnologies, Université Paris-Saclay, CNRS, UMR 9001, France; <sup>5</sup>Jozef Stefan Institute, Slovenia; <sup>6</sup>Luxembourg Institute of Science and Technology, Luxembourg

**EL16.08.21**

**Enhancing Energy Output and Long-Term Stability of Triboelectric Nanogenerators via Advanced Coating Techniques** [Qingyang Zhou](#) and Takashi Ikuno; Tokyo University of Science, Japan

**EL16.08.22**

**Sonochemically Synthesized Al-Doped ZnO Nanorods-Based Flexible Piezoelectric Nanogenerators for Durable Energy Harvesting** [Tiham Fayaz](#), Ahmed H. Jalal and Fahmida Alam; The University of Texas Rio Grande Valley, United States

SESSION EL16.09: Energy Harvesting

Session Chairs: Miso Kim and Lijie Li

Thursday Morning, April 10, 2025

Summit, Level 4, Room 437

**8:15 AM EL16.09.01**

**Construction and Applications of Fur-Brush Triboelectric Nanogenerators with High Performance and High Durability** [Pengfei Chen](#)<sup>1</sup>, Xudong Wang<sup>1</sup> and ZhongLin Wang<sup>2,3</sup>; <sup>1</sup>University of Wisconsin–Madison, United States; <sup>2</sup>Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China; <sup>3</sup>Georgia Institute of Technology, United States

**8:30 AM \*EL16.09.02**

**Blue Energy Triboelectric Nanogenerators—From Modelling to Large Scale Experimental Testing** [Joao Ventura](#); Faculty of Sciences of the University of Porto, Portugal

**9:00 AM EL16.09.03**

**Electromechanical and Electrochemical Energy Harvesting from Ambient Moisture** Jiaming Zhou, Eunjong Kim and [Dong-Myeong Shin](#); University of Hong Kong, Hong Kong

**9:15 AM EL16.09.04**

**Integration of Energy Harvesting and Storage by Magnetic Field-Enhanced Battery Fibers** [Xiao Xiao](#)<sup>1</sup>, Xiao Xiao<sup>2</sup>, Chang Liu<sup>1</sup>, Xiaosa Li<sup>2</sup>, Zimo Wang<sup>1,2</sup>, Ghim Wei Ho<sup>1</sup> and Changsheng Wu<sup>1</sup>; <sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Tsinghua University, China

**9:30 AM \*EL16.09.05**

**Solar and Triboelectric Energy Generators Using Eco-Friendly Materials and Resource-Efficient Processes** [Ravinder Dahiya](#); Northeastern University, United States

**10:00 AM BREAK**

SESSION EL16.10: Piezoelectrics and Ferroelectrics

Session Chairs: Lijie Li and Morten Willatzen

Thursday Morning, April 10, 2025

Summit, Level 4, Room 437

**10:30 AM \*EL16.10.01**

**Dopants, Defects and Domains in Wurtzite Ferroelectrics** Nate Bernstein<sup>1,2,3</sup>, Margaret Brown<sup>1</sup>, Jun Weng Yeo<sup>1</sup>, Cheng-Wei Lee<sup>1,2</sup>, Victoria Bradford<sup>4,1,2</sup>, Thi Nguyen<sup>5</sup>, Daniel Drury<sup>3</sup>, Keisuke Yazawa<sup>2,1</sup>, Brendan Hanrahan<sup>3</sup>, Prashun Gorai<sup>5,2,1</sup> and Geoff L. Brennecke<sup>1</sup>; <sup>1</sup>Colorado School of Mines, United States; <sup>2</sup>National Renewable Energy Laboratory, United States; <sup>3</sup>U.S. Army Research Laboratory, United States; <sup>4</sup>University of Connecticut, United States; <sup>5</sup>Rensselaer Polytechnic Institute, United States

**11:00 AM EL16.10.02**

**Ferroelectric Domain Dynamics of Alternating Current and Direct Current Poled Relaxor-PbTiO<sub>3</sub> Single Crystals Using *In Situ* X-Ray Photon Correlation Spectroscopy** Jeong-Woo Sun<sup>1,2</sup>, Zhengze Xu<sup>2</sup>, Sang-Goo Lee<sup>3</sup>, Wook Jo<sup>1</sup>, Xiaoning Jiang<sup>2</sup> and Jong Eun Ryu<sup>2</sup>; <sup>1</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>North Carolina State University, United States; <sup>3</sup>iBULe Photonics, Inc., Korea (the Republic of)

**11:15 AM \*EL16.10.03**

**Microwave Frequency Phononic Classical and Quantum Information Processing Enabled By Strong Electron-Phonon Interactions** Matt Eichenfield<sup>1,2,3</sup>; <sup>1</sup>University of Arizona, United States; <sup>2</sup>Sandia National Laboratories, United States; <sup>3</sup>Center for Integrated Nanotechnologies, United States

**11:45 AM EL16.10.04**

**Introducing Lead-Free Hybrid Organic-Inorganic Halobismuthates as High Performance Piezoelectrics** Benjamin Gallant<sup>1,2</sup>, Esther Hung<sup>2</sup>, Henry Snaith<sup>2</sup>, Harry C. Sansom<sup>3,2</sup> and Dominik Kubicki<sup>1</sup>; <sup>1</sup>University of Birmingham, United Kingdom; <sup>2</sup>University of Oxford, United Kingdom; <sup>3</sup>University of Bristol, United Kingdom

SESSION EL16.11: Design of Piezoelectric and Triboelectric Systems

Session Chair: Sangtae Kim

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 437

**1:30 PM \*EL16.11.01**

**Inducing Piezoelectric Effect for Centrosymmetric Semiconductors by Doping/Defect** Lijie Li; Swansea University, United Kingdom

**2:00 PM \*EL16.11.02**

**Theory of Triboelectric Nanogenerators—Vision for a Universal Approach** Ishara Dharmasena, Rameesh Bulathsinghala and Shuxin Meng; Loughborough University, United Kingdom

**2:30 PM \*EL16.11.03**

**Quantization of the Piezoelectric Constant** Morten Willatzen; University of Aalborg, Denmark

**3:00 PM BREAK**

SESSION EL16.12: Environmental Energy Harvesting and Sensing

Session Chairs: Ishara Dharmasena and Miso Kim

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 437

**3:30 PM \*EL16.12.01**

**Direct Conversion of Thermal Energy to Stored Electrochemical Energy via a Pyroelectrochemical Cell—Exploring a New Technology Using Experiment and Simulation** Tim Kowalchik, Joshua Augenstein, Fariha Khan, Shad Roundy and Roseanne Warren; University of Utah, United States

**4:00 PM EL16.12.02**

**A Salt Concentration-Gradient Cationic Hydrogel Based Moisture-Enabled Electric Generator for Sustainable Green Energy Production** Eunjong Kim, Xiaoting Ma, Jiaming Zhou, Jingyi Gao and Dong-Myeong Shin; The University of Hong Kong, Hong Kong



**4:15 PM \*EL16.12.03**

**Electrochemically Driven Thermal Energy Harvesting via Solid-to-Liquid Phase Transition** Sangtae Kim; Hanyang University, Korea (the Republic of)

**4:45 PM EL16.12.04**

**Atomic-Thin p-Type Semiconductors Based Wearables for Personalized Digital Health** Jing Jiang and Wenzhuo Wu; Purdue University, United States

SESSION EL16.13: Poster Session II: Piezoelectric and Triboelectric Devices

Session Chairs: Ruoxing Wang and Wenzhuo Wu

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EL16.13.01**

**Development of Piezoelectric Film with Transparent Electrode for Optical Application** Makoto Imaji; Kureha America Inc., United States

**EL16.13.02**

**Structural Design of Ion-Gel Based Triboelectric Nanogenerators for Self-Powered Motion Detection** Chen Liu<sup>1</sup>, Ruibo Wang<sup>1</sup>, Ruiyi Gao<sup>2</sup>, Yuming Zhang<sup>1</sup>, Zixuan Wang<sup>1</sup> and Shiyuan Cheng<sup>1</sup>; <sup>1</sup>Xidian University, China; <sup>2</sup>Fundamentals Department, Air Force Engineering University, Xi'an 710051, China

**EL16.13.03**

**Liquid Density Sensing by a Piezoelectric Micromachined Ultrasonic Transducer (PMUT) Based on Aluminum Nitride** Hao Ren; ShanghaiTech University, China

**EL16.13.04**

**Nanocomposite Materials for Green Energy Nanogeneration and Piezocatalysis** Zouhair Hanani<sup>1</sup>, Brigita Rozic<sup>1</sup>, Salma Touili<sup>2</sup>, Youness Hadouch<sup>1</sup>, Daoud Mezzane<sup>2</sup>, Mimoun El Marssi<sup>3</sup>, Hana Ursic<sup>1</sup>, Matjaz Spreitzer<sup>1</sup> and Zdravko Kutnjak<sup>1</sup>; <sup>1</sup>Jozef Stefan Institute, Slovenia; <sup>2</sup>Cadi Ayyad University, Morocco; <sup>3</sup>University of Picardie Jules Verne, France

**EL16.13.05**

**Scalable Low-Dimensional Laser-Induced Graphene Heterostructure for Wearable IR/NIR Photodetectors** Don K. Perera and Wenzhuo Wu; Purdue University, United States

**EL16.13.06**

**Enhanced Wearability and Performance in Laser-Induced Graphene Sensors Through Bio-Inspired Interfacial Cross-Linking** Pedro Henrique de Souza Barbosa, Tuhina Saxena and Wenzhuo Wu; Purdue University, United States

**EL16.13.07**

**Ultrathin and Flexible Solution-Processed Triboelectric Nanogenerators for e-Skin Applications** Bushara Fatma<sup>1</sup>, Rishow Singh<sup>2</sup>, Yarjan Abdul Samad<sup>1</sup>, Leontios Hadjileontiadis<sup>1</sup>, Ashish Garg<sup>2</sup>, Blaise Tardy<sup>1</sup> and Charalampos Pitsalidis<sup>1,1,1</sup>; <sup>1</sup>Khalifa University of Science and Technology, United Arab Emirates; <sup>2</sup>Indian Institute of Technology Kanpur, India

**EL16.13.08**

**Magnetic High Entropy Oxide for Water Pollutant Degradation** Sanjula Pradhan and Nand K. Prasad; Indian Institute of Technology Varanasi, India

**EL16.13.09**

**Active Dendrite Suppression by Ferroelectric Membrane Separators in Rechargeable Batteries** Yutao Dong and Wenjian Liu; University of Wisconsin-Madison, United States

**EL16.13.10**

**Highly Dispersed Nanomaterials in Polymer Matrix via Aerosol-Jet-Based Multi-Material 3D Printing** Sunho Park<sup>1</sup>, Hanul Hwang<sup>2</sup> and Yeonsik Choi<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Stanford University, United States

**EL16.13.11**

**Rationally Segmented Triboelectric Nanogenerator with a Constant Direct-Current Output and Low Crest Factor** [Pengfei Chen](#)<sup>1</sup>, Xudong Wang<sup>1</sup> and ZhongLin Wang<sup>2,3</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China; <sup>3</sup>Georgia Institute of Technology, United States

**EL16.13.12**

**Selective CO<sub>2</sub>-to-Ethanol Conversion Via Copper-Doped Bismuth Vanadate Complex in a Continuous Flow Microfluidic System** [Darshana Rajput](#)<sup>1</sup>, Mauricio Trujillo Sanchez<sup>2</sup>, Maria de la Luz Olvera Amador<sup>3</sup>, Velumani Subramaniam<sup>4</sup>, Luis Gerardo Arriaga<sup>1</sup> and Goldie Oza<sup>1</sup>; <sup>1</sup>Centro de Investigación y Desarrollo Tecnológico en Electroquímica, Mexico; <sup>2</sup>Instituto Tecnológico Superior de Xalapa, Mexico; <sup>3</sup>Centro de Investigación y de Estudios Avanzados del Instituto Politécnico Nacional, Mexico; <sup>4</sup>Texas A&M University, United States

**EL16.13.13**

**Enhanced Piezoelectric Performance and Stability via Solvent Vapor of Organic/Inorganic Piezoelectric Composites** [HakSu Jang](#)<sup>1,2</sup> and Kwi-II Park<sup>1,2,3</sup>; <sup>1</sup>Kyungpook National University, Korea (the Republic of); <sup>2</sup>Innovative Semiconductor Education and Research Center for Future Mobility, Korea (the Republic of); <sup>3</sup>Research Institute of Automotive Parts and Materials, Korea (the Republic of)

**EL16.13.14**

**Enhanced Output Performance of Piezoelectric Composites via Plasma Annealing Treatment** [HakSu Jang](#)<sup>1,2</sup>, Hyeon Jun Park<sup>1,2</sup>, Bitna Bae<sup>1,2</sup> and Kwi-II Park<sup>1,2,3</sup>; <sup>1</sup>Kyungpook National University, Korea (the Republic of); <sup>2</sup>Innovative Semiconductor Education and Research Center for Future Mobility, Korea (the Republic of); <sup>3</sup>Research Institute of Automotive Parts and Materials, Korea (the Republic of)

**EL16.13.15**

**One-Step Laser Synthesis of Hemispherical MoS<sub>2</sub> for Self-Powered Image Sensor** [Chanjin Kim](#)<sup>1</sup>, Sungwoong Park<sup>2</sup> and Byung Hee Hong<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea Research Institute of Chemical Technology, Korea (the Republic of)

**EL16.13.16**

**High Performance Millimeter Electromagnetic Generator** [Jin Pyo Lee](#)<sup>1</sup>, Xinran Zhou<sup>2</sup>, Yangyang Xin<sup>1</sup>, Dace Gao<sup>3</sup>, Peiwen Huang<sup>1</sup> and Pooi See Lee<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>Donghua University, China; <sup>3</sup>Linköping University, Sweden

**EL16.13.17**

**Polarity Controlled Electrospun P(VDF-TrFE) Nanofiber Membrane for Developing High Performing Energy Harvesting Device** Jooyeol Rhee, June Kyun Park and [Hong-Joon Yoon](#); Gachon University, Korea (the Republic of)

**EL16.13.18**

**Magneto-Mechano-Electric Harvesters for AC Circular Magnetic Fields** [Dongpyo Seo](#)<sup>1</sup>, Songhee Han<sup>2</sup>, Beongki Cho<sup>1</sup> and Seungha Yoon<sup>3</sup>; <sup>1</sup>Gwangju Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Mokpo National Maritime University, Korea (the Republic of); <sup>3</sup>Korea Institute of Industrial Technology, Korea (the Republic of)

**EL16.13.19**

**Performance Enhancement of Wearable Triboelectric Pressure Sensor with Micro-Dome Structures and Nanocomposite Dielectric Layer** [Agha A. Jan](#); Pohang University of Science and Technology, Korea (the Republic of)

**EL16.13.20**

**Enhanced Electrical Conductivity of Electrospun PVDF Fibers via Electrophoretic Deposition of MWCNTs for Sensing Applications** [Michal Kopacz](#), Piotr K. Szewczyk, Elzbieta Dlugon, Jacek Niziol and Urszula Stachewicz; AGH University of Krakow, Poland

**EL16.13.21**

**Efficient Energy Harvesting Approach Using a Multifunctional Piezo and Triboelectric PVDF/rGO Composite Nanogenerator for Energy Harvesting Applications** [Sunija Sukumaran](#), Piotr K. Szewczyk and Urszula Stachewicz; AGH University of Krakow, Poland

**EL16.13.22**

**Controlled Growth of Large-Area 2D TMD Films for Energy Harvesting Applications** [Praveen Kumar](#), Parna Maity, Bhanu B. Khatua and Prasana K. Sahoo; Indian Institute of Technology Kharagpur, India

Friday Morning, April 11, 2025  
Summit, Level 4, Room 437

**8:45 AM EL16.14.01**

**Sustainable Hydrovoltaic Power Generation Using Laser-Induced Graphitized Natural Kelp** Daewoong Kim and Sangmin Jeon; Pohang University of Science and Technology, Korea (the Republic of)

**9:00 AM \*EL16.14.02**

**Nanostructures and Plasma Polymers in Nanogenerators and Solar Cells** Gloria Moreno, Fernando Nunez-Galvez, Juan Delgado, Hari K. Mishra, Xabier Garcia-Casas, Francico Aparicio, Lidia Contreras-Bernal, Jorge Budagosky, Javier K. Castillo-Seoane, Vanda Godinho, Victor Lopez-Flores, Carmen Lopez-Santos, Juan Sanchez-Valencia, Angel Barranco and Ana Borrás; ICMSE (CSIC-US), Spain

**9:30 AM \*EL16.14.03**

**On-Skin Monolithic Hybrid Tribo-Piezo-Electromagnetic Nanogenerator for Energy Harvesting and Whole-Body Self-Powered Sensing** Ying-Chih Lai; National Chung Hsing University, Taiwan

**10:00 AM BREAK**

SESSION EL16.15: Piezoelectric and Triboelectric Energy Devices and Sensors

Session Chair: Ying-Chih Lai

Friday Morning, April 11, 2025

Summit, Level 4, Room 437

**10:30 AM \*EL16.15.01**

**Ferroelectric Oxide Thin Films as a Promising Route for Self-Powered Photodetection** Nuno Silva<sup>1</sup>, Ampattu Jayakrishnan<sup>1</sup>, Adrian Kaim<sup>2</sup>, Katarzyna Gwozdz<sup>2</sup>, Ji Soo Kim<sup>3</sup>, Mario Pereira<sup>1</sup>, Luís Marques<sup>1</sup>, Robert Hoye<sup>4</sup>, Judith MacManus-Driscoll<sup>3</sup> and José Silva<sup>1</sup>; <sup>1</sup>University of Minho, Portugal; <sup>2</sup>Wroclaw University of Science and Technology, Poland; <sup>3</sup>University of Cambridge, United Kingdom; <sup>4</sup>University of Oxford, United Kingdom

**11:00 AM \*EL16.15.02**

**Piezoelectric DC Power Generation Using a Sequential Polarization Change** Hyun-Cheol Song<sup>1,2</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

**11:30 AM \*EL16.15.03**

**Dynamic Schottky DC Generator as a Bio-Inspired Artificial Mechanoreceptor for Robotic Tactile Sensing and Manipulation** Jun Liu; University at Buffalo, The State University of New York, United States

SESSION EL16.16: Nanogenerators and Sensors

Session Chairs: Jing Jiang and Wenzhuo Wu

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 437

**2:00 PM EL16.16.02**

**High-Efficiency Charge Transfer Mechanisms in Bio-Compatible Devices for Advanced Healthcare Systems** JinKyeom Kim<sup>1,2</sup>, Jeong Min Baik<sup>2</sup> and Xudong Wang<sup>1</sup>; <sup>1</sup>University of Wisconsin–Madison, United States; <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

**2:15 PM EL16.16.03**

**Scalable Printing of Self-Healable Triboelectric Pulse Sensors** Nachiket Vatkar, Meghan Gron, William S. Walker IV, Abiram S. Gurijala, Parth U. Kelkar and Wenzhuo Wu; Purdue University, United States

**2:30 PM EL16.16.04**

**Textile Triboelectric Sensors Enabling Robotic Operations with Enhanced Actile and Proprioceptive Perception** Don K. Perera and Wenzhuo Wu; Purdue University, United States

**2:45 PM EL16.16.05**

**Hierarchical Bragg Band Gap Structures for Tunable Surface Acoustic Wave Devices** Howard J. Yawit; The University of Arizona, United States

**3:00 PM BREAK**

SESSION EL16.17: Piezoelectric and Triboelectric Devices and Sensors

Session Chairs: Ishara Dharmasena and Jing Jiang

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 437

**3:30 PM EL16.17.01**

**Triboelectric Nanogenerator-Based Bimodal Tactile System for Material Type and Deformability Detection** Shaoshuai He and Yunlong Zi; The Hong Kong University of Science and Technology (Guangzhou), China

**3:45 PM EL16.17.02**

**All-Textile Triboelectric Nanogenerators for Wearable Sensing** Ishara Dharmasena, Rameesh Bulathsinghala and Shuxin Meng; Loughborough University, United Kingdom

**4:00 PM EL16.17.03**

**Wireless, Self-Powered System for Electrostatic Discharge Prevention Using Triboelectric Nanogenerators** Cheoljae Lee and Ju-Hyuck Lee; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**4:15 PM EL16.17.04**

**Instantaneous Piezoelectric Nanogenerator for Pacemaker Applications** Derui Wang<sup>1</sup>, Wenjian Liu<sup>1</sup>, Long Gu<sup>2</sup>, Pengfei Chen<sup>1</sup> and Xudong Wang<sup>1</sup>; <sup>1</sup>University of Wisconsin, United States; <sup>2</sup>Xidian University, China

**4:30 PM EL16.17.05**

**The Role of MXenes and Porosity in Alginate-Based Triboelectric Nanogenerators** Bernd Wicklein<sup>1</sup>, Hyunjoon Yoo<sup>2</sup>, Geetha Valurouthu<sup>3</sup>, Yury Gogotsi<sup>3</sup> and Il-Kwon Oh<sup>2</sup>; <sup>1</sup>Materials Science Institute of Madrid, Spain; <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Drexel University, United States

# SYMPOSIUM EN01

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Lithium-Ion Batteries and Beyond  
April 7 - April 11, 2025

Symposium Organizers

Ling Fei, The University of Louisiana at Lafayette  
Junjie Niu, University of Wisconsin--Milwaukee  
Ethan Self, Oak Ridge National Laboratory  
Shuya Wei, University of New Mexico

Symposium Support

**Bronze**

BioLogic

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN01.01: Zn Batteries I

Session Chairs: Ling Fei and Ethan Self

Monday Morning, April 7, 2025

Summit, Level 3, Room 327

**8:00 AM EN01.01.01**

**Enhanced Electrochemical Performance of Zinc Batteries with a Nonaqueous Eutectic Electrolyte** [Raju Vadthya](#)<sup>1</sup>, Hao Nguyen<sup>1</sup>, Ivanov Sergei<sup>2</sup> and Shuya Wei<sup>1</sup>; <sup>1</sup>The University of New Mexico, United States; <sup>2</sup>Los Alamos National Laboratory, United States

**8:15 AM EN01.01.02**

**Nontrivialities of Ion-Insertion and Energy Storage in Aqueous Multivalent Metal-Ion Rechargeable Batteries** [Aninda J. Bhattacharyya](#); Indian Institute of Science, India

**8:30 AM EN01.01.03**

**Alloy-Assisted Rechargeable Carbon Nanoshell Coated Zinc Oxide Anodes for Aqueous Nickel-Zinc Batteries** Nian Liu and [Zhitao Chen](#); Georgia Institute of Technology, United States

**8:45 AM EN01.01.04**

**Nature-Inspired Interfacial Engineering for Highly Stable Zn Metal Anodes** [Canbin Deng](#)<sup>1,2,3</sup>, Yang Li<sup>2</sup>, Sijing Liu<sup>2</sup>, Jinglei Yang<sup>2</sup>, Baoling Huang<sup>2</sup>, Jiapeng Liu<sup>4</sup> and Jiaqiang Huang<sup>1,2,3</sup>; <sup>1</sup>The Hong Kong University of Science and Technology (Guangzhou), China; <sup>2</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>3</sup>HKUST Shenzhen-Hong Kong Collaborative Innovation Research Institute, China; <sup>4</sup>AI for Science Institute, China

**9:00 AM \*EN01.01.05**

**Proton-Coupled Electrochemistry of Metal Oxides—From Insertion to Interfacial Phenomena** [Veronica Augustyn](#); North Carolina State University, United States

**9:30 AM EN01.01.06**

**Laser-Scribed Battery Electrodes for Ultrafast Zinc-Ion Energy Storage** [Bo Liu](#), Ailun Huang, Richard B. Kaner and Yuzhang Li; University of California, Los Angeles, United States

**9:45 AM \*EN01.01.07**

**A Universal Thick Anode for Aqueous and Seawater Energy Storage Devices** [Xiaolei Wang](#); University of Alberta, Canada

**10:15 AM BREAK**

SESSION EN01.02: Emerging Technologies for Long-Duration Energy Storage

Session Chairs: Junjie Niu and Ethan Self

Monday Morning, April 7, 2025

Summit, Level 3, Room 327

**10:30 AM \*EN01.02.01**

**INDUSTRY TRACK: Innovation in Long-Duration Energy Storage—Tackling Today's Challenges to Enable Tomorrow's Successes** [Erik D. Spörke](#); U.S. Department of Energy Office of Electricity, United States

**11:00 AM \*EN01.02.02**

**INDUSTRY TRACK: How MXenes Assist in Storing Electrical Energy** Sokhna Dieng, Yuan Zhang and [Yury Gogotsi](#); Drexel University, United States

**11:30 AM EN01.02.03**

**Elucidating Lithium Ion Diffusion Kinetics in Cation-Disordered Rocksalt Cathodes** Byungwook Kang and Kisuk Kang; Seoul National University, Korea (the Republic of)

SESSION EN01.03: Beyond Lithium—K, Fe, Ca, Mg and Al Batteries

Session Chairs: Ling Fei and Ethan Self

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 327

**1:30 PM EN01.03.01**

**High Entropy Alloy Anode Formulation for Aqueous Aluminum Batteries** Apurva Anjan, Rohit M. Manoj and Varad Mahajani; Rensselaer Polytechnic Institute, United States

**1:45 PM EN01.03.02**

**Computational Prediction of Solvation Structure in Calcium Battery Electrolytes** Heonjae Jeong<sup>1,2</sup>, Haimeng Wang<sup>2</sup> and Lei Cheng<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Argonne National Laboratory, United States

**2:00 PM EN01.03.03**

**Evaluation Study of Phosphonate and Phosphonate/Carboxylate-Based Iron Complexes as Anolytes in Aqueous All-Iron Redox Flow Batteries** Gabriel S. Nambafu, Aaron Hollas, David M. Reed, Vincent Sprengle and Guosheng Li; Pacific Northwest National Laboratory, United States

**2:15 PM \*EN01.03.04**

**Potassium-Based Batteries—Advantages and Challenges** Yiyang Wu; The Ohio State University, United States

**2:45 PM BREAK**

**3:00 PM \*EN01.03.05**

**MXene Cathodes for Rechargeable Aluminum Batteries** Majid Beidaghi; The University of Arizona, United States

**3:30 PM EN01.03.06**

**Achieving Planar Zn Electroplating in Aqueous Zinc Batteries with Cathode-Compatible Current Densities by Cycling Under Pressure** Zixuan Li<sup>1</sup>, Peter Bruce<sup>1</sup> and Alex Robertson<sup>2</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>University of Warwick, United Kingdom

SESSION EN01.04: Cathode Materials I

Session Chairs: Junjie Niu and Shuya Wei

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 327

**3:45 PM EN01.04.01**

**Single-Crystalline Cathode Synthesis via Eutectic Li-Salt Assisted Particle Deagglomeration** Moonsu Yoon<sup>1,2</sup>, Yanhao Dong<sup>3</sup>, Jaephil Cho<sup>4</sup> and Ju Li<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Massachusetts Institute of Technology, United States; <sup>3</sup>Tsinghua University, China; <sup>4</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of)

**4:00 PM EN01.04.02**

**Surface-Modified Ni-Rich Cathodes for Reversible Li Intercalation at High Voltage** Danna Yan and Jae Chul Kim; Stevens Institute of Technology, United States

**4:15 PM EN01.04.03**

**Progress Towards Quinone-Based Cathode Materials for New Rechargeable Battery Architectures** Imoleayo M. Olorunyolemi and Aleksandr Prokofjevs; North Carolina Agricultural and Technical State University, United States

**4:30 PM EN01.04.04**

**New Regime for Lithium-Manganese-Rich Layered Oxides—Enhancing Oxygen Redox Reversibility and Longevity via Strategic Voltage Window Regulation** Munsoo Song<sup>1</sup>, Danwon Lee<sup>1</sup>, Hyunjun Choi<sup>2</sup>, Daesoo Kim<sup>2</sup>, Juwon Kim<sup>1</sup>, Chihyun Nam<sup>1</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>LG Energy Solution, Ltd., Korea (the Republic of)

**4:45 PM EN01.04.05**

**Decoupling Capacity Fade and Voltage Decay of Li-Rich Mn-Rich Layered Oxides by Regulating Surface Reconstruction Pathways** Gukhyun Lim<sup>1</sup>, Min Kyung Cho<sup>2</sup>, Jaewon Choi<sup>3</sup>, Ke-Jin Zhou<sup>3</sup>, Seungyun Jeon<sup>1</sup>, Minhyung Kwon<sup>1</sup>, A-Re Jeon<sup>1</sup>, Minah Lee<sup>1</sup> and Jihyun Hong<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Diamond Light Source, United Kingdom

**5:00 PM EN01.04.06**

**INDUSTRY TRACK: Polyoxometalates as an Alternative Coating Strategy for Layered Ni-Rich Oxide Cathodes in Liquid- and Solid-State Batteries** Barbara N. Nunes<sup>1</sup>, Masooma Ibrahim<sup>1</sup>, Wengao Zhao<sup>1</sup>, Ziyang Zhang<sup>1</sup>, Aleksandr Kondrakov<sup>2</sup> and Torsten Brezesinski<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>BASF Corporation, Germany

**5:15 PM EN01.04.07**

**Structural Mapping the Fate of Lithium and Electrode Heterogeneity Under Uniform Stack Pressure in Extreme Fast Charging Lithium-Ion Batteries** Elizabeth K. Allan-Cole<sup>1</sup>, Emily Fenner<sup>1</sup>, Rachel Garman<sup>1</sup>, Sarah Hartin<sup>1</sup>, Lacey Roberts<sup>1</sup>, Kelsey Uselton<sup>1</sup>, Swati Narasimhan<sup>2</sup>, Rafael Ferreira de Menezes<sup>1</sup>, Sanjit Ghose<sup>3</sup>, Hui Zhong<sup>3</sup>, Samuel Marks<sup>1</sup>, William C. Chueh<sup>2</sup>, Kayla Sprenger<sup>1</sup> and Michael F. Toney<sup>1,1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Stanford University, United States; <sup>3</sup>Brookhaven National Laboratory, United States

**5:30 PM EN01.04.08**

**Solvent-Mediated Oxide Hydrogenation in Layered Cathodes** Gang Wan; Stanford University, United States

**5:45 PM EN01.04.09**

**Investigating Metal - Ligand Covalency for Designing Ni and Co-Free Li-Ion Battery Cathodes** Sudhan Nagarajan<sup>1</sup>, Sooyeon Hwang<sup>2</sup>, Subhayan Roychoudhury<sup>3</sup>, Conan Weiland<sup>4</sup>, Dimeira M. Debora<sup>5</sup>, David Prendergast<sup>3</sup>, Mahalingam Balasubramanian<sup>6</sup> and Leela Mohana Reddy Arava<sup>1</sup>; <sup>1</sup>Wayne State University, United States; <sup>2</sup>Brookhaven National Laboratory, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States; <sup>4</sup>National Institute of Standards and Technology, United States; <sup>5</sup>Canadian Light Source, Canada; <sup>6</sup>Oak Ridge National Laboratory, United States

SESSION EN01.05: Cathode Materials II

Session Chairs: Ling Fei and Junjie Niu

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 327

**10:30 AM \*EN01.05.01**

**Intricacies of Oxide Cathode Chemistry in Lithium-Ion and Sodium-Ion Batteries** Arumugam Manthiram; The University of Texas at Austin, United States

**11:00 AM EN01.05.02**

**Process Study of Aqueous High-Voltage Spinel Cathode LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> Development for High Energy Density Lithium-Ion Batteries** Buket Boz, Lukas Neidhart, Katja Fröhlich and Marcus Jahn; Austrian Institute of Technology GmbH, Austria

**11:15 AM EN01.05.03**

**Advancing the Performance of Li- and Mn-Rich Cathodes—Bulk and Surface Controls** Subhadip Mallick<sup>1</sup>, Chun Yuen Kwok<sup>2</sup>, Mahalingam Balasubramanian<sup>2</sup>, Rajesh Pathak<sup>1</sup>, Jeffrey W. Elam<sup>1</sup> and Jason R. Croy<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**11:30 AM EN01.05.04**

**Energy Landscapes, Magnetic Frustration and the Influence of Site Swapping in Iron-Oxide Battery Cathodes—A Test Study** Emma F. Cuddy<sup>1</sup>, Eder G. Lomeli<sup>1</sup>, Brian Moritz<sup>2</sup> and Tom Devereaux<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**11:45 AM EN01.05.05**

**Structural and Kinetic Understanding of the Surface Reconstruction in Ni-Rich NMC Using Second-Harmonic Nonlinear Electrochemical Impedance Spectroscopy** Yuefan Ji and Daniel T. Schwartz; University of Washington, United States

SESSION EN01.06: Advanced Characterization for Batteries I

Session Chairs: Ling Fei and Shuya Wei

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 327

**1:30 PM \*EN01.06.01**

**In-Operando Vibrational Spectroscopy for Next Generation Lithium Batteries** Vibha Kalra; Cornell University, United States

**2:00 PM \*EN01.06.02**

**Development of Metrology for Characterizing Energy Storage Materials** Minghao Zhang; University of Chicago, United States

**2:30 PM EN01.06.03**

**Optimizing Battery Analysis Workflows for Efficient, High-Quality Energy Materials R&D** Yulia Trenikhina and Stephen Kelly; Carl Zeiss X-Ray Microscopy, United States

**2:45 PM EN01.06.04**

**Performance and Degradation Mechanisms of Lithium-Ion Battery Cells and Materials** Kenza Maher and Ameni Boumaiza; Qatar Environment and Energy Research Institute, Qatar

**3:00 PM EN01.06.05**

**Experimental and Numerical Investigation of Liquid Cooled Polymer-Nanomaterial Composites for Battery Thermal Management Systems** Sajib K. Mohonta<sup>1</sup>, Shinto M. Francis<sup>1</sup>, Andrew Ferebee<sup>1</sup>, Pooja Puneet<sup>1</sup>, Yi Ding<sup>2</sup> and Ramakrishna Podila<sup>1</sup>; <sup>1</sup>Clemson University, United States; <sup>2</sup>U.S. Army DEVCOM-GVSC, United States

**3:15 PM BREAK**

SESSION EN01.07: Anode Materials

Session Chairs: Ethan Self and Shuya Wei

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 327

**3:30 PM EN01.07.01**

**Ultrasoft Amorphous Antimony (III) Sulfide Colloidal Nanoparticles for Li-Ion and Na-Ion Batteries with Industrial Potential** Guesang K. Lee, Zachery R. Wylie, Soohyung Lee, Lilo D. Pozzo and Vincent C. Holmberg; University of Washington, United States

**3:45 PM EN01.07.02**

**In Situ Image-Based Nano-Tomography to Quantify Anode Degradation During Charging in High-Energy Density LiBs** Michael Häusler<sup>1</sup>, Olga Stamati<sup>2</sup>, Christoph Stangl<sup>3</sup>, Julie Villanova<sup>4</sup>, Stefan Koller<sup>3</sup> and Roland Brunner<sup>1</sup>; <sup>1</sup>Materials Center Leoben Forschung GmbH, Austria; <sup>2</sup>CNRS, France; <sup>3</sup>Varta Innovation GmbH, Austria; <sup>4</sup>ESRF - The European Synchrotron, France

**4:00 PM EN01.07.03**

**PCBM-Functionalized WS<sub>2</sub>-CNT Hybrid Nanostructures for Enhanced and Binder-Free Li-Ion Battery Anodes** Bikram Mondal and Shahab Ahmad; Indian Institute of Technology Jodhpur, India

**4:15 PM EN01.07.04**

**Lithium and Oxygen Co-Engineered Si-Rich SiO<sub>x</sub> for High-Performance Lithium-Ion Batteries** Ji Young Kim<sup>1</sup>, Da Young Ko<sup>1</sup>, Min-Sik Park<sup>2</sup> and Hansu Kim<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Kyung Hee University, Korea (the Republic of)



**4:30 PM EN01.07.05**

**High Rate, High Loading Silicon Anodes via Bilayer Engineered Surfaces with Thermally Stable Binders** [Jackson A. Pope](#)<sup>1</sup>, Charlotte Thomas<sup>1</sup>, Yangyang Wang<sup>1</sup>, Elisabetta Arca<sup>2</sup>, Seoung-Bum Son<sup>3</sup> and Chunmei Ban<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Newcastle University, United Kingdom; <sup>3</sup>Argonne National Laboratory, United States

**4:45 PM EN01.07.06**

**C<sub>60</sub>-Fullerene Embedded Polymer Derived SiOC Fibermats for Enhanced Lithium Storage** [Arijit Roy](#) and Gurpreet Singh; Kansas State University, Korea (the Republic of)

SESSION EN01.08: Cathode Materials III

Session Chairs: Junjie Niu and Ethan Self

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 327

**8:00 AM EN01.08.01**

**Manufacturing Thick Structured Electrodes Using Acoustophoresis** [Emilee Armstrong](#)<sup>1</sup>, Keith E. Johnson<sup>2</sup>, Eva Allen<sup>3</sup>, Isik Su Buyuker<sup>3</sup>, Ozgenur Kahvecioglu<sup>3</sup>, Matthew Begley<sup>1</sup> and Corie L. Cobb<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>University of California, Santa Barbara, United States; <sup>3</sup>Argonne National Laboratory, United States

**8:15 AM EN01.08.02**

**First Principles Modeling of Core-Level Spectroscopy for Anionic-Redox Active Cathode Materials** [Kuan Hsiang Hsu](#)<sup>1,2</sup>, Eder G. Lomeli<sup>1,2</sup>, Joshua Kas<sup>3,2</sup>, John Vinson<sup>4</sup>, John Rehr<sup>3,2</sup>, Brian Moritz<sup>2</sup>, Wanli Yang<sup>5</sup> and Tom Devereaux<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>Washington State University, United States; <sup>4</sup>National Institute of Standards and Technology, United States; <sup>5</sup>Lawrence Berkeley National Laboratory, United States

**8:30 AM EN01.08.03**

**Synthesis of Single-Crystal Disordered Rock-Salt Li-Ion Cathode Materials Enabled by Nucleation and Growth Control** [Hoda Ahmed](#) and Jinhyuk Lee; McGill University, Canada

**8:45 AM EN01.08.04**

**Stress-Optimized Cathode for Advanced All-Solid-State Batteries via Quantitative Analysis of Microstructure and Resistance** [Hyeseong Jeong](#)<sup>1,2</sup>, Dongwook Shin<sup>2</sup>, Hyoungchul Kim<sup>3</sup> and Jong-Ho Lee<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Hanyang University, Korea (the Republic of); <sup>3</sup>Hongik University, Korea (the Republic of)

**9:00 AM EN01.08.05**

**Battery Performance of Co-Free Layered Cathode Materials with Partial Disorder** [Heesang Lee](#) and Chunjoong Kim; Chungnam National University, Korea (the Republic of)

**9:15 AM \*EN01.08.06**

**High-Voltage Oxide Cathode Materials** [Ju Li](#); Massachusetts Institute of Technology, United States

**9:45 AM EN01.08.07**

**Oxygen Dimerization as a Defect-Driven Process in Ni-Rich Cathode Materials** [Alexander G. Squires](#)<sup>1</sup>, Seán R. Kavanagh<sup>2</sup>, Christopher Savory<sup>1</sup> and David Scanlon<sup>1</sup>; <sup>1</sup>University of Birmingham, United Kingdom; <sup>2</sup>Harvard University, United States

**10:00 AM BREAK**

**10:15 AM EN01.08.08**

**Thermal Runaway Mechanism in Ni-Rich Cathode Full Cells of Lithium-Ion Batteries— The Role of Multidirectional Crosstalk** [Sungjae Seo](#)<sup>1</sup>, Sugeun Jo<sup>2</sup>, Songkyu Kang<sup>2</sup>, Won Bae Kim<sup>2</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of)

**10:30 AM EN01.08.09**

**Scalable Synthesis Route for Mn-Rich Disordered Rocksalt (DRX) Cathodes** Ethan C. Self, Matthew S. Chambers and Beth L. Armstrong; Oak Ridge National Laboratory, United States

**10:45 AM \*EN01.08.10**

**Cost Oriented Fundamental Research for Single Crystal Cathode Materials Synthesis and Scaleup** Jie Xiao<sup>1,2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of Washington, United States

**11:15 AM EN01.08.11**

**Advancing Earth-Abundant Cathode Active Materials Design for Li-Ion Batteries** Jiajun Chen<sup>1</sup>, Anh Vu<sup>1</sup>, Mahalingam Balasubramanian<sup>2</sup> and Jason R. Croy<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**11:30 AM EN01.08.12**

**Investigating Structural Evolution and Oxygen Redox in Disordered Rock Salt Cathodes for Lithium-Ion Batteries** Sandeep Das, Alexander G. Squires and David Scanlon; University of Birmingham, United Kingdom

**11:45 AM EN01.08.13**

**Iron Fluoride-Based Conversion Cathodes for High-Energy Batteries—Tackling Efficiency Challenges Through Interface Engineering** Feng N. Wang<sup>1</sup>, Wenbin Fu<sup>2,3</sup>, Jeffrey W. Elam<sup>1</sup>, Peter Zapol<sup>1</sup> and Gleb Yushin<sup>2,3</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Georgia Institute of Technology, United States; <sup>3</sup>Sila Nanotechnologies InC., United States

SESSION EN01.09: Lithium Metal Batteries

Session Chairs: Ethan Self and Shuya Wei

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 327

**1:30 PM \*EN01.09.01**

**Challenges and Perspectives on Improving Cycle Life of Lithium Metal Batteries** Ji-Guang Zhang; Pacific Northwest National Laboratory, United States

**2:00 PM \*EN01.09.02**

**In Situ Formation of Phosphorus and Fluorine Rich Polymeric Interphase for High-Performance Lithium Metal Batteries** Hossein Pazooki and Juchen Guo; University of California, Riverside, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EN01.09.03**

**Artificial Layers for Lithium Metal Protection** Wu Xu, Ridwan A. Ahmed, Ju-Myung Kim and Ji-Guang Zhang; Pacific Northwest National Laboratory, United States

**4:00 PM EN01.09.04**

**An Organic Pigment Derived, Nitrogen-Enriched 3D Carbon Current Collector for Enhanced Electrochemical Kinetics and Reversibility in Li Metal Batteries** Sujeong Woo and Patrick J. Kim; Kyungpook National University, Korea (the Republic of)

**4:15 PM EN01.09.05**

**Inorganic-Organic Bi-Layered on Li Metal with Reduceable Li Salt@ptfe Layer for High Energy Density Li Metal Batteries** Jiwoon Kim, Seungcheol Myeong, Minsung Kim, Jaeik Kim, Insung Hwang, Joonhyeok Park, Taeseup Song and Ungyu Paik; Hanyang University, Korea (the Republic of)

**4:30 PM EN01.09.06**

**Application of Strengthened Solid Electrolyte Films for Pouch-Type All-Solid-State Li Metal Batteries** Ki Heon Baeck, Yong Bae Song and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

**4:45 PM EN01.09.07**

**Enhancing Li-Ion Flux and Cycling Stability in Li-Metal Batteries Through MnO<sub>x</sub> and Polydopamine-Modified Graphene-Coated Separators** Wootack Choi, Yujin Lee and Patrick J. Kim; Kyungpook National University, Korea (the Republic of)

SESSION EN01.10: Poster Session I: Lithium-Ion Batteries and Beyond I

Session Chairs: Junjie Niu and Ethan Self

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EN01.10.01**

**Ultra Flexible Thick Electrodes for 3D Free Form Li Ion Batteries** Niguss Hatsey, Areum Kim, Jin Young Lee, Minsub Oh, Hye-Mi So and Seungmin Hyun; Korea Institute of Machinery and Materials, Korea (the Republic of)

**EN01.10.02**

**Double Transition Metal Nitride MXene as High-Capacity Stable Anode for Li-Ion Batteries and Beyond—Ab Initio and Machine Learning Force Field Study** Arpan Chakraborty; Indian Institute of Science, India

**EN01.10.03**

**Gas phase synthesis of SiN<sub>x</sub> nanoparticles for battery application using a hot-wall reactor** Atharva Harshawardhan Ladole<sup>1</sup>, Moritz Loewenich<sup>1</sup> and Hartmut Wiggers<sup>1,2</sup>; <sup>1</sup>University of Duisburg-Essen, Germany; <sup>2</sup>CENIDE – Center for Nanointegration Duisburg-Essen, Germany

**EN01.10.04**

**Mechanical Characterization of Cathode Electrolyte Interphase Layers in High-Voltage Lithium-Ion Batteries** Xiaotang Shi, Franjo Weber and Rüdiger Berger; Max-Planck Institute, Germany

**EN01.10.05**

**Enhancing Tin Dioxide Anode Performance by Narrowing the Potential Range and Optimizing Electrolytes** Jose F. Florez Gomez; University of Puerto Rico at Río Piedras, United States

**EN01.10.06**

**Synergistic Electrochemical Properties of Conductive Additives with 1D-2D Carbon Networks** Seon Lee, Shi Hyeong Kim and Seongjae Oh; Korea Institute of Industrial Technology, Korea (the Republic of)

**EN01.10.07**

**Free-Standing (Current Collector-Free, Binder-Free and Conductive Additive-Free Binder-Free) Anode Architecture Based on Hierarchical Carbon Nanofiber Networks for Lithium-Ion Batteries** Songgeui Bae, Minsun Kim, Jun Kang, Hyemin Kim, Yongsup Yun and Young-Chan Lee; National Korea Maritime and Ocean University, Korea (the Republic of)

**EN01.10.08**

**Effect of Carbon Precursors on Resulting Electrode Performance** Megan Freyman<sup>1</sup>, Xinzhe Xue<sup>2</sup>, Hannah Eshelman<sup>1</sup>, Elwin Hunter Sellars<sup>1</sup>, Derrick Kaseman<sup>1</sup>, Swetha Chandrasekaran<sup>1</sup>, Yat Li<sup>2</sup> and Marcus Worsley<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>University of California, Santa Cruz, United States

**EN01.10.09**

**Synthesis of Ni-Rich NMA (LiNi<sub>0.96</sub>Mn<sub>0.02</sub>Al<sub>0.02</sub>O<sub>2</sub>) Cathode Material by Co-Precipitation Method and the Impact of Chelating NH<sub>4</sub>OH and Characteristics of Doped-NMA** Dong Myung Kim; Chungnam National University, Korea (the Republic of)

**EN01.10.10**

**Anionic Substitution as A Pathway to Enhanced Charge-Transfer Kinetics and Cyclability of Lithium-Rich Sulfide-Based Cathodes** Adane G. Hailemariam<sup>1,2</sup>, Tadios T. Mamo<sup>1</sup>, Mohammad Qorbani<sup>3</sup>, Heng-Liang Wu<sup>3,4</sup>, Ching-Ming Wei<sup>1</sup>, Li-Chyong Chen<sup>3,4</sup> and Kuei-Hsien Chen<sup>1,3</sup>; <sup>1</sup>Institute of Atomic and Molecular Sciences, Academia Sinica, Taiwan; <sup>2</sup>National Yang-Ming Chiao Tung University, 30010, Taiwan, Taiwan; <sup>3</sup>National Taiwan University, Taiwan; <sup>4</sup>Center of Atomic Initiative for New Materials, National Taiwan University, 10617, Taiwan, Taiwan

**EN01.10.11**

**Liquified Salt-Assisted Upcycling to LMFP Cathode from Waste LFP Batteries** Seungmi Lee and Moonsu Yoon; Gachon University, Korea (the Republic of)

**EN01.10.12**

**Effect of Annealing Protocols on the Performance of Single-Crystal  $\text{Li}_x\text{Ni}_{0.9}\text{Mn}_{0.05}\text{Co}_{0.05}\text{O}_2$  Cathodes Synthesized by Eutectic Method** [Brooklynn R. Nash](#)<sup>1,2</sup> and Mengya Li<sup>2</sup>; <sup>1</sup>Prairie View A&M University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**EN01.10.13**

**Controlled Synthesis and Properties of Polyvinylidene Fluoride Based Metal-Fluoride Surface Treatments for High-Nickel NCM Cathodes** [Heesang Lee](#) and Chunjoong Kim; Chungnam National University, Korea (the Republic of)

**EN01.10.14**

**Origins of Disorder and Stability for High-Entropy Rocksalt Li-Ion Battery Cathodes** [Lin Wang](#) and Bin Ouyang; Florida State University, United States

**EN01.10.15**

**Electrochemical Performance of High-Loading Pure Ni Layered Oxide Electrodes with Functional Conductive Agents** [Rei Matsumoto](#)<sup>1</sup>, Yosuke Ugata<sup>1</sup>, Atsuo Omaru<sup>2</sup>, Kosuke Ishii<sup>2</sup> and Naoaki Yabuuchi<sup>1</sup>; <sup>1</sup>Yokohama National University, Japan; <sup>2</sup>3DC Inc., Japan

**EN01.10.16**

**Integrative Interfacial Stabilization of Ni-Rich Cathodes Using Dual  $\text{Li}_3\text{PO}_4$ - $\text{Li}_2\text{WO}_4$  Coatings for Improved Cycling Stability** [Yumin Lee](#) and Moonsoo Yoon; Gachon University, Korea (the Republic of)

**EN01.10.17**

**Application of Highly Concentrated Electrolytes with Surfactant to High-Energy Lithium Metal Batteries with Pure Nickel Layered Oxides** [Takumi Komagata](#), Tomohiro Kuriyama, Yosuke Ugata and Naoaki Yabuuchi; Yokohama National University, Japan

**EN01.10.18**

**Potassium-Rich Iron Hexacyanoferrate/Carbon Cloth Electrode for Flexible and Wearable Potassium-Ion Batteries** [Xiaolin Zhang](#); Physics, China

**EN01.10.19**

**Enhancing the Electrical Conductivity of Iron-Oxide-Based Anodes by Tin-Oxide-Based Coating for Lithium-Ion Batteries** [Shao-Ning Hsu](#), Yi-Wei Chang and Tri-Rung Yew; National Tsing Hua University, Taiwan

**EN01.10.20**

**Alkali Metal-Derived Cup-Stacked Type Carbon Nanotubes—Synthesis and Evaluation for Conductive Additive** [Minsun Kim](#), Songui Bae, Jun Kang, Hyemin Kim, Yongsup Yun and Young-Chan Lee; National Korea Maritime and Ocean University, Korea (the Republic of)

**EN01.10.21**

**Iron, Cobalt Co-Embedded Xerogel Derived Carbon as Cathode Host for Ultra-High-Rate Performance Lithium-Sulfur Batteries** [Sony K. Cherian](#)<sup>1,2</sup>, Mayur M. Gaikwad<sup>1</sup>, Katchala Nanaji<sup>2</sup>, Bulusu V. Sarada<sup>2</sup>, Tata N. Rao<sup>2</sup> and Chandra Shekhar Sharma<sup>1</sup>; <sup>1</sup>Indian institute of technology Hyderabad, India; <sup>2</sup>International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI), India

**EN01.10.22**

**Unlocking the Potential of Vanadium Oxide ( $\text{V}_2\text{O}_5$ ) Thin Films via RF Magnetron Sputtering for Lithium-Free Microelectronic Applications** [Ananya Bansal](#), Pramod Kumar and Ramesh Chandra; Indian Institute of Technology Roorkee, India

**EN01.10.23**

**2D- $\text{TiS}_2$ /Zn-ion Capacitors for Advanced Energy Storage Applications** Sumeyye Kandur Baglicaklioglu, Sena Oz, Ali D. Ucar, Mete B. Durukan and [Husnu E. Unalan](#); Middle East Technical University, Turkey

**EN01.10.24**

**Improving Cathode-Electrolyte Interface Stability in High-Voltage Lithium Metal Batteries via Phase-Separated Cyano-Containing Copolymer-Based Polymer Electrolytes** [HyunSoo Kwon](#)<sup>1</sup>, Bumjoon J. Kim<sup>1</sup> and Michael J. Lee<sup>2</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Kyung Hee University, Korea (the Republic of)

**EN01.10.25**

**The Origin of Improved Performance in Boron-Alloyed Silicon Nanoparticle-Based Anodes for Lithium-Ion Batteries** [Pashupati Adhikari](#)<sup>1</sup>, Gregory F. Pach<sup>1</sup>, Joseph Quinn<sup>2</sup>, Chongmin N. Wang<sup>2</sup>, Avtar Singh<sup>1</sup>, Nina Prakash<sup>1</sup>, Ankit Verma<sup>1</sup>, Andrew Colclasure<sup>1</sup>, Gabriel M. Veith<sup>3</sup>, Nathan R. Neale<sup>1</sup> and Gerard M. Carroll<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>Oak Ridge National

Laboratory, United States

#### EN01.10.26

***In Situ* Study of Lithium Plating and Stripping Dynamics on 2D Carbon Surfaces** Lu Shi<sup>1</sup>, Artem Grebenko<sup>1</sup>, Sergey Luchkin, Hanning Zhang<sup>2</sup>, Ruslan Yamaletdinov<sup>2</sup>, Hongji Zhang<sup>1</sup>, Sergey Grebenchuk<sup>1</sup>, Chee Tat Toh<sup>1</sup>, Maciej Koperski<sup>1</sup>, Kostya S. Novoselov<sup>1</sup>, Oleg Yazyev<sup>2</sup> and Barbaros Ozyilmaz<sup>1</sup>;  
<sup>1</sup>National Univeristy of Singapore, Singapore; <sup>2</sup>École Polytechnique Fédérale de Lausanne, Swaziland

#### EN01.10.27

**Relaxation Times Analysis to Better Understand the Electrochemical Performance of a Quasi-Solid Li-Ion Battery with Eco-Friendly Pectin/PEG Electrolyte** Phillip Wu<sup>1</sup>, Yan-Ruei Chen<sup>1</sup>, Chin-Yi Chung<sup>1</sup>, Yu Hsuan Su<sup>1</sup>, Wei-Ming Chen<sup>1</sup>, Jia-Hui Wang<sup>1</sup>, Jia-Huan Chung<sup>1</sup>, YR Wu<sup>1</sup>, Po-Wei Chi<sup>2</sup> and Maw-Kuen Wu<sup>1</sup>; <sup>1</sup>Institute of Physics, Academia Sinica, Taiwan; <sup>2</sup>Chung Yuan Christian University, Taiwan

#### EN01.10.28

**Molecularly Engineered Siloxane Binders—Elevating LFP Cathode Efficiency Under High Active Mass Loading** Asuman Celik-Kucuk; Kyoto University, Japan

#### EN01.10.29

**Toward Green Renewable Energies and Energy Storage for the Sustainable Decarbonization and Electrification of Society** Atiyeh Nekahi<sup>1</sup>, Anil Kumar Madikere Raghunatha Reddy<sup>1</sup>, Sixu Deng<sup>1</sup>, Xia Li<sup>1</sup>, Apostolos Petropoulos<sup>2</sup>, Jagjit Nanda<sup>3</sup> and Karim Zaghbi<sup>1</sup>; <sup>1</sup>Concordia University, Canada; <sup>2</sup>International Energy Agency, France; <sup>3</sup>Stanford University, United States

#### EN01.10.30

**Investigation of Vanadium Pentoxide–Sulfur Cathodes for Enhanced Lithium–Sulfur Battery Performance** Sunny Choudhary<sup>1</sup>, Shweta Shweta<sup>1</sup>, Satyam Kumar<sup>1</sup>, Shivaraju Chandrappa<sup>1</sup>, Ivan Castillo<sup>1,2,3</sup>, Balram Tripathi<sup>1,4</sup>, Gerardo Morell<sup>1</sup> and Ram S. Katiyar<sup>1</sup>; <sup>1</sup>University of Puerto Rico, United States; <sup>2</sup>University of Puerto Rico at Cayey, United States; <sup>3</sup>Ana G Mendez Cupey University, United States; <sup>4</sup>S S Jain Subodh P.G.(Auto.) College, Jaipur, Rajasthan, India, India

#### EN01.10.31

**Redox-Active Metal Complexes as Promising Anode Materials for High-Performance Lithium-Ion Batteries** Honggyu Seong<sup>1</sup>, Youngho Jin<sup>1</sup>, Chan Woong Na<sup>2</sup>, Yoon Myung<sup>2</sup> and Jaewon Choi<sup>1</sup>; <sup>1</sup>Gyeongsang National University, Korea (the Republic of); <sup>2</sup>Korea Institute of Industrial Technology, Korea (the Republic of)

#### EN01.10.32

**Rechargeable, Cost-Effective, Novel Aluminium-Nickel Intermetallic Batteries for Stationary Utility-Scale Energy Storage Applications** Ayan Dey, Sougata Halder, Ghanshyam Varshney, Ankit Dev Singh, Andrews Cyril, Amitava Banerjee and Srijan Sengupta; Indian Institute of Technology Jodhpur, India

#### EN01.10.33

**Advanced X-Ray and Electron Based Techniques for Material and Cell-Level Battery Analysis** Zijun Wang<sup>1,2</sup>; <sup>1</sup>Rigaku Americas, United States; <sup>2</sup>University of Colorado Boulder, United States

#### EN01.10.34

**Domain Structure Influence on the Impedance Rise at Low State of Charge of Lithium-rich Oxides—Theoretical Insights** Juan C. Garcia, Jason R. Croy and Hakim Iddir; Argonne National Laboratory, United States

#### EN01.10.35

**Sacrificial Solvent Strategy for Enhancing Stability of Li-S Batteries by Mitigating Ether Electrolyte Decomposition** SeungMok Kang and Young-Jun Kim; Sungkyunkwan University, Korea (the Republic of)

#### EN01.10.36

**Graphene-Polymer Coating for Solvent-Free Fabrication of Sulfur/Carbon Composite Electrodes in Lithium-Sulfur Batteries** Seongbae Park<sup>1,2</sup> and Young-Jun Kim<sup>1,2</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Sungkyunkwan, Korea (the Republic of)

SESSION EN01.11: Advanced Characterization for Batteries II

Session Chairs: Ling Fei and Junjie Niu

Thursday Morning, April 10, 2025  
Summit, Level 3, Room 327

**8:00 AM EN01.11.01**

**Probing Thermal Responses of Cylindrical Lithium-Ion and Sodium-Ion Batteries via Fiber Optical Sensors** Xibin Lu<sup>1,2</sup> and Jiaqiang Huang<sup>2,1</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>The Hong Kong University of Science and Technology (Guangzhou), China

**8:15 AM EN01.11.02**

**Quantitative Understanding on Lithium Nucleation Process to Unveil the Performance-Limiting Interfaces** Zeyu Hui and Ping Liu; University of California, San Diego, United States

**8:30 AM EN01.11.03**

**Electrochemical Activity of Oxygen in Li-Ion Battery Cathodes from X-Ray Spectroscopic Modeling** Eder G. Lomeli<sup>1,2</sup>, Kuan Hsiang Hsu<sup>1,2</sup>, Joshua Kas<sup>3</sup>, John Vinson<sup>4</sup>, John Rehr<sup>3</sup>, Brian Moritz<sup>2</sup>, Wanli Yang<sup>5</sup> and Tom Devereaux<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>University of Washington, United States; <sup>4</sup>National Institute of Standards and Technology, United States; <sup>5</sup>Advanced Light Source, United States

**8:45 AM EN01.11.04**

**Quantitative Nanoscale Mapping of Defects in Spinel Oxides for Multi-Valent Ion Batteries** Zhichu Tang, Wenxiang Chen, Kaijun Yin, Robert Busch, Hanyu Hou, Oliver Lin, Zhiheng Lyu, Hong Yang, Jian-Min Zuo and Qian Chen; University of Illinois at Urbana-Champaign, United States

**9:00 AM EN01.11.05**

**In Situ FTIR Detection of Transition Metal (Mn, Ni)-Ion Dissolution From Cathodes in Li-Ion Batteries** Ravindra K. Bhardwaj<sup>1</sup>, Subhadip Mallick<sup>2</sup>, Kevin Zhu<sup>2</sup>, Chen Liao<sup>2</sup>, Sang-Don Han<sup>3</sup>, Daniel Abraham<sup>2</sup>, Jason R. Croy<sup>2</sup> and Bertrand J. Tremolet de Villers<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Sejong University, Korea (the Republic of)

**9:15 AM \*EN01.11.06**

**Microscopic Insights into Enhancing Conductivity and Stability in Sodium Solid Electrolytes** Miaofang Chi<sup>1,2</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>Duke University, United States

**9:45 AM EN01.11.07**

**Analyzing the Phase Change Behavior in NMC Material by Ex-Situ Studies** Sai Rashmi Manippady, Alicja Glaszczka, Magdalena Winkowska-Struzik, Dominika Buchberger and Andrej Czerwinski; University of Warsaw, Poland

**10:00 AM BREAK**

**10:30 AM \*EN01.11.08**

**Cryo-TEM Captured Insight on the Origin of Li Morphology Disparity in the Same Coin Cell** Chongmin N. Wang; Pacific Northwest National Laboratory, United States

**11:00 AM EN01.11.09**

**Nondestructive State-of-Health Evaluation of Li-Ion Batteries Using EIS and Nonlinear EIS** Rebecca Vincent, Yuefan Ji and Daniel T. Schwartz; University of Washington, United States

**11:15 AM EN01.11.10**

**Electrochemical Formation of Anion-Derived Solid-Electrolyte Interphase (SEI)** Weilai Yu<sup>1,2</sup>, Yi Cui<sup>2</sup> and Zhenan Bao<sup>2</sup>; <sup>1</sup>University of Toronto, United States; <sup>2</sup>Stanford University, United States

**11:30 AM EN01.11.11**

**Investigating the Synthesis Pathway of Disordered Rocksalt Cathode Materials Using Synchrotron X-Ray Characterization** Zhilin Liang, Otavio Marques, Oscar Paredes Mellone, Sikhumbuzo Masina, Chi Cao, Dimosthenis Sokaras, Johanna N. Weker and Kevin Stone; SLAC National Accelerator Laboratory, United States

**11:45 AM EN01.11.12**

**Engineering Battery Corrosion Films by Tuning Electrical Double Layer Composition** Xintong Yuan and Yuzhang Li; University of California, Los Angeles, United States

SESSION EN01.12: Solid-State Batteries

Session Chairs: Ling Fei and Junjie Niu

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 327

**1:30 PM \*EN01.12.01**

**Dry-Processed Electrolytes and Electrodes for Liquid and Solid-State Batteries** Zheng Chen; University of California, San Diego, United States

**2:00 PM EN01.12.02**

**Synthesis and Characterization of a New Lithium Oxythiophosphate Ionic Conductor** Jamal Bouaouina<sup>1</sup>, Christel Laberty-Robert<sup>1,2</sup> and Arnaud Perez<sup>1,2</sup>; <sup>1</sup>Sorbonne University, France; <sup>2</sup>Réseau sur le Stockage Electrochimique de l'Energie (RS2E), FR CNRS 3459, France

**2:15 PM \*EN01.12.03**

**Superionic Li-Ion Transport in Amorphous Nb/Ta Halides as Solid-State Electrolytes** De-en Jiang; Vanderbilt University, United States

**2:45 PM EN01.12.04**

**Maximum Current Density in Polymer-Ceramic Composite Electrolytes Based on Interconnected Ceramic Scaffold** Xi C. Chen<sup>1</sup>, Kyra D. Owensby<sup>2</sup>, Wooseok Go<sup>3</sup>, Beth L. Armstrong<sup>1</sup>, Jiyoung Ock<sup>1</sup>, Andrew Ullman<sup>1</sup>, Michael C. Tucker<sup>3</sup>, Sergiy Kalnaus<sup>1</sup> and Ritu Sahore<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>The University of Tennessee, Knoxville, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**3:00 PM BREAK**

**3:30 PM \*EN01.12.05**

**Nanostructured Biopolymer-Based Electrolyte Membrane for Solid-State Lithium-Ion and Sodium-Ion Battery** Qingye Lu; University of Calgary, Canada

**4:00 PM EN01.12.06**

**Operando Hard X-Ray Photoelectron Spectroscopy of Anode-Free Solid-State Batteries** Elmar Kataev<sup>1,2</sup>, Burak Aktekin<sup>3,3</sup>, Zora Chalkley<sup>1,2</sup>, Ping Feng<sup>1</sup>, Peter Van-der-Berg<sup>4</sup>, Luise Riegger<sup>3,3</sup>, Raul Garcia-Diez<sup>2,5</sup>, Roberto Felix-Duarte<sup>5,2</sup>, Regan Wilks<sup>2,5</sup>, Yaolin Xu<sup>1</sup>, Anja Henß<sup>3,3</sup>, Swapna Ganapathy<sup>4</sup>, Marnix Wagemaker<sup>4</sup>, Yan Lu<sup>1,6</sup>, Juergen Janek<sup>3,3</sup> and Marcus Baer<sup>2,5,7</sup>; <sup>1</sup>Helmholtz-Zentrum-Berlin, Germany; <sup>2</sup>Energy Materials In-Situ Laboratory Berlin (EMIL), Germany; <sup>3</sup>Justus-Liebig-Universität Gießen, Germany; <sup>4</sup>Delft University of Technology, Netherlands; <sup>5</sup>Helmholtz-Zentrum Berlin, Germany; <sup>6</sup>University of Potsdam, Germany; <sup>7</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

**4:15 PM EN01.12.07**

**Defect-Driven Optimization of Metal-Organic Framework-Based Quasi-Solid-State Electrolytes for High-Efficiency Lithium Metal Batteries** Zeru Wang and Ke Wang; Southern University of Science and Technology, China

**4:30 PM EN01.12.08**

**An Atomistic Study of Reactivity in Solid State Electrolyte Interphase Formation for Li/Li7P3S11 Systems** Bryant Li<sup>1,2</sup>, Vir Karan<sup>1,2</sup>, Aaron Kaplan<sup>2</sup> and Kristin A. Persson<sup>2,1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**4:45 PM EN01.12.09**

**Quantifying Resistance in a PEO-LiTFSI/LLZO Interface with Tri-Layer Composite Electrolytes** Jeong Seop Yoon<sup>1</sup>, Michael J. Coughlan<sup>1</sup>, Meghan Burns<sup>1,2</sup>, Pallab Barai<sup>1</sup>, Sanja Tepavcevic<sup>1</sup> and Venkat Srinivasan<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>University of Illinois at Chicago, United States

SESSION EN01.13: Poster Session II: Lithium-Ion Batteries and Beyond II

Session Chairs: Ling Fei and Shuya Wei

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EN01.13.01**

**Analysis of Lithium Metal-Electrolyte Interfacial Phenomena Through Nonlinear Electrochemical Impedance Spectroscopy** [Rose Yesl Lee](#)<sup>1</sup>, Jun Liu<sup>1</sup> and Daniel T. Schwartz<sup>1,2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Clean Energy Institute, United States

**EN01.13.02**

**Rational Design and Control of Mixed Ionic-Electronic Conducting Metal Organic Frameworks for Li-S Batteries** [Sadisha Nanayakkara](#)<sup>1</sup>, Nohely Lopez Espinoza<sup>1</sup>, Kwangnam Kim<sup>2</sup>, Liwen Wan<sup>2</sup> and Monica So<sup>1</sup>; <sup>1</sup>California State University, Chico, United States; <sup>2</sup>Lawrence Livermore National Laboratory, United States

**EN01.13.03**

**MXene-Driven TiO<sub>2</sub>/TiS<sub>2</sub> Heterostructure-Enabled Intercalation-Conversion Hybrid Cathode for High-Energy-Density Li-S Batteries** [Hyungcheoul Shim](#)<sup>1</sup>, Viet Phuong Nguyen<sup>1,2</sup>, Jong Min Yuk<sup>3</sup> and Seung-Mo Lee<sup>1,2</sup>; <sup>1</sup>Korea Institute of Machinery and Materials, Korea (the Republic of); <sup>2</sup>University of Science and Technology (UST), Korea (the Republic of); <sup>3</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**EN01.13.04**

**Low Cost Sodium-Aluminum Dual-Ion Batteries for High C-Rate Performance** [Vismay Chandra](#), Che-Ya Wu, Doyoub Kim, Yice Wang, Wenbin Fu and Gleb Yushin; Georgia Institute of Technology, United States

**EN01.13.05**

**Beyond Lithium-Ion Batteries with Semi-Fluorinated Polymer Separators** [Stephen Budy](#); BCI, United States

**EN01.13.06**

**Versatile Functional Additive for High Performance Silicon-Based Lithium-Ion Batteries** [Eunji Park](#) and Ik-Soo Shin; Soongsil University, Korea (the Republic of)

**EN01.13.07**

**Thermally Stable Ionic Liquid-Based Composite Polymer Electrolytes Enabled by *In Situ* Polymerization for Lithium-Ion Batteries** [Wookil Chae](#) and Taeshik Earmme; Hongik University, Korea (the Republic of)

**EN01.13.08**

**Understanding Electrode-Electrolyte Degradation in Electro-Spun LLZO Solid Electrolyte Batteries and the Effect of Al-Doping on the Electrical Performance** [Soumya Kollipara](#), Edan Fields, Seiichiro Higashiya, Latika Chaudhary and Harry Efstathiadis; University at Albany, State University of New York, United States

**EN01.13.09**

**Toward Long-Life High-Voltage Aqueous Li-Ion Batteries—From Solvation Chemistry to Solid-Electrolyte-Interphase Layer Optimization Against Electron Tunneling Effect** [Insu Jeong](#), Sungho Kim and Youngbi Kim; Pohang University of Science and Technology, Korea (the Republic of)

**EN01.13.10**

**Phase Convergence and Evolution of Al-Doped Li<sub>7</sub>La<sub>3</sub>Zr<sub>2</sub>O<sub>12</sub> by Solid-State Reactive Sintering Amongst the Temperature-Time Dwell Domains** [Aaron Santomauro](#) and Jianhua Tong; Clemson University, United States

**EN01.13.11**

**Amorphous Molybdenum Sulfide Chalcogels for Electrochemical Energy Storage— First-Principles Structure-Property Relationships** [Emmanuel O. Adejumo](#)<sup>1</sup>, Sahar Bayat<sup>1</sup>, Taohedul Islam<sup>2</sup>, M. Saiful Islam<sup>2</sup> and Chad Risko<sup>1</sup>; <sup>1</sup>University of Kentucky, United States; <sup>2</sup>Jackson State University, United States

**EN01.13.12**

**Computational Insights into the Improved Structural Stability and Electrochemical Behavior of NaVO Cathodes for Aqueous Zinc-Ion Batteries** [Huncheol Seo](#)<sup>1</sup>, Kwangsoo Kim<sup>2</sup>, Gyuchan Kim<sup>1</sup>, Bogeun Park<sup>1</sup> and Byung-Hyun Kim<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Korea Institute of Energy Research, Korea (the Republic of)

**EN01.13.13**

**Characterizing Zinc Metal Electrodeposition and Alloying Behavior for Aqueous Batteries** [Claire Ely](#), Lacey Roberts and Michael F. Toney; University of Colorado Boulder, United States



**EN01.13.14**

**One Dimensional Laser-Cut V<sub>2</sub>O<sub>5</sub>-rGO Cathodes for Fiber-Shaped Zn-Ion Batteries** [Recep Yuksel](#); Eskisehir Osmangazi University, Turkey

**EN01.13.15**

**Enabling Zinc Metal Anodes for Aqueous Batteries** [Bhaskar Kakoty](#) and Premkumar Senguttuvan; Jawaharlal Nehru Centre for Advanced Scientific Research, India

**EN01.13.16**

**Exploring the Influence of Working Pressure on LiNiMnCoO<sub>2</sub> Film Characteristics for Micro Battery Applications** [Austine O. Amisi](#), Raquel Garza-Hernández and Fabian Ambriz-Vargas; Centro de Investigaciones en Óptica, A.C., Mexico

**EN01.13.17**

**Incorporation of a Cross-Linked Protective Layer Containing AgNO<sub>3</sub> Additive for Improving Cycling Stability of Anode-Free Lithium Metal Batteries** [A-Hyeon Ban](#)<sup>1</sup>, Jae-Kyung Choi<sup>1</sup>, Hyun-Woo An<sup>1</sup>, Sung-Min Koo<sup>1</sup>, Woo Jin Bae<sup>2</sup>, Hyun-Sik Woo<sup>2</sup>, Jongseok Moon<sup>2</sup> and Dong-Won Kim<sup>1,1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Samsung SDI, Korea (the Republic of)

**EN01.13.18**

**Enabling Uniform Li Deposition Behavior with Electrostatic Shield by the Single Effect of Potassium Cation Additive for Dendrite-Free Lithium Metal Batteries** [Jiwoo Han](#) and Ki Jae Kim; Sungkyunkwan University, Korea (the Republic of)

**EN01.13.19**

**Imidazolium-Based Ionic Liquid Electrolytes for Fluoride Ion Batteries** [Omar Alshangiti](#)<sup>1</sup>, Giulia Galatolo<sup>1</sup>, Camilla Di Mino<sup>1</sup>, Thomas Headen<sup>2</sup>, Jacob Christianson<sup>1</sup>, Simone Merotto<sup>1</sup>, Gregory Rees<sup>1</sup>, Yoan Delavoux<sup>3</sup>, Malgorzata Swadzba-Kwasny<sup>3</sup> and Mauro Pasta<sup>1</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>ISIS Neutron and Muon Source, United Kingdom; <sup>3</sup>Queen's University of Belfast, United Kingdom

**EN01.13.20**

**Towards High-Utilization of a Four-Electron Sn Anode Aqueous Battery** [Sofia Catalina](#)<sup>1</sup>, Jianbo Wang<sup>1</sup>, Kyle Frohna<sup>1</sup>, Willow Thompson<sup>1</sup>, William C. Chueh<sup>1</sup> and J. Tyler Mefford<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>University of California, Santa Barbara, United States

**EN01.13.21**

**Antimony-Infused Nickel Current Collectors—Pioneering Advances in Lithium-Ion Battery** [Ghanshyam Varshney](#), Ayan Dey, Ankit Dev Singh, Andrews Cyril, Pranay Ranjan and Srijan Sengupta; Indian Institute of Technology Jodhpur, India

**EN01.13.22**

**Probing Imidazolium-Based Ionic Liquid Double Layers on Graphene Electrodes via Synchrotron Infrared Nanospectroscopy for Energy Storage Applications** [Zixuan Li](#)<sup>1</sup>, Ka Chon Ng<sup>1</sup>, Maximilian Jaugstetter<sup>1</sup>, Miquel B. Salmeron<sup>1,2</sup>, Hans Bechtel<sup>1</sup> and Stephanie Corder<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

**EN01.13.23**

**NH<sub>4</sub>V<sub>4</sub>O<sub>10</sub>-Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene/Carbon Nanofibers Composite Electrodes for Enhanced Aqueous Zinc-Ion Batteries** [Seojin Woo](#), Dongju Lee and Seulgi Kim; Chungbuk National University, Korea (the Republic of)

**EN01.13.24**

**Exploring Hex-Aza-COFs for Advanced Aqueous Batteries—A Case Study** [Vinayak S. Kale](#)<sup>1</sup>, Zhengnan Tian<sup>2</sup>, Sharath Kandambeth<sup>1</sup>, Osama Shekhah<sup>1</sup>, Husam N. Alshareef<sup>2</sup> and Mohamed Eddaoudi<sup>1</sup>; <sup>1</sup>King Abdullah University of Science and Technology, Saudi Arabia; <sup>2</sup>King Abdullah University of Science and Technology (KAUST), Saudi Arabia

**EN01.13.25**

**The Mechanism of Fluorine Doping for the Enhanced Lithium Storage Behavior in Cation-Disordered Cathode Oxide** [Yuanpeng Zhang](#); Oak Ridge National Laboratory, United States

**EN01.13.26**

**Highly Stable Lithium Metal Anode Enabled by Chemical Vapor Functionalization Using Trimethylaluminum Atomic Layer Deposition Precursor** [Kyobin Park](#), Donghyeon Kang and Jeffrey W. Elam; Argonne National Laboratory, United States

**EN01.13.27**

**Hybrid Carbon Materials—Synthesis and Potential Application in Lithium-Ion Batteries as Cathode** [Carolina Rojas Michea](#), Neida Santacruz, Frank Mendoza, Gerardo Morell and Brad R. Weiner; University of Puerto Rico at Río Piedras, United States

**EN01.13.28**

**Asymmetric Ether Solvents for High-Rate Lithium Metal Batteries** [Il Rok Choi](#) and Zhenan Bao; Stanford University, United States

**EN01.13.29**

**Visualisation of Tetrahedral Li in the Alkali Layers of Li-Rich Layered Oxides** [Weixin Song](#)<sup>1,2,3</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>The Faraday Insitution, United Kingdom; <sup>3</sup>The Henry Royce Insitute, United Kingdom

**EN01.13.30**

**Structural Probing of Oxygen Redox Mechanism in LiNiO<sub>2</sub>** [Jun Chen](#)<sup>1</sup>, Mikkel Juelsholt<sup>2</sup>, Robert House<sup>1</sup> and Peter Bruce<sup>1</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>Columbia University, United States

**EN01.13.31**

**Enhancing Stability in Aqueous Zn-Ion Batteries—Surface-Modified Protective Layers of Two-Dimensional Nanomaterials** [Ingyu Choi](#), Minseo Kim and Dongju Lee; Chungbuk National University, Korea (the Republic of)

**EN01.13.32**

**Lithiophilic 3D Si/SiO<sub>x</sub> Host for Dendrite-Free Lithium Metal Batteries Enabled by a Simple Magnesiothermic Reduction Process** [Asif Raza](#); Korea Electrotechnology Research Institute, Korea (the Republic of)

**EN01.13.33**

**Bio-Inspired Liquid Crystalline Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene Film for High Performance Electrochemical Energy Storage** [Sunghee Choi](#) and Dongju Lee; chungbuk national university, Korea (the Republic of)

**EN01.13.34**

**Solution Process for the Li Carboranes Solid-State Electrolyte Preparation and Its Inverse Pressure Dependence** [Kiseok Oh](#), Max Schulze, Robert Bell and Trevor Martin; National Renewable Energy Laboratory, United States

**EN01.13.35**

**Synthesis of Substituted Pyrene Aldehydes and Sulfoxides Using DMSO as a One Carbon Syntho** [Tofunmi Abegunrin](#) and Aleksandrs Prokofjevs; North Carolina Agricultural & Technical State University, United States

**EN01.13.36**

**A PINN Model for Time-Dependent Boundary Conditions in the Reaction-Diffusion Equation of Li-Ion Intercalation in Hollow Silicon Anodes in Slow and Fast Cycling Conditions Under Potentiostatic Operation** [Tejveer S. Anand](#), Tarun Bijanapally, Tanish S. Tak and Madhusudan Singh; Indian Institute of Technology Delhi, India

**EN01.13.37**

**The Impact of Precursor-Derived SiOC Ceramics on the Electrochemical Performance of Functionalized MoS<sub>2</sub> Electrodes** [Arijit Roy](#) and Gurpreet Singh; Kansas State University, Korea (the Republic of)

SESSION EN01.14: Li-S Batteries

Session Chairs: Ling Fei and Shuya Wei

Friday Morning, April 11, 2025

Summit, Level 3, Room 327

**8:00 AM EN01.14.01**

**Scalable Electrocatalysts for High-Performance Li-S Batteries** [Aninda J. Bhattacharyya](#); Indian Institute of Science, India

**8:15 AM EN01.14.02**

**Graphdiyne-Based Two-Dimensional Nanomaterials for Li-S Batteries** [Xueli Sherry Zheng](#); Stanford University, United States

**8:30 AM EN01.14.03**

**Nanostructured Electrocatalysts of Metal Compounds for Facile Sulfur Conversion Kinetics of Lithium-Sulfur Batteries and Regulated Growth of**

**Lithium Sulfide** Donghee Gueon<sup>1</sup>, Dong Ha Kim<sup>1</sup> and Jun Hyuk Moon<sup>2</sup>; <sup>1</sup>Korea Institute of Energy Research, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**8:45 AM EN01.14.04**

**Chemical Activation as a Pathway to Enhance Monoclinic Sulfur Loading on Carbon Fiber Matrices for Li-S Battery Cathodes** Joseph Nishanth<sup>1</sup>, Jyoti Shikhar<sup>2</sup>, Mohammed Saquib Khan<sup>1</sup>, Swati Sharma<sup>2</sup> and Sudarshan Narayanan<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur, India; <sup>2</sup>Indian Institute of Technology Mandi, India

**9:00 AM EN01.14.05**

**Architecting Carbon Nanofoam Papers for Lithium-Sulfur Batteries** Zachary G. Neale, Alison H. McCarthy, Megan B. Sassin, Debra R. Rolison, Jeffrey W. Long and Rachel Carter; U.S. Naval Research Laboratory, United States

**9:15 AM EN01.14.06**

**Suppressing the Lithium Polysulfides Shuttle Effect via Designing 3DOM Mn<sub>2</sub>O<sub>3</sub> Host Material for Lithium-Sulfur Batteries** Sung Joon Park and Ki Jae Kim; Sungkyunkwan university, Korea (the Republic of)

**9:30 AM BREAK**

SESSION EN01.15: Next-Generation Li Batteries I

Session Chairs: Junjie Niu and Shuya Wei

Friday Morning, April 11, 2025

Summit, Level 3, Room 327

**9:45 AM EN01.15.01**

**Tailoring Linear Organic Carbonates for Safer Li-Ion Batteries** Jina Lee<sup>1</sup>, A-Re Jeon<sup>1</sup>, Hye Jin Lee<sup>2</sup>, Ukseon Shin<sup>3</sup>, Yiseul Yoo<sup>4,5</sup>, Hee-Dae Lim<sup>6</sup>, Cheolhee Han<sup>7</sup>, Hochun Lee<sup>7</sup>, Yong Jin Kim<sup>2</sup>, Jayeon Baek<sup>2</sup>, Dong-Hwa Seo<sup>3</sup> and Minah Lee<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>3</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>4</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>5</sup>Korea University, Korea (the Republic of); <sup>6</sup>Hanyang University, Korea (the Republic of); <sup>7</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**10:00 AM EN01.15.02**

**Multi-Impurity Scavenging Separator for Lithium-Ion Batteries with Enhanced High-Temperature Performance** Da-Ae Lim, Jin-Hong Seok, Seong-Jae Lim, Jin-Young Oh and Dong-Won Kim; Hanyang University, Korea (the Republic of)

**10:15 AM EN01.15.03**

**Prediction of Carbonate Solvent Stability on Lithiated Si Anode** Heonjae Jeong<sup>1,2</sup> and Christopher Johnson<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Argonne National Laboratory, United States

**10:30 AM EN01.15.04**

**High Cation Transference Number Polymer Electrolytes Improve Capacity Retention in High Energy Density Solid-State Batteries** Xi C. Chen<sup>1</sup>, Jiyoung Ock<sup>1</sup>, Kyra D. Owensby<sup>2</sup>, Oliver W. Long<sup>3</sup>, Andrew Ullman<sup>1</sup>, Michael Zachman<sup>1</sup>, Sergiy Kalnaus<sup>1</sup> and Ritu Sahore<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>The University of Tennessee, Knoxville, United States; <sup>3</sup>Georgia Institute of Technology, United States

**10:45 AM EN01.15.05**

**Oxide-Based Semi-Solid-State Hybrid Electrolyte for High Performance Lithium-Ion Batteries** Ji-Wan Kim, Heesu Kim, Jusung Song, Seungmo Koo and Dong-Won Kim; Hanyang University, Korea (the Republic of)

**11:00 AM EN01.15.06**

**Direct-Ink-Writing of All-Solid-State Batteries with Solvent Free, Non-Flammable Electrolytes Toward Wearable Electronics** Sumin Oh<sup>1,2</sup>, Jongwoo Lim<sup>1</sup> and Seungjun Chung<sup>2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**11:15 AM EN01.15.07**

**A Scalable a-Si Anchored a-Boron Carbon Nitride Nanotubes as Binder-Free Composite Anode for Lithium-Ion Battery Applications** Abinaya Sankaran<sup>1</sup>, Nilotpal Kapuria<sup>2</sup>, Marc VanderVeldon<sup>3</sup>, Fathima Laffir<sup>1</sup>, Hugh Geaney<sup>1</sup> and Kevin Ryan<sup>1</sup>; <sup>1</sup>University of Limerick, Ireland; <sup>2</sup>Indiana University

Bloomington, United States; <sup>3</sup>Smit Thermal Solutions B.V., Netherlands

**11:30 AM EN01.15.08**

**3D Electrode Architectures for High Energy Density Batteries** Marissa Wood, Megan Freyman, Yiran Xiao, Bo Wang, Sichi Li, Nicholas R. Cross, Tiras Y. Lin, Giovanna Bucci and Marcus Worsley; Lawrence Livermore National Laboratory, United States

**11:45 AM EN01.15.09**

**Printable and Coatable Polymer Composite Separators for Lithium-Ion Battery Manufacturing** Michelle E. Katz, Vinh Q. Nguyen and Corie L. Cobb; University of Washington, United States

SESSION EN01.16: Zn Batteries II

Session Chairs: Ling Fei and Junjie Niu

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 327

**1:30 PM EN01.16.01**

**Optimally Designed Bimetallic Ni-Based Layered Double Hydroxide with Chirality-Induced Spin Selectivity Effect for Advanced Zinc-Air Batteries** Jeongyoub Lee, Yurim Won, Young Sun Park, Sumin Kim, Junwoo Lee and Jooho Moon; Yonsei University, Korea (the Republic of)

**1:45 PM EN01.16.02**

**Discovery of Liquid Crystal Interphase in Aqueous Batteries** Yuqi Li; Stanford University, United States

**2:00 PM EN01.16.03**

**Architected Cathodes and Anodes Enable Rechargeable Alkaline Zn-MnO<sub>2</sub> Batteries** Zachary G. Neale, Ryan DeBlock, Debra R. Rolison and Jeffrey W. Long; U.S. Naval Research Laboratory, United States

**2:15 PM EN01.16.04**

**A Contrasting Tale of Two Lactam Co-Solvents in Affecting Zn-Anode Performance** Bhaskar Kakoty<sup>1</sup>, Disha Brahma<sup>1</sup>, Sreshtha Ganguly<sup>2</sup>, Suraj Halder<sup>3</sup>, Sheetal K. Jain<sup>3</sup>, Sundaram Balasubramanian<sup>1</sup>, Sridhar Rajaram<sup>1</sup> and Premkumar Senguttuvan<sup>1</sup>; <sup>1</sup>Jawaharlal Nehru Centre for Advanced Scientific Research, India; <sup>2</sup>Indian Institute of Technology Kharagpur, India; <sup>3</sup>Indian Institute of Science, India

**2:30 PM EN01.16.05**

**Colossal Capacity Loss During Calendar Aging of Zn Battery Chemistries** Bo Liu, Xintong Yuan and Yuzhang Li; University of California, Los Angeles, United States

**2:45 PM EN01.16.06**

**Operando Characterization of Zinc Metal Batteries—Probing Zinc Sulfate Hydroxide Formation and Zinc Crystallographic Orientation with X-Ray Diffraction** Lacey Roberts, Claire Ely, Samuel Marks and Michael F. Toney; University of Colorado Boulder, United States

**3:00 PM EN01.16.07**

**Superior Electrochemical Performance and Rechargeability of Zinc Anodes via Additive Manufacturing** Craig Milroy<sup>1</sup>, Leonardo Caprio<sup>2</sup>, Gabriella Della Monica<sup>2</sup>, Gokhan Demir<sup>2</sup> and Barbara Previtali<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Politecnico di Milano, Italy

**3:15 PM BREAK**

SESSION EN01.17: Next-Generation Li Batteries II

Session Chairs: Ethan Self and Shuya Wei

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 327

**3:30 PM EN01.17.01**

**Earth-Abundant Mn-Rich Li-Ion Cathode Materials with High Energy Density** [Han-Ming Hau](#)<sup>1,2</sup> and Gerbrand Ceder<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**3:45 PM EN01.17.02**

**Detecting Correlated Lithium Ion Hopping in Li<sub>3</sub>YCl<sub>6</sub> (LYC) via Cross-Correlation Analysis** [Isiah Ramos](#) and Elif Ertekin; University of Illinois at Urbana-Champaign, United States

**4:00 PM EN01.17.03**

**Advancing Secondary Battery Materials with Accelerated Experiments** [Eric McCalla](#); McGill University, Canada

**4:15 PM EN01.17.04**

**In Situ TEM Insights into the Calcination Process of Li<sub>1.3</sub>Al<sub>0.3</sub>Ti<sub>1.7</sub>(PO<sub>4</sub>)<sub>3</sub> Solid Electrolyte** [Chun Chia Chen](#), Wen-Wei Wu and An-Yuan Hou; National Yang Ming Chiao Tung University, Taiwan

**4:30 PM EN01.17.05**

**Achieving Fast-Kinetics Charge Storage with 2D Layered Metal Compounds** [Minghao Yu](#); Technische Universität Dresden, Germany

**4:45 PM EN01.17.06**

**Reduction-Induced Surface Reconstruction Mechanism of Layered Oxide Cathodes in Lithium-Ion Batteries** [Jihyun Hong](#); Pohang University of Science and Technology (POSTECH), Korea (the Republic of)

## SYMPOSIUM EN02

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Sodium-Based Energy Storage

April 8 - April 11, 2025

Symposium Organizers

Xin Li, Harvard University

Guiliang Xu, Argonne National Laboratory

Yan Zeng, Florida State University

Yang Zhao, Western University

Symposium Support

**Silver**

LENS Low Cost Earth-Abundant NA-ION Storage Consortium

**Bronze**

Florida State University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN02.01: Broader Impact of Sodium Energy Storage

Session Chairs: Guiliang Xu and Yan Zeng

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 338

**10:30 AM \*EN02.01.01**

**Overview of the Low-Cost Earth-Abundant Na-Ion Storage (LENS) Consortium** [Venkat Srinivasan](#); Argonne National Laboratory, United States

**11:00 AM \*EN02.01.02**

**Pathways to High-Energy and Long-Life Sodium-Ion Batteries** Khalil Amine; Argonne National Laboratory, United States

SESSION EN02.02: Materials Development for Sodium Batteries

Session Chairs: Xin Li and Yang Zhao

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 338

**1:30 PM \*EN02.02.01**

**Consideration of Suitable Sodium Battery Cathode Materials** Esther S. Takeuchi<sup>1,2</sup>, Kenneth Takeuchi<sup>1,2</sup> and Amy Marschlok<sup>1,2</sup>; <sup>1</sup>Stony Brook University, United States; <sup>2</sup>Brookhaven National Laboratory, United States

**2:00 PM \*EN02.02.02**

**Development of Pseudocapacitive Behavior in Sodium-Ion Electrode Materials** Andrea Zambotti, Quynh Nguyen and Bruce S. Dunn; University of California, Los Angeles, United States

**2:30 PM BREAK**

**3:00 PM \*EN02.02.03**

**Sodiated Iron Chalcogenides as High-Capacity Cathode Materials for Rechargeable Sodium-Ion Batteries** Ryan DeBlock, Hunter O. Ford, Debra R. Rolison and Jeffrey W. Long; U.S. Naval Research Laboratory, United States

**3:30 PM \*EN02.02.04**

**Scalable, Non-Toxic, Chemical Presodiation for Sodium-Ion Batteries** Huolin Xin and Peng Li; University of California, Irvine, United States

**4:00 PM EN02.02.05**

**Ab Initio Simulation of Sodium-Based Cathode Materials—Efficient Configurational Screening to Discover Novel and Stable Compositions** Konstantin Köster<sup>1,2</sup> and Payam Kaghazchi<sup>1,2</sup>; <sup>1</sup>Forschungszentrum Jülich GmbH, Germany; <sup>2</sup>University of Twente, Netherlands

**4:15 PM EN02.02.06**

**Non-Equilibrium Transformation Mechanisms in a Prussian Blue Analogue Electrode** John Cattermull<sup>1,2</sup>, Mauro Pasta<sup>2</sup> and Andrew L. Goodwin<sup>2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>University of Oxford, United Kingdom

**4:30 PM EN02.02.07**

**Surface Engineering Prussian White for High-Performance Sodium-Ion Battery Cathodes** Charlotte Thomas, Kaitlin Garman, Evan Flitz and Chunmei Ban; University of Colorado Boulder, United States

**4:45 PM EN02.02.08**

**Transition Metal Vacancy and Position Engineering Enables Reversible Anionic Redox Reaction for Sodium Storage** Jiantao Li<sup>1,2</sup> and Khalil Amine<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Northwestern University, United States

SESSION EN02.03: Cathodes for Sodium Batteries I

Session Chairs: Pieremanuele Canepa and Hao Liu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 338

**8:30 AM \*EN02.03.01**

**Durable Layered Materials with Abundant Elements for Na Storage Applications** Naoaki Yabuuchi and Yosuke Ugata; Yokohama National University, Japan

**9:00 AM +EN02.03.02**

**Structure Stabilization in Layered Transition Metal Oxide Positive Electrodes for Sodium Ion Batteries** [Hui Xiong](#); Boise State University, United States

**9:30 AM BREAK**

**10:00 AM \*EN02.03.03**

**Redox Mechanisms, Cation Ordering Thermodynamics and Diffusion Kinetics in Layered Na-Intercalation Compounds** [Anton Van der Ven](#); University of California, Santa Barbara, United States

**10:30 AM +EN02.03.04**

**Increasing the Voltage for Sodium Cathode Through Copper and Oxygen Redox** [Enyuan Hu](#); Brookhaven National Laboratory, United States

**11:00 AM \*EN02.03.05**

***Operando* Interaction and Transformation of Metastable Defects in Layered Oxides for Na Ion Batteries** [Andrej Singer](#); Cornell University, United States

**11:30 AM EN02.03.06**

**Modulating the Structural Stability and Oxygen Redox of Sodium Layered Cathodes Through Dual Site Co-Doping Strategy** Bei Zhou and [Qingsong Wang](#); University of Bayreuth, Germany

**11:45 AM EN02.03.07**

**Coupling Anionic Oxygen Redox with Selenium for Stable High-Voltage Sodium Layered Oxide Cathodes** [Xueli Sherry Zheng](#); Stanford University, United States

SESSION EN02.04: Cathodes for Sodium Batteries II

Session Chairs: Enyuan Hu and Hui Xiong

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 338

**1:30 PM \*EN02.04.01**

**How Quickly Can Sodium-Ion Learn? Assessing Scenarios for Techno-Economic Competitiveness Against Lithium-Ion Batteries** [William C. Chueh](#); Stanford University, United States

**2:00 PM \*EN02.04.02**

**Pillared Layered Transition Metal Oxide for Na-Ion Batteries** [Hao Liu](#); Binghamton University, The State University of New York, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*EN02.04.03**

**Advancing Mn- and Fe-based Layered Oxide Cathodes for Sodium-Ion Batteries: Challenges and Strategies** [Eungje Lee](#)<sup>1</sup>, Jihyeon Gim<sup>1</sup>, Jehee Park<sup>2</sup>, Iddrisu Abdul-Razak<sup>3</sup>, Dennis Brown<sup>3</sup>, Sadikul Alam<sup>4</sup>, Jinwoo Hwang<sup>4</sup>, Seung-Bum Son<sup>1</sup> and Christopher Johnson<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Hanbat National University, Korea (the Republic of); <sup>3</sup>Northern Illinois University, United States; <sup>4</sup>The Ohio State University, United States

**4:00 PM EN02.04.04**

**Morphology, Structure and Electrochemical Performances of Ni/Fe-Based Layered Oxide Cathodes for Na-Ion Batteries** [Debanjana Pahari](#), Rajneesh Kumar, Josef Brey and Matteo Bianchini; University of Bayreuth, Germany

**4:15 PM ^EN02.04.05**

**Sodium Intercalation Behavior in Some New Transition Metal Phosphates** [Kent J. Griffith](#); University of California, San Diego, United States

**4:45 PM EN02.04.06**

**Iron-Based Polyanionic Cathodes for Sustainable Sodium-Ion Batteries** [Yaprak Subasi](#), Haidong Liu and Reza Younesi; Ångström Laboratory, Uppsala University, Sweden

SESSION EN02.05: Anodes, Solid Electrolytes and Solid-State Batteries for Sodium I

Session Chairs: Chao Luo and Andrej Singer

Thursday Morning, April 10, 2025

Summit, Level 3, Room 338

**9:00 AM \*EN02.05.01**

**Mechanistic Insights into Interface Instability of Sodium Metal Electrodes** [Partha P. Mukherjee](#), Aditya Singla and Bairav Vishnugopi; Purdue University, United States

**9:30 AM EN02.05.02**

**Decoupling the SEI Influence to Reveal Intrinsic Deposition of Reactive Metal** [Xintong Yuan](#) and Yuzhang Li; University of California, Los Angeles, United States

**9:45 AM BREAK**

**10:15 AM \*EN02.05.03**

**New Sodium-Based Anode Materials for Solid and Liquid-Electrolyte Batteries** [Matthew McDowell](#); Georgia Institute of Technology, United States

**10:45 AM \*EN02.05.04**

**Interdependence of Support Wettability-Electrodeposition Rate—Sodium Metal Anode and SEI Microstructure** [David Mitlin](#); The University of Texas at Austin, United States

**11:15 AM \*EN02.05.05**

**Three-Step Thermodynamic vs Two-Step Kinetics-Limited Sulfur Reactions in All-Solid-State Sodium Batteries** [Hongli Zhu](#); Northeastern University, United States

**11:45 AM EN02.05.06**

**Carbon Precision—The Key to Unlocking Efficient Sodium-Ion Storage** [Bishnu Prasad Thapaliya](#); Oak Ridge National Laboratory, United States

SESSION EN02.06: Anodes, Solid Electrolytes and Solid-State Batteries for Sodium II

Session Chairs: Chunmei Ban and Yang Zhao

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 338

**1:30 PM \*EN02.06.01**

**Strategies of Interface Stabilization for Sulfide-Type Sodium Ion Conductors in Solid-State Na Batteries** [Hui Wang](#) and Xiaolin Guo; University of Louisville, United States

**2:00 PM \*EN02.06.02**

**Anion Rotation, Cation Disorder and Ionic Conductivity in Sodium Solid Electrolytes** [Shyue Ping Ong](#)<sup>1</sup>, Zihan Yu<sup>1</sup>, Jin An Sam Oh<sup>1</sup>, Y. Shirley Meng<sup>2</sup>, Raphaële Clement<sup>3</sup> and Elias Sebt<sup>3</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>University of California, Santa Barbara, United States

**2:30 PM BREAK**

**3:00 PM \*EN02.06.03**

**Reservoir Free Na SSBs Enabled by NaSICON Separators and Na Metal Oxyhalide Electrolytes** [Linda F. Nazar](#)<sup>1</sup>, Vipin K. Singh<sup>1</sup>, Till Ortmann<sup>2</sup>, Jackson Schuler<sup>1</sup>, Shashwat Singh<sup>1</sup>, Maya Ziegler<sup>2</sup>, Insang You<sup>1</sup> and Juergen Janek<sup>2</sup>; <sup>1</sup>University of Waterloo, Canada; <sup>2</sup>Justus-Liebig-Universität Giessen, Germany



**3:30 PM \*EN02.06.04**

**Computational Design and Discovery for Sodium Ionic Conductors** [Shuo Wang](#) and Yifei Mo; University of Maryland, United States

**4:00 PM ^EN02.06.05**

**Data-Driven Understand of Na-Ion Conductor—Mechanistic Understanding, Specialized Dataset and Universal Predictor** [Bin Ouyang](#); Florida State University, United States

**4:30 PM EN02.06.06**

**Multiscale Ionic Diffusion in Novel Sodium Solid-State Amorphous Electrolytes** [Margarita Russina](#)<sup>1</sup>, Xavier Martinez de Irujo Labalde<sup>2</sup>, Tong Zhao<sup>2</sup>, Markus Appel<sup>3</sup>, Sebastian Risse<sup>1</sup> and Wolfgang Zeier<sup>2</sup>; <sup>1</sup>Helmholtz-Zentrum Berlin, Germany; <sup>2</sup>University of Münster, Germany; <sup>3</sup>Institute Laue-Langevin, France

**4:45 PM EN02.06.07**

**Lattice Dynamics Signature for Sodium Superionic Conductors** [Ming Hu](#); University of South Carolina, United States

SESSION EN02.07: Poster Session: Sodium-Based Energy Storage

Session Chairs: Yan Zeng and Yang Zhao

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EN02.07.01**

**Investigating the Influence of TMD Composition on Sodium and Potassium-Ion Battery Performance** [Arijit Roy](#) and Gurpreet Singh; Kansas State University, Korea (the Republic of)

**EN02.07.02**

**NASICON-Enhanced Sodium-Ion Solid-State Structural Batteries for Automotive and Aerospace Applications** Tiago A. Salgueiro<sup>1,2,3</sup>, [João P. Ferreira](#)<sup>2,3,4</sup>, António Almeida<sup>4</sup>, Federico Danzi<sup>1</sup>, Pedro Camanho<sup>1,3</sup> and Joana E. Oliveira<sup>3,1</sup>; <sup>1</sup>INEGI - Institute of Science and Innovation in Mechanical and Industrial Engineering, Portugal; <sup>2</sup>IFIMUP - Institute of Physics for Advanced Materials, Nanotechnology and Photonics, Portugal; <sup>3</sup>FEUP - Faculty of Engineering of the University of Porto, Portugal; <sup>4</sup>FCUP - Faculty of Sciences of the University of Porto, Portugal

**EN02.07.03**

**Tailoring the Sodium Metal/NASICON Interface with Surface Modifiers for Dendrite Suppression in All-Solid-State Sodium Batteries** Tiago A. Salgueiro<sup>1,2,3</sup>, [João P. Ferreira](#)<sup>2,4</sup>, Joana Santos<sup>4</sup>, Joao Ventura<sup>2,4</sup> and Joana E. Oliveira<sup>3,1</sup>; <sup>1</sup>INEGI - Institute of Science and Innovation in Mechanical and Industrial Engineering, Portugal; <sup>2</sup>IFIMUP - Institute of Physics for Advanced Materials, Nanotechnology and Photonics, Portugal; <sup>3</sup>FEUP - Faculty of Engineering of the University of Porto, Portugal; <sup>4</sup>FCUP - Faculty of Sciences of the University of Porto, Portugal

**EN02.07.04**

**Copper Sulfide Assisted by Multi-Walled Nanotubes for Stability and Capacity Increase Alleviation for Sodium-Ion Batteries** [Youngho Jin](#)<sup>1</sup>, Honggyu Seong<sup>1</sup>, Yoon Myung<sup>2</sup>, Chan Woong Na<sup>2</sup> and Jaewon Choi<sup>1</sup>; <sup>1</sup>Gyeongsang National University, Korea (the Republic of); <sup>2</sup>Korea Institute of Industrial Technology, Korea (the Republic of)

**EN02.07.05**

**In Situ Polymerized Composite Solid Electrolytes Integrating a 3D NASICON Framework for Sodium Batteries** Jin Seok Yang, [Jeong-Min Kim](#) and Chan-Jin Park; Chonnam National University, Korea (the Republic of)

**EN02.07.06**

**Bromide-Based Nonflammable Electrolyte for Safe and Long-Life Sodium Metal Batteries** [Changjian Zuo](#), Dejian Dong, Huwei Wang, Yue Sun and Yi-Chun Lu; The Chinese University of Hong Kong, Hong Kong

**EN02.07.07**

**Improvement of Electrochemical Performance in O3-Type NaNi<sub>0.4</sub>Fe<sub>0.25</sub>Mn<sub>0.35</sub>O<sub>2</sub> Cathodes for Sodium-Ion Batteries Using a High-Entropy Approach** Doh Young Guac<sup>1,2</sup> and [Sang-Ok Kim](#)<sup>1,3</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of); <sup>3</sup>Korea University of Science and Technology, Korea (the Republic of)

**EN02.07.08**

**Synthesis and Characterization of Sodium Trititanate For Electrochemical Applications** Assis d. Alves, Elena I. Santos and Flavio M. Vichi; University of Sao Paulo, Brazil

**EN02.07.09**

**Revisiting the Low-Temperature "Stablization Process" for Starch-Derived Hard Carbon Anodes** Yuke Shen; Shanghai Jiao Tong University, China

**EN02.07.10**

**Data-Driven Universal Model for Predicting Thermodynamics and Kinetics for Na-Ion Battery** Lin Wang, Yizhan Zhang and Bin Ouyang; Florida State University, United States

**EN02.07.11**

**Pioneering Wet Chemical Synthesis Route for High-Purity and Scalability of Sodium Solid Electrolytes (Na<sub>3</sub>InCl<sub>6</sub>)—Boosting Ion Conductivity in Next-Gen Solid-State Sodium Batteries** Saddam S. Shaikh<sup>1,2,3</sup>; <sup>1</sup>Academia Sinica, Taiwan; <sup>2</sup>National Tsing Hua University, Taiwan; <sup>3</sup>National Synchrotron Radiation Research Center, Taiwan

SESSION EN02.08: Organic Sodium Electrolytes and Electrodes

Session Chairs: David Mitlin and Hui Wang

Friday Morning, April 11, 2025

Summit, Level 3, Room 338

**8:30 AM \*EN02.08.01**

**All-Organic Solid State Sodium Metal Batteries** Brett A. Helms; Lawrence Berkeley National Laboratory, United States

**9:00 AM \*EN02.08.02**

**Organic Electrode Materials for Affordable and Sustainable Na-Ion Batteries** Chao Luo; University of Miami, United States

**9:30 AM EN02.08.03**

**Developing a Hybrid Solid Electrolyte (Interphase) and Unraveling Its Mechanism Towards Long-Life Sodium Metal and Sodium Solid-State Batteries** Roya Damircheli and Chuan-Fu Lin; Catholic University of America, United States

**9:45 AM BREAK**

**10:15 AM EN02.08.04**

**Gel Polymer Electrolytes and Its Composite with Inorganic Solid-State Conductors for Sodium-Based Rechargeable Batteries** Aninda J. Bhattacharyya; Indian Institute of Science, India

**10:30 AM \*EN02.08.05**

**Exploring Fluorine-Free Electrolytes for Sodium-Ion Batteries** Chunmei Ban; University of Colorado Boulder, United States

**11:00 AM \*EN02.08.06**

**Hybrid Solvating Electrolytes for Practical Sodium Metal Batteries** Ju Li; Massachusetts Institute of Technology, United States

**11:30 AM \*EN02.08.07**

**Designing High-Energy-Density and Fast-Charging Sodium-Based Batteries** Yuqi Li; Stanford University, United States

SESSION EN02.09: Unconventional Sodium Battery Design

Session Chairs: Phung Le and Yan Zeng

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 338

**1:30 PM EN02.09.01**

**Enabling Anode-Free Sodium Metal Batteries with a Boron Cluster Electrolyte** [Anton W. Tomich](#)<sup>1</sup>, Seoung-Bum Son<sup>1</sup>, Heonjae Jeong<sup>2</sup>, Joseph Kubal<sup>1</sup>, Vincent Lavallo<sup>3</sup> and Christopher Johnson<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Gachon University, Korea (the Republic of); <sup>3</sup>University of California, Riverside, United States

**1:45 PM EN02.09.02**

**Enhancing Seawater Battery Performance Through Integration with Water Evaporation Induced Generators** Joana E. Oliveira<sup>1,2</sup>, [João P. Ferreira](#)<sup>3,2</sup>, Patricia Soares<sup>3,4</sup>, Sara Spínola<sup>3,4</sup> and Joao Ventura<sup>3,4</sup>; <sup>1</sup>Faculty of Engineering of University of Porto, Portugal; <sup>2</sup>Associate Laboratory of Energy, Transports and Aerospace, Portugal; <sup>3</sup>University of Porto, Portugal; <sup>4</sup>Institute of Physics for Advanced Materials, Nanotechnology and Photonics (IFIMUP), Portugal

**2:00 PM EN02.09.03**

**Nondestructive Characterization of Na Ion Batteries at 0C and Below** [Harshitha Marikundam](#), Patricio Solana Bustamente and Nicholas Rolston; Arizona State University, United States

**2:15 PM EN02.09.04**

**Tuning Sodium Plating to Achieve Fast-Charging Anode-Free Sodium Batteries** [Liangliang Li](#); Lingnan University, Hong Kong

**2:30 PM BREAK**

**3:00 PM EN02.09.05**

**Microstructure Analysis and Performance of Wood Lignin-Derived Carbon Foam Electrodes for Sodium-Ion Batteries** Diprajit Biswas<sup>1</sup>, Qiang Yan<sup>2</sup> and [Eric Kazzyk](#)<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>Forest Products Laboratory, United States

**3:15 PM EN02.09.06**

**Glass-Free NaSICON with High Ionic Conductivity and Chemical Stability for Sodium Metal and Redox Flow Batteries** [Flora Tseng](#)<sup>1</sup>, Zhengwu Fang<sup>2</sup>, Jeffrey Wolfenstine<sup>3</sup>, Miaofang Chi<sup>2</sup> and Jeff Sakamoto<sup>4,1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>Mechano-Chemical Understanding of Solid Ion Conductors (MUSIC), United States; <sup>4</sup>University of California, Santa Barbara, United States

**3:30 PM EN02.09.07**

**Mechanistic Insights into O<sub>2</sub>/H<sub>2</sub>O-Assisted Na-CO<sub>2</sub> Batteries via *In Situ* Ambient Pressure X-Ray Photoelectron Spectroscopy** [Jheng-Yi Huang](#) and Ru-Shi Liu; National Taiwan University, Taiwan

## SYMPOSIUM EN03

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Scientific Advances in Nuclear Fuels Through Experiment and Modeling  
April 8 - April 11, 2025

Symposium Organizers

Marjorie Bertolus, Commissariat à l'énergie atomique et aux énergies alternatives  
Fabiola Cappia, Idaho National Laboratory  
Michael Cooper, Los Alamos National Laboratory  
David Frazer, General Atomics

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN03.01: Metallic Fuels

Session Chairs: Marjorie Bertolus and Christopher Matthews

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 339

**10:30 AM \*EN03.01.01**

**Accelerated Burnup Irradiation of U-10Mo at Intermediate Temperatures (250-500C) in the High Flux Isotope Reactor** Andrew T. Nelson, Peter Doyle, Jacob Gorton, Ian Greenquist, Annabelle Le Coq and Jason Harp; Oak Ridge National Laboratory, United States

**11:00 AM EN03.01.02**

**Microstructural Insights into Fuel Cladding Chemical Interaction in a U-20Pu-10Zr Fuel Irradiated in EBR-II** Bao-Phong Nguyen<sup>1,2</sup>, Yachun Wang<sup>2</sup>, Luca Capriotti<sup>2</sup>, Assel Aitkaliyeva<sup>1,2</sup> and Tiankai Yao<sup>2</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>Idaho National Laboratory, United States

**11:15 AM EN03.01.03**

**Atomistic Study of U<sub>3</sub>Si<sub>2</sub>** Edoardo Brando<sup>1</sup>, Johann Bouchet<sup>1</sup>, Aloïis Castellano<sup>2</sup> and François Bottin<sup>3,4</sup>; <sup>1</sup>CEA Cadarache, France; <sup>2</sup>Université de Liège, Belgium; <sup>3</sup>Université Paris-Saclay, France; <sup>4</sup>CEA, France

**11:30 AM \*EN03.01.04**

**Rethinking the Role of Pu in Metallic Fuel Behavior—How Does Pu Impact Constituent Redistribution and Thermal Properties?** Assel Aitkaliyeva<sup>1,2</sup>, Mitchell Mika<sup>1</sup>, Allison R. Probert<sup>1</sup>, Mary Severt<sup>1</sup>, Tiankai Yao<sup>2</sup>, Ethan Hisle<sup>2</sup>, Tsvetoslav Pavlov<sup>2</sup>, Cynthia Adkins<sup>2</sup> and Luca Capriotti<sup>2</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>Idaho National Laboratory, United States

SESSION EN03.02: Molten Salts

Session Chairs: Fabiola Cappia and Par Olsson

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 339

**1:30 PM EN03.02.01**

**New Insights into the Chemistry of Advanced Molten Salt Nuclear Fuels—Experimental and Computational Studies at the TU Delft** Anna L. Smith<sup>1</sup>, Nick ter Veer<sup>1</sup>, Dennis Alders<sup>1</sup>, Ana Sacristan<sup>1</sup>, Thomas Dumaire<sup>1</sup>, John Vlieland<sup>1</sup>, Sebastian Couweleers<sup>1</sup>, Aimen Gheribi<sup>2</sup>, Ondrej Benes<sup>3</sup> and Rudy Konings<sup>1</sup>; <sup>1</sup>Delft University of Technology, Netherlands; <sup>2</sup>Concordia University, Canada; <sup>3</sup>European Commission Joint Research Centre, Germany

**1:45 PM EN03.02.02**

**Atomistic Modeling of the Structure and Dynamics of Uranium-Chlorine Complexes in UCl<sub>n</sub> - (KCl-LiCl) Eutectics** Azmain Faek Islam, Xiaofeng Guo and Soumik Banerjee; Washington State University, United States

**2:00 PM EN03.02.03**

**Atomic Scale Calculations of Thermophysical Properties of Americium Based Molten Salt for Next Generation Nuclear Reactors** Maria Chiara Notarangelo<sup>1</sup>, Julien Tranchida<sup>1</sup>, Emeric Bourasseau<sup>1</sup>, Kateryna Goloviznina<sup>2</sup> and Mathieu Salanne<sup>2,3</sup>; <sup>1</sup>CEA Cadarache, France; <sup>2</sup>Sorbonne Université, CNRS, France; <sup>3</sup>Institut Universitaire de France, France

**2:15 PM EN03.02.04**

**Heat Capacity and Enthalpy of the Binary Eutectic MgCl<sub>2</sub>-NaCl Molten Salt System from 400 °C to 800 °C** Bryn E. Merrill<sup>1</sup>, Jeffrey Eakin<sup>1</sup>, Kenita Dahal<sup>1</sup>, Juliano Schorne-Pinto<sup>2</sup>, Theodore Besmann<sup>2</sup>, Jason Lonergan<sup>3</sup> and Xiaofeng Guo<sup>1</sup>; <sup>1</sup>Washington State University, United States; <sup>2</sup>University of South Carolina, United States; <sup>3</sup>Pacific Northwest National Laboratory, United States

**2:30 PM BREAK**

SESSION EN03.03: Cladding

Session Chairs: David Frazer and Pierre-Clement Simon

Tuesday Afternoon, April 8, 2025  
Summit, Level 3, Room 339

**3:00 PM \*EN03.03.01**

**Steam Oxidation Behavior of ATF Cladding Materials at Temperatures of 1200°C and Above** Mirco Grosse<sup>1,2</sup>, Martin Steinbrueck<sup>3</sup> and Mirco Große<sup>3</sup>;  
<sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>IAM/AWP, Germany; <sup>3</sup>KIT, Germany

**3:30 PM EN03.03.02**

**Radiation-Induced Thermal Conductivity Degradation in SiC, ZrC and ZrN Ceramics Cladding Studied via Transient Grating Spectroscopy** Han Liu<sup>1</sup>, Abdallah Reza<sup>2</sup>, Felix Hofmann<sup>2</sup> and Robert W. Harrison<sup>1</sup>; <sup>1</sup>University of Manchester, United Kingdom; <sup>2</sup>University of Oxford, United Kingdom

**3:45 PM \*EN03.03.03**

**Multiscale Modeling of the Mechanical Performance of the Fuel-Clad Assembly in Light Water Reactors** Laurent Capolungo<sup>1</sup>, Andrea Rovinelli<sup>1</sup>, Andre Ruybalid<sup>1</sup>, Kyle Gamble<sup>2</sup> and Ryan T. Sweet<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Idaho National Laboratory, United States

SESSION EN03.04: Uncertainty Quantification

Session Chairs: Andrew Nelson and Andrea Rovinelli

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 339

**9:00 AM \*EN03.04.01**

**The Role of Mechanistic Modeling and Multiscale Uncertainty Propagation for Accelerated Fuel Qualification** Christopher Matthews, Michael W. Cooper and David Andersson; Los Alamos National Laboratory, United States

**9:30 AM EN03.04.02**

**Understanding Model Inadequacy in TRISO Nuclear Fuel Fission Products Release Models—Empirical and Mechanistic Approaches** Somayajulu L. Dhulipala, Pierre-Clement A. Simon, Paul A. Demkowicz and Stephen R. Novascone; Idaho National Laboratory, United States

**9:45 AM EN03.04.03**

**Bayesian Calibration of UO<sub>2</sub> Creep Rates as a Tool for AFQ** Conor Galvin<sup>1</sup>, Anton Schneider<sup>1</sup>, Michael W. Cooper<sup>1</sup>, Pieterjan Robbe<sup>2</sup> and David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Sandia National Laboratories, United States

**10:00 AM BREAK**

SESSION EN03.05: UO<sub>2</sub> I

Session Chairs: Larry Aagesen and Assel Aitkaliyeva

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 339

**10:30 AM \*EN03.05.01**

**A Physics-Based Model for Fuel Fragmentation** Davide Pizzocri<sup>1</sup>, Elisa Cappellari<sup>1</sup>, Giovanni Zullo<sup>1</sup>, Lelio Luzzi<sup>1</sup> and Paul Van Uffelen<sup>2</sup>; <sup>1</sup>Politecnico di Milano, Italy; <sup>2</sup>European Commission Joint Research Centre, Germany

**11:00 AM EN03.05.02**

**Beyond the Limit—Investigating Microstructural and Compositional Evolution at the FCCI in High Burnup UO<sub>2</sub>** Allison R. Probert<sup>1</sup>, Mitchell Mika<sup>1</sup>, Cade Finney<sup>1</sup>, Casey McKinney<sup>2</sup>, Timothy Lach<sup>2</sup>, Jason Harp<sup>2</sup> and Assel Aitkaliyeva<sup>1,3</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>Idaho National Laboratory, United States

**11:15 AM EN03.05.03**

**BISON Fission Gas Behavior Modeling Capabilities at High Burnup in UO<sub>2</sub>** Pierre-Clement A. Simon<sup>1</sup>, Larry Aagesen<sup>1</sup>, David Andersson<sup>2</sup>, Sudipta Biswas<sup>1</sup>, Nathan Capps<sup>3</sup>, Michael W. Cooper<sup>2</sup>, Kyle Gamble<sup>1</sup> and Stephen R. Novascone<sup>1</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Los Alamos National Laboratory, United States; <sup>3</sup>Oak Ridge National Laboratory, United States

**11:30 AM \*EN03.05.04**

**Comprehensive Characterization of Fission Gas Behavior in High Burnup (61.4 GWd/tU) UO<sub>2</sub> Fuel Using EPMA, SEM and TEM Analyses**

Catherine Sabathier<sup>1</sup>, Mathieu Angleraud<sup>1</sup>, Claire Onofri<sup>1</sup>, Doris Drouan<sup>1</sup>, Thomas Greneche<sup>1</sup>, Karine Hanifi<sup>1</sup>, Isabelle Zacharie<sup>1</sup>, Thierry Blay<sup>1</sup>, Laurent Fayette<sup>1</sup>, Alain Chartier<sup>1</sup> and Bénédicte Warot-Fonrose<sup>2</sup>; <sup>1</sup>CEA, France; <sup>2</sup>CNRS, France

SESSION EN03.06: Corium Studies

Session Chairs: Mirco Grosse and Eddie Lopez Honorato

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 339

**1:45 PM \*EN03.06.01**

**Study of (Zr,U)SiO<sub>4</sub> Solid Solutions as Phases of Interest for Fuel Interaction in Corium** Arthur Avallone<sup>1</sup>, Paul Estevenon<sup>2</sup>, Christoph Hennig<sup>3,4</sup>, Stephanie Szenknect<sup>1</sup>, Kristina Kvashnina<sup>3,4</sup>, Pamela Vasconcelos Borges de Pinho<sup>5</sup>, Nicolas Clavier<sup>1</sup>, Xiaofeng Guo<sup>6</sup>, Christine Gueneau<sup>5</sup> and Nicolas Dacheux<sup>1</sup>; <sup>1</sup>ICSM, Univ Montpellier, CNRS, CEA, ENSCM, France; <sup>2</sup>CEA,DES,ISEC,DMRC, Univ Montpellier, France; <sup>3</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany; <sup>4</sup>ESRF, France; <sup>5</sup>Université Paris-Saclay, CEA, SCCME, SPEC, France; <sup>6</sup>Washington State University, United States

**2:15 PM EN03.06.02**

**Preparation and Characterization of (U,Zr)O<sub>2</sub> Solid Solutions, as Corium Phases of Interest** Arthur Avallone<sup>1</sup>, Paul Estevenon<sup>2</sup>, Pamela Vasconcelos Borges de Pinho<sup>3</sup>, Stephanie Szenknect<sup>1</sup>, Christoph Hennig<sup>4,5</sup>, Kristina Kvashnina<sup>4,5</sup>, Nicolas Clavier<sup>1</sup>, Xiaofeng Guo<sup>6</sup>, Christine Gueneau<sup>3</sup> and Nicolas Dacheux<sup>1</sup>; <sup>1</sup>ICSM, Univ Montpellier, CNRS, CEA, ENSCM, France; <sup>2</sup>CEA,DES,ISEC,DMRC, Univ Montpellier, France; <sup>3</sup>Université Paris-Saclay, CEA, SCCME, SPEC, France; <sup>4</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany; <sup>5</sup>ESRF, France; <sup>6</sup>Washington State University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EN03.07: UO<sub>2</sub> II

Session Chairs: Davide Pizzocri and Catherine Sabathier

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 339

**3:30 PM \*EN03.07.01**

**Meso-Scale Modeling of UO<sub>2</sub> Nuclear Fuel to High Burnup** Larry Aagesen<sup>1,2</sup>, Sudipta Biswas<sup>1</sup>, Pierre-Clement A. Simon<sup>1</sup>, Kyle Gamble<sup>1</sup>, Michael W. Cooper<sup>3</sup>, Conor Galvin<sup>3</sup>, David Andersson<sup>3</sup>, Sophie Blondel<sup>4</sup> and Wen Jiang<sup>5</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>University of Michigan–Ann Arbor, United States; <sup>3</sup>Los Alamos National Laboratory, United States; <sup>4</sup>The University of Tennessee, Knoxville, United States; <sup>5</sup>North Carolina State University, United States

**4:00 PM EN03.07.02**

**Calculation of Self-Diffusion Coefficients in UO<sub>2</sub> Using Atomic Scale Modelling** Petra Ospital, Luca Messina, Thomas Schuler, Frédéric Soisson and Marjorie Bertolus; Commissariat à l'énergie atomique et aux énergies alternatives, France

**4:15 PM EN03.07.03**

**Interstitial Loop Unfaulting and Extended Defect Evolution in Uranium Dioxide and Thorium Dioxide** Md Minaruzzaman<sup>1</sup>, Kaustubh Bawane<sup>2</sup>, Anshul Kamboj<sup>2</sup>, Mutaz Alshannaq<sup>1</sup>, Miaomiao Jin<sup>3</sup>, Yongfeng Zhang<sup>4</sup>, Boopathy Kombaiiah<sup>2</sup>, J. Matthew Mann<sup>5</sup> and Marat Khafizov<sup>1</sup>; <sup>1</sup>The Ohio State University, United States; <sup>2</sup>Idaho National Laboratory, United States; <sup>3</sup>The Pennsylvania State University, United States; <sup>4</sup>University of Wisconsin–Madison, United States; <sup>5</sup>Air Force Research Laboratory, United States

**4:30 PM EN03.07.04**

**Multiphysics Modeling for Restructuring in the High Burnup UO<sub>2</sub> Fuel** Sudipta Biswas<sup>1</sup>, Veerappan Prithvirajan<sup>1</sup>, Dewen Yushu<sup>1</sup>, Cameron B. Howard<sup>1</sup>

and Lingfeng He<sup>2</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>North Carolina State University, United States

**4:45 PM EN03.07.05**

**Experimental and Computational Validation of the Improved Radiation Tolerance of Zr-Doped UO<sub>2</sub>** Ritesh Mohun, P.J. Thomas and Simon C. Middleburgh; Bangor University, United Kingdom

SESSION EN03.08: Advanced Oxide Fuels I

Session Chairs: Sudipta Biswas and Johann Bouchet

Thursday Morning, April 10, 2025

Summit, Level 3, Room 339

**8:45 AM \*EN03.08.01**

**Evaluation of Thermophysical Properties of Actinide Dioxides Based on First-Principles Calculations** Hiroki Nakamura<sup>1</sup>, Keita Kobayashi<sup>1</sup>, Masahiko Okumura<sup>1</sup>, Mitsuhiro Itakura<sup>1</sup>, Masahiko Machida<sup>1</sup>, Masashi Watanabe<sup>1</sup> and Masato Kato<sup>2</sup>; <sup>1</sup>Japan Atomic Energy Agency, Japan; <sup>2</sup>Inspection Development Company, Japan

**9:15 AM EN03.08.02**

**Combined Electronic Structure and Empirical Potential Study of the AmO<sub>2-x</sub> System** Baptiste Labonne, Christine Gueneau and Marjorie Bertolus; Commissariat à l'énergie atomique et aux énergies alternatives, France

**9:30 AM EN03.08.03**

**Electrical Impedance Spectroscopy as a Method to Determine Grain Size or Grain Boundary Composition in Polycrystalline Oxides and Hydrides** Simon Stephens<sup>1</sup>, Jack Astbury<sup>2</sup>, Mohamad Abdallah<sup>2</sup>, Brandon J. Stratton<sup>1</sup> and Simon C. Middleburgh<sup>1</sup>; <sup>1</sup>Bangor University, United Kingdom; <sup>2</sup>Tokamak Energy, United Kingdom

**9:45 AM BREAK**

SESSION EN03.09: Machine Learning

Session Chairs: Johann Bouchet and Somayajulu Dhulipala

Thursday Morning, April 10, 2025

Summit, Level 3, Room 339

**10:15 AM \*EN03.09.01**

**A Machine Learning Approach for Accelerated Fission Product Speciation and Material Property Evolution in Nuclear Fuel** Denise Adorno Lopes, Alicia V, Rinkle Juneja, J. M. Kurley, William F. Cureton and Andrew T. Nelson; Oak Ridge National Laboratory, United States

**10:45 AM \*EN03.09.02**

**A Scale Bridging Surrogate Model for UO<sub>2</sub> Fuel Creep** Daniel Schwen<sup>1</sup>, Yifeng Che<sup>1</sup>, Ryan T. Sweet<sup>1</sup> and Gary Hu<sup>2</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Argonne National Laboratory, United States

**11:15 AM \*EN03.09.03**

**Transformative Techniques in Ion Irradiation and Characterization for Breakthroughs in Materials for Extremes** Kevin G. Field<sup>1,2</sup>, Hangyu Li<sup>1</sup>, Kai Sun<sup>1</sup>, Ian Steigerwald<sup>1</sup>, Mackenzie Warwick<sup>1</sup>, Wyatt Peterson<sup>1</sup>, Aaron G. Penders<sup>3</sup>, Charles Hirst<sup>4</sup>, Logan Clowers<sup>1</sup>, Zhexion Zhang<sup>1</sup>, Alexander Flick<sup>1</sup>, Zhijie Jiao<sup>1</sup>, Christopher R. Field<sup>2</sup> and Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Theia Scientific, LLC, United States; <sup>3</sup>Idaho National Laboratory, United States; <sup>4</sup>University of Wisconsin–Madison, United States

**11:45 AM EN03.09.04**

**A Reliable Neural Network Model for Accelerating Coupled Thermodiffusion Simulations** Mohamed Bahi Yahiaoui<sup>1</sup>, Loïc Giraldi<sup>1</sup>, Geoffrey Daniel<sup>2</sup>, Clément Introini<sup>1</sup> and Julyan Arbel<sup>3</sup>; <sup>1</sup>CEA, DES, IRESNE, DEC, SESC, France; <sup>2</sup>Université Paris-Saclay, CEA - SGLS, France; <sup>3</sup>Université Grenoble Alpes, Inria, CNRS - Grenoble INP, LJK, France

SESSION EN03.10: Nitride Fuels

Session Chairs: Fabiola Cappia and Simon Middleburgh

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 339

**1:45 PM \*EN03.10.01**

**Modelling and Experimental Irradiation Driven Microstructure Evolution in Advanced Metals and Fuels** Par Olsson<sup>1</sup>, Ebrahim Mansouri<sup>1</sup>, Elina Charatsidou<sup>1</sup>, Maria Giamouridou<sup>1</sup>, Qiuguo Yang<sup>1</sup>, Ida Neretnieks<sup>1</sup>, Jonas Planck<sup>1</sup> and Aymeric Le Harivel de Gonville<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology, Sweden; <sup>2</sup>École Polytechnique, France

**2:15 PM EN03.10.02**

**Understanding Thermal Property Behaviour as a Function of Radiation Damage in UN for Advanced Nuclear Fuel Applications** Robert W. Harrison<sup>1</sup>, Angus Wylie<sup>2</sup>, Han Liu<sup>1</sup>, Abdallah Reza<sup>3</sup>, Felix Hofmann<sup>3</sup> and Michael P. Short<sup>2</sup>; <sup>1</sup>University of Manchester, United Kingdom; <sup>2</sup>Massachusetts Institute of Technology, United States; <sup>3</sup>University of Oxford, United Kingdom

**2:30 PM EN03.10.03**

**Developing Mechanistic Three-Dimensional Fission Gas Release Threshold Curves for UO<sub>2</sub> and UN** Kaylee Cunningham<sup>1,2</sup>, Christopher Matthews<sup>1</sup> and Michael Tonks<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>University of Florida, United States

**2:45 PM EN03.10.04**

**Fission Product-Induced Swelling of Uranium Nitride Composites** Elina Charatsidou<sup>1</sup>, Maria Giamouridou<sup>1</sup>, Robert Frost<sup>2</sup> and Par Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology, Sweden; <sup>2</sup>Uppsala University, Sweden

**3:00 PM BREAK**

SESSION EN03.11: Particle Fuels

Session Chairs: Kevin Field and Par Olsson

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 339

**3:30 PM EN03.11.01**

**UN Sintering Additives for Improved Control Over Advanced Fuel Forms** J. M. Kurley, Denise Adorno Lopes, William F. Cureton, Katherine Montoya, Rebekah Petrosky, Andrew Kercher, Wesley Jones, Christopher Hobbs, Rodney Hunt and Andrew T. Nelson; Oak Ridge National Laboratory, United States

**3:45 PM EN03.11.02**

**Anisotropy of Pyrocarbon Layers in Irradiated TRISO Fuel** William F. Cureton, Tyler Gerczak, Grant Helmreich, Martino Hooghkirk and John Hunn; Oak Ridge National Laboratory, United States

**4:00 PM \*EN03.11.03**

**Coated Particle Fuels for Space Nuclear Propulsion** Eddie Lopez Honorato, Ryan Heldt, Bryan Conry, Katherine Montoya, Brandon Wilson and Dianne Ezell; Oak Ridge National Laboratory, United States

**4:30 PM EN03.11.04**

**Data-Driven Approaches Towards Improved Fabrication of Coated Particle Fuels** Bryan Conry, Eddie Lopez Honorato, Ryan Heldt, Flavio Dal Forno Chuahy, Oluwafemi Oyedeji and Tyler Gerczak; Oak Ridge National Laboratory, United States

**4:45 PM EN03.11.05**

**Thermal Oxidation and High Temperature Structures of Uranium Carbide—New Insights into the U-C-O System from *In Situ* X-Ray Diffraction Studies** Emma C. Kindall<sup>1</sup>, Natalie A. Yaw<sup>1</sup>, Juejing Liu<sup>1</sup>, Chris Malin Dixon Wilkins<sup>1</sup>, Sam Karcher<sup>1</sup>, Bryn E. Merrill<sup>1</sup>, Zi-Kui Liu<sup>2</sup>, Hongwu Xu<sup>3,4</sup>, John S. McCloy<sup>1</sup>, Arjen van Veelen<sup>3</sup>, Joshua White<sup>3</sup> and Xiaofeng Guo<sup>1,1</sup>; <sup>1</sup>Washington State University, United States; <sup>2</sup>The Pennsylvania State University, United States; <sup>3</sup>Argonne National Laboratory, United States; <sup>4</sup>Lawrence Livermore National Laboratory, United States



States; <sup>3</sup>Los Alamos National Laboratory, United States; <sup>4</sup>Arizona State University, United States

SESSION EN03.12: Advanced Oxide Fuels II

Session Chairs: Robert Harrison and Simon Middleburgh

Friday Morning, April 11, 2025

Summit, Level 3, Room 339

**9:00 AM \*EN03.12.01**

**Thermodynamic Properties of Actinides Systems at High Temperature with Machine Learning** Johann Bouchet; CEA, IRESNE, DEC, Cadarache, France

**9:30 AM EN03.12.02**

**Impact of the Atmosphere on the Sintering Capability and Chemical Durability of Nd-Doped  $UO_{2+x}$  Mixed Oxide** Thomas Barral<sup>1</sup>, Mickael Bernar<sup>1</sup>, Laurent Claparede<sup>1</sup>, Renaud podor<sup>1</sup>, Elena Bazarkina<sup>2,3</sup>, Martiane Cabie<sup>4</sup>, Kristina Kvashnina<sup>2,3</sup>, Nicolas Clavier<sup>1</sup> and Nicolas Dacheux<sup>1</sup>; <sup>1</sup>ICSM, Univ Montpellier, CNRS, CEA, ENSCM, France; <sup>2</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany; <sup>3</sup>ESRF, France; <sup>4</sup>Aix Marseille Univ, CNRS, Centrale Marseille, France

**9:45 AM EN03.12.03**

**Sintering Behavior of  $UO_2$  and MOX Fuels with Different Pu Contents** Kaythleen Torrente<sup>1,2</sup>, Christelle Duguay<sup>2</sup>, Lebreton Florent<sup>1</sup>, Doreau Franck<sup>1</sup> and Bernard-Granger Guillaume<sup>1</sup>; <sup>1</sup>CEA Marcoule, France; <sup>2</sup>CEA Cadarache, France

**10:00 AM BREAK**

SESSION EN03.13: Advanced Fuels

Session Chairs: Marjorie Bertolus and Conor Galvin

Friday Morning, April 11, 2025

Summit, Level 3, Room 339

**10:30 AM \*EN03.13.01**

**Fuel Design Led by Fuel Performance for Novel Nuclear Systems** Simon C. Middleburgh<sup>1</sup>, Ritesh Mohun<sup>1</sup>, Sarah Valley<sup>1</sup>, Simon Stephens<sup>1</sup>, Phylis Makurunje<sup>1</sup>, Cintia Leite<sup>1</sup>, David Goddard<sup>2</sup>, Gareth F. Stephens<sup>1</sup>, Aidan Cole-Baker<sup>3</sup>, Daniel Shepherd<sup>2</sup>, Akeel Ahmed<sup>2</sup> and Daniel Thatcher<sup>4</sup>; <sup>1</sup>Bangor University, United Kingdom; <sup>2</sup>National Nuclear Laboratory, United Kingdom; <sup>3</sup>Jacobs, United Kingdom; <sup>4</sup>Rolls-Royce, United Kingdom

**11:00 AM EN03.13.02**

**Multi-Scale Investigation of Plastic Deformation and Dislocation Behavior in Uranium Mononitride** Mohamed A. AbdulHameed<sup>1</sup>, Benjamin Beeler<sup>1,2</sup> and Antoine Claisse<sup>3</sup>; <sup>1</sup>North Carolina State University, United States; <sup>2</sup>Idaho National Laboratory, United States; <sup>3</sup>Westinghouse Electric Company, Sweden

**11:15 AM EN03.13.03**

**The Thermal Expansion of Uranium Mononitride (UN)** Natalie A. Yaw<sup>1</sup>, Sam Karcher<sup>1</sup>, Emma C. Kindall<sup>1</sup>, Arjen van Veelen<sup>2</sup>, Chris Malin Dixon Wilkins<sup>1</sup>, Bryn E. Merrill<sup>1</sup>, Hongwu Xu<sup>2</sup>, Joshua White<sup>2</sup>, John S. McCloy<sup>1</sup> and Xiaofeng Guo<sup>1</sup>; <sup>1</sup>Washington State University, United States; <sup>2</sup>Los Alamos National Laboratory, United States

**11:30 AM EN03.13.04**

**Structural Changes in Uranium Dioxide Induced by Chromia Doping—Insights from U-L3 EXAFS Under Varying Sintering Conditions and Dopant Level** Shinhyo Bang<sup>1</sup>, Adrien Terricabras<sup>2</sup>, Xiaofeng Guo<sup>1</sup>, Joshua White<sup>2</sup> and Arjen van Veelen<sup>2</sup>; <sup>1</sup>Washington State University, United States; <sup>2</sup>Los Alamos National Laboratory, United States

# SYMPOSIUM EN04

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Concentrating Solar Thermal Materials for Industrial Decarbonization and Heat Storage

April 8 - April 9, 2025

Symposium Organizers

Andrea Ambrosini, Sandia National Laboratories

Adrianus Indrat Aria, Cranfield University

Ramon Escobar-Galindo, Universidad de Sevilla

Loreto Valenzuela Gutiérrez, Plataforma Solar de Almería

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN04.01: Materials I

Session Chairs: Andrea Ambrosini and Ramon Escobar-Galindo

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 340

**10:30 AM \*EN04.01.01**

**Structure-Property Defect Models for Materials Discovery in Clean Energy Applications** Matthew Witman<sup>1</sup>, Lauren Way<sup>1</sup>, Catalin Spataru<sup>1</sup>, Anuj Goyal<sup>2</sup>, Stephan Lany<sup>3</sup>, Andrew Rowberg<sup>4</sup>, Anthony McDaniel<sup>1</sup>, Tyra Douglas<sup>1</sup> and Sean Bishop<sup>1</sup>; <sup>1</sup>Sandia National Laboratories, United States; <sup>2</sup>Indian Institute of Technology Hyderabad, India; <sup>3</sup>National Renewable Energy Laboratory, United States; <sup>4</sup>Lawrence Livermore National Laboratory, United States

**11:00 AM \*EN04.01.02**

**3D Printed Lattice Structures for Advanced Solar Cavity Receiver Designs** Todd Otanicar<sup>1</sup>, Koda Boldt<sup>1</sup>, Aidan McConnehey<sup>1</sup>, Jacyn Hart<sup>1</sup> and Brad Brennan<sup>2</sup>; <sup>1</sup>Boise State University, United States; <sup>2</sup>Dimensional Energy, United States

**11:30 AM EN04.01.03**

**Electrochemical Study of Molten Salt Corrosion of Alloys for Energy Application** Syed Adnan, Nicholls John and Adrianus Indrat Aria; Cranfield University, United Kingdom

SESSION EN04.02: Thermal Energy Storage I

Session Chairs: Adrianus Indrat Aria and Juan Carlos Sanchez-Lopez

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 340

**1:30 PM \*EN04.02.01**

**Recent Advances in Middle-High Temperature Micro-Encapsulated Phase Change Materials—Material Developments and Applications** Takahiro Nomura; Hokkaido University, Japan

**2:00 PM EN04.02.02**

**Thermochemical Energy Storage with Salt Hydrates for Building Applications— Performance, Control and Comparative Analysis** Logan Vawter<sup>1,2</sup>, Sumanjeet Kaur<sup>2</sup>, Chris Dames<sup>1</sup>, Sherafghan Iftikhar<sup>2</sup> and Cy Khaldi<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**2:15 PM EN04.02.03**

**A Holistic Approach for the Development of CaMnO<sub>3</sub>-Based Perovskite Materials for Hybrid Sensible-Thermochemical Storage in Next Generation**

**Concentrating Solar Thermal Technologies** [Christos Agrafiotis](#)<sup>1</sup>, David Vellas<sup>1</sup>, Lamark de Oliveira<sup>1</sup>, Raisa C. dos Santos Santana<sup>1</sup>, Enkhsetseg Dashjav<sup>1</sup>, Daniel Koch<sup>1</sup>, Mathias Pein<sup>1</sup>, Martin Roeb<sup>1</sup>, Chrysoula Pagkoura<sup>2</sup>, Vasileios Mitrousis<sup>3</sup> and George Karagiannakis<sup>2</sup>; <sup>1</sup>DLR/German Aerospace Center, Germany; <sup>2</sup>Centre for Research & Technology Hellas (CERTH), Greece; <sup>3</sup>Aristotle University of Thessaloniki, Greece

**2:30 PM EN04.02.04**

**Degradation of Thermochemical Storage Materials in Kinetic- and Diffusion-Limited Reactions** [Michael J. Adams](#), Taekyu Kim and Akanksha K. Menon; Georgia Institute of Technology, United States

**2:45 PM BREAK**

SESSION EN04.03: Solar Fuels and Water Treatment

Session Chairs: Andrea Ambrosini and Ramon Escobar-Galindo

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 340

**3:15 PM EN04.03.01**

**Oxygen Non-Stoichiometry and Thermochemical Hydrogen Production of New Machine Learned Oxides** [Tyra C. Douglas](#), Keith A. King, Maria Syrigou, Matthew Witman, Perla Salinas, Anthony McDaniel, Eric N. Coker and Sean Bishop; Sandia National Laboratories, United States

**3:30 PM \*EN04.03.02**

**Solar and Electrochemical Pathways for Sustainable Power—Transforming Flue Gases into Commodities** [V́ctor Hugo Ramos Sanchez](#); Northern Arizona University, United States

**4:00 PM EN04.03.03**

**Shaping, Experimental Evaluation and Modelling of Prototype Iron Oxide Structures for Catalytic Splitting of Sulfuric Acid** [Dimitrios Dimitrakis](#)<sup>1</sup>, Christos Agrafiotis<sup>1</sup>, Lamark de Oliveira<sup>1</sup>, Pierre-Francois Mougard-Camacho<sup>2</sup>, Pierrick Vespa<sup>2</sup>, Alice Bertino<sup>3</sup> and Andrea Narducci<sup>3</sup>; <sup>1</sup>DLR-Future Fuels Institute, Germany; <sup>2</sup>Saint Gobain, France; <sup>3</sup>University Campus Biomedico, Italy

**4:15 PM EN04.03.04**

**Thermodynamic Analysis of Vapor Transport and Photomolecular Effect in Interfacial Porous Evaporators and Solar Still Design** [James H. Zhang](#), Rohith Mittapally, Abimbola Oluwade, Jiachen Li and Gang Chen; Massachusetts Institute of Technology, United States

**4:30 PM EN04.03.05**

**Brackish Water Treatment by Interfacial Thermal Desalination Using a Novel Sustainable Organic Material for Tropical Regions** [Vikash K. Chauhan](#), Kousik Pradhan, Shobha Shukla and Sumit Saxena; Indian Institute of Technology Bombay, India

SESSION EN04.04: Poster Session: Concentrated Solar Thermal Energy—Materials and Applications

Session Chairs: Adrianus Indrat Aria and Juan Carlos Sanchez-Lopez

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EN04.04.01**

**Eco-Friendly and Scalable Multiphase Suzuki Coupling Reactions Using a Polypyrrole@Pd Solar-Thermal Catalyst** [Dongchan Lee](#) and Kwang-Suk Jang; Hanyang University, Korea (the Republic of)

**EN04.04.02**

**Pd Nanoparticle-Decorated Melamine Sponges for Recyclable and Scalable Solar-Thermal Catalysis in Suzuki Coupling Reactions** [Dongchan Lee](#) and Kwang-Suk Jang; Hanyang University, Korea (the Republic of)

**EN04.04.03**

**Solar and Thermal Hybrid Concept for Enhancing Efficiency of Renewable Energy Harvesting** Joshua Townsend<sup>1</sup>, Madison Orr<sup>1</sup>, Kayla March<sup>1</sup>, Spencer Hernandez<sup>1</sup>, Juliana Benson<sup>1</sup>, Kevin Gorgoy<sup>1</sup>, Kima Sibayan<sup>1</sup>, Sarath Witanachchi<sup>1</sup> and Murape Davison Munyaradzi<sup>2</sup>; <sup>1</sup>University of South Florida, United States; <sup>2</sup>Botswana International University of Science and Technology, Botswana

**EN04.04.04**

**Low-Power Generation Cost Thermoelectric Generator** Sungjin Park, Yousung Choi and Woochul Kim; Yonsei University, Korea (the Republic of)

**EN04.04.05**

**Solar Process Heat Pyrolysis** Maxwell Triepke<sup>1</sup>, Xavier T. Vorhies<sup>1</sup>, Andrew Greene<sup>2</sup>, Jessica M. Andriolo<sup>1</sup>, Jack Skinner<sup>1</sup> and Richard LaDouceur<sup>1</sup>; <sup>1</sup>Montana Technological University, United States; <sup>2</sup>Brigham Young University-Idaho, United States

**EN04.04.06**

**Experimental and Analytical Study of a Solar Evaporator Using Nickel Ferrite Nanoparticles** Kousik Pradhan; Indian Institute of Technology Bombay, India

**EN04.04.07**

**Long-Term Stability of Doped Calcium Manganite for High-Temperature Thermal Energy Storage** Paige Beck<sup>1,2</sup>, Sherafghan Iftikhar<sup>1</sup>, Chris Dames<sup>2</sup> and Sumanjeet Kaur<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

SESSION EN04.05: Thermal Energy Storage II

Session Chairs: Adrianus Indrat Aria and Ramon Escobar-Galindo

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 340

**8:15 AM EN04.05.01**

**SrBr<sub>2</sub>·6H<sub>2</sub>O-Based Composites for Efficient and Sustainable Thermal Energy Storage** Sherafghan Iftikhar<sup>1</sup>, Logan Vawter<sup>1,2</sup> and Sumanjeet Kaur<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

**8:30 AM \*EN04.05.02**

**Structured CaMnO<sub>3</sub>-Based Porous Ceramics for High-Temperature, Hybrid Sensible-Thermochemical Storage in Future Concentrating Solar Power Plants** Christos Agrafiotis<sup>1</sup>, Chrysoula Pagkoura<sup>2</sup>, Leonidas Chasapidis<sup>2</sup>, Kyriakos Fotiadis<sup>2</sup>, Vasileios Mitrousis<sup>3</sup>, David Vellas<sup>1</sup>, Lamark de Oliveira<sup>1</sup>, Asmaa Eltayeb<sup>1</sup>, Mathias Pein<sup>1</sup>, Martin Roeb<sup>1</sup> and George Karagiannakis<sup>2</sup>; <sup>1</sup>DLR/German Aerospace Center, Germany; <sup>2</sup>Center for Research & Technology - Hellas (CERTH), Greece; <sup>3</sup>Aristotle University of Thessaloniki, Greece

**9:00 AM \*EN04.05.03**

**Concentrating Solar Thermal Materials for Industrial Decarbonization and Heat Storage** Ivan Jerman and Ana Drinčić; National Institute of Chemistry, Slovenia

**9:30 AM BREAK**

SESSION EN04.06: Materials II

Session Chairs: Andrea Ambrosini and Tyra Douglas

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 340

**10:00 AM \*EN04.06.01**

**World's Highest Absorption and Durability Coating for High-temperature Solar Thermal Receivers** Kaoru Tsuda<sup>1</sup>, Juan Felipe Torres<sup>2</sup>, Yifan Guo<sup>2</sup>, Sahar Hosseini<sup>2</sup>, Milad Zade<sup>2</sup>, Yasushi Murakami<sup>3</sup> and Joe Coventry<sup>2</sup>; <sup>1</sup>Nano Frontier Technology Co., Ltd., Japan; <sup>2</sup>The Australian National University, Australia; <sup>3</sup>Shinshu University, Japan

**10:30 AM \*EN04.06.02**

**High-Temperature Thermal Characterization and Material Developments for Next-Generation Concentrating Solar-Thermal Systems** Renkun Chen;  
University of California, San Diego, United States

**11:00 AM EN04.06.03**

**Enhancement of High-Temperature Thermal Stability of Solar Absorber Coatings Through Thermal Diffusion Barrier on Metallic Substrates**

Claudia I. Parra-Montero<sup>1,2</sup>, T. Cristina Rojas Ruiz<sup>2</sup>, Juan Carlos Sanchez-Lopez<sup>2</sup> and Ramon Escobar-Galindo<sup>1</sup>; <sup>1</sup>Escuela Politecnica Superior, Universidad de Sevilla, Spain; <sup>2</sup>Institute of Materials Science of Seville, Spain

**11:15 AM EN04.06.04**

**Solar Aging Effects on CrAlN Multilayer Coatings for High-Temperature Solar Applications** Inmaculada Cañadas<sup>1</sup>, Miriam Sánchez-Pérez<sup>2</sup>, Johannes Wette<sup>1</sup>, José Rodríguez<sup>1</sup>, Florian Sutter<sup>3</sup>, Daniel F. Reyes<sup>4</sup>, T. Cristina Rojas Ruiz<sup>2</sup>, Ramon Escobar-Galindo<sup>5</sup> and Juan Carlos Sanchez-Lopez<sup>2</sup>; <sup>1</sup>CIEMAT-PSA, Spain; <sup>2</sup>ICMS-CSIC, Spain; <sup>3</sup>German Aerospace Center (DLR), Spain; <sup>4</sup>University of Cádiz, Spain; <sup>5</sup>University of Seville, Spain

**11:30 AM EN04.06.05**

**Thermo-Mechanical Numerical Analysis of a Novel Receiver for Parabolic Trough Collectors Using Cavity Bundle Tubes (DETECTIVE Project)**

Hossein Ebad<sup>1</sup>, Rosa Difonzo<sup>1</sup>, Diego-César Alarcón-Padilla<sup>2</sup>, Rafael Guede<sup>3</sup>, Salvatore Guccione<sup>3</sup>, Hoda Mahmoodi<sup>4</sup>, Silvia Trevisan<sup>3</sup>, Loreto Valenzuela Gutiérrez<sup>2</sup> and Laura Savoldi<sup>1</sup>; <sup>1</sup>Polytechnic of Turin, Italy; <sup>2</sup>Plataforma Solar de Almería, Spain; <sup>3</sup>KTH Royal Institute of Technology, Sweden; <sup>4</sup>Umea University, Sweden

**11:45 AM EN04.06.06**

**Zero-Vacuum-Gap Thermophotovoltaics—Enhancing Power Density in Far-Field TPV Devices** Mohammad Habibi and Longji Cui; University of Colorado Boulder, United States

SESSION EN04.07: Materials III

Session Chairs: Adrianus Indrat Aria and Ramon Escobar-Galindo

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 340

**1:30 PM \*EN04.07.01**

**INDUSTRY TRACK: High Performance Materials for Solar Supercritical CO<sub>2</sub> Plants with Solid Particles as Heat Transfer and Storage Medium**

Benedikt Koelsch<sup>1</sup>, Daniel Benitez<sup>1</sup>, Florian Sutter<sup>1</sup>, Florian Wiesinger<sup>1</sup>, Ana Gonzalez<sup>1</sup>, Goetze Alkan<sup>2</sup>, Gema San Vicente<sup>3</sup>, Angel Morales<sup>3</sup>, Marta Navas<sup>3</sup>, Rebeca Hernandez<sup>3</sup>, Samuel Marlin<sup>4</sup>, Nassira Benameur<sup>4</sup>, Mathias Galetz<sup>5</sup>, Emma White<sup>5</sup>, Ceyhun Oskay<sup>5</sup>, Christoph Grimme<sup>5</sup>, Michael Kerbstadt<sup>5</sup>, Kan Ma<sup>6</sup>, Alexander Knowles<sup>6</sup>, Thomas Blackburn<sup>6</sup>, Tatu Pinomaa<sup>7</sup>, Dmitry Naumenko<sup>8</sup> and Florian Lebendig<sup>8</sup>; <sup>1</sup>DLR Solar Research Institute, Germany; <sup>2</sup>DLR Material Research Institute, Germany; <sup>3</sup>Ciemat, Spain; <sup>4</sup>Saint Gobain Research Provence, France; <sup>5</sup>Dechema Forschungsinstitut, Germany; <sup>6</sup>University of Birmingham, United Kingdom; <sup>7</sup>VTT Technical Research Centre of Finland, Finland; <sup>8</sup>Forschungszentrum Jülich GmbH, Germany

**2:00 PM EN04.07.02**

**Analysis of A<sub>2</sub>NX (A = Ca, Sr, Ba) Mixed Anion Nitrides as Thermoelectric Materials** Kieran B. Spooner<sup>1</sup>, Dan Han<sup>1</sup>, Bonan Zhu<sup>2</sup> and David Scanlon<sup>3</sup>;

<sup>1</sup>Jilin University, China; <sup>2</sup>Beijing University of Technology, China; <sup>3</sup>University of Birmingham, United Kingdom

**2:15 PM EN04.07.03**

**Solar-Thermal Synthesis of Lithium Iron Phosphate Battery Cathodes** Andrea Ambrosini<sup>1</sup>, H. Evan Bush<sup>1</sup> and Diana Leyva<sup>2</sup>; <sup>1</sup>Sandia National

Laboratories, United States; <sup>2</sup>The University of Texas at El Paso, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EN04.08: Heat Transfer Media

Session Chairs: Andrea Ambrosini and Tyra Douglas

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 340

**3:30 PM \*EN04.08.01**

**INDUSTRY TRACK: Innovative Silicone-Based Heat Transfer Fluids—Pushing Concentrated Solar Power to New Temperature Limits** [Kai Schickedanz](#)<sup>1</sup>, Loreto Valenzuela Gutiérrez<sup>2</sup>, Christoph Hilgert<sup>3</sup>, Christian Jung<sup>3</sup>, Erich Schaffer<sup>1</sup> and Maximilian Moxter<sup>1</sup>; <sup>1</sup>WACKER Chemie AG, Germany; <sup>2</sup>Line Focus Solar Technology Unit. Plataforma Solar de Almería, Spain; <sup>3</sup>German Aerospace Center, Germany

**4:00 PM \*EN04.08.02**

**Transparent Refractory Aerogels in High Temperature Solar Environments** Neil P. Dasgupta and [Andrej Lenert](#); University of Michigan, United States

**4:30 PM EN04.08.03**

**Realizing Record-Low Thermal Conductivity and Diffusivity at High Temperatures Using Stable High-Entropy Spinel Oxide Nanoparticles** [Yu Pei](#), Ka Man Chung, Sarath Adapa and Renkun Chen; University of California, San Diego, United States

**4:45 PM EN04.08.04**

**Asymptotic Height-Dependent Heat Transfer in Vertical Granular Flows Due to the Janssen Effect** [Xintong Zhang](#)<sup>1</sup>, Sarath Adapa<sup>1</sup>, Tianshi Feng<sup>1</sup>, Ka Man Chung<sup>1</sup>, Dimitri Madden<sup>2</sup> and Renkun Chen<sup>1</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>Sandia National Laboratories, United States

## SYMPOSIUM EN05

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Thin-Film Compound Semiconductor Photovoltaics  
April 7 - April 10, 2025

Symposium Organizers

Eric Colegrove, National Renewable Energy Laboratory  
Edgardo Saucedo, Universitat Politècnica de Catalunya  
Hao Xin, Nanjing University of Posts and Telecommunications  
Heayoung Yoon, University of Utah

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN05.01: Chalcogenide and Se Photovoltaics

Session Chairs: Stela Canulescu and Zacharie Jehl Li-Kao

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 330

**10:30 AM EN05.01.01**

**Exploring Carrier Dynamics in Ternary Chalcohalides** [Rasmus S. Nielsen](#)<sup>1</sup>, Axel Gon Medaille<sup>2</sup>, Ivan Caño Prades<sup>2</sup>, Alejandro Navarro<sup>2</sup>, Angel Labordet<sup>1</sup>, Cibrán López Álvarez<sup>2</sup>, David Rovira Ferrer<sup>2</sup>, Zacharie Jehl Li-Kao<sup>2</sup>, Edgardo Saucedo<sup>2</sup> and Mirjana Dimitrievska<sup>1</sup>; <sup>1</sup>Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>2</sup>Universitat Politècnica de Catalunya, Spain

**10:45 AM \*EN05.01.02**

**Emerging Antimony and Bismuth Chalcogenides—Towards Large Scale Deployment of Customized PV in the Future** [Nicolae Spalatu](#), Athulya Babu Suseela, Mykhailo Koltsov, Sajeesh Vadakkedath Gopi, Dumitru Untila, Atanas Katerski, Malle Krunks and Ilona Oja Acik; Tallinn University of Technology, Estonia

**11:15 AM EN05.01.03**

**Investigation on Hole Transport Layers for Enhanced Efficiency in Selenium Solar Cells** [Oriol Segura Blanch](#)<sup>1,1</sup>, Arnau Torrens<sup>1,1</sup>, Ivan Caño Prades<sup>1,1</sup>,

Lorenzo Clavo-Barrio<sup>2,2</sup>, Zacharie Jehl Li-Kao<sup>1,1</sup>, Marcel Placidi<sup>1,1,3</sup>, Joaquim Puigdollers<sup>1</sup> and Edgardo Saucedo<sup>1,1</sup>; <sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Universitat de Barcelona, Spain; <sup>3</sup>Institut de Recerca de l'Energia de Catalunya, Spain

#### 11:30 AM EN05.01.04

**Exploring Selenium for Semi-Transparent and Indoor Photovoltaics** Arnau Torrens<sup>1</sup>, Oriol Segura Blanch<sup>1</sup>, Ivan Caño Prades<sup>1</sup>, Alejandro Navarro<sup>1</sup>, Maxim Guc<sup>2</sup>, Dioulde Sylla<sup>2</sup>, Jose Miguel Asensi<sup>3</sup>, Zacharie Jehl Li-Kao<sup>1</sup>, Edgardo Saucedo<sup>1</sup>, Joaquim Puigdollers<sup>1</sup>, Pablo Ortega<sup>1</sup> and Marcel Placidi<sup>1,2</sup>; <sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Institut de Recerca en Energia de Catalunya, Spain; <sup>3</sup>Universitat de Barcelona, Spain

SESSION EN05.02: Transparent and Indoor Chalcogenide Photovoltaics

Session Chairs: Edgardo Saucedo and Heayoung Yoon

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 330

#### 3:00 PM \*EN05.02.01

**High Efficiency Bifacial Cu(In,Ga)Se<sub>2</sub> Solar Cells and Its Application to Transparent Modules** Eun Pyung Choi<sup>1</sup>, Seonghoon Jeong<sup>1</sup>, Eunseo Choi<sup>1</sup>, Gee Yeong Kim<sup>1</sup>, Won Mok Kim<sup>1</sup>, Yiting Zheng<sup>2</sup>, Insoo Kim<sup>2</sup>, David Hwang<sup>2</sup> and Jeung-Hyun Jeong<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>State University of New York, United States

#### 3:30 PM EN05.02.02

**Transparent Photovoltaic Arrays of ZnO/NiO Cells for Energy Harvesting** Joondong Kim, Junghyun Lee and Chanhyuk Lee; Incheon National University, Korea (the Republic of)

#### 3:45 PM EN05.02.03

**Tuning the Crystal Structure and Optoelectronic Properties of Cu<sub>2</sub>GeS<sub>3</sub> for Indoor Photovoltaic Applications** Marit Kauk-Kuusik, Joel Kokla, Jüri Krustok, Katri Muska, Kristi Timmo, Maris Pilvet, Mati Danilson, Valdek Mikli and Maarja Grossberg-Kuusik; Tallinn University of Technology, Estonia

#### 4:00 PM EN05.02.04

**Towards Competitive Thin-Film Chalcogenides for Indoor Photovoltaics—Theoretical Insights and Experimental Innovations** Alex Jimenez Arguijo<sup>1</sup>, Yuancai Gong<sup>1</sup>, Sergio Giraldo<sup>1</sup>, Marcel Placidi<sup>1</sup>, Elisa Artegiani<sup>2</sup>, Nicolae Spalatu<sup>3</sup>, Alessandro Romeo<sup>2</sup>, Edgardo Saucedo<sup>1</sup> and Zacharie Jehl Li-Kao<sup>1</sup>; <sup>1</sup>Polytechnic University of Catalonia, Spain; <sup>2</sup>University of Verona, Italy; <sup>3</sup>Tallinn University of Technology, Estonia

#### 4:15 PM EN05.02.05

**Attaining 15.1% Efficiency in CZTS Solar Cells Under Indoor Conditions Through Sodium and Lithium Co-Doping** Yuancai Gong<sup>1</sup>, Alex J. Arguijo<sup>1</sup>, Ivan Caño Prades<sup>1</sup>, Romain Scaffidi<sup>2</sup>, Claudia Malerba<sup>3</sup>, Matteo Valentini<sup>3</sup>, David Payno<sup>4</sup>, Alejandro Navarro<sup>1</sup>, Oriol Segura Blanch<sup>1</sup>, Sergio G. Muñoz<sup>1</sup>, Alejandro Perez-Rodriguez<sup>4</sup>, Marcel Placidi<sup>1</sup>, Zacharie Jehl Li-Kao<sup>1</sup> and Edgardo Saucedo<sup>1</sup>; <sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>imec, Belgium; <sup>3</sup>ENEA, Italy; <sup>4</sup>IREC, Spain

SESSION EN05.03: Poster Session: Thin-Film Compound Semiconductor Photovoltaics

Session Chairs: Sage Bauers, Xiaojing Hao and Hao Xin

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

#### EN05.03.01

**A Study of the Desired Properties of Amorphous ZnSnO by Annealing Treatment with Real-Time Observation of Resistivity** Aitkazy Kaisha; National Laboratory Astana, Nazarbayev University, Kazakhstan

#### EN05.03.02

**Facile Fabrication of High Quality Graded Thin Film Compound Semiconductors with Computerised Composition Control** Abraham Barde; University of Manchester, United Kingdom

**EN05.03.03**

**Scalable Quantum Dot Solar Cell Production by Blade Coating Halide-Capped Lead Sulfide from Stable Inks** Jimmy Boyle, Thomas J. Forbord, Leif G. Shomali, Claire Stuvland, Nikolas Hall, Jovin Ho and Hal Van Ryswyk; Harvey Mudd College, United States

**EN05.03.04**

**Tuning Microstructure of Vacuum Thermally Evaporated Organic Photovoltaics Using Rylene Dye Derivative Templating Layers with X-Ray Characterisation Techniques** Olivia M. Gough<sup>1,2</sup>, Pascal Kaienburg<sup>1</sup>, Markus Perle<sup>1</sup>, Katherine Trinkaus<sup>1</sup>, Gregory Su<sup>2</sup> and Moritz Riede<sup>1</sup>; <sup>1</sup>University of Oxford, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**EN05.03.05**

**Exploring p-Type Dopants in the Zintl Phosphide AM2P2 Solar Absorbers** Yagmur Coban<sup>1</sup>, Zhenkun Yuan<sup>1</sup>, Gideon Kassa<sup>1</sup>, Andrew Pike<sup>1</sup>, Muhammad R. Hasan<sup>2</sup>, Guillermo Esparza<sup>3</sup>, Smitakshi Goswami<sup>1</sup>, Geoffroy Hautier<sup>1</sup>, Kirill Kovnir<sup>2</sup> and Jifeng Liu<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Iowa State University of Science and Technology, United States; <sup>3</sup>University of California, San Diego, United States

**EN05.03.06**

**Enhancing the Efficiency of Kesterite Solar Cells Through Ag Doping** Kee-Jeong Yang; DGIST, Korea (the Republic of)

**EN05.03.07**

**Anion Vacancy Defect Elimination in CZTSe Solar Cells via Hydrogen-Assisted Selenization—In Operando X-Ray Nanoprobe Analysis** Chih-Yang Huang<sup>1</sup>, Shao-Chin Tseng<sup>2</sup>, Wei-Chao Chen<sup>1</sup>, Gung-Chian Yin<sup>2</sup>, Bo-Yi Chen<sup>2</sup>, Kuei-Hsien Chen<sup>3</sup>, Li-Chyong Chen<sup>1</sup> and Cheng-Ying Chen<sup>4,1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>National Synchrotron Radiation Research Center, Taiwan; <sup>3</sup>Academia Sinica, Taiwan; <sup>4</sup>National Taiwan Ocean University, Taiwan

**EN05.03.08**

**Morphological Stability of a Quinoxaline-Based Double-Cable Conjugated Polymer Under Thermal Stress** Dasol Chung and Taiho Park; Pohang University of Science and Technology, Korea (the Republic of)

**EN05.03.09**

**Chemical and Electronic Properties of an Exfoliated Cu(In,Ga)Se<sub>2</sub>-Based Thin-Film Solar Cell** Jeyan Lacson<sup>1</sup>, Mary Blankenship<sup>1,2,3</sup>, Samuel Chen<sup>1,4</sup>, Mitchel McLean<sup>5</sup>, Dirk Hauschild<sup>2,3</sup>, Lothar Weinhardt<sup>2,3</sup>, Nicolas Gaillard<sup>5</sup> and Clemens Heske<sup>1,2,3</sup>; <sup>1</sup>University of Nevada, Las Vegas, United States; <sup>2</sup>Karlsruhe Institute of Technology, Germany; <sup>3</sup>Karlsruhe Institute of Technology (KIT), Germany; <sup>4</sup>Ed W. Clark High School, United States; <sup>5</sup>Hawai'i Natural Energy Institute (HNEI), United States

**EN05.03.10**

**Soft X-Ray Emission Spectroscopy to Determine the Chemical Structure of ZnTe/CdSe<sub>x</sub>Te<sub>1-x</sub> Thin Films with Group V Dopants and Post-Deposition Treatments** Nykita Rustad<sup>1</sup>, Constantin Wansorra<sup>1,2,2</sup>, Stephen Faussett<sup>1</sup>, Dirk Hauschild<sup>1,2,2</sup>, Lothar Weinhardt<sup>1,2,2</sup>, Wanli Yang<sup>3</sup>, Niranjana Mohan Kumar<sup>4</sup>, Mariana Bertoni<sup>4</sup>, Dan Mao<sup>5</sup> and Clemens Heske<sup>1,2,2</sup>; <sup>1</sup>University of Nevada, Las Vegas, United States; <sup>2</sup>Karlsruhe Institute of Technology (KIT), Germany; <sup>3</sup>Lawrence Berkeley National Laboratory, United States; <sup>4</sup>Arizona State University, United States; <sup>5</sup>First Solar, United States

**EN05.03.11**

**Advanced Synthesis and Control of Quasi-One-Dimensional Chalcogenides for High-Performance Photovoltaic Devices** Alejandro Navarro, Oriol Segura Blanch, Ivan Caño Prades, David Rovira Ferrer, Joaquim Puigdollers and Edgardo Saucedo; Polytechnic University of Catalunya, Spain

**EN05.03.12**

**Strain Engineering in Ferroelectric-Semiconductor Nanocomposites with Enhanced Bulk Photovoltaic Response** Emanuele Palladino<sup>1</sup>, Subhajit Pal<sup>1</sup>, Judith MacManus-Driscoll<sup>2</sup> and Joe Briscoe<sup>1</sup>; <sup>1</sup>Queen Mary University of London, United Kingdom; <sup>2</sup>University of Cambridge, United Kingdom

**EN05.03.13**

**Using Alkali Metal Atoms to Tune the Electronic Properties of Narrow-Bandgap Semiconductor Nanocrystals** Dario Mastroppolito<sup>1</sup>, Mariarosa Cavallo<sup>1</sup>, Erwan Bossavit<sup>2,1</sup>, Yoann Prado<sup>1</sup>, Mathieu Silly<sup>2</sup>, Debora Pierucci<sup>1</sup> and Emmanuel Lhuillier<sup>1</sup>; <sup>1</sup>Sorbonne Université, CNRS, Institut des NanoSciences de Paris, INSP, France; <sup>2</sup>SOLEIL Synchrotron, France

**EN05.03.14**

**Barrier Height at the CdTe/Back-Contact Junction and Its Effect on CdTe Solar Cell Performance** Patrick Millan, Tyler Lucas and Weining Wang; Seton Hall University, United States

**EN05.03.15**

**Solar Cells and Prototype PV Modules of Antimony Sulfide Selenide by Thermal Evaporation** Priyanka Priyanka, Fabiola De Bray Sanchez, Angélica



Lizbeth Espinosa Santana, Yareli Colín García, M T Santhamma Nair and P. Karunakaran Nair; Instituto de Energías Renovables, Universidad Nacional Autónoma de México, Mexico

#### EN05.03.16

**Hyperdoping Silicon with Various Impurities and Doses for Enabling Infrared Absorption** [Abdennaceur Karoui](#)<sup>1,2</sup>, Fouzia Sahtout<sup>3</sup> and Yongqiang Wang<sup>4</sup>; <sup>1</sup>Elizabeth City State University, United States; <sup>2</sup>formerly North Carolina Central University, United States; <sup>3</sup>North Carolina Central University (Formerly), United States; <sup>4</sup>Los Alamos National Laboratory, United States

#### EN05.03.17

**Evolution of Indium Aluminum Oxide with and Without Tin Doping During Cadmium Telluride Deposition and Processing** [Prabodika N. Kaluarachchi](#), Adam Phillips, Nadeesha Katakumbura, Manoj K. Jamarkattel, Ramanujam Balaji, Shannon E. Costello, Carlito Okey, Anirudh K. Pathayapura, Nikolas J. Podraza, Randy Ellingson and Michael J. Heben; University of Toledo, United States

#### EN05.03.18

**Stressor Effects in CdTe Solar Cells with Patterned Al<sub>2</sub>O<sub>3</sub> Back-Contacts** Ashrafal Mamun and [Heayoung Yoon](#); University of Utah, United States

#### EN05.03.19

**Investigation of Variations in Optical Properties Linked to the Structural Configuration of Crystalline Silicon Thin Films Deposited via Low-Pressure Thermal CVD** [Monika Dhiman](#) and Arup Samanta; Indian Institute of Technology Roorkee, India

#### EN05.03.20

**Bandgap-Tunable Kesterite Solar Cells via Isovalent Cation Substitution—High-Efficiency Solutions for Diverse Photovoltaic Applications** [Yuancai Gong](#)<sup>1</sup>, Alex J. Arguijoa<sup>1</sup>, Romain Scaffidi<sup>2</sup>, Ivan Caño Prades<sup>1</sup>, Claudia Malerba<sup>3</sup>, Matteo Valentini<sup>3</sup>, Edoardo Maggi<sup>1</sup>, Sergio G. Muñoz<sup>1</sup>, Zacharie Jehl Li-Kao<sup>1</sup>, Marcel Placidi<sup>1</sup> and Edgardo Saucedo<sup>1</sup>; <sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>imec, Belgium; <sup>3</sup>ENEA, Italy

#### EN05.03.21

**Organic Solar Cells Processed with Terpene Solvent Under Ambient Condition— Impact of Processing Conditions on *In Situ* UV-Vis Spectroscopy, Morphology and Performance** [Hyerin Jeon](#) and Bumjoon Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

#### EN05.03.22

**P-Type Doping of Pyrite FeS<sub>2</sub> Microcrystals Through the Liquid Flux Phase** [Katriin Kristmann](#)<sup>1</sup>, Taavi Raadik<sup>1</sup>, Mare Altosaar<sup>1</sup>, Advenit Makaya<sup>2</sup>, Marc V. Heemskerck<sup>1</sup> and Annaly Gutjuma<sup>1</sup>; <sup>1</sup>Tallinn University of Technology, Estonia; <sup>2</sup>European Space Agency, Netherlands

#### EN05.03.23

**Fully Transparent Photovoltaic Devices Based on ZnO<sub>1-x</sub>S<sub>x</sub> Absorbers Compatible with 3D Design—Study of the Impact of the MoO<sub>x</sub> Hole Transport Layer** [Marta Miró-Llorente](#)<sup>1,2</sup>, Gustavo Alvarez<sup>1,2,3</sup>, Alex J. Lopez-Garcia<sup>1</sup>, Victoria Rotaru<sup>1,2</sup>, Dioulde Sylla<sup>1</sup>, Maxim Guc<sup>1</sup>, Victor Izquierdo-Roca<sup>1</sup>, Alejandro Perez-Rodriguez<sup>1,2</sup> and Pedro Vidal-Fuentes<sup>1</sup>; <sup>1</sup>Catalan Institute for Energy Research (IREC), Spain; <sup>2</sup>Universitat de Barcelona, Spain; <sup>3</sup>Universitat Politècnica de Catalunya, Spain

#### EN05.03.24

**PECVD Assisted Surface Sulfurization Treatment for CIGS Thin Film Solar Cells** [Weimin Li](#) and Chunlei Yang; Chinese Academy of Sciences, China

#### EN05.03.25

**Long-Term Protection of Crystalline Zinc Phosphide (Zn<sub>3</sub>P<sub>2</sub>) Under Atmospheric Conditions** [Anja Tiede](#)<sup>1</sup>, Raphael Lemerle<sup>1</sup>, Thomas Hagger<sup>1</sup>, Helena Rabelo<sup>2</sup>, Maria Chiara Spadaro<sup>2,3,4</sup>, Jordi Arbiol<sup>2</sup> and Anna Fontcuberta i Morral<sup>1</sup>; <sup>1</sup>Ecole Polytechnique Federale de Lausanne, Switzerland; <sup>2</sup>Catalan Institute of Nanoscience and Nanotechnology, Spain; <sup>3</sup>Università degli Studi di Catania, Italy; <sup>4</sup>Institute for Microsystems and Microelectronics IMM, Italy

#### EN05.03.26

**Optical Design of Energy Conversion Layers for Enhanced Photoelectric Conversion Efficiency in Organic Solar Cells.** [Liang Zhang](#) and Chul Gyu Jhun; Hoseo University, Korea (the Republic of)

SESSION EN05.04: Antimony Based Chalcogenide Photovoltaics

Session Chairs: Rasmus Nielsen and Nicolae Spalatu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 330

**8:00 AM \*EN05.04.01**

**Additive-Assisted Hydrothermal Growth Enabling Defect Passivation and Void Remedy in Antimony Selenosulfide Solar Cells** Yazhi Wang, Seunghwan Ji and Byungha Shin; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**8:30 AM EN05.04.02**

**Optimizing Charge Transport and Crystal Orientation in Antimony Sulfide Thin-Film Solar Cells—Strategies of Doping and Using the Seed Layer to Improve Device Performance** Evgeniia Gilshtein<sup>1</sup>, Harshvardhan Maheshkant Gupta<sup>1</sup>, Ritjiua Kahuure<sup>1</sup>, Alexandra Tsekou<sup>1</sup>, Katharina Dehm<sup>2</sup>, Ryan Crisp<sup>2</sup>, Thomas Tran<sup>1</sup>, Cristina Besleaga<sup>3</sup>, Aurelian Galca<sup>3</sup>, Maarja Grossberg-Kuusik<sup>4</sup>, Hoang Van-Quy<sup>5</sup>, Dae-Hwan Kim<sup>5</sup>, Shi-Joon Sung<sup>5</sup> and Stela Canulescu<sup>1</sup>; <sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany; <sup>3</sup>National Institute of Materials Physics, Romania; <sup>4</sup>Tallinn University of Technology, Estonia; <sup>5</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**8:45 AM \*EN05.04.03**

**A Closer Look into Antimony Sulfide (Sb<sub>2</sub>S<sub>3</sub>) with Tailored Crystallographic Orientation** Evgeniia Gilshtein<sup>1</sup>, Alexandra Tsekou<sup>1</sup>, Danylo Komisar<sup>2</sup>, Harshvardhan Maheshkant Gupta<sup>1</sup>, Outman El Khouja<sup>3</sup>, Cristina Besleaga<sup>3</sup>, Aurelian Galca<sup>3</sup>, Maarja Grossberg-Kuusik<sup>4</sup>, Dae-Hwan Kim<sup>5</sup>, Shi-Joon Sung<sup>5</sup>, Oleksii Ilchenko<sup>2</sup> and Stela Canulescu<sup>1</sup>; <sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>LightNovo, Denmark; <sup>3</sup>National Institute of Materials Physics, Romania; <sup>4</sup>Tallinn University of Technology, Estonia; <sup>5</sup>DGIST, Korea (the Democratic People's Republic of)

**9:15 AM EN05.04.04**

**Photovoltaic Efficiency Enhancement Through Highly Crystalline Antimony Selenide Interface Engineering** Punchirala Arachhige Udari Imalka Wijesinghe<sup>1</sup>, Giulia Longo<sup>2</sup> and Oliver S. Hutter<sup>1</sup>; <sup>1</sup>Northumbria University, United Kingdom; <sup>2</sup>Universidad Politécnica de Valencia, Instituto de Diseño y Fabricación, Spain

**9:30 AM EN05.04.05**

**Optimization of Solution Processed Sb<sub>2</sub>Se<sub>3</sub> Thin Films Using Design of Experiments** Marissa J. Strumolo, Zhaohong Sun and Richard Brutchey; University of Southern California, United States

**9:45 AM BREAK**

SESSION EN05.05: Advances in Kesterite Photovoltaics

Session Chairs: Edgardo Saucedo and Chunlei Yang

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 330

**10:15 AM \*EN05.05.01**

**The Pathway to >15% Efficiency Emerging Kesterite Solar Cells** Qingbo Meng<sup>1,2</sup>; <sup>1</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>2</sup>Beijing National Laboratory for Condensed Matter Physics, China

**10:45 AM EN05.05.02**

**Modification of the CZTS/CdS Interface by Introducing an Intermediate CeO<sub>2</sub> Layer** Kristi Timmo, Maris Pilvet, Mati Danilson, Valdek Mikli, Jüri Krustok, Maarja Grossberg-Kuusik and Marit Kauk-Kuusik; Tallinn University of Technology, Estonia

**11:00 AM EN05.05.03**

**Pure Sulfide Kesterite Solar Cell via Solution Processing** Hao Xin, Aoqi Xu, Hongkun Liu and Xinyu Li; Nanjing University of Posts and Telecommunications, China

**11:15 AM \*EN05.05.04**

**Controlling Defect of Kesterite—Precursor, Annealing, Post-Treatment Designs** Xiaoqing Hao; University of New South Wales, Australia

**11:45 AM EN05.05.05**

**Spectroscopic Analysis of Zn<sub>(1-x)</sub>Mg<sub>x</sub>O (ZMO) Thin Films and Their Integration with CZTSe Solar Cells** Alexandra Tsekou<sup>1</sup>, Harshvardhan Maheshkant Gupta<sup>1</sup>, Evgeniia Gilshtein<sup>1</sup>, Denys Miakota<sup>1</sup>, David Payno<sup>2</sup>, Jacob A. Andrade Arvizu<sup>2</sup>, Alejandro Perez-Rodriguez<sup>2,3</sup>, Eugen Stamate<sup>1</sup> and Stela Canulescu<sup>1</sup>; <sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>Institut de Recerca en Energia de Catalunya, Spain; <sup>3</sup>University of Barcelona, Spain

SESSION EN05.06: Developments in Chalcogenide Perovskites

Session Chairs: Evgeniia Gilshtein and Hao Xin

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 330

**1:30 PM EN05.06.01**

**Impact of Vapor Phase Ge Incorporation and Reaction Pathway on the Performance and Long-Term Stability of  $\text{Cu}_2\text{Zn}(\text{Ge}, \text{Sn})\text{Se}_4$  Solar Cells** [Talat Khonsor](#)<sup>1,2,3</sup>, David Nowak<sup>2</sup>, Robert Fonoll Rubio<sup>1</sup>, Maxim Guc<sup>1</sup>, Pedro Vidal-Fuentes<sup>1</sup> and Levent Guetay<sup>2</sup>; <sup>1</sup>Catalonia Institute for Energy Research, Spain; <sup>2</sup>Carl von Ossietzky University, Germany; <sup>3</sup>Polytechnic university of Catalonia, Spain

**1:45 PM +EN05.06.02**

**Hunting for Defects in Chalcogenide Perovskites with Raman Spectroscopy** [Mirjana Dimitrievska](#); Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**2:15 PM EN05.06.03**

**Progress in Solution-Processed Chalcogenide Perovskite Synthesis and Application** [Shubhanshu Agarwal](#)<sup>1</sup>, Kiruba Catherine Vincent<sup>1</sup>, Daniel C. Hayes<sup>1</sup>, Inés Durán<sup>2</sup>, Jonathan Turnley<sup>3</sup>, Simon Svatek<sup>2</sup>, Elisa Antolin<sup>2</sup> and Rakesh Agrawal<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Universidad Politecnica de Madrid, Spain; <sup>3</sup>University of Illinois at Urbana-Champaign, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EN05.07: III-V and CdTe Photovoltaics

Session Chairs: Craig Perkins and Adam Phillips

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 330

**3:30 PM EN05.07.01**

**Optimizing CdSe Deposition and Post-Treatment for Enhanced Performance in CdTe Solar Cells** [Nadeesha Katakumbura](#), Prabodika N. Kaluarachchi, Ebin Bastola, Abasi Abdulimu, Adam Phillips, Michael J. Heben and Randy Ellingson; The University of Toledo, United States

**3:45 PM \*EN05.07.02**

**Formation and Stability of Dopants and Defects in CdTe-Based Solar Cells** [Anderson Janotti](#); University of Delaware, United States

**4:15 PM EN05.07.03**

**Process-Specific Point Defect Modeling in CdTe with KROGER—Accounting for Finite Sample Dimensions and Cooling Rates** [Khandakar Aaditta Arnab](#)<sup>1</sup>, [Intuon Chatratin](#)<sup>2</sup>, [Anderson Janotti](#)<sup>2</sup> and [Mike Scarpulla](#)<sup>1</sup>; <sup>1</sup>University of Utah, United States; <sup>2</sup>University of Delaware, United States

**4:30 PM EN05.07.04**

**Improving the Minority Carrier Lifetime of Bulk n-Type GaAs Enables Epitaxy-Free, Thin-Film GaAs Solar Cells with Voc Greater than 900 mV** [Phillip Jahelka](#), Andrew Nyholm, Susana Torres-Londono and Harry A. Atwater; California Institute of Technology, United States

**4:45 PM EN05.07.05**

**Investigating the Efficiency of InGaN p-n-p-n Homojunction Solar Cells** [Moath Alhejji](#); University of Arkansas at Fayetteville, United States

SESSION EN05.08: CdTe Photovoltaics

Session Chairs: Eric Colegrove and Heayoung Yoon

Thursday Morning, April 10, 2025

Summit, Level 3, Room 330

**8:30 AM \*EN05.08.01**

**Analysis of Buried Interfaces in Photovoltaic Device Stacks** [Craig L. Perkins](#)<sup>1</sup>, Eric Colegrove<sup>1</sup>, Deborah McGott<sup>2</sup> and Matthew Reese<sup>1</sup>; <sup>1</sup>NREL, United States; <sup>2</sup>First Solar, Sweden

**9:00 AM EN05.08.02**

**Comparison of Rear Surface Passivation Strategies via Surface Photovoltage Spectroscopy** [Nathan D. Rock](#), Ariful Islam, Khandakar Aaditta Arnab and Mike Scarpulla; University of Utah, United States

**9:15 AM EN05.08.03**

**Identifying the Dominant Recombination Mechanism and Its Location in CdTe Solar Cells** [Abasi Abudulimu](#)<sup>1</sup>, Tyler Brau<sup>1</sup>, Scott L. Wenner<sup>1</sup>, Scott M. Lambright<sup>1</sup>, Adam Phillips<sup>1</sup>, Michael J. Heben<sup>1</sup>, Chungho Lee<sup>2</sup> and Randy Ellingson<sup>1</sup>; <sup>1</sup>University of Toledo, United States; <sup>2</sup>First Solar Inc., United States

**9:30 AM EN05.08.04**

**Investigation of 2D MoTe<sub>2</sub> for Thin-Film CdTe Tandem Solar Cells** [Karthika Haridas](#) and Shubhra Bansal; Purdue University, United States

**9:45 AM BREAK**

SESSION EN05.09: Novel and Emerging Thin-Film Absorbers

Session Chairs: Eric Colegrove and Mirjana Dimitrievska

Thursday Morning, April 10, 2025

Summit, Level 3, Room 330

**10:15 AM ^EN05.09.01**

**Zintl Phosphide Thin Films as Emerging Materials for Solar Absorption** [Sage Bauers](#); National Renewable Energy Laboratory, United States

**10:30 AM EN05.09.02**

**Novel Solar Absorbers from Phosphides—BaCd<sub>2</sub>P<sub>2</sub> and More** [Zhenkun Yuan](#)<sup>1</sup>, Muhammad R. Hasan<sup>2</sup>, Gideon Kassa<sup>1</sup>, Diana F. Dahliah<sup>3,4</sup>, Andrew Pike<sup>1</sup>, Shaham Quadir<sup>5</sup>, Guillermo Esparza<sup>6</sup>, Sita Dugu<sup>5</sup>, Romain Claes<sup>3</sup>, Yagmur Coban<sup>1</sup>, Smitakshi Goswami<sup>1</sup>, Cierra Chandler<sup>7</sup>, Yihuang Xiong<sup>1</sup>, Philip Yox<sup>2</sup>, Victoria Kyveryga<sup>2</sup>, Gian-Marco Rignanese<sup>3</sup>, Ismaila Dabo<sup>7</sup>, David Fenning<sup>6</sup>, Obadiah Reid<sup>8,5</sup>, Andriy Zakutayev<sup>5</sup>, Sage Bauers<sup>5</sup>, Jifeng Liu<sup>1</sup>, Kirill Kovnir<sup>2,9</sup> and Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Iowa State University, United States; <sup>3</sup>Université Catholique de Louvain, Belgium; <sup>4</sup>An-Najah National University, Palestine, State of; <sup>5</sup>National Renewable Energy Laboratory, United States; <sup>6</sup>University of California, San Diego, United States; <sup>7</sup>The Pennsylvania State University, United States; <sup>8</sup>University of Colorado Boulder, United States; <sup>9</sup>Ames Laboratory, United States

**10:45 AM EN05.09.03**

**Exploring Thin-Film CaZn<sub>2</sub>P<sub>2</sub> and SrZn<sub>2</sub>P<sub>2</sub>—Optoelectronic Properties for Next-Generation Tandem Solar Cells** [Smitakshi Goswami](#)<sup>1</sup>, Gideon Kassa<sup>1</sup>, Sita Dugu<sup>2</sup>, Shaham Quadir<sup>2</sup>, Zhenkun Yuan<sup>1</sup>, Jifeng Liu<sup>1</sup>, Geoffroy Hautier<sup>1</sup> and Sage Bauers<sup>2</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>National Renewable Energy Laboratory, United States

**11:00 AM EN05.09.04**

**Isovalent Alkali Metal Doping as Shallow Complex Acceptors in Monovalent Copper (I) Based Semiconductors** [Kosuke Matsuzaki](#)<sup>1</sup>, Chen-Wei Chang<sup>2</sup>, Yalun Tang<sup>2</sup>, Teruya Nagafuji<sup>3</sup>, Naoki Tsunoda<sup>3</sup>, Yu Kumagai<sup>4</sup>, Kenji Nomura<sup>2</sup>, Fumiyasu Oba<sup>3</sup> and Hideo Hosono<sup>3,5</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology, Japan; <sup>2</sup>University of California, San Diego, United States; <sup>3</sup>Tokyo Institute of Technology, Japan; <sup>4</sup>Tohoku University, Japan; <sup>5</sup>National Institute for Materials Science, Japan

**11:15 AM EN05.09.05**

**Phosphosulfides—New, Stable Thin-film PV Absorbers with Long Carrier Lifetimes** Lena A. Mittmann, Eugène Bertin, Javier Sanz Rodrigo, Anat Itzhak and [Andrea Crovetto](#); Technical University of Denmark, Denmark

**11:30 AM EN05.09.06**

**Characteristics Analysis of Colored Photovoltaic Modules with Bragg Reflectors and Luminescent Down-Shifting Layers** [Jaehoon Kim](#)<sup>1</sup>, Hyung-Jun Song<sup>2</sup>, Kijeong Lee<sup>1</sup>, Shinil Choi<sup>1</sup> and Keunnam Kim<sup>1</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Seoul National University of Science and Technology, Korea (the Republic of)

**11:45 AM EN05.09.07**

**Multimodal, Versatile and Automate Platform for Accelerating the Advanced Characterization of Thin Films Photovoltaic Technologies** Robert Fonoll Rubio<sup>1</sup>, Jon Garí-Galíndez<sup>1</sup>, Gina Soracá<sup>1</sup>, Victoria Rotaru<sup>1</sup>, Ginner Laurin<sup>2</sup>, Paul Pistor<sup>3</sup>, Thomas Unold<sup>4</sup>, Stefan Paetel<sup>5</sup>, Krzysztof Stanik<sup>6</sup>, Konrad Wojciechowski<sup>6</sup>, Andreas Zimmermann<sup>7</sup>, Pedro Vidal-Fuentes<sup>1</sup>, Maxim Guc<sup>1</sup> and Victor Izquierdo-Roca<sup>1</sup>; <sup>1</sup>Catalonia Institute for Energy Research (IREC), Spain; <sup>2</sup>Austrian Institute of Technology GmbH (AIT), Austria; <sup>3</sup>Universidad Pablo de Olavide de Sevilla, Spain; <sup>4</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>5</sup>Zentrum für Sonnenenergie- und Wasserstoff-Forschung, Baden-Württemberg, Germany; <sup>6</sup>Saule Technologies, Poland; <sup>7</sup>Sunplugged GmbH, Austria

SESSION EN05.10: Advances in CIGS Photovoltaics

Session Chairs: Peter Borowski and Hao Xin

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 330

**1:45 PM \*EN05.10.01**

**High Efficiency Flexible CIGS Solar Cells and Perovskite/CIGS Tandem Solar Cells** Weimin Li and Chunlei Yang; Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, China

**2:15 PM EN05.10.02**

**Impact of Air-Annealing and Na<sub>2</sub>S Rinsing on the Chemical and Electronic Structure of RbF Post-Deposition Treated Cu(In,Ga)Se<sub>2</sub> Surfaces** Dirk Hauschild<sup>1,2,3</sup>, Ole Hahn<sup>1</sup>, Constantin Wansorra<sup>1,3</sup>, Ralph Steininger<sup>1</sup>, Dimitrios Hariskos<sup>4</sup>, Wolfram Witte<sup>4</sup>, Rico Gutzler<sup>4</sup>, Stefan Paetel<sup>4</sup>, Michael Powalla<sup>4</sup>, Clemens Heske<sup>1,2,3</sup> and Lothar Weinhardt<sup>1,2,3</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>Karlsruhe Institute of Technology (KIT), Germany; <sup>3</sup>University of Nevada, Las Vegas (UNLV), United States; <sup>4</sup>Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW), Germany

**2:30 PM BREAK**

SESSION EN05.11: Thin-Film Photovoltaics Industry Session

Session Chairs: Eric Colegrove, Edgardo Saucedo, Hao Xin and Heayoung Yoon

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 330

**3:00 PM \*EN05.11.01**

**INDUSTRY TRACK: Balancing Efficiency and Sustainability—A Comparative Life Cycle Assessment of Perovskite and Chalcogenide Solar Cell Technologies** Shahab Resalati, Amani Maalouf and Tobechi Okoroafor; Oxford Brookes University, United Kingdom

**3:30 PM \*EN05.11.02**

**Glass Substrates and Covers for Thin-Film Photovoltaic Integration** Sean Garner; Corning, United States

**4:00 PM \*EN05.11.03**

**CIGS Thin-Film PV as a Versatile Component of Future Tandem PV Modules** Peter Borowski, Souhaib Oueslati, Christian Schubbert, Mohit Sood, Janina Moereke, Pablo Reyes-Figueroa, Arindam Mallick, Faraz Din, Bastian Jarmer, Matej Hala, Hossam Elanzeery, Marko Stölzel, Patrick Eraerds and Thomas Dalibor; AVANCIS GmbH, Germany

**4:30 PM \*EN05.11.04**

**INDUSTRY TRACK: Advances of CdTe Photovoltaics** Gang Xiong; First Solar, United States

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# SYMPOSIUM EN06

Materials for Energy-Storage Systems in Extreme Environments  
April 8 - April 11, 2025

Symposium Organizers

Torsten Brezesinski, Karlsruhe Institute of Technology  
Yanqing Su, Utah State University  
Shuozhi Xu, University of Oklahoma  
Jieun Yang, Kyung Hee University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN06.01: Energy Storage Materials in Extreme Thermal Environments I

Session Chairs: Manish Chhowalla and Jieun Yang

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 329

**10:30 AM \*EN06.01.01**

**MXenes and Their Hybrids with Graphene for Energy Storage** Yury Gogotsi; Drexel University, United States

**11:00 AM \*EN06.01.02**

**Electrolyte Designs for Lithium Ion Battery Use Under Extreme Conditions** Esther S. Takeuchi<sup>1,2</sup>, Kenneth Takeuchi<sup>1,2</sup> and Amy Marschilok<sup>1,2</sup>; <sup>1</sup>Stony Brook University, United States; <sup>2</sup>Brookhaven National Laboratory, United States

**11:30 AM EN06.01.03**

**Anion-Modulated Solvation Sheath and Electric Double Layer Enabling Lithium Batteries Operation from –60 to 80 °C** Song Yuan and Xiaodong Chen; Nanyang Technological University, Singapore

**11:45 AM EN06.01.04**

**Investigation and Design of Electrode-Electrolyte Interfaces to Enable Li-Ion Batteries for Extreme Temperature Operation** Sudhan Nagarajan<sup>1</sup>, Sooyeon Hwang<sup>2</sup>, Conan Weiland<sup>3</sup>, Chernoo Jaye<sup>3</sup>, Mahalingam Balasubramanian<sup>4</sup> and Leela Mohana Reddy Arava<sup>1</sup>; <sup>1</sup>Wayne State University, United States; <sup>2</sup>Brookhaven National Laboratory, United States; <sup>3</sup>National Institute of Standards and Technology, United States; <sup>4</sup>Oak Ridge National Laboratory, United States

SESSION EN06.02: Energy Storage Materials in Extreme Thermal Environments II

Session Chairs: Manish Chhowalla and Jieun Yang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 329

**1:30 PM EN06.02.01**

**Design Principles for High-Performance Electrolytes—Overcoming Low-Temperature Challenges in Lithium-Ion Batteries** Nikhil Rampal, Stephen E. Weitzner, Seongkoo Cho, Christine Orme, Marcus Worsley and Liwen Wan; Lawrence Livermore National Laboratory, United States

**1:45 PM EN06.02.02**

**A Deep Look into the Thermochemical Reactions Between Lithium and Carbonate Electrolytes at Elevated Temperature** Juyoung Oh and Ming Tang; Rice University, United States

**2:00 PM \*EN06.02.03**

**Enhancing the Low Temperature Performance of Commercial 18650 Li-Ion Cells** Marshall Schroeder<sup>1</sup>, Wesley Henderson<sup>1</sup>, Jeffrey Read<sup>1</sup>, Marshall Smart<sup>2</sup>, Glen Bremner<sup>3</sup>, Jay He<sup>3</sup>, Bryan Wood<sup>3</sup> and Brian Way<sup>3</sup>; <sup>1</sup>U.S. Army Research Laboratory, United States; <sup>2</sup>NASA Jet Propulsion Laboratory, United States; <sup>3</sup>E-One Moli Energy (Canada) Ltd., Canada

**2:30 PM BREAK**

**3:00 PM \*EN06.02.04**

**Advanced Energy Storage Devices Operating at Wide Temperature Range** Soojin Park; Pohang University of Science and Technology, Korea (the Republic of)

**3:30 PM EN06.02.05**

**High-Temperature Ca<sup>2+</sup> Conduction in NASICON-Type Ca<sub>(1+x)/2</sub>In<sub>x</sub>Zr<sub>2-x</sub>(PO<sub>4</sub>)<sub>3</sub>** Hauke H. Glück and Wolfgang Zeier; University of Münster, Germany

**3:45 PM EN06.02.06**

**Evaluating the Effect of Heat Treatment on HIC Resistance of API X65 Pipeline Steel** Ayman Y. Musaad; King Fahd University of Petroleum and Minerals, Saudi Arabia

**4:00 PM EN06.02.07**

**Development and Characterization of a Scoria-Based Composite Phase Change Material for Energy Storage Applications Under Hot Climate Conditions** Khaled O. Mohaisen; King Fahd University of Petroleum and Minerals, Saudi Arabia

**4:15 PM EN06.02.08**

**Unveiling Anode Kinetics and Its Impact on All-Solid-State Battery Performance by Three-Electrode Measurements** Ruizhuo Zhang<sup>1</sup>, Aleksandr Kondrakov<sup>1,2</sup>, Juergen Janek<sup>1,3</sup> and Torsten Brezesinski<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>BASF SE, Germany; <sup>3</sup>Justus-Liebig-University Giessen, Germany

**4:30 PM \*EN06.02.09**

**Lithium Metal Batteries Under Extreme Conditions—From Temperature Resilience to Cycling Stability** Wurigumula Bao and Y. Shirley Meng; The University of Chicago, United States

SESSION EN06.03: Materials in Energy Storage Systems

Session Chairs: Jieun Yang and Zhiyuan Zeng

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 329

**8:45 AM EN06.03.01**

**Kosmotropic Aqueous Processing Solution for Green Lithium Battery Cathode Manufacturing** Won-Yeong Kim<sup>1</sup>, Jung-Hui Kim<sup>1</sup>, Sebin Kim<sup>2</sup>, Junghwan Kim<sup>1</sup>, Won Bo Lee<sup>2</sup> and Sang-Young Lee<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**9:00 AM EN06.03.02**

**Metal-Organic Framework-Derived Surface Electroactive Sites of Tungstate Zirconia with High Catalytic Performance for All-Vanadium Redox Flow Batteries** Aknachew M. Demeku; National Taiwan University of Science and Technology, Taiwan

**9:15 AM EN06.03.03**

**Design and Development of Electrospun Fibrous Materials for Thermal Management** Madhurima Das and Urszula Stachewicz; AGH University of Krakow, Poland

**9:30 AM EN06.03.04**

**Constriction and Contact Impedance of Ceramic Solid Electrolytes** Md Salman Rabbi Limon, Curtis Duffee and Zeeshan Ahmad; Texas Tech University, United States

**9:45 AM EN06.03.05**

**Self-Regenerative Electrolytes with Intrinsic Redox Activity for Energy Storage Devices** Nageh K. Allam; American University in Cairo, Egypt

**10:00 AM BREAK**

**10:30 AM \*EN06.03.06**

**Metallic MoS<sub>2</sub> and Graphene Heterostructures for Lithium-Sulfur Batteries** [Manish Chhowalla](#); University of Cambridge, United Kingdom

**11:00 AM \*EN06.03.07**

**Polysulfide-Incompatible Additive Suppresses Spatial Reaction Heterogeneity of Li-S Batteries** [Guiliang Xu](#); Argonne National Laboratory, United States

**11:30 AM EN06.03.08**

**Photonic Surface Coating of Compositionally Complex Oxides for Battery Applications** Yanyan Cui<sup>1</sup>, Xiaomeng Pi<sup>1</sup>, Torsten Brezesinski<sup>1</sup>, Juergen Janek<sup>1,2</sup> and [Miriam Botros](#)<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>Justus-Liebig-Universität Giessen, Germany

**11:45 AM EN06.03.09**

**Structural and Electromechanical Properties of BFO-Based Piezoelectric Materials for Energy Storage Devices** [Hussein S. Alrobej](#); Prince Sattam Bin Abdulaziz University, Saudi Arabia

SESSION EN06.04: Energy Storage Materials in Chemically Reactive Environments I

Session Chairs: Miriam Botros and Florian Strauss

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 329

**1:30 PM \*EN06.04.01**

**Synthesis and Performance of New Energy Materials in Extreme Environments** [Russell J. Hemley](#); University of Illinois at Chicago, United States

**2:00 PM \*EN06.04.02**

**Data-Driven Understanding of Synthetic Accessibility and Corrosion Resistance of Multi-Principal Element Alloys** [Bin Ouyang](#); Florida State University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM EN06.04.03**

**Investigation of Moisture-Induced Degradation Mechanisms Between Sulfide Solid Electrolytes and Cathode Materials and Reviving Strategies for Electrode Interface Stabilization** [Yujeong Hwang](#)<sup>1</sup>, Hwiho Kim<sup>1</sup>, Jun Lim<sup>2</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang Accelerator Laboratory, Korea (the Republic of)

**3:45 PM EN06.04.04**

**MXenes with High Thermal Stability in Air** [Hui Fang](#)<sup>1</sup>, Anupma Thakur<sup>2</sup>, Zhenyao Fang<sup>1</sup>, Amirhossein Zahmatkeshsaredorahi<sup>3</sup>, Vahid Rad<sup>4</sup>, Ahmad Shamsabadi<sup>1</sup>, Masoud Soroush<sup>4</sup>, Xiaoji Xu<sup>3</sup>, Andrew M. Rappe<sup>1</sup>, Babak Anasori<sup>2</sup> and Zahra Fakhraai<sup>1</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>Purdue University, United States; <sup>3</sup>Lehigh University, United States; <sup>4</sup>Drexel University, United States

**4:00 PM EN06.04.05**

**A Comprehensive Approach to Qatar's Electric Future—Addressing Battery Challenges for ESS and EV Expansion** [Kenza Maher](#) and Ameni Boumaiza; Qatar Environment and Energy Research Institute, Qatar

**4:15 PM \*EN06.04.06**

**Material Engineering of LaNi<sub>5</sub>, Zn and Mn Anodes for Aqueous Batteries with Stable Cycling at -40°C** [Nian Liu](#); Georgia Institute of Technology, United States

**4:45 PM EN06.04.07**

**Decorating Carbon with Transition Metal Oxides for Energy Storage in Supercapacitors** [Amrita Jain](#)<sup>1</sup> and Monika Michalska<sup>2</sup>; <sup>1</sup>Institute of Fundamental Technological Research, Polish Academy of Science, Poland; <sup>2</sup>VSB Technical University, Czechia



SESSION EN06.05: Poster Session: Materials for Energy-Storage Systems in Extreme Environments

Session Chairs: Torsten Brezesinski and Jieun Yang

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

#### EN06.05.01

**Interfacial Reactivity and Thermal Stability of Molten Salt Electrolytes with FeF<sub>3</sub> Cathode in Thermal Batteries** Heonjae Jeong and Myeongjae Heo; Gachon University, Korea (the Republic of)

#### EN06.05.02

**Multi-Scale Imaging of Corrosion and Hydrogen Embrittlement in Irradiated Nuclear Materials** David H. Simonne, Riley Hultquist, Sayantan Mondal and Ericmoore Jossou; Massachusetts Institute of Technology, United States

#### EN06.05.03

**Development of Lightweight Energy Storage Cladding Panels for Building Applications** Zeyad A. Al-Absi<sup>1,2</sup>, Mohd Isa Mohd Hafizal<sup>3</sup> and Muhammad Asif<sup>4,2</sup>; <sup>1</sup>King Fahd University of Petroleum and Minerals, Saudi Arabia; <sup>2</sup>King Fahd University of Petroleum & Minerals (KFUPM), Saudi Arabia; <sup>3</sup>Universiti Sains Malaysia, Malaysia; <sup>4</sup>King Fahd University of Petroleum & Minerals (KFUPM), Saudi Arabia

#### EN06.05.04

**Nitrogen-Enriched Nanoporous Polytriazine as Efficient Electrode Material for High-Performance Supercapacitors Application in Non-Aqueous Medium with High Cyclic Stability** Arun Kumar<sup>1</sup>, Preeti Rawat<sup>1</sup>, Bhisma N. Mahanty<sup>2</sup> and Paritosh Mohanty<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee, India; <sup>2</sup>The Australian National University, Australia

#### EN06.05.05

**High-Capacity Reversible Hydrogen Storage in Superalkali OLi<sub>3</sub>-Supported Bihenylene Monolayer—Insights from a First-Principles Study** Preeti Beniwal and Thogluva Janardhanan Dhillip Kumar; Indian Institute of Technology Ropar, India

#### EN06.05.06

**Facile Synthesis of Ag<sub>2</sub>S Quantum Dots for Energy Storage and Sensing Applications** Sharath S C<sup>1</sup>, Bahubali K. Murgunde<sup>2</sup>, M. K. Rabinal<sup>3</sup>, Basavaraj G G. Mulimani<sup>3</sup> and M N. Kalasad<sup>1</sup>; <sup>1</sup>Davangere University, India; <sup>2</sup>SDM College of Engineering and Technology, India; <sup>3</sup>Karnatak University, India

#### EN06.05.07

**Enhancing the Heat Transfer Efficiency of a Solar Still Desalination Unit by the Utilization of Cobalt Ferrite Coating for Sustainable Wastewater Treatment** Kousik Pradhan; Indian Institute of Technology Bombay, India

#### EN06.05.08

**Analysis of Hydrogen Absorption and Desorption Behavior Using *In Situ* XRD in AB<sub>2</sub> Hydrogen Storage Alloy** Gyu Byeong Kang<sup>1,2</sup>, Min Ah Baek<sup>1,2</sup>, Seong Chan Hong<sup>1,2</sup>, Gyeong Chan Suk<sup>1,2</sup>, Kwangsook Park<sup>1</sup>, Donghoe Kim<sup>2</sup> and Taewook Na<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

#### EN06.05.09

**Design and Influence Analysis of Si on AB<sub>2</sub> Hydrogen Storage Alloys** Min Ah Baek<sup>1,2</sup>, Gyu Byeong Kang<sup>1,2</sup>, Gyeong Chan Suk<sup>1,2</sup>, Seong Chan Hong<sup>1,2</sup>, Kwangsook Park<sup>1</sup>, Donghoe Kim<sup>2</sup> and Taewook Na<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

#### EN06.05.10

**Photoelectrochemical Solar Water Splitting—Investigating Degradation Mechanisms in Long-Term Practical Testing** Jie Yu, Peng Peng and Joel Ager; Lawrence Berkeley National Laboratory, United States

#### EN06.05.11

**One-Step Synthesis of Monolithic All-in-One Structural Supercapacitor** Yifan Rao, Jonghak Lee and Barbaros Ozyilmaz; National University of Singapore, Singapore

#### EN06.05.12

**Tough Hydrogel-Based Supercapacitor Fiber Fabricated via Thermal Drawing for Long-Term and Minimally Invasive Bio-implantation** Sungha

Jeon<sup>1,2</sup>, Hyeonyeob Seo<sup>2</sup>, Yeji Kim<sup>2</sup>, Jung Tae Lee<sup>3</sup> and Seongjun Park<sup>1,1,1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Kyung Hee University, Korea (the Republic of)

### EN06.05.13

**Construction of 3D Flower-Like O-Doped g-C<sub>3</sub>N<sub>4</sub>/N-Doped Nb<sub>2</sub>O<sub>5</sub>/C Heterostructure with Direct S-Scheme Charge Transfer for Enhanced Visible-Light-Driven Photocatalytic Performance** Amjad Qaraah; East China University of Science and Technology, China

SESSION EN06.06: Energy Storage Materials in Chemically Reactive Environments II

Session Chairs: Ben Breitung and Jieun Yang

Thursday Morning, April 10, 2025

Summit, Level 3, Room 329

### 8:30 AM EN06.06.01

**Hybrid Renewable Energy Systems for EV Charging—Optimizing Battery Technologies and Techno-Economic Feasibility** Yirga Belay Muna<sup>1,2</sup> and Cheng-Chien Kuo<sup>2</sup>; <sup>1</sup>National Sun Yat-Sen University, Taiwan; <sup>2</sup>National Taiwan University of Science and Technology, Taiwan

### 8:45 AM \*EN06.06.02

**Understanding and Designing Materials for Solid-State Batteries Through Atomistic Level Insights** Shuo Wang and Yifei Mo; University of Maryland, United States

### 9:15 AM \*EN06.06.03

**Battery Intercalation for Material Synthesis and *In Situ* Liquid Phase TEM Studies** Zhiyuan Zeng; City University of Hong Kong, Hong Kong

### 9:45 AM BREAK

SESSION EN06.07: High-Entropy Materials for Energy Storage I

Session Chairs: Miriam Botros and Torsten Brezesinski

Thursday Morning, April 10, 2025

Summit, Level 3, Room 329

### 10:15 AM \*EN06.07.01

**Sustainable Magnets with Strong Anisotropy** Willie Beeson<sup>1</sup>, Dinesh Bista<sup>1</sup>, Huairuo Zhang<sup>2,3</sup>, Sergiy Krylyuk<sup>2</sup>, Dhritiman Bhattacharya<sup>1</sup>, Albert V. Davydov<sup>2</sup>, Gen Yin<sup>1</sup> and Kai Liu<sup>1</sup>; <sup>1</sup>Georgetown University, United States; <sup>2</sup>National Institute of Standards and Technology, United States; <sup>3</sup>Theiss Research, Inc., United States

### 10:45 AM \*EN06.07.02

**High-Entropy Ceramics—A Promising Novel Material Class for Extreme Environments** Ben Breitung; Karlsruhe Institute of Technology, Germany

### 11:15 AM EN06.07.03

**Tuning Ionic Conductivity in High Entropy Lithium Argyrodite Solid Electrolytes** Florian Strauss; Karlsruhe Institute of Technology, Germany

### 11:30 AM EN06.07.04

**Electrodeposited FeCoNiCuZn High Entropy Alloy Thin Films and Nanowires** Erin L. Marlowe and Kai Liu; Georgetown University, United States

SESSION EN06.08: High-Entropy Materials for Energy Storage II

Session Chairs: Torsten Brezesinski and Florian Strauss

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 329

**1:30 PM \*EN06.08.01**

**High-Entropy Oxides for Energy Conversion and Storage** Maren Lepple; Justus Liebig University Giessen, Germany

**2:00 PM \*EN06.08.02**

**Designing Lithium-Ion Cathodes with High Thermal Stability via High-Entropy Doping** Huolin Xin, Yaqi Jing and Lei Wang; University of California, Irvine, United States

**2:30 PM EN06.08.03**

**Insights into Defect Kinetics, Mass Transport and Electronic Structure in Ion-Irradiated Bi<sub>2</sub>O<sub>3</sub>** Ellis R. Kennedy<sup>1</sup>, James Valdez<sup>1</sup>, Yongqiang Wang<sup>1</sup>, Stephanie Ribet<sup>2</sup>, Kurt Sickafus<sup>1</sup>, Cortney Kreller<sup>1</sup>, Blas P. Uberuaga<sup>1</sup> and Benjamin K. Derby<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**2:45 PM BREAK**

SESSION EN06.09: Strategic Vision for Advanced Battery Technologies

Session Chairs: Torsten Brezesinski and Maren Lepple

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 329

**3:15 PM \*EN06.09.01**

**Enhanced Cycling Performance of LiNiO<sub>2</sub> in Li-Ion Batteries via Nb-Based Surface Coating** Barbara N. Nunes<sup>1</sup>, Leonhard Karger<sup>1</sup>, Aleksandr Kondrakov<sup>2</sup> and Torsten Brezesinski<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>BASF Corporation, Germany

**3:45 PM \*EN06.09.02**

**New LHCE Designs for Lithium Metal Batteries** Jang Wook Choi; Seoul National University, Korea (the Republic of)

SESSION EN06.10: Hydrogen Embrittlement-Resistant Materials for Hydrogen Storage and Transport

Session Chairs: Torsten Brezesinski and Jieun Yang

Friday Morning, April 11, 2025

Summit, Level 3, Room 329

**8:30 AM EN06.10.01**

**Molecular Insights into Enhanced Hydrogen Storage in Fluorine-Substituted MOFs—A Multi-Scale Approach Using DFT, MD and GCMC** Nilima Sinha and Jhumpa Adhikari; Indian Institute of Technology Bombay, India

**8:45 AM EN06.10.02**

**Unraveling the Influence of Hydrogen and Blended Gas on Polymer Performance in Infrastructure Systems** Wenbin Kuang<sup>1</sup>, Kevin Simmons<sup>1</sup> and Nalini Menon<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Sandia National Laboratories, United States

**9:00 AM EN06.10.03**

**Degradation of Organic Pollutants Using the Highly Efficient Mn-Mo(O,S)<sub>2</sub> Oxysulfide Photocatalyst Under Visible Light Irradiation** Worku L. Kebede; University of Gondar, Ethiopia

**9:15 AM EN06.10.04**

**Lattice Dynamics and Thermal Conductivity of 2D Monolayer MH<sub>2</sub> and Their Application in Hydrogen Vehicles—A First-Principles Study** Mukesh Singh, Shivprasad S. Shastri and Alok Shukla; Indian Institute of Technology Bombay, India

**9:30 AM EN06.10.05**

**Optical Fiber H<sub>2</sub> Sensor Operating in Harsh Environment of Subsurface H<sub>2</sub> Storage Reservoirs** Daejin Kim<sup>1,2</sup>, Alexander Shumski<sup>1,2</sup> and Ruishu

Wright<sup>1</sup>; <sup>1</sup>U.S. Department of Energy National Energy Technology Laboratory, United States; <sup>2</sup>NETL Support Contractor, United States

**9:45 AM EN06.10.06**

**Influence of Residual Stress on Hydrogen Permeation and Mechanical Behavior in Shot-Peened Steel** Jia-Huei Tien<sup>1</sup>, Courtney L. Clark<sup>1,2</sup>, David R. Johnson<sup>1</sup> and David F. Bahr<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Los Alamos National Laboratory, United States

**10:00 AM BREAK**

**10:30 AM EN06.10.07**

**Cobalt Embedded N-Doped Carbon Nanotubes as Bifunctional Catalysts for Zinc–Air Batteries** Sarvesh Kumar and Balam Sahoo; Indian Institute of Science, India

**10:45 AM EN06.10.08**

**Synthesis of Silica Aerogels via Supercritical CO<sub>2</sub> Drying for Efficient Hydrogen Storage** Brianna Zheng<sup>1</sup>, Seohee Park<sup>2</sup>, Leo Pan-Wang<sup>3</sup>, Shi Fu<sup>4</sup>, Huiting Luo<sup>4</sup>, Hongyeon Lee<sup>5</sup>, Yongseok Kim<sup>5</sup>, Brian Bick<sup>4</sup>, Yiwei Fang<sup>4</sup>, Taejin Kim<sup>4</sup>, Tatiana Zaliznyak<sup>4</sup> and Miriam H. Rafailovich<sup>4</sup>; <sup>1</sup>BASIS Independent Silicon Valley, United States; <sup>2</sup>Dwight School Seoul, Korea (the Republic of); <sup>3</sup>The Peddie School, United States; <sup>4</sup>Stony Brook University, The State University of New York, United States; <sup>5</sup>Chungnam National University, Korea (the Republic of)

**11:00 AM EN06.10.09**

**Substitution Guided Redox-Potential Variation in Perfluorinated Phenothiazine** Paban Sitaula and Mustapha Soukri; RTI-International, United States

**11:15 AM EN06.10.10**

**Bimetallic Nitride-Based High Voltage Interdigitated Micro-Supercapacitor for Miniaturized Energy Storage Application** Sheetal Issar<sup>1</sup>, Deepika Jhahria<sup>2</sup> and Ramesh Chandra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee, India; <sup>2</sup>Indian Institute of Technology Kanpur, India

# SYMPOSIUM EN07

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Solid-State Alkali-Metal Batteries  
April 8 - April 11, 2025

Symposium Organizers

Yoon Seok Jung, Yonsei University  
Brian Sheldon, Brown University  
Hui Wang, University of Louisville  
Hongli Zhu, Northeastern University

Symposium Support

**Silver**

BioLogic USA

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION EN07.01: Opportunities and Challenges in Solid-State Batteries

Session Chairs: Yoon Seok Jung and Hongli Zhu

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 328

**10:30 AM \*EN07.01.01**

**Challenges at the Lithium Anode and Composite Cathode in All-Solid-State Batteries** [Peter Bruce](#)<sup>1</sup>, Xiangwen Gao<sup>1,2</sup>, Longlong Wang<sup>1</sup>, Bingkun Hu<sup>1</sup>, Shengming Zhang<sup>1</sup>, Dominic L. R. Melvin<sup>1</sup>, Ziyang Ning<sup>1</sup> and Guanchen Li<sup>3</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>Shanghai Jiao Tong University, China; <sup>3</sup>University of Glasgow, United Kingdom

**11:00 AM \*EN07.01.02**

**Soft and Highly-Conductive Inorganic Lithium Metal Oxochloride Solid-State Electrolytes Based on 1-Dimensional Polymeric Structures** [Linda F. Nazar](#) and Insang You; University of Waterloo, Canada

**11:30 AM EN07.01.03**

**Updates in Lithium-Metal Battery Development** [Jordi Sastre](#); QuantumScape Corporation, United States

SESSION EN07.02: Anode Design and Engineering for Solid-State Batteries I

Session Chairs: Brian Sheldon and Hui Wang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 328

**1:30 PM \*EN07.02.01**

**Electro-Chemo-Mechanics of “Anode-Free” Solid-State Batteries** [Neil P. Dasgupta](#); University of Michigan, United States

**2:00 PM \*EN07.02.02**

**Understanding the Mechanisms Governing Anode-Free and Alloy-Anode Solid-State Batteries** [Matthew McDowell](#); Georgia Institute of Technology, United States

**2:30 PM EN07.02.03**

**Improving Cycle Stability of Anode-Free All-Solid-State Lithium-Ion Batteries by Pore Engineering of the Carbon Protective Layer** [Da Young Ko](#)<sup>1</sup>, Hyun Jong Kim<sup>1</sup>, Haeseok Park<sup>1</sup>, Eunbin Kim<sup>1</sup>, Ji Young Kim<sup>1</sup>, Hansu Kim<sup>1</sup> and Min-Sik Park<sup>2</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Kyung Hee University, Korea (the Republic of)

**2:45 PM EN07.02.04**

**Design Principles for Current Collectors in Anode-Free All-Solid-State Batteries with Argyrodite LPSCI Electrolytes** [Yixian Wang](#) and David Mitlin; The University of Texas at Austin, United States

**3:00 PM BREAK**

**3:30 PM \*EN07.02.05**

**Control of Two Solid Electrolyte Interphases at the Negative Electrode of an Anode-Free All Solid-State Battery Based on Argyrodite Electrolyte** [David Mitlin](#); The University of Texas at Austin, United States

**4:00 PM \*EN07.02.06**

**Material Design and In Operando Raman Spectroscopy for Study of Anode-Free Lithium Metal Batteries** [Vibha Kalra](#); Cornell University, United States

**4:30 PM EN07.02.07**

**High-Capacity Anodes for All-Solid-State Batteries Operating Under Low Operating Pressures** [Yoon Seok Jung](#); Yonsei University, Korea (the Republic of)

**4:45 PM EN07.02.08**

**The Impact of Silver Content on Lithium-Silver Alloy Electrode Performance with Garnet Solid Electrolyte in All Solid State Batteries** [Shomaz Ul Haq](#)<sup>1,2</sup>, Andrew Westover<sup>2,1</sup>, Ritu Sahore<sup>2</sup> and Andrew Ullman<sup>2</sup>; <sup>1</sup>University of Tennessee, Knoxville, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

SESSION EN07.03: Design of Anode and Solid Electrolyte for Solid-State Li Batteries

Session Chairs: Yoon Seok Jung and Hui Wang

Wednesday Morning, April 9, 2025  
Summit, Level 3, Room 328

**8:00 AM \*EN07.03.01**

**INDUSTRY TRACK: All Solid-State Batteries Utilizing Sulfide and Halide Based Electrolytes** [Jagjit Nanda](#)<sup>1,2</sup>; <sup>1</sup>SLAC National Laboratory, United States; <sup>2</sup>Stanford University, United States

**8:30 AM \*EN07.03.02**

**Unraveling the Complexities of Li Metal for Solid State Batteries** [Andrew S. Westover](#)<sup>1</sup>, Shomaz U. Haq<sup>1</sup>, Ethan C. Self<sup>1</sup>, Wan-Yu Tsai<sup>2</sup>, Yan-Ru Lin<sup>1</sup>, Ritu Sahore<sup>1</sup>, Erik Herbert<sup>1</sup>, Sergiy Kalnaus<sup>1</sup> and Kyra Owensby<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>Université de Lille, France

**9:00 AM EN07.03.03**

**Engineered Nanostructured Li<sub>2</sub>Se on Lithium Metal Anodes for Enhancing Energy Density in All-Solid-State Lithium Metal Batteries** [Joonhyeok Park](#), Jaeik Kim, Seungwoo Lee, Seungmin Han, Jooheon Sun, Jinwoo Jeong, Yeseung Lee, Ungyu Paik and Taeseup Song; Hanyang University, Korea (the Republic of)

**9:15 AM EN07.03.04**

**Metal-Carbon Dual Buffer Layer Development to Suppress Lithium Dendrite Growth in All-Solid-State Batteries** Venkata S. Avvaru and [Haegyecom Kim](#); Lawrence Berkeley National Laboratory, United States

**9:30 AM EN07.03.05**

**Lithium Diffusion-Controlled Li-Al Alloy Anode for All-Solid-State Battery** [Yuju Jeon](#)<sup>1</sup>, Dong Ju Lee<sup>1</sup>, Hongkui Zheng<sup>2</sup>, Sessa S. Behara<sup>3</sup>, Jung-Pil Lee<sup>4</sup>, Junlin Wu<sup>1</sup>, Feng Li<sup>1</sup>, Wei Tang<sup>1</sup>, Lanshuang Zhang<sup>1</sup>, Yu-Ting Chen<sup>1</sup>, Dapeng Xu<sup>1</sup>, Jiyoung Kim<sup>4</sup>, Min-Sang Song<sup>4</sup>, Anton Van der Ven<sup>3</sup>, Kai He<sup>2</sup> and Zheng Chen<sup>1</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>University of California, Irvine, United States; <sup>3</sup>University of California, Santa Barbara, United States; <sup>4</sup>LG Energy Solution, Ltd., Korea (the Republic of)

**9:45 AM BREAK**

SESSION EN07.04: Interface Design and Characterizations in Solid-State Batteries I

Session Chairs: Yoon Seok Jung and Hongli Zhu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 328

**10:15 AM \*EN07.04.01**

**Nanomechanics of Brittle Solid Electrolytes—A Case Study on Garnets** [William C. Chueh](#); Stanford University, United States

**10:45 AM EN07.04.02**

**Rationally Designed Interlayers for Sulfide All-Solid-State Lithium Batteries** [Yong Bae Song](#), Boyeong Jang, Donghyeok Kim and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

**11:00 AM EN07.04.03**

**New Way to Design Interphase for High-Performance All-Solid-State Lithium Metal Batteries** [Weiran Zhang](#) and Chunsheng Wang; University of Maryland, United States

**11:15 AM EN07.04.04**

**Role of Surface Diffusion Mechanism in Void Formation and Instability at Solid/Solid Electrochemical Interfaces** [Sourim Banerjee](#), Bairav Vishnugopi and Partha P. Mukherjee; Purdue University, United States

**11:30 AM \*EN07.04.05**

**Interface Reaction Design and AI Modulation for High Current Densities in Solid-State Alkali-Metal Batteries** [Xin Li](#); Harvard University, United States

SESSION EN07.05: Interface Design and Characterizations in Solid-State Batteries II

Session Chairs: Dongping Lu and Brian Sheldon

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 328

**1:30 PM \*EN07.05.01**

**Stabilizing Li–Solid Electrolyte Interface Using MIEC Interlayers—Insights from *Operando* Electron Microscopy and Modeling** Yan Yao; University of Houston, United States

**2:00 PM EN07.05.02**

**Early Detection of the Degradation at Li-Solid Electrolyte Interface During Stripping with Galvanostatic Electrochemical Impedance Measurements** Younggyu Kim and Neil P. Dasgupta; University of Michigan, United States

**2:15 PM EN07.05.03**

**Imaging the Microstructure of Sodium Metal in "Anode-free" Solid-State Batteries Using EBSD** Till Ortman<sup>1</sup>, Till Fuchs<sup>1</sup>, Juri Becker<sup>1</sup>, Catherine Haslam<sup>2,2</sup>, Maya Ziegler<sup>1</sup>, Vipin K. Singh<sup>3,3</sup>, Marcus Rohnke<sup>1</sup>, Boris Mogwitz<sup>1</sup>, Klaus Peppeler<sup>1</sup>, Linda F. Nazar<sup>3,3</sup>, Jeff Sakamoto<sup>4</sup> and Juergen Janek<sup>1</sup>; <sup>1</sup>Justus-Liebig-Universität Giessen, Germany; <sup>2</sup>University of Michigan–Ann Arbor, United States; <sup>3</sup>University of Waterloo, Canada; <sup>4</sup>University of California, Santa Barbara, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION EN07.06: Cathode Design and Engineering in Solid-State Batteries I

Session Chairs: Dongping Lu and Hui Wang

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 328

**3:30 PM \*EN07.06.01**

**Progress in the Development of Sulfur Cathodes for Solid State Batteries** Ping Liu; University of California, San Diego, United States

**4:00 PM \*EN07.06.02**

**Optimal Sulfur Cathode for High-Energy Density All-Solid-State Li-S Batteries** Mingi Jeong, Michael Kindle, Jie Bao, Yaobin Xu, Jing Wu, Un Hyuck Kim, Dahee Jin, Chao Zeng, Zhijie Xu and Dongping Lu; Pacific Northwest National Laboratory, United States

**4:30 PM EN07.06.03**

**Quantifying the Mixing Quality of Composite Cathodes and Its Implications for Reproducibility and Comparability of Solid-State Battery Cells** Maximilian Kissel, Johannes Schubert, René Rekers, Anja Bielefeld and Juergen Janek; Justus-Liebig-Universität Giessen, Germany

**4:45 PM EN07.06.04**

**Effect of Molecular Weight of PTFE on the Cycling Performance of Dry-Processed Composite Cathode for Sulfide-Based All-Solid-State Batteries** Young-Jun Lee, Se-Yeon Kim, Won-Jae Song and Dong-Won Kim; Hanyang University, Korea (the Republic of)

SESSION EN07.07: Cathode Design and Engineering in Solid-State Batteries II

Session Chairs: Jongwoo Lim and Hongli Zhu

Thursday Morning, April 10, 2025

Summit, Level 3, Room 328

**8:00 AM \*EN07.07.01**

**INDUSTRY TRACK: Multi-Dimensional Approaches Towards a Practical Use of Sulfide Solid Electrolytes** Benoit Fleutot, Fabien Nassoy, Emmanuelle Garitte, Charlotte Mallet, Lara Faour and Chisu Kim; Hydro-Québec, Canada

**8:30 AM \*EN07.07.02**

**How Interfacial Chemo-Mechanical Properties Govern Lithium Transport and Lifetime of Cathode Particles in All-Solid-State Batteries** Jongwoo Lim; Seoul National University, Korea (the Republic of)

**9:00 AM EN07.07.03**

**Systematic Optimization of Slurry-Cast All-Solid-State Battery Cathodes and Their Characterization** Ruizhuo Zhang<sup>1</sup>, Seyedhosein Payandeh<sup>1</sup>, Jun Hao Teo<sup>1</sup>, Aleksandr Kondrakov<sup>1,2</sup>, Juergen Janek<sup>1,3</sup> and Torsten Brezesinski<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology, Germany; <sup>2</sup>BASF SE, Germany; <sup>3</sup>Justus-Liebig-University Giessen, Germany

**9:15 AM EN07.07.04**

**Understanding the Impact of Co-Sintering Temperature on NASICON Electrolyte and Layered Cathode Composites for Enhanced Solid-State Sodium Battery Performance** Pratima Kumari<sup>1</sup>, Ajit Kumar<sup>2</sup>, Harshita Lohani<sup>3</sup>, Abhinanda Sengupta<sup>1</sup>, Aakash Ahuja<sup>1</sup> and Sagar Mitra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay, India; <sup>2</sup>Deakin University, Australia; <sup>3</sup>Collège de France, France

**9:30 AM EN07.07.05**

**A Facile Method for Forming an Artificial CEI Layer Utilizing Residual Lithium Compounds on High-Ni Cathodes in All-Solid-State Batteries** Jaek Kim, Seungwoo Lee, Hyungjun Lee, Joonhyeok Park, Jiwoon Kim, Jinwoo Jeong, Ungyu Paik and Taeseup Song; Hanyang University, Korea (the Republic of)

**9:45 AM BREAK**

SESSION EN07.08: Studies on Novel Solid Electrolyte Materials

Session Chairs: Jongwoo Lim and Hongli Zhu

Thursday Morning, April 10, 2025

Summit, Level 3, Room 328

**10:15 AM \*EN07.08.01**

**LLTO Scaffold-Based Composite Polymer Electrolyte for Solid-State Li-Ion Batteries** Sanja Tepavcevic, Jungkuk Lee, Michael J. Coughlin, Pallab Barai, Meghan Burns, Venkat Srinivasan and Yuepeng Zhang; Argonne National Laboratory, United States

**10:45 AM EN07.08.02**

**Binary Ionic Transport in Single-Ion Conductor Cubic  $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$**  Peng Bai; Washington University in St. Louis, United States

**11:00 AM EN07.08.03**

**Operando Characterisation of Dendrite Propagation in Single-Crystal LLZO** Diana Avadani<sup>1</sup>, Sabrina Lang<sup>1</sup>, Steffen Ganschow<sup>2</sup>, Dominik Kramer<sup>1</sup>, Reiner Moenig<sup>1</sup> and Christoph Kirchlechner<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology–Institute for Applied Materials, Germany; <sup>2</sup>Leibniz-Institut für Kristallzüchtung, Germany

**11:15 AM EN07.08.04**

**Doping  $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$  (LLZO)—Implications for Charge Carrier Concentration and Processing** Kristoffer Eggestad, Sverre M. Selbach and Benjamin A. Williamson; NTNU Norwegian University of Science and Technology, Norway

SESSION EN07.09: Modeling and Theory Studies in Solid-State Batteries

Session Chairs: Brian Sheldon, Hui Wang and Hongli Zhu

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 328

**1:45 PM \*EN07.09.01**

**The Impact of the Interface Layer on Li Plating and Stripping Morphology** Yue Qi; Brown University, United States



**2:15 PM EN07.09.02**

**Quantifying Multiphase SEI Growth Kinetics in Sulfide Solid Electrolytes** Christoph D. Alt, Nadia Mueller, Luise Riegger, Burak Aktekin, Philip Minnmann, Klaus Pepler and Juergen Janek; Justus Liebig University Giessen, Germany

**2:30 PM EN07.09.03**

**Atomic-Scale Mechanisms of Superionic Conduction and Interfacial Phenomena in Sulfide Electrolytes for Solid-State Alkali Metal Batteries** Varun Shreyas, Meghnath Jaishi, Saransh Gupta, Selim Halacoglu, Hui Wang and Badri Narayanan; University of Louisville, United States

**2:45 PM EN07.09.04**

**Impedance Modelling of Parent Metal Anodes in Solid-State Batteries—The Role of Current Constriction at Interface Voids, Heterogeneities and SEI** Janis K. Eckhardt, Till Fuchs, Peter J. Klar, Juergen Janek and Christian Heiliger; Justus-Liebig-Universität Giessen, Germany

**3:00 PM BREAK**

SESSION EN07.10: Engineering Challenge in Solid State Battery Device

Session Chairs: Brian Sheldon, Hui Wang and Hongli Zhu

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 328

**3:30 PM \*EN07.10.01**

**Flammability of Sulfide Solid-State Electrolytes  $\beta$ -Li<sub>3</sub>PS<sub>4</sub> and Li<sub>6</sub>PS<sub>5</sub>Cl— Volatilization and Autoignition of Sulfur Vapor—New Insight into All-Solid-State Battery Thermal Runaway** Thomas A. Yersak, Hernando Gonzalez Malabet, Vamakshi Yadav, Nicholas Pieczonka, William Collin and Mei Cai; General Motors Battery R&D, United States

**4:00 PM EN07.10.02**

**The Influence of Pressure on Structural Evolution of Lithium Alloy Materials** Congcheng Wang and Matthew McDowell; Georgia Institute of Technology, United States

**4:15 PM EN07.10.03**

**Unveiling the Role of Hidden Internal Stresses in Lithium Heterogeneity for High-Performance All-Solid State Batteries** Hwiho Kim<sup>1</sup>, Dal Y. Kim<sup>1</sup>, Chihyun Nam<sup>1</sup>, Yujeong Hwang<sup>1</sup>, Mingyuan Ge<sup>2</sup>, Yun S. Lee<sup>1</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Brookhaven National Laboratory, United States

**4:30 PM EN07.10.04**

**Stress Engineering of Solid State Electrolytes to Improve Electrochemical Performance** Charlotte Thomas<sup>1</sup>, Matthew Chancey<sup>2</sup>, Marco Di Michiel<sup>3</sup>, Kaitlin Garman<sup>1</sup>, Yangyang Wang<sup>1</sup>, Stephen J. Harris<sup>4</sup>, Donal Finegan<sup>5</sup>, Yongqiang Wang<sup>2</sup> and Chunmei Ban<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>Los Alamos National Laboratory, United States; <sup>3</sup>European Synchrotron Radiation Facility, France; <sup>4</sup>Lawrence Berkeley National Laboratory, United States; <sup>5</sup>National Renewable Energy Laboratory, United States

**4:45 PM EN07.10.05**

**A Comparative Safety Analysis of Lithium-Ion and Solid-State Lithium-Metal Pouch Cells** Jonathan Fakkema, Harsh Sapra and Eric Kazyak; University of Wisconsin-Madison, United States

SESSION EN07.11: Poster Session: Advances in Solid-State Alkali-Metal Batteries

Session Chairs: Hui Wang and Hongli Zhu

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**EN07.11.01**

**Heterogeneity in Point Defect Distribution and Mobility in Solid Ion Conductors** Md Salman Rabbi Limon and Zeeshan Ahmad; Texas Tech University,

United States

#### EN07.11.02

**Engineering Metal-Organic Framework-Based Ionic Conductors for Solid-State Batteries** [Aaron Levy](#)<sup>1,2</sup>; <sup>1</sup>California State University of Long Beach, United States; <sup>2</sup>University of California, San Diego, United States

#### EN07.11.03

**Highly Resistant to Dendrite Growth in Three-Dimensional Garnet-Type  $\text{Li}_{6.4}\text{La}_3\text{Zr}_{1.4}\text{Ta}_{0.6}\text{O}_{12}$  Solid-State Li-Metal Batteries** Soeng Ryeol Choi, Seojeong Yoo and [Jun-Young Park](#); Sejong University, Korea (the Republic of)

#### EN07.11.04

**Metal-Organic Framework Derived C-Doped Metal-Oxides as Promising Cathode Materials for All-Solid-State Li-CO<sub>2</sub> Batteries** [Irfan Ullah](#); University of Puerto Rico at Río Piedras, Puerto Rico

#### EN07.11.05

**Investigation of Post-Treatment-Induced Surface Chemistry of Li Argyrodites for All-Solid-State Batteries** [Boyeong Jang](#), Yong Bae Song and Yoon Seok Jung; Yonsei University, Korea (the Republic of)

#### EN07.11.06

**Nanohybrid Gel Polymer Electrolyte Featuring Highly Dispersed And Copolymerized Surface-Functionalized Boron Nitride Nanosheets for Safe Lithium Metal Batteries** [Gulsah Yaman Uzunoglu](#)<sup>1</sup> and Recep Yukse<sup>2,3</sup>; <sup>1</sup>Istanbul Health and Technology University, Turkey; <sup>2</sup>Eskisehir Osmangazi University, Turkey; <sup>3</sup>ESKISEHIR OSMANGAZI UNIVERSITY, Turkey

#### EN07.11.07

**Materials Discovery and Process Development of Bulk Ionic Glass (BIG) Solid Electrolytes Through Geometric Frustration for All Solid State Batteries** [Shomaz Ul Haq](#)<sup>1,2</sup>, Andrew Westover<sup>1,2</sup>, Andrew Kercher<sup>2</sup>, Andrew F. May<sup>2</sup>, Sergiy Kalnaus<sup>2</sup> and Takeshi Egami<sup>1,2</sup>; <sup>1</sup>University of Tennessee, Knoxville, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

#### EN07.11.08

**Harnessing Database-Supported High-Throughput Screening for the Design of Stable Interlayers in Halide-Based All-Solid-State Batteries** [Longyun Shen](#)<sup>1</sup> and Francesco Ciucci<sup>1,2,2</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, China; <sup>2</sup>University of Bayreuth, Germany

#### EN07.11.09

**Enthalpy-Driven Molecular Engineering Enables High-Performance Quasi-Solid-State Electrolytes for Stable Lithium Metal Batteries** [Zilong Wang](#)<sup>1</sup>, Qing Chen<sup>1</sup> and Francesco Ciucci<sup>2</sup>; <sup>1</sup>Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>Universität Bayreuth, Germany

#### EN07.11.10

**All-Solid-State Lithium Metal Batteries Operating at Near-Zero Pressure** [Hyeongseok Lee](#), Jihun Sung and Soojin Park; Pohang University of Science and Technology, Korea (the Republic of)

#### EN07.11.11

**In Situ Formed Co-polymer Based Composite Solid Electrolyte for High-voltage Solid-state Lithium Metal Batteries** [Youngwoong Song](#)<sup>1</sup>, Hyochan Lee<sup>1,2</sup>, Younghoon Jung<sup>1,2</sup>, Hyein Song<sup>1,2</sup>, Eunmi Kim<sup>1</sup>, Minyoung Kim<sup>1</sup> and Jinsub Lim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Chonnam National University, Korea (the Republic of)

#### EN07.11.12

**Fabrication and Characterization of Composite Solid Electrolytes via *In Situ* Polymerization** [Hyochan Lee](#)<sup>1,2</sup>, Youngwoong Song<sup>1</sup>, Younghoon Jung<sup>1,2</sup>, Hyein Song<sup>1,2</sup>, Jinsub Lim<sup>1</sup> and Minyoung Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea (the Republic of); <sup>2</sup>Chonnam National University, Korea (the Republic of)

#### EN07.11.13

**Fluorine-Substituted Lithium Chloride Solid Electrolytes for High-Voltage All-Solid-State Lithium-Ion Batteries** [Seungho Yu](#); Korea Institute of Science and Technology, Korea (the Republic of)

#### EN07.11.14

**Effects of Mechanically Interlocked Structure on Ionic Conductivity in Polyrotaxane-Based Polymer Electrolytes** Bitgaram Kim, Eunji Lee and [Jihun Seo](#); Korea University, Korea (the Republic of)

SESSION EN07.12: New Discoveries on Solid-State Alkali-Metal Batteries

Session Chairs: Donghai Wang and Hui Wang

Friday Morning, April 11, 2025

Summit, Level 3, Room 328

**8:15 AM \*EN07.12.01**

**High-Energy All-Solid-State Li-S Batteries** Donghai Wang; Southern Methodist University, United States

**8:45 AM EN07.12.02**

**A New Method to Produce Protic Organic Ionic Plastic Crystal and His Implementation as Catholyte in a New Generation High-Energy Lithium Metal Polymer Battery** Jean-Christophe Daigle, Ki Seok Koh, David Lepage, Sergey Krachkovskiy, Yasmine Benabed and Chisu Kim; Hydro-Québec, Canada

**9:00 AM EN07.12.03**

**The Effect of Halogen Doping on Li Mobility of Thiophosphate Solid Electrolytes** Junteng Du and Jae Chul Kim; Stevens Institute of Technology, United States

**9:15 AM EN07.12.04**

**Lithium Anode Interlayer Design for All-Solid-State Lithium-Metal Batteries** Zeyi Wang; University of Maryland, United States

**9:30 AM EN07.12.05**

**Exploring Dehydration Mechanisms and Conductivity Optimization in  $\text{Li}_3\text{InCl}_6 \cdot x\text{H}_2\text{O}$  via *In Situ* Synchrotron Techniques** Yuan-Ting Hung and Ru-Shi Liu; National Taiwan University, Taiwan

**9:45 AM EN07.12.06**

**Solid Sodium Anodes Enabled by Low-Cost, Mesoporous Carbon Interlayer—Progress and Prospects for Scalable Energy Storage** (Jon) Mark Weller, Hyungkyu Han, Eugene Polikarpov, Guosheng Li, David M. Reed and Vincent Sprenkle; Pacific Northwest National Laboratory, United States

# SYMPOSIUM MT01

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Integrating AI-Assisted Computation and Experimentation for Autonomous Laboratories  
April 8 - April 10, 2025

Symposium Organizers

Mahshid Ahmadi, University of Tennessee, Knoxville  
Nongnuch Artrith, University of Utrecht  
Guoxiang (Emma) Hu, Georgia Institute of Technology  
Haegyem Kim, Lawrence Berkeley National Laboratory

Symposium Support

**Bronze**

APL Machine Learning  
Jiang Family Foundation  
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+ JMR Distinguished Invited Speaker  
^ MRS Communications Early Career Distinguished Presenter

SESSION MT01.01: Novel Materials Discovery  
Session Chairs: Nongnuch Artrith and Guoxiang (Emma) Hu  
Tuesday Morning, April 8, 2025  
Summit, Level 4, Room 424

**10:30 AM \*MT01.01.01**

**Leveraging Experimental Literature Data to Discover Novel Metal-Organic Frameworks and Mechanophores** [Heather J. Kulik](#); Massachusetts Institute of Technology, United States

**11:00 AM \*MT01.01.02**

**Accelerating MOF Discovery—Integrating AI into Lab Workflows for Optimized Thin-Film Growth** [Christoph Kreisbeck](#)<sup>1</sup>, Manuel Tsotsalas<sup>1,2</sup> and Yi Luo<sup>1,2</sup>; <sup>1</sup>Aixelo, Inc, United States; <sup>2</sup>Karlsruhe Institute of Technology (KIT), Germany

SESSION MT01.02: Building Autonomous Laboratories  
Session Chairs: Mahshid Ahmadi and Haegyeom Kim  
Tuesday Afternoon, April 8, 2025  
Summit, Level 4, Room 424

**1:30 PM \*MT01.02.01**

**Data-Rich Autonomous Fluidic Labs for Accelerated Nanomaterials Discovery** [Milad Abolhasani](#); North Carolina State University, United States

**2:00 PM MT01.02.02**

**Polymer Materials AI/ML Optimization—Continuous Flow Chemistry and Additive Manufacturing** [Rigoberto C. Advincula](#); The University of Tennessee/Oak Ridge National Laboratory, United States

**2:15 PM MT01.02.03**

**Autonomous Raman Spectroscopy for Investigating Lithium Salt Degradation Processes** Tobias Rangel Guillen, [Yangang Liang](#) and Jie Xiao; Pacific Northwest National Laboratory, United States

**2:30 PM BREAK**

**3:00 PM \*MT01.02.04**

**Development of Experimental Tools and Data Analysis Pipelines for Autonomous Electrochemistry** [Jason R. Hattrick-Simpers](#); University of Toronto, Canada

**3:30 PM MT01.02.05**

**Building Spatial Differentiability into Convolutional Neural Networks for Reliable and Accurate Pose Prediction of Autonomous Contact-Based Characterization Robotic Systems** [Alexander E. Siemenn](#), Basita Das, Kangyu Ji, Fang Sheng and Tonio Buonassisi; Massachusetts Institute of Technology, United States

**3:45 PM MT01.02.06**

**Automatic and Autonomous Equipment for AI-Driven Materials Science** [Chengyi Wu](#), Hui Li, Andy Huang and Xiaoping Jiang; MTI Corporation, United States

**4:00 PM \*MT01.02.07**

**NIST Autonomous Research Laboratories for Materials Exploration and Discovery** [Aaron Gilad Kusne](#)<sup>1,2</sup>, Haotong Liang<sup>2</sup>, Austin McDannald<sup>1</sup>, Brian L. DeCost<sup>1</sup>, Howie Joress<sup>1</sup>, Felix Adams<sup>2</sup>, Chih-Yu Lee<sup>2</sup>, Ryan Kim<sup>2</sup> and Ichiro Takeuchi<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>University of Maryland, United States

**4:30 PM MT01.02.08**

**Exploring the Limits of kNN Noisy Feature Detection and Recovery for Self-Driving Labs** [Qiuyu Shi](#)<sup>1</sup>, Kangming Li<sup>2,1</sup>, Yao Fehils<sup>3</sup>, Daniel Persaud<sup>1</sup> and Jason R. Hattrick-Simpers<sup>1</sup>; <sup>1</sup>University of Toronto, Canada; <sup>2</sup>Acceleration Consortium, Canada; <sup>3</sup>Artificial, Inc., United States

**4:45 PM MT01.02.09**

**Machine Learning Accelerated Small Angle Scattering Analysis** [Graham Roberts](#), Mu-Ping Nieh, Anson Ma and Qian Yang; University of Connecticut, United States

SESSION MT01.03: Poster Session

Session Chairs: Mahshid Ahmadi and Guoxiang (Emma) Hu

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**MT01.03.01**

**Digital Transformation Models by Multiscale/Multiphysics Simulation and AI for Ceramic Manufacturing Process** [Jinhwa Park](#)<sup>1,2</sup>, Ga-Ae Ryu<sup>1</sup>, Youn-Woo Hong<sup>1</sup> and Sangil Hyun<sup>1</sup>; <sup>1</sup>Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of); <sup>2</sup>Pusan National University, Korea (the Republic of)

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT02.04/MT01.04: Joint Session: Advances of Lab Automation

Session Chairs: Guoxiang (Emma) Hu and Eric McCalla

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 423

**8:30 AM \*MT02.04/MT01.04.01**

**AI-Ready Microscopy and Spectroscopy Data for Autonomous Laboratory** [Maria K. Chan](#); Argonne National Laboratory, United States

**9:00 AM \*MT02.04/MT01.04.02**

**Building a Self-Driving Lab from Scratch** [Shijing Sun](#); University of Washington, United States

**9:30 AM \*MT02.04/MT01.04.03**

**Accelerating the Development of Electrolytes for Lithium Batteries with Self-Driving Labs** [Dong-Hwa Seo](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM \*MT02.04/MT01.04.04**

**Designing Experiment Workflows to Inform and Evaluate Computation Models** [John M. Gregoire](#)<sup>1,2</sup>, Joel Haber<sup>1</sup>, Dan Guevarra<sup>1</sup>, Lan Zhou<sup>1</sup>, Kevin Kan<sup>1</sup>, Ryan Jones<sup>1</sup>, Yungchieh Lai<sup>1</sup>, Michael Statt<sup>3</sup>, Brian Rohr<sup>3</sup>, Ja'Nya Breedon<sup>1</sup> and Santosh Suram<sup>4</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>Flagship Labs 97, Inc., United States; <sup>3</sup>Modelyst, United States; <sup>4</sup>Toyota Research Institute, United States

**11:00 AM ^MT02.04/MT01.04.05**

**Expanding Synthesizable Battery Materials Through Computation, Theory and Automation-Integrated Synthesis Platforms** [Yan Zeng](#); Florida State University, United States

**11:30 AM \*MT02.04/MT01.04.06**

**Towards Automated Materials Discovery for Next-Generation Batteries** [Yan Eric Wang](#); Samsung Advanced Institute of Technology-America, United States

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT01.05: High-Throughput Experiments and Characterizations

Session Chairs: Guoxiang (Emma) Hu and Haegyeom Kim

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 424

**1:30 PM \*MT01.05.01**

**High-Throughput Battery Material Data Supplemented by Machine-Learning Algorithms** [Eric McCalla](#); McGill University, Canada

**2:00 PM MT01.05.02**

**Selection of the Frequencies for Impedance Measurements on Batteries and Fuel Cells Using the Distribution of Relaxation Times, Gaussian Processes and Optimal Experimental Design** [Baptiste D. Py](#)<sup>1</sup> and Francesco Ciucci<sup>2,2</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>University of Bayreuth, Germany

**2:15 PM MT01.05.03**

**Machine Learning-Aided Multimodal Spectroscopy for Advanced Local Structure Characterization** [Haili Jia](#)<sup>1</sup>, Gihyeok Lee<sup>2</sup>, Miaofang Chi<sup>3</sup>, Wanli Yang<sup>2</sup> and Maria K. Chan<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Duke University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*MT01.05.04**

**Combining Automated, *In Situ* Experiments with Machine Learning to Quantify the Dynamic Behavior of Halide Perovskites** [Marina S. Leite](#); University of California, Davis, United States

**4:00 PM MT01.05.05**

**An Open Access Digital Twin to Support High-Throughput Experiments on New Materials** Lena A. Mittmann<sup>1</sup>, Hampus Näsström<sup>2</sup>, Jose Marquez Prieto<sup>2</sup>, Javier Sanz Rodrigo<sup>1</sup>, Eugène Bertin<sup>1</sup> and [Andrea Crovetto](#)<sup>1</sup>; <sup>1</sup>Technical University of Denmark, Denmark; <sup>2</sup>Humboldt-Universität zu Berlin, Germany

**4:15 PM MT01.05.06**

**Uncertainty-Aware Simulation-to-Experiment Modeling with Application in High-Throughput Materials Characterization** [Jie Chen](#)<sup>1</sup>, Timothy Long<sup>2</sup>, Michael Wall<sup>2</sup>, Todd C. Hufnagel<sup>2</sup> and Wei Chen<sup>3</sup>; <sup>1</sup>Virginia Tech, United States; <sup>2</sup>Johns Hopkins University, United States; <sup>3</sup>Northwestern University, United States

**4:30 PM \*MT01.05.07**

**Optimization of Colloidal Nanomaterials Synthesis with AI-Driven Experiments and Accessible Automation** Brenden Pelkie, Zachery R. Wylie, Abdul Moez and [Lilo D. Pozzo](#); University of Washington, United States

SESSION MT01.06: Advanced AI/ML Techniques

Session Chairs: Nongnuch Artrith and Guoxiang (Emma) Hu

Thursday Morning, April 10, 2025

Summit, Level 4, Room 424

**9:00 AM \*MT01.06.01**

**AI-Assisted Self-Driving Experimentation for Energy Storage Materials Discovery and Development** [Wei Wang](#); Pacific Northwest National Laboratory, United States

**9:30 AM \*MT01.06.02**

**Machine Learning for Automated if Not Autonomous Electrochemistry** [Chong Liu](#); University of California, Los Angeles, United States

**10:00 AM BREAK**

**10:30 AM \*MT01.06.03**

**Scaling Up Computational Materials Discovery via Deep Learning** [Ekin Dogus Cubuk](#); Google, United States

**11:00 AM MT01.06.04**

**Automated 3D Segmentation of Refractory Material Microstructures Using Deep Learning for Improved Corrosion Resistance** Johan Moncoutie<sup>1</sup>, [Lalitha Raghavan](#)<sup>1</sup>, Deniz Cetin<sup>1</sup>, Darren Rogers<sup>1</sup>, Damien Bolore<sup>2</sup> and Sunhwi Bang<sup>1</sup>; <sup>1</sup>Saint-Gobain Research North America, United States; <sup>2</sup>Saint Gobain Research Provence, France

**11:15 AM MT01.06.05**

**Revolutionize SEM Characterization with AI-Powered Image Analysis Tool** Yanhui Hong, Yuzhi Zhang, [Ruyi Song](#), Dongxu Pan, Xi Chen, Guolin Ke and Linfeng Zhang; DP Technology, China

**11:30 AM MT01.06.06**

**Machine Learning to Extract Two-Dimensional Semiconductor Material Properties from Transistor Measurements** [Robert K. Bennett](#)<sup>1</sup>, Harmon F. Gault<sup>1</sup>, Asir Intisar Khan<sup>1</sup>, Kathryn Neilson<sup>1</sup>, Lauren Hoang<sup>1</sup>, Tara Pena<sup>1</sup>, Zhepeng Zhang<sup>1,2</sup>, Andrew J. Mannix<sup>1</sup> and Eric Pop<sup>1,1,1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

SESSION MT01.07: AI/ML-Accelerated Modeling

Session Chairs: Nongnuch Artrith and Guoxiang (Emma) Hu

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 424

**1:30 PM \*MT01.07.01**

**Generalizability, Data Diversity and Representation in Microstructure-Property Mapping** [Olga Wodo](#); University at Buffalo, The State University of New York, United States

**2:00 PM MT01.07.02**

**Microstructure Evolution, the Influence on Material Properties and the Optimized Processing Parameters Search in Additive Manufacturing** [Wei Huang](#); Georgia Institute of Technology, United States

**2:15 PM MT01.07.03**

**A Unique Authenticator for Additively Manufactured Parts Derived from Their Microstructure** Kanhaiya Gupta, Konstantin Poka, Alexander Ulbricht and [Anja Waske](#); BAM, Germany

**2:30 PM \*MT01.07.04**

**An Extreme-Scale Multi-Fidelity Computational Active Learning Paradigm Towards Realizing Autonomous Synthesis** [Panchapakesan Ganesh](#); Oak Ridge National Laboratory, United States

**3:00 PM BREAK**

**3:30 PM MT01.07.05**

**Machine Learning Potential for Modeling Fracture in 2D High-Entropy VTiCrMoC3 MXenes** [Daniel Ocampo](#)<sup>1</sup>, Reza Namakian<sup>1</sup>, Fei Shuang<sup>2</sup>, Jianyu Dai<sup>1</sup>, Chenglin Wu<sup>1</sup> and Wei Gao<sup>1,1</sup>; <sup>1</sup>Texas A&M University, United States; <sup>2</sup>Delft University of Technology, Netherlands

**3:45 PM MT01.07.06**

**Synthesis of Novel Rare-Earth MXenes Using Density Functional Theory and Optimal Experiment Design** [Kat Nykiel](#), Annabelle Bedford, Babak Anasori and Alejandro Strachan; Purdue University, United States

4:00 PM MT01.07.07

**Multi-Scale Simulation of GaN Alkaline Wet Etching Leveraging a Machine Learning Potential** [Purun-hanul Kim](#)<sup>1</sup>, Jeongmin Choi<sup>1</sup>, Youngho Kang<sup>2</sup> and Seungwu Han<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Incheon National University, Korea (the Republic of)

# SYMPOSIUM MT02

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Accelerated Material Discovery—Data-Driven Discovery, High-Throughput Experimentation and Autonomous Laboratories  
April 7 - April 11, 2025

## Symposium Organizers

Chris Bartel, University of Minnesota  
Ling Chen, Toyota North America  
Eric McCalla, McGill University  
Bin Ouyang, Florida State University

## Symposium Support

### **Bronze**

GE Vernova's Advanced Research Center

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT02.01: Bridging Experiment and Theory: Automated Workflow and Beyond

Session Chairs: Ling Chen and Sheng Gong

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 423

10:30 AM MT02.01.01

**Autonomous, Cloud-Based Machine-Learning-Guided Optical Evaluation of Durability of Oxygen Evolution Reaction (OER) Electrocatalysts** [Joel Haber](#)<sup>1</sup>, Dan Guevarra<sup>1</sup>, Ryan Jones<sup>1</sup>, John M. Gregoire<sup>1</sup>, Willie Neiswanger<sup>2</sup>, Michael Statt<sup>3</sup>, Brian Rohr<sup>3</sup>, Kevin Tran<sup>4</sup> and Santosh Suram<sup>4</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>University of Southern California, United States; <sup>3</sup>Modelyst, United States; <sup>4</sup>Toyota Research Institute, United States

10:45 AM MT02.01.02

**Data Infrastructure for Automated Labs and Framework for Interpretation of Characterization Results** [Olympia Dartsis](#)<sup>1</sup>, Bernardus Rendy<sup>1,2</sup>, Yuxing Fei<sup>1,2</sup>, Andrea Giunto<sup>1</sup>, Patrick Huck<sup>1</sup>, Gerbrand Ceder<sup>1,2</sup> and Anubhav Jain<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

11:00 AM MT02.01.03

**A Data-Driven Approach for the Guided Regulation of Exposed Facets in Nanoparticles** [Zihao Ye](#), Bo Shen, Dohun Kang, Christopher Wolverton and Chad A. Mirkin; Northwestern University, United States

11:15 AM MT02.01.04

**A Vision for a Modular Autonomous Research Ecosystem** [Howie Joross](#), Zachary Trautt, Austin McDannald, Brian L. DeCost, Aaron Gilad Kusne and Francesca Tavazza; National Institute of Standards and Technology, United States

11:30 AM MT02.01.05

**Differentiable Modeling Enabled Autonomous Experimentation for Engineering Soft-Matter** [Kiran Vaddi](#), Huat Thart Chiang, Aleksandra H. Grey and Lilo D. Pozzo; University of Washington, United States



**11:45 AM MT02.01.06**

**Model Based Predictive Control of Thin Film Synthesis with Pulsed Laser Deposition** [Sumner B. Harris](#)<sup>1</sup>, Ruth Fajardo<sup>2</sup>, Alexander Puretzky<sup>1</sup>, Feng Bao<sup>2</sup>, Kai Xiao<sup>1</sup> and Rama Vasudevan<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>Florida State University, United States

SESSION MT02.02: Foundation AI, LLM and Generative AI

Session Chairs: Chris Bartel and Bin Ouyang

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 423

**1:30 PM MT02.02.01**

**DiffuSyn—Chemically-Guided Generative Diffusion Model Enables Zeolite Synthesis Planning** [Elton Pan](#)<sup>1</sup>, Soonhyoung Kwon<sup>1</sup>, Sulin Liu<sup>1</sup>, Mingrou Xie<sup>1</sup>, Yifei Duan<sup>1</sup>, Thorben Prein<sup>2</sup>, Killian Sheriff<sup>1</sup>, Yuriy Roman-Leshkov<sup>1</sup>, Manuel Moliner<sup>3</sup>, Rafael Gomez-Bombarelli<sup>1</sup> and Elsa Olivetti<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Technische Universität München, Germany; <sup>3</sup>Universitat Politècnica de València, Spain

**1:45 PM MT02.02.02**

**A Generative Initialization Strategy for Genetic Algorithms for Crystal Structure Prediction** [Sam Dong](#), Ajinkya Hire, Jason B. Gibson and Richard Hennig; University of Florida, United States

**2:00 PM \*MT02.02.03**

**Scaling Up Deep Learning for Computational Materials Discovery** [Ekin Dogus Cubuk](#); Google, United States

**2:30 PM BREAK**

**3:00 PM \*MT02.02.04**

**MatterGen—A Generative Model for Inorganic Materials Design** [Tian Xie](#); Microsoft Research, United Kingdom

**3:30 PM MT02.02.05**

**Towards Material Design with AI Foundation Models—Ligand Selection for Better LED Materials and Gas Absorption Prediction** Xi Chen, Dongxu Pan, [Ruyi Song](#), Zhifeng Gao, Linfeng Zhang, Guolin Ke and Hang Zheng; DP Technology, China

**3:45 PM \*MT02.02.06**

**Machine Learning Force Field Framework for Liquid Electrolyte** [Sheng Gong](#); ByteDance Inc, United States

**4:15 PM \*MT02.02.07**

**Accelerating the Discovery of New Materials Using Materials Informatics Techniques in Solid-State Batteries** [Hisatsugu Yamasaki](#); Toyota Motor Corporation, Japan

SESSION MT02.03: Poster Session: Data Science and High Throughput Experiments and Theory

Session Chairs: Ling Chen and Bin Ouyang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**MT02.03.01**

**Unraveling Complexities of Nanostructured Sol-Gel SiO<sub>2</sub> Synthesis with Automation and ML-Accelerated Experimentation** [Brenden Pelkie](#), Chi Y. Yung and Lilo D. Pozzo; University of Washington, United States

**MT02.03.02**

**3D CNN-Driven Accelerated Exploration of Over 2 Million High Entropy Over-Lithiated Layered Oxides** [Juo Kim](#), Seoungpyo Kang and Kyoungmin Min; Soongsil University, Korea (the Republic of)

**MT02.03.03**

**User-Centric Machine Learning-Assisted Non-Destructive Prediction of Lithium-Ion Battery** [Seveon Shin](#), Chihyun Nam and Jongwoo Lim; Seoul National University, Korea (the Republic of)

**MT02.03.04**

**Exploring Oxide Solid Electrolytes with Corner-Sharing Frameworks Using a Topology-Based Crystal Structure Prediction Method** [Seungwoo Hwang](#)<sup>1</sup>, Jiho Lee<sup>1</sup>, Youngho Kang<sup>2</sup>, Seungwu Han<sup>1</sup> and Sungwoo Kang<sup>3</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Incheon National University, Korea (the Republic of); <sup>3</sup>Korea Institute of Science and Technology, Korea (the Republic of)

**MT02.03.05**

**AI-Assisted Superconductor Discovery—Reducing Computational Bottlenecks with Machine Learning** [Jason B. Gibson](#)<sup>1</sup>, Ajinkya Hire<sup>1</sup>, Benjamin Geisler<sup>1</sup>, Phil Dee<sup>2</sup>, Peter Hirschfeld<sup>1</sup> and Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**MT02.03.06**

**High-Throughput Synthesis of Nano-Structured Metal Oxides Using Small Angle X-Ray Scattering (SAXS) and UV-Vis** [Abdul Moez](#) and Lilo D. Pozzo; University of Washington, United States

**MT02.03.07**

**High-Throughput Discovery of Vanadium Oxysulfide Complexes—A Novel Laser-Assisted Molten Salt and Electrochemical Synthesis Approach** [Pradyumna Kumar Chand](#)<sup>1,1,2</sup>, Wei-Ssu Liao<sup>1</sup>, Ya-Ping Hsieh<sup>2</sup> and Mario Hofmann<sup>1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan

**MT02.03.08**

**Autonomous Learning Across Heterogenous, Low-Cost, Modular Self-Driving Labs** [Ryan Y. Kim](#)<sup>1,2</sup>, Haotong Liang<sup>1</sup>, William Lambert<sup>3</sup>, Suerken Matsuyama<sup>1</sup>, Ichiro Takeuchi<sup>1</sup> and Aaron Gilad Kusne<sup>2,1</sup>; <sup>1</sup>University of Maryland, United States; <sup>2</sup>National Institute of Standards and Technology, United States; <sup>3</sup>St. Mary's College of Maryland, United States

**MT02.03.09**

**Machine Learning Pipeline for Novel High Entropy Carbides** [Ishan Fernando](#) and Yang Hao; Queen Mary University of London, United Kingdom

**MT02.03.10**

**Searching for Infra-Red Detector Materials Using High-Throughput Computing** [Hamza AlHasam](#)<sup>1</sup>, Andrew Pike<sup>1</sup>, Wei Chen<sup>2</sup>, Jifeng Liu<sup>1</sup> and Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Université Catholique de Louvain, Belgium

**MT02.03.11**

**Metal-Organic Frameworks for Water Harvesting—Large-Scale Molecular Simulations and Development of Predictive Machine Learning Models** Zhi-Xun Xu<sup>1</sup>, Yi-Ming Wang<sup>1</sup>, Shiue-Min Shih<sup>1</sup> and [Li-Chiang Lin](#)<sup>1,2</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>The Ohio State University, United States

**MT02.03.12**

**UF3 Machine Learning Interatomic Potential Assisted Study for Diffusion Pathways of Xenon Through Zeolites for Radionuclide Application.** [Soham K. Savarkar](#)<sup>1</sup>, Preston Vargas<sup>2</sup>, Richard Hennig<sup>1</sup> and Juan Nino<sup>1</sup>; <sup>1</sup>University of Florida, United States; <sup>2</sup>Sandia National Laboratories, United States

**MT02.03.13**

**Development of a High-Throughput Workflow of Mechanoredox Free Radical Polymerization** [Christopher Gould](#); University of Washington, United States

**MT02.03.14**

**Structural Transformations in Flash Annealed Ultra-Thin HZO Thin Films via Time-Resolved Synchrotron Grazing Incidence X-Ray Diffraction** [Cristian Ruano Arens](#)<sup>1</sup>, Balreen Saini<sup>1</sup>, Vivek Thampy<sup>2</sup>, Douglas Van Campen<sup>2</sup>, John Baniecki<sup>2</sup> and Paul C. McIntyre<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**MT02.03.15**

**A Physics-Informed Active Learning Framework for Accelerated Materials Discovery** [Maitreyye Sharma Priyadarshini](#)<sup>1,2</sup>, Eddie Gienger<sup>3</sup>, Jarett Ren<sup>1</sup> and Paulette Clancy<sup>1</sup>; <sup>1</sup>Johns Hopkins University, United States; <sup>2</sup>Virginia Tech, United States; <sup>3</sup>Applied Physics Laboratory, Johns Hopkins University, United States

**MT02.03.16**

**NN-AE-VQE—Neural Network Parameter Prediction on Autoencoded Variational Quantum Eigensolvers** Koen Meesman, [Yinglu Tang](#), Matthias Moller, Sebastian Feld and Boyang Chen; TU Delft, Netherlands

**MT02.03.17**

**Finite Temperature Materials Informatics for Ultra-High Temperature Ceramics Using Small-Cell Methods** Philip Wurzner<sup>1</sup>, Matthias Moller<sup>1</sup>, Boyang Chen<sup>1</sup>, Sebastian Feld<sup>1</sup>, Qijun Hong<sup>2</sup> and Yinglu Tang<sup>1</sup>; <sup>1</sup>TU Delft, Netherlands; <sup>2</sup>Arizona State University, United States

**MT02.03.18**

**Accelerated Discovery of Cost-effective Photoabsorber Materials for Near-infrared ( $\lambda=1600$  nm) Photodetector Applications** Wayne Zhao<sup>1,2</sup>, Ruoxi Yang<sup>2</sup>, Aaron Kaplan<sup>2</sup> and Kristin A. Persson<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**MT02.03.19**

**Autonomous Catalyst Explorer—Accelerating Data-Driven Optimization of Electrocatalysts for Electrochemical CO<sub>2</sub> Reduction** Yi-An Lai<sup>1,2</sup>, Muxin Xiong<sup>1</sup>, Aijian Huang<sup>1</sup>, Yaming Hao<sup>1</sup>, Hao Ming Chen<sup>2</sup>, Matthew J. Nava<sup>1</sup> and Chong Liu<sup>1</sup>; <sup>1</sup>University of California, Los Angeles, United States; <sup>2</sup>National Taiwan University, Taiwan

**MT02.03.20**

**Leveraging Physics-Based Machine Vision for Defect Characterization in Additively Manufactured Steels** Can Uysale<sup>1</sup>, Jackelin Cotrina<sup>1</sup>, Elisa Torresani<sup>2</sup> and Maziar Ghazinejad<sup>1</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>San Diego State University, United States

**MT02.03.21**

**Artificial Intelligence-Assisted Bandgap Prediction and Mechanistic Analysis in Hybrid Perovskites** Bonghyun Jo<sup>1,2</sup> and Wenning Chen<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>SKKU Institute of Energy Science and Technology, Korea (the Republic of)

**MT02.03.22**

**Establishing Trust in Automation by Validating the Transfer of Perovskite Functional and Structural Properties Across Scales** Kanokwan Tungkitkancharoen<sup>1</sup>, Alexander E. Siemenn<sup>1</sup>, Basita Das<sup>1</sup>, Fang Sheng<sup>1</sup>, Eunice Aissi<sup>1</sup>, Hamide Kavak<sup>2</sup> and Tonio Buonassisi<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Çukurova University, Turkey

**MT02.03.23**

**Predicting Glass Transition Temperatures of Polymers Using Machine Learning** Sally Han<sup>1</sup> and Clarise Han<sup>2</sup>; <sup>1</sup>High School, United States; <sup>2</sup>Massachusetts Institute of Technology, United States

**MT02.03.24**

**Accelerated Prediction for High Ion Conductivity of Solid States Electrolytes Using Elemental Features via Large Language Models(LLMs) and Machine Learning** Younsoo Kim, Maciej P. Polak and Dane Morgan; University of Wisconsin-Madison, United States

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT02.04/MT01.04: Joint Session: Advances of Lab Automation

Session Chairs: Guoxiang (Emma) Hu and Eric McCalla

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 423

**8:30 AM \*MT02.04/MT01.04.01**

**AI-Ready Microscopy and Spectroscopy Data for Autonomous Laboratory** Maria K. Chan; Argonne National Laboratory, United States

**9:00 AM \*MT02.04/MT01.04.02**

**Building a Self-Driving Lab from Scratch** Shijing Sun; University of Washington, United States

**9:30 AM \*MT02.04/MT01.04.03**

**Accelerating the Development of Electrolytes for Lithium Batteries with Self-Driving Labs** Dong-Hwa Seo; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM \*MT02.04/MT01.04.04**

**Designing Experiment Workflows to Inform and Evaluate Computation Models** [John M. Gregoire](#)<sup>1,2</sup>, Joel Haber<sup>1</sup>, Dan Guevarra<sup>1</sup>, Lan Zhou<sup>1</sup>, Kevin Kan<sup>1</sup>, Ryan Jones<sup>1</sup>, Yungchieh Lai<sup>1</sup>, Michael Statt<sup>3</sup>, Brian Rohr<sup>3</sup>, Ja'Nya Breedon<sup>1</sup> and Santosh Suram<sup>4</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>Flagship Labs 97, Inc., United States; <sup>3</sup>Modelyst, United States; <sup>4</sup>Toyota Research Institute, United States

**11:00 AM ^MT02.04/MT01.04.05**

**Expanding Synthesizable Battery Materials Through Computation, Theory and Automation-Integrated Synthesis Platforms** [Yan Zeng](#); Florida State University, United States

**11:30 AM \*MT02.04/MT01.04.06**

**Towards Automated Materials Discovery for Next-Generation Batteries** [Yan Eric Wang](#); Samsung Advanced Institute of Technology-America, United States

SESSION MT02.05: Inclusion of Domain Knowledge, and Physical Theory in Machine Learning

Session Chairs: Chris Bartel and Ling Chen

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 423

**1:30 PM \*MT02.05.01**

**Automated Phase Mapping of High Throughput X-Ray Diffraction Data Encoded with Domain-Specific Materials Science Knowledge** Dongfang Yu<sup>1</sup>, Sean Greisemer<sup>2</sup>, Tzu-chen Liu<sup>2</sup>, [Christopher Wolverton](#)<sup>2</sup> and Yizhou Zhu<sup>1</sup>; <sup>1</sup>Westlake University, China; <sup>2</sup>Northwestern University, United States

**2:00 PM MT02.05.02**

**The Impact of Domain Knowledge on Universal Models for Predicting High Entropy Materials** [Lin Wang](#) and Bin Ouyang; Florida State University, United States

**2:15 PM MT02.05.03**

**XQuerier—Intelligent Phase Identification for Powder X-Ray Diffraction** [Cao Bin](#); Hong Kong University of Science and Technology (Guangzhou), China

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*MT02.05.04**

**Incorporating Crystallographic Symmetries into Probabilistic Learning Approaches for Materials—High-Accuracy Many Body Wave Functions and Generative Models for Inorganic Crystalline Solids** [Elif Ertekin](#); University of Illinois at Urbana-Champaign, United States

**4:00 PM +MT02.05.05**

**Methods for Generating Unbiased and Robust A.I.'s for Autonomous Materials** [Jason R. Hattrick-Simpers](#); University of Toronto, Canada

**4:30 PM MT02.05.06**

**Harnessing Quantum Chemical Bonding Analysis Descriptors for Material Property Predictions** [Aakash Ashok A. Naik](#)<sup>1,2</sup>, Nidal Dhamrait<sup>1</sup>, Philipp Benner<sup>1</sup>, Gian-Marco Rignanese<sup>3</sup> and Janine George<sup>1,2</sup>; <sup>1</sup>Federal Institute for Materials Research and Testing, Germany; <sup>2</sup>Friedrich Schiller University Jena, Germany; <sup>3</sup>Université Catholique de Louvain, Belgium

**4:45 PM MT02.05.07**

**Physics-Informed Machine Learning for Silicone Formulation Development** [Qingtao Cao](#), Sheng Zhao, Lalitha Raghavan and Ying Wang; Saint-Gobain Research North America, United States

SESSION MT02.06: Automated and High-Throughput Experiments I

Session Chairs: Eric McCalla and Yan Zeng

Thursday Morning, April 10, 2025

Summit, Level 4, Room 423

**8:30 AM MT02.06.01**

**Accelerated Screening of Evaporated Perovskite Thin-Films via Automated Characterization Platforms and Machine Learning Assisted Analysis** [Alexander Wieczorek](#)<sup>1</sup>, Austin Kuba<sup>2</sup>, Jan Sommerhäuser<sup>1</sup>, Luis N. Caceres<sup>1</sup>, Christian M. Wolff<sup>2</sup> and Sebastian Siol<sup>1</sup>; <sup>1</sup>Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland; <sup>2</sup>École Polytechnique Fédérale de Lausanne, Switzerland

**8:45 AM MT02.06.02**

**An Experimental, Computational and Data Platform to Enable Inverse Design of Semiconductors** Javier Sanz Rodrigo, Lena A. Mittmann, Eugène Bertin, Anat Itzhak and [Andrea Crovetto](#); Technical University of Denmark, Denmark

**9:00 AM \*MT02.06.03**

**AutoBot—Automated Thin Film Semiconductor Synthesis and Characterization Towards Closed Loop Platforms** [Carolyn M. Sutter-Fella](#); Lawrence Berkeley National Laboratory, United States

**9:30 AM BREAK**

**10:00 AM \*MT02.06.04**

**Self-Driving Labs for Semiconductors** [Tonio Buonassisi](#); Massachusetts Institute of Technology, United States

**10:30 AM \*MT02.06.05**

**Robot- and Machine-Learning-Accelerated Discovery of Complex Materials** [Emory Chan](#); Lawrence Berkeley National Laboratory, United States

**11:00 AM \*MT02.06.06**

**Polybot—An AI-Guided Robotic Laboratory Advancing Polymer Innovation for Sustainability** [Jie Xu](#); Argonne National Laboratory, United States

**11:30 AM \*MT02.06.07**

**Accelerated Battery Materials Discovery Through Ultrafast and Precise Synthesis** [Jiayu Wan](#); Shanghai Jiao Tong University, China

SESSION MT02.07: Automated and High-Throughput Experiments II

Session Chairs: Ling Chen and Jason Hattrick-Simpers

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 423

**1:30 PM MT02.07.01**

**Building Argonne's Autonomous Research Laboratory (AARL) for Advanced Scientific Exploration** [Lily Robertson](#), Ilya A. Shkrob, Ryan Lewis, Logan Ward, Tobias S. Ginsburg, Casey Stone and Noah H. Paulson; Argonne National Laboratory, United States

**1:45 PM MT02.07.02**

**A Data-Rich Self-Driving Fluidic Lab for Accelerated Development of Colloidal Quantum Dots** [Fernando Delgado-Licona](#), Abdulrahman Alsaiani, Phil Klem and Milad Abolhasani; North Carolina State University, United States

**2:00 PM MT02.07.03**

**Automated In *Operando* Experimental Analysis of Phase Evolution During Additive Manufacturing of Multiple-Principal Element Alloys** [Arun Devaraj](#), Bhuvaneshwari Vukkum, Tingkun Liu, Vinay Amatya, Harilal Sivanandan and Jan Strube; Pacific Northwest National Laboratory, United States

**2:15 PM MT02.07.04**

**Development of an Automated Laboratory for High-Throughput Characterization of Structural Materials for Extreme Environments** [Todd C. Hufnagel](#), Lori Graham-Brady, Jaafar A. El-Awady, David Elbert, Axel Krieger, K.T. Ramesh and Timothy P. Weihs; Johns Hopkins University, United States

**2:30 PM MT02.07.05**

**Data Driven Approach to Optimize the Morphology of Block Copolymer Thin Films** [Saroj Upreti](#)<sup>1</sup>, Bradley Lamb<sup>1</sup>, Yunfei Wang<sup>1</sup>, Daniel Struble<sup>1</sup>, Chenhui Zhu<sup>2</sup>, Paul Ashby<sup>2</sup>, Guillaume Freychet<sup>3</sup>, Wenjie Xia<sup>4</sup>, Derek Patton<sup>1</sup>, Boran Ma<sup>1</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Brookhaven National Laboratory, United States; <sup>4</sup>Iowa State University of Science and

Technology, United States

**2:45 PM MT02.07.06**

**Interrogating Electrochemical Doping in Organic Mixed Conductors Through a Robotic Platform Guided by Machine Learning** Garrett W. Collins and Connor G. Bischak; The University of Utah, United States

**3:00 PM BREAK**

**3:30 PM MT02.07.07**

**Machine Intelligence-Accelerated Discovery of All-Natural Plastic Substitutes for Sustainable Future** Po-Yen Chen; University of Maryland, College Park, United States

**3:45 PM MT02.07.08**

**DREAM—Data-Driven Reinvigorated Advanced Membrane Discovery Platform** Yunfei Wang<sup>1,2</sup>, Saroj Upreti<sup>1</sup>, Paul Ashby<sup>2</sup>, Daniel Struble<sup>1</sup>, Boran Ma<sup>1</sup>, Yi Liu<sup>2</sup>, Chenhui Zhu<sup>2</sup> and Xiaodan Gu<sup>1</sup>; <sup>1</sup>University of Southern Mississippi, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**4:00 PM MT02.07.09**

**Bayesian Optimization for Multi-Step Organic Flow Battery Batch Synthesis** Clara N. Tamura<sup>1</sup>, Heather Job<sup>2</sup>, Shijing Sun<sup>1</sup> and Yangang Liang<sup>2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

**4:15 PM MT02.07.10**

**High-Throughput Experimental Methodologies for Synthesizing Optimized High Surface Area Functionalized Nanomaterials in Parts-Per-Billion (PPB) Level Formaldehyde (CH<sub>2</sub>O) Gas Sensors** Michael B. Frank, Naeun Yang, Tabib Hossain and Moazzem Hossain; AtmoSense, Inc., United States

**4:30 PM MT02.07.11**

**Adapting the Jubilee Robot for Automated Dip Coating** Duke Vierra<sup>1</sup>, Matthew Nakamura<sup>1</sup>, Lilo D. Pozzo<sup>2</sup> and Joseph Brown<sup>1</sup>; <sup>1</sup>University of Hawaii at Manoa, United States; <sup>2</sup>University of Washington, United States

SESSION MT02.08: Advances in Machine Learning for Materials Discovery I

Session Chairs: Chris Bartel and Bin Ouyang

Friday Morning, April 11, 2025

Summit, Level 4, Room 423

**8:30 AM MT02.08.01**

**Framework for a High-Throughput Screening Method to Assess Polymer/Plasticizer Miscibility—The Case of Hydrocarbons in Polyolefins** Paola Carbone; The University of Manchester, United Kingdom

**8:45 AM MT02.08.02**

**Physics and Explainable Descriptor Informed Machine Learning Probing Lower Bound of Lattice Thermal Conductivity** Ming Hu; University of South Carolina, United States

**9:00 AM \*MT02.08.03**

**High-Throughput Simulations of Dielectric Properties Using Machine Learning** Ryoji Asahi and Alexander Kutana; Nagoya University, Japan

**9:30 AM \*MT02.08.04**

**Accelerating Electrolyte Discovery for Batteries** Chibueze Amanchukwu; University of Chicago, United States

**10:00 AM BREAK**

**10:30 AM \*MT02.08.05**

**Bridging the Gap Between Machine-Learning-Powered Simulations and Experiments for the Free Energies of Liquids and Solids** Vyacheslav Bryantsev, Luke D. Gibson and Rajni Chahal; Oak Ridge National Laboratory, United States

**11:00 AM \*MT02.08.06**

**Machine Learning Vacancy Formation Energy in Nickel-Based Superalloys** [Aditya Sundar](#) and Michael Gao; National Energy Technology Laboratory, United States

**11:30 AM \*MT02.08.07**

**Logical Design for Functional Luminescent Materials from Scratch Based on Quantum Chemical Calculation** [Kazuo Tanaka](#); Kyoto University, Japan

SESSION MT02.09: Advances in Machine Learning for Materials Discovery II

Session Chairs: Bin Ouyang and Lin Wang

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 423

**1:30 PM MT02.09.01**

**Integrating Graph Neural Networks and Many-Body Expansion Theory for Potential Energy Surfaces** [Siqi Chen](#)<sup>1</sup>, Zhiqiang Wang<sup>1,2</sup>, Xianqi Deng<sup>1,3</sup>, Yili Shen<sup>1,4</sup>, Cheng-Wei Ju<sup>1,5</sup>, Jun Yi<sup>1,6</sup>, Lin Xiong<sup>1</sup>, Guo Ling<sup>1</sup>, Dieaa Alhmoud<sup>1</sup>, Hui Guan<sup>1</sup> and Zhou Lin<sup>1,1</sup>; <sup>1</sup>University of Massachusetts Amherst, United States; <sup>2</sup>Florida Atlantic University, United States; <sup>3</sup>University at Albany, State University of New York, United States; <sup>4</sup>University of Notre Dame, United States; <sup>5</sup>The University of Chicago, United States; <sup>6</sup>Wake Forest University, United States

**1:45 PM MT02.09.02**

**Accelerated High-Throughput Screening for Solid-State Multivalent Conductors Using Machine Learning Interatomic Potentials** [Yunyeong Choi](#)<sup>1,2</sup>, Jiyeon Kim<sup>1,2</sup>, Qian Chen<sup>2</sup>, Kristin A. Persson<sup>1,2</sup> and Gerbrand Ceder<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**2:00 PM MT02.09.03**

**Prediction of High-Frequency Dielectric Properties of Polymers Using Molecular Dynamics Simulations** [Masato Ohnishi](#)<sup>1</sup>, Koki Kitai<sup>2</sup>, Yuta Yoshimoto<sup>2</sup>, Yoshihiro Hayashi<sup>1</sup>, Ryo Yoshida<sup>1</sup> and Junichiro Shiomi<sup>2</sup>; <sup>1</sup>The Institute of Statistical Mathematics, Japan; <sup>2</sup>The University of Tokyo, Japan

**2:15 PM MT02.09.04**

**Accelerating Optimization of Composite Material Formulations Having Best Property Through AI Models and Quasi-Quantum Computing Methods** [Yoshishige Okuno](#), Kohsuke Kakuda and Suguru Sakaguchi; Resonac Corporation, Japan

**2:30 PM MT02.09.05**

**High-Throughput Virtual Screening for Organic Electronics—Experimental Benchmarks** [Alessandro Troisi](#); University of Liverpool, United Kingdom

**2:45 PM BREAK**

**3:15 PM MT02.09.06**

**Quantum Kernel Machine Learning for Autonomous Materials Science** [Felix Adams](#)<sup>1</sup>, Ichiro Takeuchi<sup>1</sup>, Aaron Gilad Kusne<sup>2,1</sup>, Daiwei Zhu<sup>3</sup> and David Steuerman<sup>3</sup>; <sup>1</sup>University of Maryland, United States; <sup>2</sup>National Institute of Standards and Technology, United States; <sup>3</sup>IonQ, United States

**3:30 PM MT02.09.07**

**Data-Driven Discovery of Non-Aqueous Proton Conductors for Polymer Electrolytes Using Density Functional Theory** [Yifan Liu](#)<sup>1</sup>, Debjyoti Bhattacharya<sup>2</sup>, Wesley Reinhart<sup>2</sup> and Valentino R. Cooper<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>The Pennsylvania State University, United States

**3:45 PM MT02.09.08**

**From Atoms to Materials—Rapid Design of High-Performing MOFs with Minimal Input Information** [Nicole Beaugerard](#) and Ranjan Srivastava; University of Connecticut, United States

**4:00 PM MT02.09.09**

**Leveraging Deep Learning to Predict Defect Formation Energy in Semiconducting Materials** [Savyasanchi Aggarwal](#)<sup>1,2</sup>, Seán R. Kavanagh<sup>3</sup>, Kedar Hippalgaonkar<sup>2,4</sup> and David Scanlon<sup>5</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>Agency for Science Technology and Research (A\*STAR), Singapore; <sup>3</sup>Harvard University Center for the Environment, United States; <sup>4</sup>Nanyang Technological University, Singapore; <sup>5</sup>University of Birmingham, United Kingdom

4:15 PM MT02.09.10

**Learning Physics-Based Interatomic Potentials for Alloys Using Reinforcement Learning-Driven Symbolic Regression** [Bilvin Varughese](#)<sup>1,2</sup>, Aditya Koneru<sup>1,2</sup>, Adil Muhammed<sup>1,2</sup>, Sukriti Manna<sup>2,1</sup>, Troy D. Loeffler<sup>2</sup>, Rohit Batra<sup>2</sup>, Henry Chan<sup>2</sup> and Subramanian K. Sankaranarayanan<sup>1,2</sup>; <sup>1</sup>University of Illinois at Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States

## SYMPOSIUM MT03

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Harnessing Data-Centric Strategies for Materials by Design

April 9 - April 11, 2025

### Symposium Organizers

James Chapman, Boston University

Victor Fung, Georgia Institute of Technology

Tuan Anh Pham, Lawrence Livermore National Laboratory

Qian Yang, University of Connecticut

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT03.01: Physics-Aware Machine Learning for Inorganic Materials

Session Chairs: James Chapman, Arun Kumar Mannodi-Kanakkithodi and Qian Yang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 422

10:00 AM ^MT03.01.01

**Vendi Scoring for Materials Discovery** [Adji Bouso Dieng](#); Princeton University, United States

10:30 AM \*MT03.01.02

**Design of Novel Materials Using Machine Learning** [Saryu Fensin](#); Los Alamos National Laboratory, United States

11:00 AM MT03.01.03

**Unveiling Solvation Structure Dynamics in Lithium-Ion Battery Electrolytes Through Enhanced Sampling and Machine Learning** [Xiaoxu Ruan](#)<sup>1</sup>,

Fabrice Roncoroni<sup>2</sup>, David Prendergast<sup>2</sup> and Tod Pascal<sup>1</sup>; <sup>1</sup>University of California, San Diego, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

11:15 AM MT03.01.04

**Rational Computational Design of Next-Generation Semiconductors** [Arun Kumar Mannodi-Kanakkithodi](#); Purdue University, United States

11:30 AM \*MT03.01.05

**Physics-Based and Data-Driven ICME for Metal Additive Manufacturing—From Feedstock to Process Optimization** [Jinhui Yan](#); University of Illinois at Urbana-Champaign, United States

SESSION MT03.02: Building Machine Learning Models Using Atomistic Data

Session Chairs: Kyle Bushick, Victor Fung and Tuan Anh Pham



Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 422

**1:30 PM \*MT03.02.01**

**NOMAD—A Platform for Accelerating Research** [Claudia Draxl](#) and Jose Marquez; Humboldt-Universität zu Berlin, Germany

**2:00 PM MT03.02.02**

**Teacher-Student Training Improves Accuracy and Efficiency of Machine Learning Interatomic Potentials** [Sakib Matin](#)<sup>1</sup>, Alice E. Allen<sup>1</sup>, Emily Shinkle<sup>1</sup>, Yulia Pimonova<sup>1</sup>, Aleksandra Pachalieva<sup>1</sup>, Galen Craven<sup>1</sup>, Benjamin Nebgen<sup>1</sup>, Justin Smith<sup>2</sup>, Richard Messerly<sup>1</sup>, Ying Wai Li<sup>1</sup>, Sergei Tretiak<sup>1</sup>, Kipton Barros<sup>1</sup> and Nicholas Lubbers<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>Nvidia, United States

**2:15 PM MT03.02.03**

**Orchestrating Interatomic Potential Training and Analysis** [Kyle Bushick](#)<sup>1</sup>, Joshua Vita<sup>1</sup>, Fikret Aydin<sup>1</sup>, Nathan Keilbart<sup>1</sup>, Logan Williams<sup>1</sup>, Eric Fuemmeler<sup>2</sup>, Amit Gupta<sup>2</sup>, Claire Waters<sup>2</sup>, Ilia Nikiforov<sup>2</sup>, Yonatan Kurniawan<sup>3</sup>, Ellad B. Tadmor<sup>2</sup>, Tomas Oppelstrup<sup>1</sup> and Vincenzo Lordi<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>University of Minnesota, United States; <sup>3</sup>Brigham Young University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION MT03.03: Machine Learning for Atomistic Materials Properties

Session Chairs: Victor Fung, Tuan Anh Pham and Qian Yang

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 422

**4:00 PM MT03.03.01**

**Learning Interatomic Potentials from First Principles Data Using Symbolic Regression** [Bilvin Varughese](#)<sup>1,2</sup>, Aditya Koneru<sup>1,2</sup>, Adil Muhammed<sup>1,2</sup>, Sukriti Manna<sup>2,1</sup>, Troy D. Loeffler<sup>2</sup>, Rohit Batra<sup>2</sup> and Subramanian K. Sankaranarayanan<sup>1,2</sup>; <sup>1</sup>University of Illinois at Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States

**4:15 PM MT03.03.02**

**Designing Metal-Organic Frameworks for Water Adsorption using Monte Carlo and Machine Learning Interatomic Potentials** [Samuel M. Greene](#), Rushil Randhar and Donald Siegel; The University of Texas at Austin, United States

**4:30 PM MT03.03.03**

**Machine Learning-Driven Closed-Loop Discovery of Hard Multiple Principal Element Alloys** [Maitreyee Sharma Priyadarshini](#)<sup>1</sup>, Eddie Gienger<sup>2</sup>, Jarett Ren<sup>3</sup> and Paulette Clancy<sup>3</sup>; <sup>1</sup>Virginia Tech, United States; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory, United States; <sup>3</sup>Johns Hopkins University, United States

SESSION MT03.04: Incorporating Physics Into AI Design Paradigms

Session Chairs: Markus Buehler, Victor Fung and Qian Yang

Thursday Morning, April 10, 2025

Summit, Level 4, Room 422

**8:15 AM MT03.04.01**

**Physics-Based Long-Range Equivariant Interatomic Potentials** [Zeeshan Ahmad](#) and Moin Uddin Maruf; Texas Tech University, United States

**8:30 AM +MT03.04.02**

**Physics-Aware Agentic Artificial Intelligence to Connect Scales, Disciplines and Modalities for Materials-by-Design** [Markus J. Buehler](#); Massachusetts Institute of Technology, United States

**9:00 AM MT03.04.03**

**Active and Transfer Learning with Bayesian Neural Networks for Materials** [Sarah Allec](#) and Maxim Ziatdinov; Pacific Northwest National Laboratory, United States

**9:15 AM MT03.04.04**

**Physics-Inspired Augmentation of Equivariant Graph Neural Networks for Modeling Quantum Confinement** [Krishnakumar S. Bhattaram](#)<sup>1</sup>, Pratik Brahma<sup>1</sup>, Jack Broad<sup>2</sup>, Sinead M. Griffin<sup>2</sup> and Sayeef Salahuddin<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**9:30 AM MT03.04.05**

**Predicting Magnetic Properties of van der Waals Magnets Using Graph Neural Networks** Peter Minch<sup>1</sup>, Romakanta Bhattarai<sup>1</sup>, Kamal Choudhary<sup>2</sup> and [Trevor David Rhone](#)<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute, United States; <sup>2</sup>National Institute of Standards and Technology, United States

**9:45 AM BREAK**

SESSION MT03.05: Interpretable Machine Learning for Materials Discovery

Session Chairs: James Chapman, Victor Fung, Tuan Anh Pham and Qian Yang

Thursday Morning, April 10, 2025

Summit, Level 4, Room 422

**10:30 AM \*MT03.05.01**

**Open Materials Generation (OMG)—Open-Source Generative AI for Crystalline Material Discovery** [Ellad B. Tadmor](#)<sup>1</sup>, Tom Egg<sup>2</sup>, Eric Fuemmeler<sup>1</sup>, Amit Gupta<sup>1</sup>, Philipp Hoellmer<sup>2</sup>, Maya Martirosyan<sup>2</sup>, Pawan Prakash<sup>3</sup>, Gregory Wolfe<sup>2</sup>, Adrian Roitberg<sup>3</sup>, Huzefa Rangwala<sup>4</sup>, George Karypis<sup>1</sup>, Mingjie Liu<sup>3</sup>, Mark Transtrum<sup>5</sup>, Richard Hennig<sup>3</sup> and Stefano Martiniani<sup>2</sup>; <sup>1</sup>University of Minnesota, United States; <sup>2</sup>New York University, United States; <sup>3</sup>University of Florida, United States; <sup>4</sup>Amazon Web Services, United States; <sup>5</sup>Brigham Young University, United States

**11:00 AM MT03.05.02**

**Machine Learning-Driven Prediction of Yield Strength in High Entropy Alloys Based on Composition** [Seungtae Lee](#), Yoonmook Kang, Hae-Seok Lee and Donghwan Kim; Korea University, Korea (the Republic of)

**11:15 AM MT03.05.03**

**Deep Learning Reveals Key Predictors of Thermal Conductivity in Covalent Organic Frameworks** Prakash Thakolkaran<sup>1</sup>, [Yiwen Zheng](#)<sup>2</sup>, Yaqi Guo<sup>1</sup>, Aniruddh Vashisth<sup>2</sup> and Siddhant Kumar<sup>1</sup>; <sup>1</sup>Delft University of Technology, Netherlands; <sup>2</sup>University of Washington, United States

**11:30 AM \*MT03.05.04**

**Interpretable AI for Materials Optimization with Active Learning** [Milica Todorovic](#); University of Turku, Finland

SESSION MT03.06: Intuitive Featurizations for Domain-Specific Problems

Session Chairs: James Chapman, Victor Fung and Qian Yang

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 422

**1:30 PM \*MT03.06.01**

**In Pursuit of Happiness—Designing Materials Under Coexisting Uncertainties** [Ramin Bostanabad](#); University of California, Irvine, United States

**2:00 PM MT03.06.02**

**Machine Learning Prediction of Chemical Resistance of Resin Materials Based on Crystallinity** [Shogo Kunieda](#)<sup>1</sup>, Mitsuru Yambe<sup>1</sup>, Takeru Nakamura<sup>1</sup>, Yosuke Hanawa<sup>1</sup>, Shunya Sugiyama<sup>2</sup>, Toshiaki Shintani<sup>2</sup>, Hitoshi Kamijima<sup>2</sup>, Yoshihiro Hayashi<sup>3</sup> and Ryo Yoshida<sup>3</sup>; <sup>1</sup>SCREEN Holdings. Co., Ltd., Japan; <sup>2</sup>Research Institute of Systems Planning, Inc., Japan; <sup>3</sup>The Institute of Statistical Mathematics, Japan

**2:15 PM MT03.06.03**

**Enhancing Graph-Neural-Network Prediction of Defect Formation Energies—Using Transfer Learning on Large Datasets of Crystal Formation Energies** Justin M. Garrigus<sup>1</sup>, Thomas Bouchard<sup>2</sup>, Angela Zhang<sup>3</sup>, Fatimah F. Habis<sup>1</sup> and Yuanxi Wang<sup>1</sup>; <sup>1</sup>University of North Texas, United States; <sup>2</sup>Austin Peay State University, United States; <sup>3</sup>The University of Texas at Austin, United States

**2:30 PM MT03.06.04**

**Forecasting Battery Degradation Trajectory Under Domain Shift with Domain Generalization** Ruifeng Tan<sup>1,2,3</sup>, Xibin Lu<sup>1,3,4</sup>, Minhao Cheng<sup>3</sup>, Jia Li<sup>1,3,2</sup>, Jiaqiang Huang<sup>1,3,2</sup> and Tongyi Zhang<sup>1,2</sup>; <sup>1</sup>The Hong Kong University of Science and Technology (Guangzhou), China; <sup>2</sup>Guangzhou Municipal Key Laboratory of Materials Informatics, China; <sup>3</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>4</sup>HKUST Shenzhen-Hong Kong Collaborative Innovation Research Institute, China

**2:45 PM MT03.06.05**

**Machine Learning for Prediction of Tribological Properties of Interfaces Between Single Crystals** Veerendra Naralasetti and Aravind Krishnamoorthy; Texas A&M University, United States

**3:00 PM BREAK**

SESSION MT03.07: Generative Design Strategies for Materials Discovery

Session Chairs: Victor Fung and Qian Yang

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 422

**3:30 PM \*MT03.07.01**

**Making Artificial Intelligence Work in Materials Research** Johannes Hachmann; University at Buffalo, The State University of New York, United States

**4:00 PM MT03.07.02**

**Latent Space Exploration for Predicting and Generating Hot Deformation Behavior and Microstructural Evolution Using Autoencoders** Min Jik Kim<sup>1,2</sup>, Woo Seok Yang<sup>1</sup>, Sang Min Park<sup>2</sup> and Da Seul Shin<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science, Korea (the Republic of); <sup>2</sup>Pusan National University, Korea (the Republic of)

**4:15 PM MT03.07.03**

**Probabilistic Microstructure-Aware Inverse Process Design with Uncertainty Quantification** Dung-Yi Wu and Todd C. Hufnagel; Johns Hopkins University, United States

**4:30 PM MT03.07.04**

**A Hybrid Method Combining Graph Fragmentation and Generative Models for Exhaustive Molecular Generation** Seio Inoue, Masahiro Sato and Akiko Kumada; The University of Tokyo, Japan

**4:45 PM MT03.07.05**

**Uncertainty Quantification for Neural Network Potentials** Jenna Pope, Jesun Firoz, Henry Sprueill and Sutanay Choudhury; Pacific Northwest National Laboratory, United States

SESSION MT03.08: Poster Session: Harnessing Data-Centric Strategies for Materials by Design

Session Chairs: James Chapman, Victor Fung, Tuan Anh Pham and Qian Yang

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**MT03.08.01**

**True Covalent Bonds from First-Principles Calculations** Emily Oliphant, Emmanouil Kioupakis and Wenhao Sun; University of Michigan, United States

**MT03.08.02**

**Machine Learning-Driven Insights into Oxygen Diffusion Barriers—A Closed-Loop Approach for Optimizing Superconducting Thin Films from First Principles** [Sarvesh Chaudhari](#), Cristóbal Méndez, Rushil Choudhary, Tathagata Banerjee, Maciej Olszewski, Zhaslan Baraissov, David Muller, Valla Fatemi and Tomas Arias; Cornell University, United States

**MT03.08.03**

**Automated Construction of Phase Change Material Databases Using Novel Graph Data Recognition Techniques** [Young Ok Cha](#) and Yang Hao; Queen Mary University of London, United Kingdom

**MT03.08.04**

**A Novel LLM-Powered Assistant Facilitating Data Visualization in Research and Education** Holt Bui, Brandi Ransom, Stefan Zecevic and [Tim Erdmann](#); IBM Research, United States

**MT03.08.05**

**An Interpretable Mixed Network Framework for Microstructure-Property Relationships in Nickel and Cobalt Based Superalloys** [Aditya Gollapalli](#); Indian Institute of Science Bengaluru, India

**MT03.08.06**

**AG-Driven Surface Transformations in 2D Material Formation—Insights to Inform Future Data-Driven Models** [Mona Layegh](#) and Joseph W. Bennett; University of Maryland, Baltimore County, United States

**MT03.08.07**

**Curating Benchmarking Data Sets for Universal Machine Learning Interatomic Potentials Beyond Energy** [Haoming Howard Li](#)<sup>1</sup>, Aaron Kaplan<sup>2</sup> and Kristin A. Persson<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**MT03.08.08**

**Structural Constraint Integration in Generative Model for Discovery of Quantum Material Candidates** [Ryotaro Okabe](#) and Mingda Li; Massachusetts Institute of Technology, United States

**MT03.08.09**

**Ensuring Excitation: Machine Learning a Phosphor's Excitation Band Position** [Nakyung Lee](#)<sup>1,1</sup>, Malgorzata Sójka<sup>1,1</sup>, Jakoah Brgoch<sup>1,1</sup>, Seán R. Kavanagh<sup>2</sup> and David Scanlon<sup>3</sup>; <sup>1</sup>University of Houston, United States; <sup>2</sup>Harvard University Center for the Environment, United States; <sup>3</sup>University of Birmingham, United Kingdom

**MT03.08.10**

**A Computationally Efficient Framework for Predicting Ductility in Refractory High Entropy Alloys by Modeling Distributed Defect Properties with Physics Informed Machine Learning** [Christopher Tandoc](#)<sup>1</sup>, Michael Gao<sup>2</sup> and Yong-Jie Hu<sup>1</sup>; <sup>1</sup>Drexel University, United States; <sup>2</sup>U.S. Department of Energy National Energy Technology Laboratory, United States

**MT03.08.11**

**Enhanced NLP Pipeline Design for Hydrogen storage alloy Literature: From Database Architecture to BERT Model Evaluation** [Sumin Lee](#)<sup>1</sup>, Hyekyung Choi<sup>1</sup>, MinJong Noh<sup>2</sup>, Jae-Hyuck Shim<sup>1,3,4</sup> and Yunseok Kim<sup>1,3,4</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Samsung SDI Co., Ltd, Korea (the Republic of); <sup>3</sup>Energy Materials Research Center, Korea Institute of Science and Technology(KIST), Korea (the Republic of); <sup>4</sup>KIST-SKKU Carbon-Neutral Research Center, Sungkyunkwan University (SKKU), Korea (the Republic of)

SESSION MT03.09: Machine Learning Materials Properties Under Dynamic Conditions

Session Chairs: Abhirup Patra, Tuan Anh Pham and Qian Yang

Friday Morning, April 11, 2025

Summit, Level 4, Room 422

**8:00 AM MT03.09.01**

**Overcoming Chemical Space Challenges in High-Entropy Argyrodite Li Solid Electrolytes with Fine-Tuned Neural Network Potentials** [Jisu Kim](#)<sup>1</sup>, Jiho Lee<sup>1</sup>, Youngho Kang<sup>2</sup> and Seungwu Han<sup>1,3</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Incheon National University, Korea (the Republic of); <sup>3</sup>Korea Institute for Advanced Study, Korea (the Republic of)

**8:15 AM ^MT03.09.02**

**AI to Enable Bulk Dislocation Dynamics Imaging in Real-Time** [Leora E. Dresselhaus-Marais](#); Stanford University, United States

**8:45 AM MT03.09.03**

**Quality of Dynamical Properties Computed from Force-Fitted Empirical and Machine-Learned Interatomic Potentials** [Aravind Krishnamoorthy](#); Texas A&M University, United States

**9:00 AM MT03.09.04**

**Force Field-Based Approaches Toward Designing High Thermal Conductivity Polymers** [Hiroto Yokoyama](#), Takahiro Umemoto, Akiko Kumada and Masahiro Sato; The University of Tokyo, Japan

**9:15 AM \*MT03.09.05**

**Minimal Information Models for Materials Design** [Luca M. Ghiringhelli](#); Friedrich-Alexander University (FAU), Germany

**9:45 AM BREAK**

SESSION MT03.10: Large Language Models for Materials Discovery and Design

Session Chairs: James Chapman, Victor Fung and N M Anoop Krishnan

Friday Morning, April 11, 2025

Summit, Level 4, Room 422

**10:15 AM \*MT03.10.01**

**AI for Accelerated Materials Discovery at Intel Labs** [Santiago Miret](#); Intel Corporation, United States

**10:45 AM MT03.10.02**

**LLMs for FAIR Materials Data Curation** [Catherine Brinson](#), Defne Circi and Bhuwan Dhingra; Duke University, United States

**11:00 AM MT03.10.03**

**ChemChat—Democratizing Access to Domain-Specific AI/ML Through LLM-Powered Conversational Assistants** [Tim Erdmann](#), Stefan Zecevic, Nathan Park, Brandi Ransom, Holt Bui, Krystelle Lioni and Jim Hedrick; IBM Research, United States

**11:15 AM MT03.10.04**

**Enabling Polymer Design Tasks Using Multi-Agent Workflows and Foundation Models** [Nathan Park](#), Tiffany Callahan, Eduardo Soares, Emilo Ashton Vital Brazil, Tim Erdmann, Jim Hedrick and Sara Capponi; IBM, United States

**11:30 AM \*MT03.10.05**

**Towards an End-to-End Framework for Materials Discovery** [N M Anoop Krishnan](#); Indian Institute of Technology Delhi, India

# SYMPOSIUM MT04

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Rational Design of Electrocatalysts—Insights into Structure-Function Relationships for Next-Generation Materials

April 7 - April 8, 2025

Symposium Organizers

Shoji Hall, Johns Hopkins University

Emil Hernandez-Pagan, University of Delaware

Megan Jackson, University of North Carolina at Chapel Hill

Yao Yang, Cornell University

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT04.01: Advanced Material Design for Enhanced Electrocatalytic Performance: Structure, Reactivity, and Precision Synthesis

Session Chairs: Emil Hernandez-Pagan, Megan Jackson and Yao Yang

Monday Morning, April 7, 2025

Summit, Level 4, Room 422

**8:30 AM MT04.01.01**

**Tuning Multimetallic Phosphide Nanorods and Hetero-Nanostructures for Electrocatalysis** [Yulu Zhang](#) and Sen Zhang; University of Virginia, United States

**8:45 AM MT04.01.02**

**Microwave-Assisted Solid-State Synthesis of Catalytically Relevant Potassium Intercalated Molybdenum Chalcogenides** [Rose Smiley](#), Rose Lam and Jesus M. Velazquez; University of California, Davis, United States

**9:00 AM MT04.01.03**

**Towards Precision Electrosynthesis of Nanoparticles Libraries for Accelerated Discovery of Electrocatalysts** [Hang Ren](#); University of Texas at Austin, United States

**9:15 AM \*MT04.01.04**

**Designing Inorganic Nanomaterials for Hydrogen Production and Utilization** [Taeghwan Hyeon](#)<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**9:45 AM MT04.01.05**

**Active Site Ensembles on Transition Metal Phosphide Nanocrystals for NO<sub>3</sub><sup>-</sup> Electroreduction** [Emily Nishiwaki](#)<sup>1</sup>, Peter Rice<sup>2</sup>, Simone Rauegi<sup>2</sup> and Brandi Cossairt<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

**10:00 AM BREAK**

**10:30 AM MT04.01.06**

**Halide Anion-Induced Reconstruction of Copper Catalysts During Acidic CO<sub>2</sub> Electroreduction** [Hyeontae Kim](#)<sup>1</sup>, Ji-Yong Kim<sup>1</sup>, Dae-Hyun Nam<sup>2</sup> and Young-Chang Joo<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**10:45 AM \*MT04.01.07**

**Microwave-Synthesized Alloyed Chevrel Phase Sulfides Allow Tunability in the CO<sub>2</sub> Reduction Reaction** [Jesus M. Velazquez](#); University of California, Davis, United States

**11:15 AM MT04.01.08**

**Enhanced Hydrogen Peroxide Production by Nickel Re-Dispersion in Oxidized Ni@TiN Catalysts** [Hwakyoung Seo](#)<sup>1</sup>, DongHwan Oh<sup>2</sup>, Changhyun Kim<sup>2</sup>, Chan Beum Park<sup>2</sup>, WooChul Jung<sup>1</sup> and Jeong Woo Han<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**11:30 AM MT04.01.09**

**Advanced Magnetoelectric Nanogenerator for Magnetically Enhanced Hydrogen Evolution Reactions** [Nandan Murali](#), Shashank B. Das and Soutik Betal; Indian Institute of Technology Delhi, India

**11:45 AM MT04.01.10**

**Electric Field-Driven Chemistry** [Boyuan Zhang](#); Fairfield University, United States

SESSION MT04.02: Mechanistic Insights and Computational Advances in Electrocatalysis: From Reaction Pathways to Catalyst Design

Session Chairs: Shoji Hall, Emil Hernandez-Pagan and Yao Yang

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 422

**1:30 PM \*MT04:02.01**

**Assessing Reaction Mechanisms of Electrocatalysis—Beyond Density Functional Theory** [Emily A. Carter](#)<sup>1,2</sup>; <sup>1</sup>Princeton University, United States;

<sup>2</sup>Princeton Plasma Physics Laboratory, United States

**2:00 PM MT04:02.02**

**Grand Canonical Modeling of Adsorbate-Induced Restructuring of Cu Electrode** [Zisheng Zhang](#)<sup>1,2</sup>, Philippe Sautet<sup>2</sup> and Anastassia N. Alexandrova<sup>2</sup>;

<sup>1</sup>Stanford University/SLAC National Accelerator Laboratory, United States; <sup>2</sup>University of California, Los Angeles, United States

**2:15 PM MT04:02.03**

**Mechanistic Insights into the Formation of CO and HCOOH During Electrochemical CO<sub>2</sub> Reduction Reaction** [Hsuan-Yu Chen](#)<sup>1,2,1</sup> and Heng-Liang

Wu<sup>1,2,1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Academia Sinica, Taiwan

**2:30 PM MT04:02.04**

**A Novel Approach to First-Principles Rational Design of Electrocatalysts—Effective Atom Theory (EAT) Applied to High-Entropy Rock Salt Oxides**

**for the Oxygen Evolution Reaction** [Justin Tahmassebpur](#), Boris Barron, Brandon Li, Peter Frazier, Hector Abruna and Tomas Arias; Cornell University, United States

**2:45 PM MT04:02.05**

**Coordinated H<sub>2</sub>O Mediating Proton Transfer Pathway for CO<sub>2</sub> Electroreduction in Bismuth-Based Crystalline Coordination Framework** [Huilin](#)

[Qing](#), Katherine Mirica and Weiyang Li; Dartmouth College, United States

**3:00 PM BREAK**

**3:30 PM \*MT04:02.06**

**A Kinetic Analysis of the CO Electro-Oxidation Reaction on Bimetallics—Understanding the Interplay of Bifunctional and Electronic Effects** [Adam](#)

[Holewinski](#); University of Colorado Boulder, United States

**4:00 PM MT04:02.07**

**Machine Learning Assisted Design of Metal–Nitrogen–Carbon Catalysts for the Oxygen Reduction Reaction** Prajeet Oza and [Guoxiang \(Emma\) Hu](#);

Georgia Institute of Technology, United States

**4:15 PM \*MT04:02.08**

**The Activation of Alkanes at Electrochemical Interfaces Using Real-Time Control of Potentials—Novel Avenues for Energy Storage and Sustainable**

**Chemical Manufacturing** [Marcel Schreier](#)<sup>1,2</sup>; <sup>1</sup>University of Wisconsin–Madison, United States; <sup>2</sup>University of Wisconsin–Madison, United States

SESSION MT04.03: Advanced Material Design for Enhanced Electrocatalytic Performance: Structure, Reactivity and Precision Synthesis

Session Chairs: Shoji Hall and Yao Yang

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 422

**10:30 AM \*MT04.03.01**

**Electrocatalysis at Organic–Metal Interfaces—Identification of Structure–Reactivity Relationships for CO<sub>2</sub> Reduction** [Francesca M. Toma](#)<sup>1,2,3</sup>;

<sup>1</sup>Helmholtz-Zentrum Hereon, Germany; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Helmut Schimdt University, Germany

**11:00 AM MT04.03.02**

**Enhancing Hydrogen Production Efficiency Using Functionalized MXenes with Coordinated Metal Nanoparticles** [Yewon Oh](#)<sup>1</sup>, Hyeon Jin Jung<sup>2</sup>, Insik

In<sup>3</sup>, Seung Jun Lee<sup>3</sup> and Anju Toor<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of); <sup>3</sup>Korea National University of Transportation, Korea (the Republic of)

**11:15 AM MT04.03.03**

**Photoelectrochemical Glycerol Upgrading via Surface Valence State Engineered Bimetallic Overlayer** Jaekyum Kim<sup>1</sup>, Won Tae Hong<sup>1</sup>, Jong Hun Kim<sup>1</sup>, Byung-Hyun Kim<sup>2</sup> and Jung Kyu Kim<sup>1,1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Hanyang University, Korea (the Republic of)

**11:30 AM MT04.03.04**

**Facet-Selective Hydrogen Evolution on  $M_2P$  ( $M=Ni, Co, Fe$ ) Single Crystals** Seongyoung Kong<sup>1,2</sup>, Dhruv Raturi<sup>1</sup>, Duane D. Johnson<sup>1,2</sup> and Kirill Kovnir<sup>1,2</sup>; <sup>1</sup>Iowa State University, United States; <sup>2</sup>Ames Laboratory, United States

**11:45 AM MT04.03.05**

**Electron Transfer at Low-DOS Interfaces—Investigating the Impact of DOS on Reorganisation Energy** Sonal Maroo; University of California, Berkeley, United States

SESSION MT04.04: Operando and *In-Situ* Insights into Catalytic Dynamics and Microenvironments in Electrocatalysis

Session Chairs: Shoji Hall, Emil Hernandez-Pagan and Megan Jackson

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 422

**1:30 PM +MT04.04.01**

**Probing Strain and Structural Properties of Catalytic Nanoparticles with Four-Dimensional Scanning Transmission Electron Microscopy** Yimo Han<sup>1</sup>, Chuqiao Shi<sup>1</sup>, Zhihua Cheng<sup>1</sup>, Yao Yang<sup>2</sup> and Matthew R. Jones<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Cornell University, United States

**2:00 PM MT04.04.02**

**Nanometer-Resolved Observation of Electrochemical Microenvironment Formation at the Nanoparticle–Ligand Interface** Yu Shan<sup>1</sup>, Xiao Zhao<sup>2</sup>, Maria Fonseca Guzman<sup>1</sup>, Asmita Jana<sup>2</sup>, Shouping Chen<sup>1</sup>, Sunmoon Yu<sup>1</sup>, Ka Chon Ng<sup>2</sup>, Inwhan Roh<sup>1</sup>, Hao Chen<sup>2</sup>, Virginia Altoe<sup>2</sup>, Stephanie Corder<sup>2</sup>, Hans Bechtel<sup>2</sup>, Jin Qian<sup>2</sup>, Miquel B. Salmeron<sup>2</sup> and Peidong Yang<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**2:15 PM MT04.04.03**

***In Situ* Probe of Electrolyte Rearrangement in the Electric Double Layer** Hui Fang and Zahra Fakhraai; University of Pennsylvania, United States

**2:30 PM MT04.04.04**

**Impact of Current Density, Anolyte Salts and Pulsing on Water Crossover in Zero Gap CO<sub>2</sub> Electrolyzers Revealed by Operando Neutron Radiography** Dominic Ross<sup>1</sup>, Maxwell Goldman<sup>1</sup>, Aditya Prajapati<sup>1</sup>, Michell Marufu<sup>1</sup>, Jonathan Davis<sup>1</sup>, Jongmin Lee<sup>2</sup>, Michael Troksa<sup>1</sup>, Sarah Baker<sup>1</sup>, Po-Ya Abel Chuang<sup>3</sup> and Christopher Hahn<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>Paul Scherrer Institut, Switzerland; <sup>3</sup>University of California, Merced, United States

**2:45 PM BREAK**

**3:15 PM \*MT04.04.05**

**Revealing of Nanocracking of CuO-Derived Cu Nanocatalysts During CO<sub>2</sub> Electroreduction Using Operando Multimodal Electrochemical Liquid Cell TEM and X-Ray Methods** Haimei Zheng<sup>1,2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of California, Berkeley, United States

**3:45 PM MT04.04.06**

**Polarization Dependent Signatures of Intermediate Species at the TiO<sub>2</sub>-Water Interface** Jennifer Sormberger, Moritz Lang, Cassius Boyd, Sarang Yeola, Tanja Cuk and David M. Jonas; University of Colorado Boulder, United States

**4:00 PM MT04.04.07**

**Operando Electron Paramagnetic Resonance Studies of Electrocatalytic Hydrogen Evolution Reaction of MOS<sub>2</sub> Nanocrystals** Yohannes W. Getahun<sup>1</sup>, Eric D. Walter<sup>2</sup>, Sudakar Chandran<sup>3</sup> and Srinivasa Rao Singamaneni<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>Indian Institute of Technology Madras, India

**4:15 PM MT04.04.08**

**Operando Studies of Dynamic Evolution of Electrocatalysts Under CO<sub>2</sub> Reduction** Yao Yang; Cornell University, United States



SESSION MT04.05: Poster Session

Session Chairs: Shoji Hall, Emil Hernandez-Pagan, Megan Jackson and Yao Yang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**MT04.05.01**

**Zr as Effective Modulator of Electrocatalytic Properties of  $M_2P$  ( $M=Ni, Co, Fe$ )** Seongyoung Kong<sup>1,2</sup>, Prashant Singh<sup>2</sup>, Dhruv Raturi<sup>1</sup>, Duane D. Johnson<sup>1,2</sup> and Kirill Kovnir<sup>1,2</sup>; <sup>1</sup>Iowa State University, United States; <sup>2</sup>Ames Laboratory, United States

**MT04.05.02**

**Achieving High-Performance OER Catalysis with Dual-Site Modulated Fe-Based Perovskites** Yixin Bi<sup>1</sup>, Qing Chen<sup>1</sup> and Francesco Ciucci<sup>2,1</sup>; <sup>1</sup>The Hong Kong University of Science and Technology, Hong Kong; <sup>2</sup>University of Bayreuth, Germany

**MT04.05.03**

**Interfacial Engineering of Chromium-Doped NiCoSe—A Pathway to Enhanced Overall Water Splitting Performance** Bee Lyong Yang<sup>1,2</sup>, Mallappa Mahanthappa<sup>1,2</sup>, Debabrata Chanda<sup>1,2</sup>, Jaechang Yang<sup>1,2</sup>, Shahbaz Ahmed<sup>1,2</sup>, Myung Seon Ryu<sup>3</sup>, Gi-sung Lee<sup>4</sup>, Daewon Hong<sup>4</sup> and Kweon Soon-Yong<sup>5</sup>; <sup>1</sup>Kumoh National Institute of Technology, Korea (the Republic of); <sup>2</sup>GHS Co. Ltd, Korea (the Republic of); <sup>3</sup>Phoenix Tech Co., Ltd., Korea (the Republic of); <sup>4</sup>National NanoFab Center, Yuseong-gu, Korea (the Republic of); <sup>5</sup>Korea National University of Transportation, Korea (the Republic of)

**MT04.05.04**

**Deep Learning-Driven Discovery of a Best-Performing Perovskite Oxide for Water Oxidation** Junseok Moon<sup>1,2</sup> and Taeghwan Hyeon<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**MT04.05.05**

**Surface Engineering of Cobalt Spinel Oxide by Cation Incorporation for High-Performance Electrocatalysis** Hyunsoo Ji<sup>1,2</sup> and Taeghwan Hyeon<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**MT04.05.06**

**Electrocatalytic CO<sub>2</sub> Reduction Modulated by the Surface Microenvironment of Nanoclusters** Seungwoo Yoo<sup>1,2</sup> and Taeghwan Hyeon<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**MT04.05.07**

**Unraveling the Role of Re Doping in Metastable Hexagonal Ir Catalysts for Enhanced OER Performance—A DFT Study** Kwangsoo Kim<sup>1,2</sup>, HyukSu Han<sup>3</sup>, Myeongjin Kim<sup>4</sup> and Byung-Hyun Kim<sup>5</sup>; <sup>1</sup>Korea Institute of Energy Research, Korea (the Republic of); <sup>2</sup>Yonsei University, Korea (the Republic of); <sup>3</sup>Sungkyunkwan University, Korea (the Republic of); <sup>4</sup>Kyungpook National University, Korea (the Republic of); <sup>5</sup>Hanyang University, Korea (the Republic of)

**MT04.05.08**

**Selective Hydrogen Peroxide Production via Structural Variations in Molybdenum Phosphide Catalysts—A Density Functional Theory Study** Bogeun Park<sup>1</sup>, Kwangsoo Kim<sup>2,3</sup>, Gyuchan Kim<sup>1</sup>, Huncheol Seo<sup>1</sup> and Byung-Hyun Kim<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Korea Institute of Energy Research, Korea (the Republic of); <sup>3</sup>Yonsei University, Korea (the Republic of)

**MT04.05.09**

**A Novel Experimental Method for Measuring CO Binding on Catalyst Surfaces Using a Gas Diffusion Electrode** Yesol Kim and Joel W. Ager; Lawrence Berkeley National Laboratory, United States

**MT04.05.10**

**Thermally-Driven Oxygen Functionalization for Durable Pt Electrocatalyst in Oxygen Reduction Reaction** Jae Young Jung; Korea Institute of Energy Research, Korea (the Republic of)

**MT04.05.11**

**Exploring HER Activity Descriptors for Early Transition Metals—Insights from DFT Analysis of Ir<sub>3</sub>M ( $M=V, Ta, Nb$ ) Electrocatalysts** Gyuchan

Kim<sup>1</sup>, Kwangsoo Kim<sup>2</sup>, Hunchool Seo<sup>1</sup>, Bogeun Park<sup>1</sup> and Byung-Hyun Kim<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Korea Institute of Energy Research, Korea (the Republic of)

**MT04.05.12**

**Z-Schematic Ta<sub>3</sub>N<sub>5</sub>-Si Photoanode with Enhanced Light Harvesting and Charge Transport** Hee Ryeong Kwon, Seon Ju Park, Soomin Lee and Ho Won Jang; Seoul National University, Korea (the Republic of)

**MT04.05.13**

**High-Efficiency Unbiased Water Splitting with Photoanodes Harnessing Polycarbazole Hole Transport Layers** Jin Wook Yang<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>University of California, Berkeley, United States

**MT04.05.14**

**Facet-Dependent Selectivity and Performance of PdSe<sub>2</sub> Microstructure Electrocatalysts for Two-Electron Oxygen Reduction Reaction** Kaylin Xu<sup>1</sup>, Seth T. Putnam<sup>2</sup>, Romualdus E. Wibowo<sup>3</sup>, Joshua Goldberger<sup>4</sup>, Matthew Mayer<sup>3</sup>, Joaquin Rodriguez-Lopez<sup>2</sup> and Song Jin<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>University of Illinois at Urbana-Champaign, United States; <sup>3</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>4</sup>The Ohio State University, United States

**MT04.05.15**

**Solution Phase Synthesis of Structurally Ordered PtMg Alloy Electrocatalysts with Extra High Durability in Hydrogen Fuel Cells** Caleb Gyan-Barimah, DongHyun Lee, Ha-Young Lee and Jong-Sung Yu; Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**MT04.05.16**

**Theoretical Insights into Pt<sub>3</sub>M Alloy Electrocatalysts for Li-S Battery** Miyeon Kim and Jeong Woo Han; Seoul National University, Korea (the Republic of)

**MT04.05.17**

**Development of Ultra-Low Work Function Promoter for Highly Active Anode in Direct Ammonia Solid Oxide Fuel Cells** WonJun Lee, Sewoong Lee, WooChul Jung and Jeong Woo Han; Seoul National University, Korea (the Republic of)

# SYMPOSIUM MT05

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The Materials Science of Synthesis Across Scales Through Data Science Integration  
April 8 - April 10, 2025

Symposium Organizers

Menglin Chen, Aarhus University  
S. B. Majumder, University of Washington  
Xin Qi, Dartmouth College  
Chenyang Shi, Pacific Northwest National Laboratory

Symposium Support

**Bronze**  
Center for the Science of Synthesis Across Scales

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION MT05.01: New Design Principles for Advanced Materials With Integration of Data Science

Session Chairs: Menglin Chen and Chenyang Shi

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 421

**10:30 AM \*MT05.01.01**

**Nanotube Porins—A Bioinspired Membrane Channel Model** [Aleksandr Noy](#)<sup>1,2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory, United States; <sup>2</sup>University of California Merced, United States

**11:00 AM \*MT05.01.02**

**Keep Your Hair On—The Role of Dynamic Ligand Coverage in Nanoparticle Self-Assembly** [Michael Gruenwald](#); University of Utah, United States

**11:30 AM MT05.01.03**

**Learning and Predicting the Structure-Property Relationship of Plasmonic Gold Nanoparticles and Assemblies via Dual Variational Autoencoder** [Mengqi Sun](#)<sup>1</sup>, Muammer Yaman<sup>1</sup>, Sergei Kalinin<sup>2,3</sup>, Maxim Ziatidnov<sup>4</sup>, Kathryn Guye<sup>1</sup> and David S. Ginger<sup>1,3</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>The University of Tennessee, Knoxville, United States; <sup>3</sup>Pacific Northwest National Laboratory, United States; <sup>4</sup>Oak Ridge National Laboratory, United States

SESSION MT05.02: Synergy in Materials Design: Characterization, Simulation and Data Science

Session Chairs: Menglin Chen and Chenyang Shi

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 421

**1:30 PM MT05.02.01**

**Bridging Atomic and Macroscopic Scales—The Role of the Structure Parameter in Brittle Fracture** [Rachel Morin](#)<sup>1</sup>, Nicholas Mecholsky<sup>1</sup>, Steve Freiman<sup>2</sup> and John J. Mecholsky<sup>3</sup>; <sup>1</sup>The Catholic University of America, United States; <sup>2</sup>Freiman Consulting, United States; <sup>3</sup>University of Florida, United States

**1:45 PM ^MT05.02.02**

**Hexagonal Boron Nitride Surfaces Under Condition of Oxidative Dehydrogenation of Propane—Off-Stoichiometric Restructuring and Metastable Active Species** [Zisheng Zhang](#)<sup>1,2</sup>, Melissa Cendejas<sup>1</sup>, Simon Bare<sup>1</sup>, Ive Hermans<sup>3</sup> and Anastassia N. Alexandrova<sup>2</sup>; <sup>1</sup>Stanford University/SLAC National Accelerator Laboratory, United States; <sup>2</sup>University of California, Los Angeles, United States; <sup>3</sup>University of Wisconsin–Madison, United States

**2:00 PM \*MT05.02.03**

**Atomically Detailed Insights into Nanoscale Energy Dissipation—From Single-Molecule Dynamics to Moiré-Patterned 2D Materials** [Guilherme Vilhena](#); Spanish National Research Council, Spain

**2:30 PM BREAK**

**3:00 PM \*MT05.02.04**

**Integrated 3D Nanomaterial Fabrication Through DNA-Directed Self-Assembly, Templating and Surface Growth** [Oleg Gang](#); Columbia University/Brookhaven National Laboratory, United States

**3:30 PM \*MT05.02.05**

**Optimizing Nanoparticle Assembly via Engineered Fluctuations with Physically-Tethered DNA ‘Bonds’** Huat Thart Chiang<sup>1</sup>, Daniel McKeen<sup>2</sup>, Nick Herringer<sup>3</sup>, Shuai Zhang<sup>4</sup>, Oleg Gang<sup>2</sup>, Andrew Ferguson<sup>3</sup> and [Lilo D. Pozzo](#)<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Columbia University, United States; <sup>3</sup>The University of Chicago, United States; <sup>4</sup>Pacific Northwest National Laboratory, United States

**4:00 PM \*MT05.02.06**

**Illuminating Disorder—Optical Properties of Complex Plasmonic Assemblies** [Thomas Truskett](#); The University of Texas at Austin, United States

**4:30 PM MT05.02.07**

**Revealing the Nano-Mechanical Properties of DNA-Templated Lattices** [Eric Shen](#)<sup>1</sup>, Alexei Tkachenko<sup>2</sup>, Aaron Michelson<sup>2</sup> and Oleg Gang<sup>1,2</sup>; <sup>1</sup>Columbia University, United States; <sup>2</sup>Brookhaven National Laboratory, United States

**4:45 PM MT05.02.08**

**Efficient Analysis of Small-Angle Scattering Curves for Large Biomolecular Assemblies Using Monte Carlo Methods** [Huat Thart Chiang](#)<sup>1</sup>, Zhiyin

Zhang<sup>2</sup>, Kiran Vaddi<sup>1</sup>, Faik A. Tezcan<sup>2</sup> and Lilo D. Pozzo<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>University of California, San Diego, United States

SESSION MT05.03: Poster Session

Session Chairs: Menglin Chen, Chenyang Shi and Xiao Zhao

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**MT05.03.01**

**The Fermi Sphere—Jones Zone Interactions in Intermetallic Compounds—As Explored by the Mott-Jones Hamilton Population** Leah C. Garman and Daniel Fredrickson; University of Wisconsin-Madison, United States

**MT05.03.02**

**Homogeneous Nucleation and Growth of Organic Semiconductors— [1]Benzothieno[3,2-*b*] Benzothiophene (BTBT) and Derivatives as Paradigmatic Herringbone Structures** Sashen Ruhunage and Chad Risko; University of Kentucky, United States

**MT05.03.03**

**Designing Incident-Angle-Independent Metamaterials** Vera Kotova, Rishabh Sanghavi and Zachary Sherman; University of Washington, United States

**MT05.03.04**

**Additively Manufactured 17-4PH For Fracture Management Devices** Aruntapam Dash, Susmita Bose and Amit Bandyopadhyay; Washington State University, United States

**MT05.03.05**

**Determining Materials as Charge Density Wave Candidates with the Band-U Method** Patrick Cross and Daniel Fredrickson; University of Wisconsin-Madison, United States

**MT05.03.06**

**Describing Point Defect Topology in 2D Energy Materials Through Computer Vision** Grace Guinan<sup>1</sup>, Michelle Smeaton<sup>1</sup>, Addison Salvador<sup>1</sup>, Hilary Egan<sup>1</sup>, Andrew Glaws<sup>1</sup>, Brian Wyatt<sup>2</sup>, Babak Anasori<sup>2</sup> and Steven R. Spurgeon<sup>1,3</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Purdue University, United States; <sup>3</sup>University of Colorado Boulder, United States

**MT05.03.07**

**Integration of Short-Range Interaction into Pre-Trained Graph Neural Network Potential for Molecular Dynamics Simulations for Semiconductor Process** Sangmin Oh, Changho Hong, Hyungmin An and Seungwu Han; Seoul National University, Korea (the Republic of)

SESSION MT05.04: Sciences in Nanocrystal Syntheses and Properties

Session Chairs: Xin Qi and Zisheng Zhang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 421

**8:00 AM MT05.04.01**

**Dynamics of Phase Separation of Metastable Crystal Surfaces by Surface-Diffusion—A Phase-Field Study** Thomas Philippe; Condensed Matter Physics Laboratory, Ecole polytechnique, France

**8:15 AM MT05.04.02**

**Mechanistic Understanding of Vapor Deposition of Novel Materials Using Molecular Simulations** Himanshu Shekhar and Aravind Krishnamoorthy; Texas A&M University, United States

**8:30 AM \*MT05.04.03**

**Toward Scalable and Autonomous Synthesis of Colloidal Metal Nanocrystals** Yunan Xia; Georgia Institute of Technology, United States

**9:00 AM \*MT05.04.04**

**Toward Controlling the Morphology in Nanocrystal Growth—Thermodynamic vs Kinetic Shapes** Kristen A. Fichthorn; The Pennsylvania State University, United States

**9:30 AM BREAK**

**10:00 AM \*MT05.04.05**

**Kinetic Monte Carlo Simulations for Nanocrystal Shape Control** Carlos L. Bassani<sup>1</sup>, Kamilla Zaripova<sup>1,2</sup> and Michael Engel<sup>1</sup>; <sup>1</sup>FAU Erlangen-Nurnberg, Germany; <sup>2</sup>University of Freiburg, Germany

**10:30 AM \*MT05.04.06**

**Accurate Modeling of Interfacial Properties in van der Waals Heterostructures— Integrating Empirical Force Fields with Machine Learning Potentials** Wengen Ouyang; Wuhan University, China

**11:00 AM MT05.04.07**

**Towards a Generic Large Atomic Model (DPA Model Series) for Materials Simulations** Ruyi Song, Yuzhi Zhang, Linfeng Zhang, Duo Zhang, Xi Chen and Dongxu Pan; DP Technology, United States

**11:15 AM MT05.04.08**

**Machine-Learning-Augmented Simulation of Thin Metal Film Growth on Weakly-Interacting Substrates** Jyri Kimari<sup>1,2</sup>, Flyura Djurabekova<sup>2</sup> and Kostas Sarakinos<sup>1,2</sup>; <sup>1</sup>KTH Royal Institute of Technology, Sweden; <sup>2</sup>University of Helsinki, Finland

**11:30 AM MT05.04.09**

**Unveiling the Hidden Evolution of Crystal Defects and Disorder in Energy Materials** Steven R. Spurgeon<sup>1,2</sup>, Arman Ter-Petrosyan<sup>3</sup>, Mike Holden<sup>4</sup>, Jenna Pope<sup>4</sup>, Sarah Akers<sup>4</sup>, Christina Doty<sup>4</sup>, Kayla H. Yano<sup>4</sup>, Rajendra Paudel<sup>5</sup>, Le Wang<sup>4</sup>, Eric Lang<sup>6</sup>, Grace Guinan<sup>1</sup>, Michelle Smeaton<sup>1</sup>, Hilary Egan<sup>1</sup>, Andrew Glaws<sup>1</sup>, Brian Wyatt<sup>7</sup>, Bethany Matthews<sup>4</sup>, Khalid Hattar<sup>8</sup>, Ryan Comes<sup>5</sup>, Yingge Du<sup>4</sup> and Babak Anasori<sup>7</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>University of Colorado Boulder, United States; <sup>3</sup>University of California, Irvine, United States; <sup>4</sup>Pacific Northwest National Laboratory, United States; <sup>5</sup>University of Delaware, United States; <sup>6</sup>The University of New Mexico, United States; <sup>7</sup>Purdue University, United States; <sup>8</sup>The University of Tennessee, Knoxville, United States

**11:45 AM MT05.04.10**

**Combining Simulation and Small Angle Neutron Scattering at SNS and HFIR** Yingrui Shang; Oak Ridge National Laboratory, United States

SESSION MT05.05: Recent Advances in Modeling Particle Assembly

Session Chairs: Carlos Bassani and Xin Qi

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 421

**1:30 PM MT05.05.01**

**Strongly Coupled Plasmonic Nanoparticle Metamaterials—Fundamental Insights, Efficient Approximate Methods and Inverse Design Strategies** Zachary Sherman, Rishabh Sanghavi and Kenny K. Lam; University of Washington, United States

**1:45 PM MT05.05.02**

**Practical Approaches to Bottom-Up Coarse-Graining for Soft Materials** Dylan Fortney<sup>1</sup> and Brett Savoie<sup>2</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Notre Dame, United States

**2:00 PM \*MT05.05.03**

**SciAgents—Automating Scientific Discovery Through Multi-Agent Intelligent Graph Reasoning and Physics-Aware Artificial Intelligence** Markus J. Buehler and Alireza Ghafarollahi; Massachusetts Institute of Technology, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*MT05.05.04**

**Surrogate Modeling for Inverse Design of Soft Materials** Michael P. Howard; Auburn University, United States

**4:00 PM \*MT05.05.05**

**Simulating Structure-Dependent Assembly Pathways for Materials Synthesis** Julia Dshemuchadse; Cornell University, United States

**4:30 PM MT05.05.06**

**Large-Scale Chemical and Crystal Packing Space Exploration for HOF-Based Porous Materials** Lucia Gigli<sup>1</sup>, Joshua Dickman<sup>1</sup>, Jay Johal<sup>1</sup>, Qiang Zhu<sup>2</sup>, Thomas Fellowes<sup>2</sup>, Filip Szczypinski<sup>2</sup>, Andrew Cooper<sup>2</sup> and Graeme Day<sup>1</sup>; <sup>1</sup>University of Southampton, United Kingdom; <sup>2</sup>University of Liverpool, United Kingdom

**4:45 PM MT05.05.07**

**Inverse Design of Colloidal Nanocrystal Assemblies with Targeted Structural and Optical Features** Kaitlyn Matsunaga<sup>1</sup>, Matthew Nakamura<sup>1</sup>, Rishabh Sanghavi<sup>2</sup>, Zachary Sherman<sup>2</sup>, Joseph Brown<sup>1</sup> and Chrisy X. Du<sup>1</sup>; <sup>1</sup>University of Hawaii at Manoa, United States; <sup>2</sup>University of Washington, United States

SESSION MT05.06: Syntheses and Applications of Smart Materials

Session Chairs: Menglin Chen and Chenyang Shi

Thursday Morning, April 10, 2025

Summit, Level 4, Room 421

**8:00 AM \*MT05.06.01**

**Salt Ions-Directed Hierarchical Organization of Silk Fibroin for Novel Polymeric Materials** Xuan Mu; The University of Iowa, United States

**8:30 AM \*MT05.06.02**

**Uncovering the Hidden Superpowers of Elastin-Like Peptides for the Synthesis of Hierarchical and Stimuli-Responsive Materials** Francois Baneyx; University of Washington, United States

**9:00 AM MT05.06.03**

**Predicting the Effect of Temperature on the Assembly of Gold Nanoparticles Functionalized with Elastin-Like Polypeptides via Dual Variational Autoencoders** Yifeng Cai<sup>1</sup>, Mengqi Sun<sup>1</sup>, Maxim Ziatdinov<sup>2</sup>, Sergei Kalinin<sup>3,2</sup>, David S. Ginger<sup>1</sup> and Francois Baneyx<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>The University of Tennessee, Knoxville, United States

**9:15 AM MT05.06.04**

**Dimensional Scaling of Transition Metal Phosphides for Advanced Interconnect** Gangtae Jin; Gachon University, Korea (the Republic of)

**9:30 AM \*MT05.06.05**

**Implications of Amyloid Peptide Crystallization in Biomaterial Design** Mingdong M. Dong; University of Aarhus, Denmark

**10:00 AM BREAK**

**10:30 AM \*MT05.06.06**

**In Situ Investigation of Electrode-Electrolyte Interfaces for Energy Applications** Xiao Zhao<sup>1,2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>Stanford University, United States

**11:00 AM MT05.06.07**

**Internal Friction Response Arising from Dislocation-Hydrogen Relaxation in Bcc Iron— Mechanistic Insights from a Multiscale MD-KMC Framework** Madhur Gupta, Sanjay Manda, Indradev Samajdar and Ajay S. Panwar; Indian Institute of Technology Bombay, India

**11:15 AM MT05.06.08**

**Origin of the Reaction Temperature in Solid-State Materials Synthesis** Shibo Tan<sup>1</sup>, Gabrielle Kamm<sup>2</sup>, Alex Stangel<sup>1</sup>, Paul Chao<sup>1</sup>, Ashwin Shahani<sup>1</sup>, Robert Hovden<sup>1</sup>, Karena Chapman<sup>2</sup> and Wenhao Sun<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Stony Brook University, The State University of New York, United States

**11:30 AM MT05.06.09**

**Ion Correlations Explain Kinetic Selectivity in Diffusion-Limited Solid-State Powder Synthesis Reactions** Vir Karan<sup>1,2</sup>, Max Gallant<sup>1,2</sup> and Kristin A.

Persson<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**11:45 AM MT05.06.10**

**Tuning Molecular Interaction Between Peptoids and Substrate to Achieve Surface-agnostic Coating** [Wenhao Zhou](#)<sup>1,2</sup>, Shuai Zhang<sup>2,1</sup>, James De Yoreo<sup>2,1</sup> and Chun-Long Chen<sup>1,2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

SESSION MT05.07: Recent Advances in Characterization Methods

Session Chairs: Chenyang Shi and Xiao Zhao

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 421

**1:30 PM MT05.07.01**

**Interfacial Water is Separated from a Hydrophobic Silica Surface by a Gap of 1.2 nm** [Diana Mendez Arvelo](#) and Ricardo Garcia; ICMM-CSIC, Spain

**1:45 PM MT05.07.02**

**Rapid Estimation of the Liquidus Curve for Unexplored Multicomponent Alloy Chemistries** [Joshua Willwerth](#), Shibo Tan and Abrar Rauf; University of Michigan–Ann Arbor, United States

**2:00 PM \*MT05.07.03**

**Material-Water Interfaces at the Molecular Scale** [Ricardo Garcia](#); Consejo Superior de Investigaciones Científicas, Spain

**2:30 PM \*MT05.07.04**

**Bacterial Elastomers, Structured Liquids and EUV Resists, Oh My! Building Better Functional Materials by Probing the Solid-Liquid Interface at the Nanoscale** Preetika Rastogi<sup>1</sup>, Dong Li<sup>2</sup>, Yu Chai<sup>3</sup>, Luke Long<sup>4</sup>, Patrick Naulleau<sup>4</sup>, Thomas Russell<sup>1,5</sup>, Caroline Ajo-Franklin<sup>6</sup> and [Paul Ashby](#)<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>Thermo Fisher Scientific, United States; <sup>3</sup>City University of Hong Kong, Hong Kong; <sup>4</sup>EUV Tech, United States; <sup>5</sup>University of Massachusetts Amherst, United States; <sup>6</sup>Rice University, United States

**3:00 PM BREAK**

**3:30 PM \*MT05.07.05**

***In Situ*, Multimodal Imaging of Solid-Liquid Interfaces** [Xiao-Ying Yu](#); Oak Ridge National Laboratory, United States

**4:00 PM \*MT05.07.06**

**High-Speed Atomic Force Microscopy to Study Pore-Forming Proteins** Zhaoyi Zhai<sup>1</sup>, Simon Scheuring<sup>2,2</sup> and [Fang Jiao](#)<sup>1</sup>; <sup>1</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>2</sup>Weill Cornell Medicine, United States

**4:30 PM MT05.07.07**

**Inverse Design of Extinction Spectra for Plasmonic Nanoparticles** [Rishabh Sanghavi](#) and Zachary Sherman; University of Washington Seattle, United States

# SYMPOSIUM QT01

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Development of 2D Quantum Materials Pipelines (2D-QMaPs)

April 10 - April 11, 2025

Symposium Organizers

Amirhossein Hasani, Montana State University

Dharmraj Kotekar Patil, University of Arkansas

Andrew Mannix, Stanford University

Suji Park, Brookhaven National Laboratory

Symposium Support

**Bronze**

MonArk NSF Quantum Foundry - Montana State University

MonArk NSF Quantum Foundry- University of Arkansas

QUANTUM DESIGN

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT01.01: Innovative Fabrication Techniques for 2D Materials I

Session Chairs: Amirhossein Hasani and Dharmraj Kotekar Patil

Thursday Morning, April 10, 2025

Summit, Level 4, Room 440

**8:00 AM \*QT01.01.01**

**2D Material Devices via a Cleanroom in a Glovebox** [Kenneth Burch](#); Boston College, United States

**8:30 AM \*QT01.01.02**

**Fabrication and Quantum Transport of van der Waals Junctions of 2D Materials** [Tomoki Machida](#); University of Tokyo, Japan

**9:00 AM QT01.01.03**

**Scalable Etchant-Free Transfer Technique for Low-Dimensional Materials from Metal Thin Film Surfaces** [Kentaro Yumigeta](#), Muhammed Yusufoglu, Franco Daluisio, Richard Holloway and Zafer Mutlu; The University of Arizona, United States

**9:15 AM \*QT01.01.04**

**Ultraclean Assembly of van der Waals Heterostructures** [Roman Gorbachev](#); University of Manchester, United Kingdom

**9:45 AM \*QT01.01.05**

**Photophysics of Quantum Defects in Layered Materials** [Sanjay K. Behura](#); San Diego State University, United States

**10:15 AM BREAK**

**10:30 AM \*QT01.01.06**

**High-Throughput Production of 2D Monolayers, Moiré Structures and Their 1D Counterparts** [Fang Liu](#); Stanford University, United States

**11:00 AM QT01.01.07**

**Dry Transfer of van der Waals Junctions of Two-Dimensional Materials onto Patterned Substrates Using Plasticized Polyvinyl Chloride/*Kamaboko*-Shaped Polydimethylsiloxane** [Momoko Onodera](#)<sup>1</sup>, Manabu Ataka<sup>1</sup>, Yijin Zhang<sup>1</sup>, Rai Moriya<sup>1</sup>, Kenji Watanabe<sup>2</sup>, Takashi Taniguchi<sup>2</sup>, Hiroshi Toshiyoshi<sup>1</sup> and Tomoki Machida<sup>1</sup>; <sup>1</sup>The University of Tokyo, Japan; <sup>2</sup>National Institute for Materials Science, Japan

**11:15 AM \*QT01.01.08**

**Van der Waals Integration Beyond the Limits of van der Waals Forces Using Adhesive Matrix Transfer** [Farnaz Niroui](#); Massachusetts Institute of Technology, United States

**11:45 AM QT01.01.09**

**Scalable Manufacturing for Moiré Materials** [Gregory Zaborski Jr.](#) and Fang Liu; Stanford University, United States

SESSION QT01.02: Automation in Material Identification and Characterization

Session Chairs: Amirhossein Hasani and Suji Park



Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 440

**2:00 PM \*QT01.02.01**

**The MonArk Quantum Foundry—Development of 2D Quantum Material Pipelines (2D-QMaPs)** Josue A. Goss<sup>1</sup>, Shiva Davari Dolatabadi<sup>1</sup>, Din L. Duong<sup>2</sup>, Tim Faltermeier<sup>2</sup>, Nolan Geyer-Poncin<sup>2</sup>, Forrest Gile<sup>2</sup>, Eli Hamaker<sup>1</sup>, Amirhossein Hasani<sup>2</sup>, Khoa Luu<sup>1</sup>, Torrey McLoughlin<sup>2</sup>, Xuan Bac Nguyen<sup>1</sup>, Josh Oliver<sup>2</sup>, Corbin Russ<sup>1</sup>, Daniel Vazquez<sup>2</sup>, Samuel Wyss<sup>2</sup>, Dharmraj Kotekar Patil<sup>1</sup>, Bothina Manasreh<sup>1</sup>, Nicholas J. Borys<sup>2</sup> and Hugh O. Churchill<sup>1</sup>;  
<sup>1</sup>University of Arkansas, United States; <sup>2</sup>Montana State University, United States

**2:30 PM QT01.02.02**

**Segment Any Flakes—A Quantum Crystal-Based Tokenization Learning Approach to Quantum 2D Material Understanding** Xuan Bac Nguyen, Solomon A. Hufford, Hugh O. Churchill and Khoa Luu; University of Arkansas, United States

**2:45 PM QT01.02.03**

**Development and Implementation of the Optical Cataloger for Automatic 2D Crystallite Identification** Tim Faltermeier<sup>1</sup>, Samuel Wyss<sup>1</sup>, Bridger McGimpsey<sup>1</sup>, David Miller<sup>1</sup>, Thomas Ferrel<sup>1</sup>, Dinh Loc Duong<sup>2</sup>, Torrey McLoughlin<sup>1</sup>, Josue A. Goss<sup>3</sup>, Hugh O. Churchill<sup>3</sup> and Nicholas J. Borys<sup>1</sup>; <sup>1</sup>Montana State University, United States; <sup>2</sup>University of Maine, United States; <sup>3</sup>University of Arkansas, Fayetteville, United States

**3:00 PM BREAK**

**3:30 PM \*QT01.02.04**

**Machine Learning for Real-Time Detection and Classification of 2D Material Flakes** Christoph Stampfer<sup>1,2</sup>; <sup>1</sup>RWTH Aachen University, Germany; <sup>2</sup>Forschungszentrum Jülich GmbH, Germany

**4:00 PM \*QT01.02.05**

**Electrons in Twisted Layers—Design, Surprise and a New Set of Eyes** David Goldhaber-Gordon<sup>1,2</sup>, Steven Tran<sup>1,2</sup>, Mihir Pendharkar<sup>1,2</sup>, Gregory Zaborski Jr.<sup>1</sup>, Aaron Sharpe<sup>2</sup>, Andrew J. Mannix<sup>1,2</sup> and Marc Kastner<sup>1,2,3</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>Massachusetts Institute of Technology, United States

**4:30 PM \*QT01.02.06**

**Consequences and Characterization of Device as Interface** Thomas Beechem; Purdue University, United States

SESSION QT01.03: Poster Session

Session Chairs: Amirhossein Hasani and Andrew Mannix

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**QT01.03.01**

**Large-Domain Growth of MoS<sub>2</sub> by Heterogeneous Oxygen-Assisted MOCVD** Yejun Lee and Byung Hee Hong; Seoul National University, Korea (the Republic of)

**QT01.03.02**

**Seeded Vapor-Phase Synthesis and Properties of Two-Dimensional Ferromagnet Fe<sub>3</sub>GeTe<sub>2</sub> Nanoplates** Yueai Lin, Haotian Jiang, Fan Fei, Ying Wang, Jun Xiao and Song Jin; University of Wisconsin–Madison, United States

**QT01.03.03**

**Rapid Automated 2D Material Characterization with Optical Contrast Heuristics** Glenn Foster<sup>1,1</sup>, Matthew Carbone<sup>2</sup>, Suji Park<sup>2</sup>, Houk Jang<sup>2</sup> and Patrick Vora<sup>1,1</sup>; <sup>1</sup>George Mason University, United States; <sup>2</sup>Brookhaven National Laboratory, United States

**QT01.03.04**

**Thickness-Dependent Structural and Transport Properties of Bi<sub>2</sub>Se<sub>3</sub> Thin Films** Dae-Hyung Cho<sup>1,2</sup>, Tae-Ha Hwang<sup>1</sup>, Yong-Duck Chung<sup>1,2</sup>, So-Young Lim<sup>1,2</sup>, Rina Kim<sup>1</sup> and Woo-Jung Lee<sup>1,2</sup>; <sup>1</sup>Electronics and Telecommunications Research Institute, Korea (the Republic of); <sup>2</sup>Korea University of Science and

Technology (UST), Korea (the Republic of)

SESSION QT01.04: Innovative Fabrication Techniques for 2D Materials II

Session Chairs: Dharmraj Kotekar Patil and Suji Park

Friday Morning, April 11, 2025

Summit, Level 4, Room 440

**8:00 AM \*QT01.04.01**

**Novel 2-Dimensional Atomic Crystals on Metal Substrates** [Hongjun Gao](#); Institute of Physics, Chinese Academy of Sciences, China

**8:30 AM \*QT01.04.02**

**Fabrication of Ultra-Clean Interfaces Between Atomically Thin Semiconductors and High  $k$  Dielectrics** [Manish Chhowalla](#); University of Cambridge, United Kingdom

**9:00 AM \*QT01.04.03**

**Thin-Film Growth of Topological Semi-Metal for Future Interconnect** [Hyeon-Jin Shin](#); Gwangju Institute of Science and Technology, Korea (the Republic of)

**9:30 AM BREAK**

**10:00 AM QT01.04.04**

**Enhancement of Hopping Transport in Polycrystalline WS<sub>2</sub> via Gate-Induced Oxygen Diffusion from Laser Digital Annealing** [Junil Kim](#)<sup>1</sup>, Arindam Bala<sup>2</sup>, Seungho Baek<sup>2</sup>, Hyuk-Jun Kwon<sup>1</sup> and Sunkook Kim<sup>2</sup>; <sup>1</sup>DGIST, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

**10:15 AM QT01.04.05**

**High-Quality and Low-Defect MoS<sub>2</sub> Monolayers Synthesized via Liquid-Precursor-Assisted CVD Controlled by a Mild Catalysts** [Zhenping Wang](#), Robert Bobowski and Cong Su; Yale University, United States

**10:30 AM \*QT01.04.06**

**Industrial Production of Graphene Materials for Consumer Electronics and Quantum Technology** [Byung Hee Hong](#)<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Graphene Square, Korea (the Republic of)

**11:00 AM QT01.04.07**

**Large Area Transition Metal Dichalcogenide Monolayers with Intrinsic Physics Properties** [Nicholas M. Olsen](#)<sup>1</sup>, Sunggun Yoon<sup>1</sup>, Madisen Holbrook<sup>1,1</sup>, Morgan Thinel<sup>1,1</sup>, Luke Holtzman<sup>1</sup>, Yiliu Li<sup>1</sup>, Yufeng Liu<sup>1</sup>, Dorian Gavilanes<sup>1,2</sup>, Katayun Barmak<sup>1</sup>, Abhay Pasupathy<sup>1</sup>, James Hone<sup>1</sup> and Xiaoyang Zhu<sup>1</sup>; <sup>1</sup>Columbia University, United States; <sup>2</sup>The City University of New York, United States

**11:15 AM QT01.04.08**

**Strain-Induced Decoupling Drives Gold-Assisted Exfoliation of Large 2D Crystal Monolayers** [Jakob Ziewer](#)<sup>1</sup>, Abyay Ghosh<sup>1</sup>, Michaela Hanusová<sup>2,3</sup>, Luka Pirker<sup>2</sup>, Otakar Frank<sup>2</sup>, Matěj Velický<sup>2</sup>, Myrta Grüning<sup>1</sup> and Fumin Huang<sup>1</sup>; <sup>1</sup>Queen's University Belfast, United Kingdom; <sup>2</sup>J. Heyrovský Institute of Physical Chemistry, Czechia; <sup>3</sup>University of Chemistry and Technology, Prague, Czechia

SESSION QT01.05: Understanding Properties and Phenomena in 2D Materials

Session Chairs: Amirhossein Hasani and Andrew Mannix

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 440

**1:30 PM \*QT01.05.01**

**Computational Design of Sustainable 2D Layered Semiconductors, Interfaces and Devices** [Yee Sin Ang](#); Singapore University of Technology and Design, Singapore

**2:00 PM \*QT01.05.02**

**Ultrafast Exciton Spectroscopy of Gate-Tunable Monolayer and Heterobilayer Devices** [Hyunyong Choi](#); Seoul National University, Korea (the Republic of)

**2:30 PM \*QT01.05.03**

**Valley-Spin Polarization at Zero Magnetic Field Induced by Strong Hole-Hole Interactions in Monolayer WSe<sub>2</sub>** [Louis Gaudreau](#); National Research Council Canada, Canada

**3:00 PM BREAK**

**3:30 PM \*QT01.05.04**

**Strain Manipulation and Generalized Defect Characterization of 2D Materials with Atomic Force Microscopy** [Matthew R. Rosenberger](#); University of Notre Dame, United States

**4:00 PM \*QT01.05.06**

**Magnetism and Strange Metal in V-Doped WSe<sub>2</sub>** [Dinh Loc Duong](#)<sup>1</sup>, Lan-Anh Thi Nguyen<sup>2</sup>, Mallesh Bathi<sup>2</sup>, Tuan Dung Nguyen<sup>2</sup> and Young Hee Lee<sup>2</sup>; <sup>1</sup>University of Maine, United States; <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

# SYMPOSIUM QT02

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Advanced Quantum Magnets and Related Technologies Toward Energy-Efficient Computing  
April 7 - April 10, 2025

Symposium Organizers

Charudatta Phatak, Argonne National Laboratory  
Elton Santos, University of Edinburgh  
Srinivasa Rao Singamaneni, The University of Texas at El Paso  
Nina-Juliane Steinke, ILL Neutrons for Society

Symposium Support

**Bronze**  
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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT02.01: Quantum Technologies/AI/ML I

Session Chairs: Elton Santos and Srinivasa Rao Singamaneni

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 442

**10:30 AM \*QT02.01.01**

**INDUSTRY TRACK: Voltage and Current Controlled Nanomagnetism for Memory and Logic** [Ramamoorthy Ramesh](#)<sup>1,2</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>University of California, Berkeley, United States

**11:00 AM QT02.01.02**

**Spintronic Security Devices Based on Magnetic Random-Access Memory** Soogil Lee<sup>1</sup>, Jaimin Kang<sup>2</sup>, Seungwook Choi<sup>1</sup> and Byong-Guk Park<sup>3</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Northwestern University, United States; <sup>3</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**11:15 AM QT02.01.03**

**Bioinspired Polymeric Quantum Systems** Mingfeng Wang; The Chinese University of Hong Kong, Shenzhen, China

SESSION QT02.02: New Quantum Magnets/Properties I

Session Chairs: Charudatta Phatak and Srinivasa Rao Singamaneni

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 442

**1:30 PM \*QT02.02.01**

**Electrical Switching of an Odd-Parity 'Altermagnet'** Riccardo Comin; Massachusetts Institute of Technology, United States

**2:00 PM QT02.02.02**

**Probing Magnetic Properties of Photoexcited CrSBr Using Electron Spin Resonance** Yohannes W. Getahun<sup>1</sup>, Eric D. Walter<sup>2</sup>, Daniel R. Romo<sup>1</sup>, Lovia Ofori<sup>1</sup>, Jenny Fertel<sup>1</sup>, Xavier Roy<sup>3</sup> and Srinivasa Rao Singamaneni<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>Columbia, United States

**2:15 PM QT02.02.03**

**Topological Spin Textures in Fe<sub>3</sub>GaTe<sub>2</sub> Triggered Correlated by with the Coexistence of Distinct Magnetic Phases** Sang-Eon Lee<sup>1,2</sup>, Yue Li<sup>3</sup>, Yeonkyu Lee<sup>4</sup>, Kice Brown<sup>5</sup>, Gregory McCandless<sup>5</sup>, Alex Moon<sup>1,6</sup>, Lingrui Mei<sup>1,6</sup>, Jaeyoung Kim<sup>2</sup>, Julia Chan<sup>5</sup>, Jeehoon Kim<sup>4</sup>, Charudatta Phatak<sup>3</sup>, Vadym Kulichenko<sup>1</sup> and Luis Balicas<sup>1,6</sup>; <sup>1</sup>National High Magnetic Field Laboratory, United States; <sup>2</sup>Hanyang University, Korea (the Republic of); <sup>3</sup>Argonne National Laboratory, United States; <sup>4</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>5</sup>Baylor University, United States; <sup>6</sup>Florida State University, United States

**2:30 PM BREAK**

SESSION QT02.03: Advanced Measurement Techniques/Properties I

Session Chairs: Charudatta Phatak and Elton Santos

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 442

**3:00 PM \*QT02.03.01**

**Light-Induced Metastability in a Cuprate Ladder** Matteo Mitrano; Harvard University, United States

**3:30 PM QT02.03.02**

**Investigation of High-Frequency Electron Paramagnetic Resonance in the Kagome-Lattice YMn<sub>6</sub>Sn<sub>6</sub> Crystal** Lovia Ofori<sup>1</sup>, Johan van Tol<sup>2</sup>, Srinivasa Rao Singamaneni<sup>1</sup>, Nathan Tolva<sup>3</sup> and Ghimire J. Nirmal<sup>4</sup>; <sup>1</sup>University of Texas at El Paso, United States; <sup>2</sup>Florida State University, United States; <sup>3</sup>Boston College, United States; <sup>4</sup>University of Notre Dame, United States

**3:45 PM QT02.03.03**

**First-Principles-Derived Magnetic Hamiltonian for the 2D Antiferromagnets MPS<sub>3</sub> (M = Mn, Fe, Co, Ni) Including Biquadratic Interactions**

Mohammad Amirabbasi and Peter Kratzer; University of Duisburg-Essen, Germany

**4:00 PM \*QT02.03.04**

**Ultrafast Spin-Phonon Coupling in van der Waals Antiferromagnets** Haidan Wen; Argonne National Laboratory, United States

**4:30 PM \*QT02.03.05**

**Nanoscale Measurements of Novel Textures in 2D Magnets** Joerg Wrachtrup<sup>1,2</sup>; <sup>1</sup>University of Stuttgart, Germany; <sup>2</sup>Max Planck Institute for Solid State Research, Germany

SESSION QT02.04: Quantum Technologies/AI/ML II

Session Chairs: Charudatta Phatak and Elton Santos

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 442

**8:30 AM +QT02.04.01**

**INDUSTRY TRACK: Building AI Hardware with Oxide Quantum Materials and Devices Integrated on Microelectronic Platforms** Shriram Ramanathan; Rutgers, The State University of New Jersey, United States

**9:00 AM \*QT02.04.02**

**All Optical Control of Magnetism for Energy Efficient and Brain Inspired Computing** Theo Rasing<sup>1,2</sup>; <sup>1</sup>Radboud University, Netherlands; <sup>2</sup>Wuhan University of Technology, China

**9:30 AM \*QT02.04.03**

**Designing High-Performance Magnets with Data-Mining** Olle R. Eriksson<sup>1,2</sup>, Alena Vishina<sup>1</sup> and Heike C. Herper<sup>1</sup>; <sup>1</sup>Uppsala University, Sweden; <sup>2</sup>WISE Wallenberg Initiative Materials Science, Sweden

**10:00 AM BREAK**

SESSION QT02.05: Simulations/Theory I

Session Chairs: Elton Santos and Srinivasa Rao Singamaneni

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 442

**10:30 AM \*QT02.05.01**

**Understanding the Emergence of Exotic Quantum States in 2D-Chern Insulators** Sugata Chowdhury; Howard University, United States

**11:00 AM \*QT02.05.02**

**Large-Scale Simulation of Spin and Orbital Dynamics in 2D Materials** Aron Cummings<sup>1</sup>, Luis Canonico<sup>1</sup>, Jorge Martínez Romeral<sup>1,2</sup> and Stephan Roche<sup>1,3</sup>; <sup>1</sup>Catalan Institute of Nanoscience and Nanotechnology (ICN2), Spain; <sup>2</sup>Autonomous University of Barcelona (UAB), Spain; <sup>3</sup>Institució Catalana de Recerca i Estudis Avançats (ICREA), Spain

**11:30 AM \*QT02.05.03**

**New Types of Kitaev Candidates and the Role of Kitaev Interaction in Ordered Magnetism** Changsong Xu<sup>1</sup>, Laurent Bellaiche<sup>2</sup> and Hongjun Xiang<sup>1</sup>; <sup>1</sup>Fudan University, China; <sup>2</sup>University of Arkansas, United States

SESSION QT02.06: New Quantum Magnets/Properties II

Session Chairs: Charudatta Phatak and Elton Santos

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 442

**1:30 PM \*QT02.06.01**

**Magnetism and Magneto-Transport in Covalent 2D Magnets by Self-Intercalation** Hao Zeng; University at Buffalo, The State University of New York, United States

**2:00 PM \*QT02.06.02**

**Polymorph Control of Magnetic Order in Epitaxial Cr<sub>x</sub>Te<sub>y</sub> Monolayers** Phil King; University of St Andrews, United Kingdom

**2:30 PM BREAK**

SESSION QT02.07: Magnonics and Magnetic Properties  
Session Chairs: Elton Santos and Srinivasa Rao Singamaneni  
Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 442

**3:30 PM \*QT02.07.01**

**Hybrid Magnon Modes** [Axel Hoffmann](#); University of Illinois at Urbana-Champaign, United States

**4:00 PM \*QT02.07.02**

**CrSBr—A New Platform for Nonlinear Opto-Magnonics** [Geoff Diederich](#); University of Maryland, Baltimore County, United States

**4:30 PM \*QT02.07.03**

**Ordering and Dynamics of f-Electrons in Metallic Hexagonal Magnets** [Yishu Wang](#); The University of Tennessee, Knoxville, United States

SESSION QT02.08: Poster Session: New Quantum Magnetic/Energy Materials

Session Chairs: Charudatta Phatak and Srinivasa Rao Singamaneni  
Wednesday Afternoon, April 9, 2025  
5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**QT02.08.01**

**Used and Unused Energizer Battery Material (E91,1.5V)—EPR and Magnetic Investigation** [Jenny Fertel](#), Kahani Smith and Srinivasa Rao Singamaneni; The University of Texas at El Paso, United States

SESSION QT02.09: Advanced Measurement Techniques/Properties II

Session Chairs: Charudatta Phatak and Elton Santos  
Thursday Morning, April 10, 2025  
Summit, Level 4, Room 442

**8:15 AM \*QT02.09.01**

**Unusual Domain Physics and Skyrmion Formation in Centrosymmetric *f*-Electron Antiferromagnets** [Priscila Rosa](#); Los Alamos National Laboratory, United States

**8:45 AM ^QT02.09.02**

**Insight into Topological Magnetic States in van der Waals Ferromagnets Enabled with Cryo Electron Microscopy** [Yue Li](#)<sup>1</sup>, Arthur R. McCray<sup>2</sup>, Eric Qian<sup>3</sup>, Duck Young Chung<sup>1</sup>, Mercuri G. Kanatzidis<sup>3</sup>, Amanda K. Petford-Long<sup>1,4</sup> and Charudatta Phatak<sup>1,4</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Stanford University, United States; <sup>3</sup>Northwestern University, United States; <sup>4</sup>Department of Materials Science and Engineering, United States

**9:15 AM \*QT02.09.03**

**Magnetic Materials with Nano-Skyrmions and Layered Magnetic Domains Studied by Scanning Tunneling Microscopy and Spin-Polarized STM** [TeYu Chien](#); University of Wyoming, United States

**9:45 AM BREAK**

**10:15 AM \*QT02.09.04**

**Proximity Effect and Tunability of Magnetic Behavior of 2-Dimensional van der Waals Magnets and Their Heterostructures** Neesha Yadav, Sandeep Sandeep and [Pintu Das](#); Indian Institute of Technology Delhi, India

**10:45 AM QT02.09.05**

**Pentagonal All-in-All-out Antiferromagnetic Chains in NaMn<sub>6</sub>Bi<sub>5</sub>** [Madalynn Marshall](#)<sup>1,2</sup>, Raimundas Sereika<sup>3</sup>, Ying Zhou<sup>4</sup>, Gang Wang<sup>4</sup>, Jie Ma<sup>5</sup>, Wenli Bi<sup>3</sup>, Randy Fishman<sup>2</sup>, David Parker<sup>2</sup> and Huibo Cao<sup>2</sup>; <sup>1</sup>Kennesaw State University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>University of Alabama, United States; <sup>4</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>5</sup>Shanghai Jiao Tong University, China

**11:00 AM QT02.09.06**

**Thickness-dependent Transport and Magnetic Properties of All-epitaxial Fe<sub>5</sub>GeTe<sub>2</sub>/WSe<sub>2</sub> Van der Waals Heterostructures** [Hua Lv](#)<sup>1</sup>, Jens Herfort<sup>1</sup>, Michael Hanke<sup>1</sup>, Chen Chen<sup>2</sup>, Joan M. Redwing<sup>2</sup>, Achim Trampert<sup>1</sup>, Mehak Loyal<sup>3</sup>, Gerhard Jakob<sup>3</sup>, Mathias Klau<sup>3</sup>, Roman Engel-Herbert<sup>1</sup>, Manfred Ramsteiner<sup>1</sup> and João Marcelo J. Lopes<sup>1</sup>; <sup>1</sup>Paul-Drude-Institut für Festkörperelektronik, Leibniz-Institut im Forschungsverbund Berlin e. V., Germany; <sup>2</sup>2D Crystal Consortium Materials Innovation Platform, Materials Research Institute, The Pennsylvania State University, United States; <sup>3</sup>Institute of Physics, Johannes Gutenberg University Mainz, Germany

**11:15 AM QT02.09.07**

**Spin-Orbit Torque Switching in Van der Waals Heterostructures of Topological Materials** [Won Joon Cho](#); Samsung Advanced Institute of Technology, Korea (the Republic of)

**11:30 AM \*QT02.09.08**

**Visualizing Two Subsequent Magnetic Phase Transitions in a Helimagnet Candidate** [Liuyan Zhao](#); University of Michigan, United States

SESSION QT02.10: Novel Quantum Magnetic Phases

Session Chairs: Charudatta Phatak and Elton Santos

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 442

**1:45 PM QT02.10.01**

**Spectroscopic Visualization of Magneto-Topological Phase Transitions in Topotactically-Converted Zintl Films** [Haim Beidenkopf](#), Hadas Shtrikman, Man Suk Song, Jean Souze, Moshe Haim, Ambikesh Gupta, Lothar Houben, Nurit Avraham, Binghai Yan and Yufei Zhao; Weizmann Institute of Science, United States

**2:00 PM QT02.10.03**

**Disorder Driven Crossover Between Anomalous Hall Regimes in Fe<sub>3</sub>GaTe<sub>2</sub>** Sang-Eon Lee<sup>1</sup>, Kice Brown<sup>2</sup>, Minkyu Park<sup>3</sup>, Vadym Kulichenko<sup>1</sup>, Yan Xin<sup>1</sup>, Julia Chan<sup>2</sup>, Gregory McCandless<sup>2</sup>, Soon Cheol Hong<sup>3</sup>, Jaeyoung Kim<sup>4</sup> and [Luis Balicas](#)<sup>1</sup>; <sup>1</sup>Florida State University, United States; <sup>2</sup>Baylor University, United States; <sup>3</sup>Quantum Technology Institute, Korea (the Republic of); <sup>4</sup>Hanyang University, Korea (the Republic of)

**2:15 PM QT02.10.04**

**Electronic Structure of van der Waals Ferromagnet Fe<sub>1-x</sub>GeTe<sub>2</sub> in Correlation with Structurally-Dependent Magnetic Domains** [Zixuan Li](#)<sup>1</sup>, Barat Achinuq<sup>1</sup>, Andrew May<sup>2</sup>, Padraic Shafer<sup>3</sup>, Christoph Klewe<sup>1</sup>, Alpha N'Diaye<sup>1</sup>, Hans Bechtel<sup>1</sup> and Stephanie Corder<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>Brookhaven National Laboratory, United States

**2:30 PM \*QT02.10.05**

**Nonlinear Coupled Magnonics** [Edoardo Baldini](#); The University of Texas at Austin, United States

## SYMPOSIUM QT03

Symposium Organizers

Long Ju, Massachusetts Institute of Technology  
Giulia Pacchioni, Springer Nature  
Jairo Velasco Jr., University of California, Santa Cruz  
Matthew Yankowitz, University of Washington

Symposium Support

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT03.01: van der Waals I

Session Chairs: Long Ju and Giulia Pacchioni

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 441

**10:30 AM \*QT03.01.01**

**Anomalous Hall Crystals in Rhombohedral Multilayer Graphene** [Ashvin Vishwanath](#); Harvard University, United States

**11:00 AM \*QT03.01.02**

**Displacement Field-Controlled Fractional Chern Insulators and Charge Density Waves in a Graphene/hBN Moire Superlattice** [Raymond Ashoori](#)<sup>1</sup>, Samuel Aronson<sup>1</sup>, Tonghang Han<sup>1</sup>, Zhengguang Lu<sup>1</sup>, Kenji Watanabe<sup>2</sup>, Takashi Taniguchi<sup>2</sup> and Long Ju<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>National Institute for Materials Science, Japan

**11:30 AM \*QT03.01.03**

**Topological Wigner Crystal and Quantum Anomalous Hall Effects in ABC Stacked Multilayer Graphene** [Yahui Zhang](#); Johns Hopkins University, United States

SESSION QT03.02: van der Waals II

Session Chairs: Long Ju and Yahui Zhang

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 441

**1:30 PM \*QT03.02.01**

**Superconductivity in Twisted Bilayer WSe<sub>2</sub>** [Cory Dean](#); Columbia University, United States

**2:00 PM \*QT03.02.02**

**Novel Probes for the Cascades in Magic Angle Twisted Bilayer Graphene** María José Calderón<sup>1</sup>, Alberto Camjayi<sup>2,3</sup>, Anushree Datta<sup>4</sup> and [Leni Bascones](#)<sup>1</sup>; <sup>1</sup>Instituto de Ciencia de Materiales de Madrid, Spain; <sup>2</sup>Universidad Buenos Aires, Argentina; <sup>3</sup>Conyct, Argentina; <sup>4</sup>Universities Paris Saclay and Paris Cité, France



**2:30 PM \*QT03.02.03**

**New Theoretical Insights into Moiré Solids from Machine Learning Assisted First-Principles Calculations** Ting Cao; University of Washington, United States

**3:00 PM BREAK**

**3:30 PM QT03.02.04**

**Visualizing the Origins of Topology in tMoTe<sub>2</sub>** Ellis A. Thompson<sup>1</sup>, Keng Tou Chu<sup>1</sup>, Florie Mesple<sup>1</sup>, Xiao-Wei Zhang<sup>1</sup>, Chaowei Hu<sup>1</sup>, Yuzhou Zhao<sup>1</sup>, Heonjoon Park<sup>1</sup>, Jiaqi Cai<sup>1</sup>, Eric Anderson<sup>1</sup>, Kenji Watanabe<sup>2</sup>, Takashi Taniguchi<sup>2</sup>, Jihui Yang<sup>1</sup>, Jiun-Haw Chu<sup>1</sup>, Xiaodong Xu<sup>1</sup>, Ting Cao<sup>1</sup>, Di Xiao<sup>1</sup> and Matthew Yankowitz<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>National Institute for Materials Science, Japan

**3:45 PM \*QT03.02.05**

**New Opportunities with Moiré Materials** Allan MacDonald; University of Texas-Austin, United States

**4:15 PM \*QT03.02.06**

**Electron Correlation and Topology in Rhombohedral Multilayer Graphene** Zhengguang Lu<sup>1,2</sup>, Tonghang Han<sup>2</sup>, Yuxuan Yao<sup>2</sup>, Zach Hadjri<sup>2</sup>, Jixiang Yang<sup>2</sup>, Junseok Seo<sup>2</sup>, Fan Zhang<sup>3</sup>, Liang Fu<sup>2</sup> and Long Ju<sup>2</sup>; <sup>1</sup>Florida State University, United States; <sup>2</sup>Massachusetts Institute of Technology, United States; <sup>3</sup>The University of Texas at Dallas, United States

**4:45 PM QT03.02.07**

**Switching Ferroelectricity with Dynamically Rotatable Dual-Gated Heterostructures** Gaia Maffione<sup>1</sup>, Liam Farrar<sup>1</sup>, Kenji Watanabe<sup>2</sup>, Takashi Taniguchi<sup>2</sup>, Dominique Maily<sup>1</sup> and Rebeca Ribeiro<sup>1</sup>; <sup>1</sup>Centre de Nanosciences et de Nanotechnologies (C2N), France; <sup>2</sup>National Institute for Materials Science, Japan

SESSION QT03.03: Poster Session

Session Chairs: Giulia Pacchioni and Jairo Velasco Jr.

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**QT03.03.01**

**Flux Synthesis and Point Defect Repair of Ultrapure Transition-Metal Dichalcogenides** Robert J. Boyd<sup>1</sup>, Daniel A. Rhodes<sup>1</sup> and Sina Najmaei<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>U.S. Army Research Laboratory, United States

**QT03.03.02**

**Twist-Optics in van der Waals Crystals** Mackey S. Long, Ryan Kowalski and Hakan Salihoglu; Vanderbilt University, United States

**QT03.03.03**

**Tunable Exciton-Driven Photoelasticity in van der Waals Acoustic Cavities** Jeremy T. Robinson<sup>1</sup>, Maxim Zalalutdinov<sup>1</sup>, Cory Cress<sup>1</sup>, Jose Fonseca<sup>1</sup>, Samuel Lagasse<sup>2</sup>, Ian Welland<sup>1</sup>, Thomas Reinecke<sup>1</sup>, Saikat Dey<sup>1</sup> and James Culbertson<sup>1</sup>; <sup>1</sup>U.S. Naval Research Laboratory, United States; <sup>2</sup>Laboratory for Physical Sciences, United States

SESSION QT03.04: van der Waals III

Session Chairs: Giulia Pacchioni and Aiming Yan

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 441

**8:30 AM \*QT03.04.01**

**Integer and Fractional Quantum Anomalous Hall Effect in Rhombohedral Graphene** Fan Zhang; The University of Texas at Dallas, United States

**9:00 AM \*QT03.04.02**

**New Developments in Fractional Quantum Anomalous Hall Effect** [Xiaodong Xu](#); University of Washington, United States

**9:30 AM \*QT03.04.03**

**Fractional Quantum Anomalous Hall Effect in Twisted Bilayer Transition Metal Dichalcogenides** [Di Xiao](#); University of Washington, United States

**10:00 AM BREAK**

**10:30 AM \*QT03.04.04**

**Impact of the Angular Alignment on the Crystal Field and Intrinsic Doping of Bilayer Graphene/BN Heterostructures** [Rebeca Ribeiro](#)<sup>1</sup>, Gaia Maffione<sup>1</sup>, Liam Farrar<sup>1</sup>, Viet-hung Nguyen<sup>2</sup>, Kenji Watanabe<sup>3</sup>, Takashi Taniguchi<sup>3</sup>, Jean-Christophe Charlier<sup>2</sup> and Dominique Maily<sup>1</sup>; <sup>1</sup>Center for Nanoscience and Nanotechnology, France; <sup>2</sup>Université Catholique de Louvain, Belgium; <sup>3</sup>National Institute for Materials Science, Japan

**11:00 AM \*QT03.04.05**

**Thermodynamic Quantum Oscillations and Band Reconstruction in Strongly Correlated Moiré Systems** [Eli Zeldov](#); Weizmann Institute of Science, Israel

**11:30 AM QT03.04.06**

**Ab Initio Prediction of Novel Induced Stacking Phase Transition in Intercalated Bi<sub>2</sub>Se<sub>3</sub> Heterostructures—Theory and Implications** [Drake Niedzielski](#)<sup>1</sup>, Betul Pamuk<sup>2</sup>, Mark Polking<sup>3</sup> and Tomas Arias<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Williams College, United States; <sup>3</sup>Lincoln Laboratory, MIT, United States

SESSION QT03.05: van der Waals IV

Session Chairs: Rebeca Ribeiro-Palau and Matthew Yankowitz

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 441

**1:30 PM \*QT03.05.01**

**Stacking Enabled Property Tailoring in van der Waals Materials** [Aiming Yan](#); University of California, Santa Cruz, United States

**2:00 PM \*QT03.05.02**

**High-Temperature Quantum Valley Hall Effect and Topological Valleytronics** [Jun Zhu](#); The Pennsylvania State University, United States

**2:30 PM BREAK**

**3:30 PM \*QT03.05.03**

**Interactions and Topology Within the Narrow Bands of Twisted Bilayer Graphene** [Oskar Vafek](#)<sup>1,2</sup>; <sup>1</sup>National High Magnetic Field Laboratory, United States; <sup>2</sup>Florida State University, United States

**4:00 PM \*QT03.05.04**

**Correlated Excitons in TMDC Moiré Superlattice** [Sufei Shi](#); Carnegie Mellon University, United States

**4:30 PM \*QT03.05.05**

**Imaging Wigner Crystals in 2D Semiconducting Devices** [Michael Crommie](#)<sup>1,2,1</sup>, Zhehao Ge<sup>1,2</sup>, Zehao He<sup>1,2</sup>, Qize Li<sup>1,2</sup>, Feng Wang<sup>1,2,1</sup>, Ziyu Xiang<sup>1,2</sup>, Jianghan Xiao<sup>1,2</sup> and Hongyuan Li<sup>3</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Cornell University, United States

SESSION QT03.06: van der Waals V

Session Chairs: Qiong Ma and Matthew Yankowitz

Thursday Morning, April 10, 2025

Summit, Level 4, Room 441

**9:00 AM \*QT03.06.01**

**Measurement of Superfluid Stiffness of Twisted Multilayer Graphene Superconductors** [Philip Kim](#); Harvard University, United States

**9:30 AM \*QT03.06.03**

**Visualizing Strongly Correlated Electronic States in Two-Dimensional Materials** [Ali Yazdani](#); Princeton University, United States

**10:00 AM BREAK**

**10:30 AM QT03.06.04**

**Spatial-Selective Electrostatic Doping of Two-Dimensional Semimetals via Substrate Heterointerface Engineering** [Ke Ma](#), Jiayun Liang, Zakaria Al Balushi and Matthew P. Sherburne; University of California, Berkeley, United States

**10:45 AM \*QT03.06.05**

**Beyond the Single Moiré—Independently Tunable Flat Bands in a Double Moiré System** Yimeng Wang, Jihang Zhu, Allan MacDonald and [Emanuel Tutuc](#); The University of Texas at Austin, United States

**11:15 AM \*QT03.06.06**

**Induced Spin-Orbit Interaction in Graphene Quantum Devices** [Klaus Ensslin](#); ETH Zurich, Switzerland

**11:45 AM QT03.06.07**

**Integration of Air-Sensitive 2D Monolayers for High Performance vdW Heterostructure-Based Devices and Their Optoelectronic Properties** [HaeYeon Lee](#)<sup>1</sup>, Zhiying Wang<sup>2</sup>, Anjaly Rajendran<sup>2</sup>, Grace Chen<sup>3</sup>, Philip Kim<sup>3</sup> and James Hone<sup>2</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>Columbia University, United States; <sup>3</sup>Harvard University, United States

SESSION QT03.07: van der Waals VI

Session Chairs: Ting Cao and Jairo Velasco Jr.

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 441

**1:30 PM \*QT03.07.01**

**Imaging Strongly Correlated Phases in Twisted Trilayer Graphene** [Stevan Nadj-Perge](#); California Institute of Technology, United States

**2:00 PM \*QT03.07.02**

**Quantum Transport in 2D Superconductors, Insulators and Semiconductors** Chun Ning (Jeanie) Lau and [Yuxin Zhang](#); The Ohio State University, United States

**2:30 PM \*QT03.07.03**

**Non-Collinear Antiferromagnetism and Altermagnetism in Intercalation Compounds of Transition Metal Dichalcogenides** Daniel K. Bediako<sup>1</sup> and [Lilia S. Xie](#)<sup>2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Princeton University, United States

**3:00 PM BREAK**

**3:30 PM QT03.07.04**

**Relationship Between Capillary Wettability, Mass and Momentum Transfer in Nanoconfined Water—The Case of Water in Nanoslits of Graphite and Hexagonal Boron Nitride** [Paola Carbone](#); The University of Manchester, United Kingdom

**3:45 PM \*QT03.07.05**

**Nonlinear Responses in van der Waals Topological Materials** [Qiong Ma](#); Boston College, United States

**4:15 PM \*QT03.07.06**

**Electron-Hole Fluid in van der Waals Heterostructures** [Feng Wang](#)<sup>1,2</sup>; <sup>1</sup>University of California-Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

4:45 PM QT03.07.07

**Hidden Phonon Highways Promote Photoinduced Interlayer Energy Transfer in Twisted Transition Metal Dichalcogenide Heterostructures** [Amalya C. Johnson](#)<sup>1</sup>, Johnathan Georganas<sup>1</sup>, Xiaozhe Shen<sup>2</sup>, Helen Yao<sup>1</sup>, Ashley P. Saunders<sup>1</sup>, Helen J. Zeng<sup>1</sup>, Hyungjin Kim<sup>1</sup>, Aditya Sood<sup>1</sup>, Tony F. Heinz<sup>1</sup>, Aaron Lindenberg<sup>1</sup>, Duan Luo<sup>2</sup>, Felipe H. da Jornada<sup>1</sup> and Fang Liu<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

# SYMPOSIUM QT04

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Transformative Oxide Heterostructures for Microelectronics and Energy Technologies  
April 7 - April 9, 2025

## Symposium Organizers

Ho Nyung Lee, Oak Ridge National Laboratory  
Elizabeth Skoropata, Paul Scherrer Institut  
Ruijuan Xu, North Carolina State University  
Hua Zhou, Argonne National Laboratory

## Symposium Support

**Bronze**  
Nexttron  
QUANTUM DESIGN

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT04.01: Membranes I

Session Chairs: Ho Nyung Lee and Bai Yang Wang

Monday Morning, April 7, 2025

Summit, Level 4, Room 440

**8:30 AM \*QT04.01.01**

**Monolithic 3D Integration of Complex Oxides for Advanced Electronics** [Jeehwan Kim](#); Massachusetts Institute of Technology, United States

**9:00 AM \*QT04.01.02**

**Fabrication of Large Size, High Integrity Manganite Oxide Membranes** [Xiaofang Zhai](#), Qing Wang, Qinwen Lu and Long Cheng; ShanghaiTech University, China

**9:30 AM \*QT04.01.03**

**Strain Engineering of Freestanding Cuprate Membranes** [Bai Yang Wang](#)<sup>1,2</sup>, Eunkyo Ko<sup>1,2</sup>, Cheng-Tai Kuo<sup>2</sup>, Jiarui Li<sup>1,2</sup>, Xin Wei<sup>1,2</sup>, Yijun Yu<sup>1,2</sup>, Jun-Sik Lee<sup>2</sup> and Harold Y. Hwang<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**10:00 AM BREAK**

**10:30 AM \*QT04.01.04**

**Artificially designed heterostructures through freestanding nanomembranes for new physcial coupling and M3D integration** [Sanghoon Bae](#); Washington University in St. Louis, United States

**11:00 AM QT04.01.05**

**Exploring the Moiré Landscape of Graphene–Perovskite Oxide Membranes with Machine Learning** [Victor Rosendal](#), Peter Bøggild, Nini Pryds and

Mads Brandbyge; Technical University of Denmark, Denmark

**11:15 AM \*QT04.01.06**

**Interface Design Beyond Epitaxy** Varun Harbola; Max Planck Institute, Germany

SESSION QT04.02: *In Situ* and Time-Resolved Properties

Session Chairs: Hyeon Han and Hua Zhou

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 440

**1:45 PM \*QT04.02.01**

***In Situ* Coherent X-Ray Studies of Complex Oxide Heterostructures** Dillon D. Fong<sup>1</sup>, Qingteng Zhang<sup>1</sup>, Jill Wenderott<sup>2</sup>, Yan Li<sup>1</sup>, Tadesse Billo Reta<sup>1</sup>, Irene Calvo-Almazan<sup>3</sup>, Gang Wan<sup>4</sup>, Vitalii Starchenko<sup>5</sup>, Panchapakesan Ganesh<sup>5</sup>, Hyoungjeen Jeon<sup>6</sup>, Ho Nyung Lee<sup>5</sup> and Hua Zhou<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Drexel University, United States; <sup>3</sup>University of Zaragoza, Spain; <sup>4</sup>Stanford University, United States; <sup>5</sup>Oak Ridge National Laboratory, United States; <sup>6</sup>Pusan National University, Korea (the Republic of)

**2:15 PM QT04.02.02**

**Multi Time Scale Mesoscale Domain Dynamics in Ferroelectric Superstructures Observed Using Pump-Probe Coherent X-Ray Diffraction** Anudeep Mangu<sup>1</sup>, Vladimir A. Stoica<sup>2,1</sup>, Akash Saha<sup>2</sup>, Huyongqing Chen<sup>3</sup>, Saugata Sarker<sup>2</sup>, Matthieu Chollet<sup>4</sup>, Sanghoon Song<sup>4</sup>, Wanzheng Hu<sup>3</sup>, Lane W. Martin<sup>5</sup>, Diling Zhu<sup>4</sup>, Venkatraman Gopalan<sup>2</sup>, Yue Cao<sup>1</sup> and Aaron Lindenberg<sup>6,4</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The Pennsylvania State University, United States; <sup>3</sup>Boston University, United States; <sup>4</sup>SLAC National Accelerator Laboratory, United States; <sup>5</sup>Rice University, United States; <sup>6</sup>Stanford University, United States

**2:30 PM \*QT04.02.03**

**Designing Linearity from Nonlinearity Through Oxide Heterostructure Engineering** Changhee Sohn; Ulsan National Institute of Science and Technology, Korea (the Republic of)

**3:00 PM BREAK**

**3:30 PM \*QT04.02.04**

**Terahertz Magnon Dynamics in Oxide Heterostructures with Metal-Insulator Transitions** Ambrose Seo<sup>1,2</sup>; <sup>1</sup>University of Kentucky, United States; <sup>2</sup>Ewha Womans University, Korea (the Republic of)

**4:00 PM QT04.02.05**

**Ultrafast Dynamics of Correlated Electron Systems—Performance of Furka—The Soft X-Ray Condensed Matter Endstation at the Swiss Free Electron Laser (SwissFEL)** Elizabeth Skoropata; Paul Scherrer Institut, Switzerland

**4:15 PM QT04.02.06**

**Development of Highly Selective and Scalable Gas Sensor Arrays Using Atmospheric Pressure Spatial Atomic Layer Deposition (AP-SALD)** Ahmed M. Shahin<sup>1,2,3</sup>, Agosh Saini<sup>1,2,3</sup>, Na Young Kim<sup>1,4,3</sup> and Kevin Musselman<sup>1,2,3</sup>; <sup>1</sup>University of Waterloo, Canada; <sup>2</sup>Mechanical and Mechatronics Engineering, Canada; <sup>3</sup>Waterloo Institute for Nanotechnology, Canada; <sup>4</sup>Electrical and Computer Engineering, Canada

**4:30 PM QT04.02.07**

**10-nm-Thick Silicon Oxide in Conductive Bridging Random Access Memory Enables High Switching Speed, Ultra-Low Operation Voltage and Ultra-Low LRS Resistance** Hao Ren; ShanghaiTech University, China

**4:45 PM QT04.02.08**

**Combinatorial Sputtering of Photoluminescent Europium Titanium Oxide Thin Films** Junfeng Chen, Jeff Rao and Adrianus Indrat Aria; Cranfield University, United Kingdom

SESSION QT04.03: Membranes II

Session Chairs: Sanghoon Bae and Bharat Jalan

Tuesday Morning, April 8, 2025  
Summit, Level 4, Room 440

**10:30 AM \*QT04.03.01**

**Moiré-Engineered Oxide Membrane Heterostructures** Chang-Beom Eom; University of Wisconsin-Madison, United States

**11:00 AM \*QT04.03.02**

**Oxide Bicrystals—A Novel Platform for Engineering Quantum Interfaces** Bharat Jalan; University of Minnesota, United States

**11:30 AM \*QT04.03.03**

**Twist Engineering in Ultrathin Transition Metal Oxide Freestanding Membranes—A New Frontier in Oxide Technology** Nini Pryds; Technical University Denmark, Denmark

SESSION QT04.04: Quantum Interfaces

Session Chairs: Nini Pryds and Xiaofang Zhai

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 440

**1:30 PM \*QT04.04.01**

**New Opportunities at Quantum Heterointerfaces—From Oxides to Nitrides** Erjia Guo; Institute of Physics, Chinese Academy of Sciences, China

**2:00 PM \*QT04.04.02**

**Unlocking Novel Magnetism in Transition Metal Oxides** Milan Radovic; Paul Scherrer Institut, Switzerland

**2:30 PM \*QT04.04.03**

**Quantum Monte Carlo for Quantum Heterostructures** Thomas A. Maier; Oak Ridge National Laboratory, United States

**3:00 PM BREAK**

**3:30 PM \*QT04.04.04**

**Universality of Aperiodic Quantum Oscillations at Complex Oxide Interfaces** Km Rubi<sup>1,2</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>National High Magnetic Field Laboratory, United States

**4:00 PM QT04.04.05**

**High Electron Density and Rashba Splitting in Complex Oxide Heterostructures SrGeO<sub>3</sub>-KBO<sub>3</sub> (B=Ta,Nb)** Suman Mondal and Amrita Bhattacharya; Indian Institute of Technology Bombay, India

**4:15 PM QT04.04.06**

**Towards Room-Temperature Ferroelectric-Spin-Orbit (FESO) Devices Based on Perovskite Ferroelectrics** Anouk S. Goossens<sup>1</sup>, Ruchi Tomar<sup>1</sup>, Fernando Gallego<sup>1</sup>, Thomas Buttiens<sup>1</sup>, Marko Kuvezdić<sup>1</sup>, Luis Moreno Vicente-Arche<sup>1</sup>, Lucia Iglesias<sup>1</sup>, Florian Godel<sup>1</sup>, Laurent Villa<sup>2</sup>, Jean-Philippe Attane<sup>2</sup> and Manuel Bibes<sup>1</sup>; <sup>1</sup>Laboratoire Albert Fert, France; <sup>2</sup>Spintec, France

**4:30 PM \*QT04.04.07**

**Spin and Topological Phenomena in Low Loss Ferromagnetic Insulator Thin Films** Charles Zheng<sup>1</sup>, Sanyum Channa<sup>1</sup>, Houssam Sabri<sup>2</sup>, Lauren Riddiford<sup>1</sup>, Jacob Wisser<sup>1</sup>, Krishnamurthy Mahalingam<sup>3</sup>, Cynthia Bowers<sup>3</sup>, Michael McConney<sup>3</sup>, Alpha N'Diaye<sup>4</sup>, Arturas Vailionis<sup>1</sup>, Egecan Cogulu<sup>5</sup>, Haowen Ren<sup>5</sup>, Tianyue Chen<sup>5</sup>, Zbigniew Galazka<sup>6</sup>, Andrew Kent<sup>5</sup>, Jiadong Zang<sup>2</sup> and Yuri Suzuki<sup>1,7</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>University of New Hampshire, United States; <sup>3</sup>Air Force Research Laboratory, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States; <sup>5</sup>New York University, United States; <sup>6</sup>Leibniz-Institut für Kristallzüchtung, Germany; <sup>7</sup>SLAC National Accelerator Laboratory, United States

SESSION QT04.05: Poster Session

Session Chairs: Elizabeth Skoropata and Ruijuan Xu

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**QT04.05.01**

**A MXene Decorated ZnO Nanorod Gas Sensor for Low Concentration NO<sub>2</sub> at Room Temperature via UV Irradiation** Gyeongtae Kim, Seung Taek Jo, Jimyeong Park, Dae-Hwang Yoo, Myung Sik Choi and Jong Wook Roh; Kyungpook National University, Korea (the Republic of)

**QT04.05.02**

**On-Surface Preparation and Doping of Single-Layer NiO<sub>2</sub> and Sr<sub>x</sub>NiO<sub>2</sub>** Aidi Zhao; ShanghaiTech University, China

**QT04.05.03**

**Microscale Patterning of Transparent Conductive Oxides (TCOs) Using High Precision Capillary Printing** Sahar Al Kamand<sup>1</sup>, Amin Mbarki<sup>1</sup>, Marc Pascual<sup>1</sup>, Achille Guitton<sup>1</sup>, Ludovic Hahn<sup>2</sup>, Chloé Guerin<sup>2</sup>, Vincent Jousseume<sup>2</sup> and Anthony Fiorini<sup>3</sup>; <sup>1</sup>Humminck, France; <sup>2</sup>CEA, France; <sup>3</sup>RP America, United States

**QT04.05.04**

**Enhancing Thermophysical Properties and Photocatalytic Performance in PtModified Bi<sub>4</sub>O<sub>4</sub>SeCl<sub>2</sub>-Based Hybrid Heterostructures: Entropy and Phase Engineering for Advanced Energy Applications** Yangyang Shi; Southeast University, China

SESSION QT04.06: Microscopy and Structure I

Session Chairs: Erjia Guo and Jordan Hachtel

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 440

**9:00 AM \*QT04.06.01**

**Assessing the Nature of Ferroelectric Domain Walls in Lead Titanate Superlattices** Marios Hadjimichael<sup>1</sup>, Edoardo Zatterin<sup>2</sup>, Petr Ondrejko<sup>3</sup>, Louis Bastogne<sup>4</sup>, Céline Lichtensteiger<sup>5</sup>, Ludovica Tovaglieri<sup>5</sup>, Daniel A. Chaney<sup>2</sup>, Alireza Sasani<sup>4</sup>, Alexei Bosak<sup>2</sup>, Steven Leake<sup>2</sup>, Pavlo Zubko<sup>6</sup>, Philippe Ghosez<sup>4</sup>, Jiri Hlinka<sup>3</sup> and Jean-Marc Triscone<sup>5</sup>; <sup>1</sup>University of Warwick, United Kingdom; <sup>2</sup>European Synchrotron Radiation Facility, France; <sup>3</sup>The Czech Academy of Sciences, Czechia; <sup>4</sup>Université de Liège, Belgium; <sup>5</sup>University of Geneva, Switzerland; <sup>6</sup>University College London, United Kingdom

**9:30 AM QT04.06.02**

**Structure and Domain Formation in WO<sub>3</sub> Thin Films Under Epitaxial Strain** Ewout van der Veer<sup>1</sup>, Jack Eckstein<sup>2</sup>, Martin Sarott<sup>1</sup>, Stijn Feringa<sup>1</sup>, Dennis van der Veen<sup>1</sup>, Majid Ahmadi<sup>1</sup>, Bart J. Kooi<sup>1</sup> and Beatriz Noheda<sup>1</sup>; <sup>1</sup>University of Groningen, Netherlands; <sup>2</sup>University of Cambridge, United Kingdom

**9:45 AM QT04.06.03**

**Investigation of Atomic-Scale Topotactic Phase Transformation in Perovskite La<sub>0.5</sub>Sr<sub>0.5</sub>CoO<sub>x</sub> Resistive Switching Memristive Device** Zi-Qin Hong<sup>1</sup>, Yen-Jung Chen<sup>1</sup>, Jan-Chi Yang<sup>2</sup> and Wen-Wei Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>2</sup>National Cheng Kung University, Taiwan

**10:00 AM BREAK**

**10:30 AM \*QT04.06.04**

**Hyperbolic Plasmon Polaritons Propagating in Ultrapure Metal PdCoO<sub>2</sub>** Sangmoon Yoon<sup>1</sup>, Carlos Maciel-Escudero<sup>2</sup>, Rainer Hillenbrand<sup>3</sup>, Javier Aizpurua<sup>4</sup>, Andrew R. Lupini<sup>5</sup> and Ho Nyung Lee<sup>5</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>CSIC-UPV/EHU, Spain; <sup>3</sup>CIC NanoGUNE, Spain; <sup>4</sup>Donostia International Physics Center, Spain; <sup>5</sup>Oak Ridge National Laboratory, United States

**11:00 AM \*QT04.06.05**

**Advanced Epitaxy for Complex Oxide Interfaces** Eren Suyolcu; Max Planck Institute for Solid State Research, Germany

**11:30 AM \*QT04.06.06**

**Measuring Polar Displacement and Lattice Strain in Ferroelastic Specimens via Precession-Enhanced Cepstral Analysis** Megan E. Holtz; Colorado School of Mines, United States

SESSION QT04.07: Microscopy and Structure II  
Session Chairs: Eren Suyolcu and Sangmoon Yoon  
Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 440

**1:30 PM \*QT04.07.01**

**Unveiling Topology-Induced Phonons Modes Using High-Spatial-Resolution Polarization-Selective Electron Energy-Loss Spectroscopy** Jordan A. Hachtel; Oak Ridge National Laboratory, United States

**2:00 PM \*QT04.07.02**

**Angstrom Scale Imaging of Polarization Induced Phonons in Ferroelectric Materials** Sandhya Susarla; Arizona State University, United States

**2:30 PM BREAK**

SESSION QT04.08: Tailored Transport, Electronic and Magnetic States  
Session Chairs: Milan Radovic and Changhee Sohn  
Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 440

**3:30 PM \*QT04.08.01**

**Strongly Correlated Dirac Semimetal in Perovskite Iridates** Jun Fujioka; University of Tsukuba, Japan

**4:00 PM QT04.08.02**

**Engineering the Synthesis and Electronic Properties of Hybrid MBE-Grown Epitaxial IrO<sub>2</sub> Thin Films** Sreejith Nair<sup>1</sup>, Zhifei Yang<sup>1,1</sup>, Seung G. Jeong<sup>1</sup>, Dooyong Lee<sup>2,1</sup>, Silu Guo<sup>1</sup>, Abdul Saboor<sup>3</sup>, Yan Li<sup>4</sup>, Hua Zhou<sup>4</sup>, Anderson Janotti<sup>3</sup>, Kevin Storr<sup>5</sup>, K. Andre Mkhoyan<sup>1</sup>, Kelsey A. Stoerzinger<sup>1</sup> and Bharat Jalan<sup>1</sup>; <sup>1</sup>University of Minnesota Twin Cities, United States; <sup>2</sup>Kyungpook National University, Korea (the Republic of); <sup>3</sup>University of Delaware, United States; <sup>4</sup>Argonne National Laboratory, United States; <sup>5</sup>Prairie View A&M University, United States

**4:15 PM QT04.08.03**

**Tailoring Electrical and Magnetic Properties in Oxide Thin Films via Ionic Defect Control** Hyeon Han; Pohang University of Science and Technology, Korea (the Republic of)

**4:30 PM \*QT04.08.04**

**Signatures of Spin Liquid Ground State in Epitaxial Thin Films of TbInO<sub>3</sub>** Johanna Nordlander<sup>1,2</sup>, Margaret A. Anderson<sup>2</sup>, Tony Chiang<sup>3</sup>, Austin Kaczmarek<sup>4</sup>, Nabaraj Pokhrel<sup>5</sup>, Kuntal Talit<sup>5</sup>, Spencer Doyle<sup>2</sup>, Edward Mercer<sup>6</sup>, Christian Tzschaschel<sup>2</sup>, Jun Ho Son<sup>4</sup>, Hesham El-Sherif<sup>2</sup>, Charles Brooks<sup>2</sup>, Eun-Ah Kim<sup>4</sup>, Alberto De la Torre<sup>6</sup>, Ismail El Baggari<sup>2</sup>, Elizabeth Nowadnick<sup>5</sup>, Katja C. Nowack<sup>4</sup>, John T. Heron<sup>3</sup> and Julia Mundy<sup>2</sup>; <sup>1</sup>University of Zurich, Switzerland; <sup>2</sup>Harvard University, United States; <sup>3</sup>University of Michigan, United States; <sup>4</sup>Cornell University, United States; <sup>5</sup>University of California, Merced, United States; <sup>6</sup>Northeastern University, United States

# SYMPOSIUM QT05

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Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures

April 8 - April 10, 2025

Symposium Organizers

Unai Atxitia Macizo, Consejo Superior de Investigaciones Científicas



Judy Cha, Cornell University  
Jun Xiao, University of Wisconsin-Madison  
Xiao-Xiao Zhang, University of Florida

Symposium Support

**Platinum**

Gordon and Betty Moore Foundation

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT05.01: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures I

Session Chair: Unai Atxitia Macizo

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 443

**10:30 AM +QT05.01.01**

**Hidden States and Dynamics in Moiré Quantum Matter** Xiaoyang Zhu; Columbia University, United States

**11:00 AM \*QT05.01.02**

**Emergent Moiré Magnetism in Near 0° and Near 180° Twisted Double Bilayer CrI<sub>3</sub>** Liuyan Zhao; University of Michigan, United States

**11:30 AM QT05.01.03**

**Detection of Chiral Fluctuations Driven by Frustration in Mott Insulators** Kuan Hsiang Hsu<sup>1,2</sup>, Chunjing Jia<sup>3</sup>, Brian Moritz<sup>2</sup>, Rudi Hackl<sup>4,5,6</sup> and Tom Devereaux<sup>1,2,7</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States; <sup>3</sup>University of Florida, United States; <sup>4</sup>Walther Meissner Institut, Germany; <sup>5</sup>Technische Universität München, Germany; <sup>6</sup>IFW Dresden, Germany; <sup>7</sup>Geballe Laboratory for Advanced Materials, United States

**11:45 AM QT05.01.04**

**Novel Spin Configuration in the Non-Centrosymmetric Magnet ScMnGe** Sunil K. Karna<sup>1</sup>, David Young<sup>2</sup>, John DiTusa<sup>3</sup>, Michael McGuire<sup>4</sup>, Damien Tristant<sup>5</sup> and Chin-Wei Wang<sup>6</sup>; <sup>1</sup>Prairie View A&M University, United States; <sup>2</sup>Louisiana State University, United States; <sup>3</sup>Indiana University Indianapolis, United States; <sup>4</sup>Oak Ridge National Laboratory, United States; <sup>5</sup>Northwestern State University, United States; <sup>6</sup>National Synchrotron Radiation Research Center, Taiwan

SESSION QT05.02: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures II

Session Chairs: Jun Xiao and Xiao-Xiao Zhang

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 443

**1:30 PM \*QT05.02.01**

**Magnetism in Quantum Flatland—Controlling Magnetic Phases and Light-Matter Interactions in CrSBr** Ting Cao; University of Washington, United States

**2:00 PM \*QT05.02.02**

**Unconventional Magnon Photon Coupling in a Magnetic Semiconductor** Youn Jue Bae; Cornell University, United States

**2:30 PM BREAK**

**3:00 PM ^QT05.02.03**

**Revealing the Structure-Property Relationship in van der Waals Materials by Nanomechanical Resonator** Ying Wang; University of Wisconsin-

Madison, United States

**3:30 PM \*QT05.02.04**

**Topological Spin Textures Coupled to Optical and Electrical Excitations in Insulating van der Waals Ferromagnets** Maciej Koperski; National University of Singapore, Singapore

**4:00 PM QT05.02.05**

**Search for Chiral Phonons in MnPS<sub>3</sub>** Banhi Chatterjee and Peter Kratzer; University of Duisburg-Essen, Germany

**4:15 PM QT05.02.06**

**Probing Local Structure and Magnetic Order in Low-Dimensional Fe<sub>x</sub>NbCh<sub>2</sub> Magnetic Intercalation Compounds** Matthew Erodici and Daniel K. Bediako; University of California, Berkeley, United States

**4:30 PM QT05.02.07**

**Effects of Cu Doping on the Structural, Morphological, Thermal and Magnetic Properties of NiTe<sub>2</sub>** Arumugam Sonachalam<sup>1,2</sup> and Rajkumar Sokkalingam<sup>1</sup>; <sup>1</sup>Bharathidasan University, India; <sup>2</sup>Tamil Nadu Open University, India

**4:45 PM QT05.02.08**

**Correlating the Strain Distribution and Magnetic Texture in a Layered Chiral Magnet** Justin S. Woods<sup>1</sup>, Yue Cao<sup>1</sup>, Hao Zheng<sup>1</sup>, Zhonghou Cai<sup>1</sup>, Yan Li<sup>1</sup>, Yue Li<sup>1</sup>, Sang-Wook Cheong<sup>2</sup>, Kai Du<sup>2</sup>, Hanfei Yan<sup>3</sup> and Ajith Pattammattel<sup>3</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Rutgers, The State University of New Jersey, United States; <sup>3</sup>Brookhaven National Laboratory, United States

SESSION QT05.03: Poster Session

Session Chairs: Jun Xiao and Xiao-Xiao Zhang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**QT05.03.01**

**Investigating the 1T' to Td Phase Transition in Mo<sub>1-x</sub>W<sub>x</sub>Te<sub>2</sub> via Raman Spectroscopy** Riccardo Torsi, Maria Munoz, Sergiy Krylyuk, Albert Davydov and Angela R. Hight Walker; National Institute of Standards and Technology, United States

**QT05.03.02**

**New Search Rule to Generate Valley Degrees of Freedom and Corresponding Topological Phases with In-plane Magnetization** Subhendu Mishra; Indian Institute of Science Bangalore, India

**QT05.03.03**

**Investigation of Optical and Electrical Properties of CVD Grown MoS<sub>2</sub>(1-x)Se<sub>2x</sub>** Kamini Bharti, Sudipta Khamrui, Preetam Banerjee and Debamalya Banerjee; Indian Institute of Technology Kharagpur, India

**QT05.03.04**

**Exploring the Morphology of Two, Three and Four-Atom Removed Hole Defects in 2D B<sub>2</sub>C Monolayers Using a Machine Learning-Enhanced Process** Dominic A. Milla, Liyuan Zhang and Michael Groves; California State University, Fullerton, United States

**QT05.03.05**

**Electronic Structure and Magnetic Properties of a Rare-Earth-Based Antiferromagnet ErNi<sub>3</sub>Ga<sub>9</sub>** Sabin Regmi<sup>1</sup>, Volodymyr Buturlim<sup>1</sup>, Binod K. Rai<sup>2</sup>, Peter Oppeneer<sup>3</sup> and Krzysztof Gofryk<sup>1</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Savannah River National Laboratory, United States; <sup>3</sup>Uppsala University, Sweden

**QT05.03.06**

**Systematically Quantifying the Morphology and Electronic Properties of Physical Hole Defects in Graphene** Michael Groves and Alyana A. Carrell; California State University Fullerton, United States

**QT05.03.07**

**Fractional Quantum Hall Effect in Trilayer Graphene Proximitized by V-Doped WSe<sub>2</sub>** Pramod Ghising<sup>1</sup>, Ashok Mondal<sup>1,2</sup>, Malleth Bathi<sup>1,2</sup>, Kenji Watanabe<sup>3</sup>, Takashi Taniguchi<sup>3</sup> and Young Hee Lee<sup>1,4,5</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Department of Energy Science, Sungkyunkwan University, Suwon 16419, Republic of Korea, Korea (the Republic of); <sup>3</sup>National Institute for Materials Science, Japan; <sup>4</sup>Center for Low-Dimensional Quantum Materials, Hubei University of Technology, Wuhan 430062, China, China; <sup>5</sup>Center for Two-dimensional Quantum Heterostructures, Institute for Basic Science (IBS), Department of Energy Science, Sungkyunkwan University, Suwon 16419, Republic of Korea, Korea (the Republic of)

#### QT05.03.08

**Hysteretic Quantum Hall Ferromagnetism in electronically decoupled twisted bilayer graphene** Vineet Pandey, Prasenjit Ghosh and Vidya Kochat; Indian Institute of Technology Kharagpur, India

SESSION QT05.04: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures III

Session Chairs: Unai Atxitia Macizo and Xiao-Xiao Zhang

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 443

#### 8:30 AM \*QT05.04.01

**Superconductivity in Bernal Bilayer Graphene Stabilized by Spin-Orbit Coupling** Stevan Nadj-Perge; California Institute of Technology, United States

#### 9:00 AM \*QT05.04.02

**Chern Insulators at Fractional Band Filling in Graphene Moiré Lattices** Matthew Yankowitz; University of Washington, United States

#### 9:30 AM BREAK

#### 10:00 AM \*QT05.04.03

**Electron Ptychography of 2D Moiré Superlattices** Yichao Zhang, Jeffrey Huang, Sang Hyun Bae, Ballal Ahammed, Arend M. van der Zande, Elif Ertekin and Pinshane Y. Huang; University of Illinois at Urbana-Champaign, United States

#### 10:30 AM QT05.04.04

**Unveiling a Large Supermodulation Underlying Electronic Anisotropy in Uranium Chalcogenide** Suk Hyun Sung and Ismail El Baggari; Rowland Institute at Harvard, United States

#### 10:45 AM QT05.04.05

**Half-Integer Quantum Hall States in Two-Dimensional Graphite** Nicholas Mazzucca<sup>1</sup>, Bishoy M. Kousa<sup>2</sup>, Kenji Watanabe<sup>3</sup>, Takashi Taniguchi<sup>3</sup>, Allan MacDonald<sup>2</sup> and Marc W. Bockrath<sup>1</sup>; <sup>1</sup>The Ohio State University, United States; <sup>2</sup>The University of Texas at Austin, United States; <sup>3</sup>National Institute for Materials Science, Japan

#### 11:00 AM QT05.04.06

**Exploring Electronic Properties of B2C Monolayers—Effects of Hole Defects on Band Gap** Liyuan Zhang, Dominic A. Milla and Michael Groves; California State University, Fullerton, United States

#### 11:15 AM QT05.04.07

**Using Selective Plasma Stripping Methodology to Reduce the Contact Resistance of Two Dimensional Materials** Jin-Bin Yang<sup>1</sup>, I-Chih Ni<sup>1</sup>, En-Cheng Chang<sup>1</sup> and Chih-I Wu<sup>1,2</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Industrial Technology Research Institute, Taiwan

#### 11:30 AM QT05.04.08

**Electronic Structure of Topological and Emergent Ground States in Rhombohedral Graphene** Anil Rajapitamahuni, Turgut Yilmaz, Asish Kundu, Suji Park, Abdullah Al-Mahboob, Jerzy Sadowski and Elio Vescovo; Brookhaven National Laboratory, United States

#### 11:45 AM QT05.04.09

**Impact of Mixed-Valence States on Electrical Transport in 2D Van der Waals Crystals of ZrTe<sub>3</sub>** Xiao Tong; Brookhaven National Laboratory, United States

SESSION QT05.05: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures V

Session Chairs: Ying Wang and Jun Xiao

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 443

**2:00 PM \*QT05.05.01**

**Visualizing the Impact of Quenched Disorders on Electron Wigner Crystals** [Zhehao Ge](#)<sup>1</sup>, Zehao He<sup>1</sup>, Qize Li<sup>1</sup>, Ziyu Xiang<sup>1</sup>, Jianghan Xiao<sup>1</sup>, Wenjie Zhou<sup>1</sup>, Mit Naik<sup>1</sup>, Salman Kahn<sup>1</sup>, Renee Sailus<sup>2</sup>, Rounak Banerjee<sup>2</sup>, Takashi Taniguchi<sup>3</sup>, Kenji Watanabe<sup>3</sup>, Sefaattin (. Tongay<sup>2</sup>, Steven Louie<sup>1</sup>, Feng Wang<sup>1</sup> and Michael Crommie<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Arizona State University, United States; <sup>3</sup>National Institute for Materials Science, Japan

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*QT05.05.02**

**Atomic-Scale Imaging of Structure-Property Relationships in Strontium Ruthenates** [Peter Wahl](#)<sup>1,2</sup>; <sup>1</sup>University of St Andrews, United Kingdom; <sup>2</sup>University of Bonn, Germany

**4:00 PM \*QT05.05.03**

**Using Electron Ptychography as a “Computational Lens” to Push Resolution in 2D Materials** [Kayla Nguyen](#); University of Illinois at Urbana-Champaign, United States

**4:30 PM QT05.05.04**

**Atomically Precise Graphene Nanoribbon Transistors with Long-Term Stability and Reliability** [Muhammed Yusufoglu](#) and Zafer Mutlu; The University of Arizona, United States

**4:45 PM QT05.05.05**

**Two-Dimensional Materials as Hosts for Spin Qubits** [Michael Toriyama](#)<sup>1</sup> and Giulia Galli<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The University of Chicago, United States

SESSION QT05.06: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures VI

Session Chair: Sujan Subedi

Thursday Morning, April 10, 2025

Summit, Level 4, Room 443

**8:30 AM ^QT05.06.01**

**Topology and Correlations in Thin-Layered TaIrTe<sub>4</sub>** [Qiong Ma](#); Boston College, United States

**9:00 AM \*QT05.06.02**

**A van der Waals Heterojunction Approach to the Superconducting Proximity Effect** [Jun Zhu](#); The Pennsylvania State University, United States

**9:30 AM BREAK**

**10:00 AM \*QT05.06.03**

**Exploring the Electronic and Topological Properties of Bulk and Few-Layer Metastable 1T'-WSe<sub>2</sub>** [Daniel A. Rhodes](#)<sup>1</sup>, Yangchen He<sup>1</sup>, Alex Strasser<sup>2</sup>, Nicholas Hagopian<sup>1</sup>, Carter Fox<sup>1</sup>, Zizhong Li<sup>1</sup>, Nicholas Pederson<sup>1</sup>, Jun Xiao<sup>1</sup>, Paul M. Voyles<sup>1</sup> and Xiaofeng Qian<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>Texas A&M University, United States

**10:30 AM QT05.06.04**

**Metal-Assisted Vacuum Transfer Enabling *In Situ* Visualization of Charge Density Waves in Monolayer MoS<sub>2</sub>** [Wei Kong](#), Jichuang Shen, Xiaopeng Xie, Jiaqi Guan and Ruihua He; Westlake University, China

**10:45 AM QT05.06.05**

**Topological Valley Current in Non-Uniformly Strained Graphene** [Haiyue Dong](#)<sup>1</sup>, Yue Zhang<sup>1</sup>, Arend M. van der Zande<sup>1</sup> and Nadya Mason<sup>2</sup>; <sup>1</sup>University

of Illinois at Urbana-Champaign, United States; <sup>2</sup>The University of Chicago, United States

**11:00 AM QT05.06.06**

**Study of Vanadium-Doped WTe<sub>2</sub>** Dimitre Dimitrov<sup>1,2</sup>, Nikolay Minev<sup>2</sup> and Vera G. Marinova<sup>2</sup>; <sup>1</sup>Bulgarian Academy of Sciences, Bulgaria; <sup>2</sup>Institute of Optical Materials and Technologies-Bulgarian Academy of Sciences, Bulgaria

**11:15 AM QT05.06.07**

**Magneto-Transport Properties in Co<sub>2</sub>MnGa/(Topological Insulator Bi<sub>2</sub>Te<sub>3</sub>, Heavy Metal W & Pt) Based Heterostructures** Nikita Sharma, Nakul Kumar and Sujeet Chaudhary; Indian Institute of Technology Delhi, India

**11:30 AM QT05.06.08**

**Revealing the Electrical Characteristics and Phase Transformation of MoTe<sub>2</sub>-Based RRAM Devices** Chien-Hua Wang, Mu-Pai Lee and Wen-Wei Wu; National Yang Ming Chiao Tung University, Taiwan

SESSION QT05.07: Emergent Quantum Orderings and Properties in 2D Materials and Heterostructures VII

Session Chairs: Daniel Rhodes and Xiao-Xiao Zhang

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 443

**1:30 PM \*QT05.07.01**

**Creating and Probing Localized Excitons in 2D Semiconductors** Tony F. Heinz<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**2:00 PM \*QT05.07.02**

**Magneto Exciton-Polaritons in van der Waals Magnets** Vinod Menon<sup>1,2</sup>; <sup>1</sup>The City College of New York, United States; <sup>2</sup>The City University of New York, United States

**2:30 PM \*QT05.07.03**

**Many-Body Effects on Exciton Dynamics and Nonlinear Optics in Low-Dimensional Materials** Diana Qiu; Yale University, United States

**3:00 PM BREAK**

**3:30 PM \*QT05.07.04**

**(Sub)Nanoscale Hyperspectral Imaging of Excitons in Two-Dimensional Materials** Sandhya Susarla; Arizona State University, United States

**4:00 PM QT05.07.05**

**Investigation of Strain-Localized Excitons in Nanobubbles of Single-Layer WS<sub>2</sub> on a Gold Surface** Mohammad Soroush<sup>1</sup>, Matthew Strasbourg<sup>2</sup>, Kiyoung Jo<sup>3</sup>, Emanuil Yanev<sup>2</sup>, P James Schuck<sup>2</sup>, Deep M. Jariwala<sup>3</sup>, David Dickensheets<sup>1</sup> and Nicholas J. Borys<sup>1</sup>; <sup>1</sup>Montana State University, United States; <sup>2</sup>Columbia University, United States; <sup>3</sup>University of Pennsylvania, United States

**4:15 PM QT05.07.06**

**Strong Terahertz Emission and Coherent Phonon Dynamics in 2D Ferroelectrics** Sujan Subedi<sup>1</sup>, Carter Fox<sup>1</sup>, Fan Fei<sup>1</sup>, Wenhao Liu<sup>2</sup>, Bing Lv<sup>2</sup> and Jun Xiao<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>The University of Texas at Dallas, United States

# SYMPOSIUM QT06

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Defects in Solid-State Materials for Quantum Technologies

April 8 - April 11, 2025

Symposium Organizers

Christopher Anderson, University of Illinois at Urbana-Champaign  
Kai-Mei Fu, University of Washington  
Jeffrey McCallum, University of Melbourne  
Yuan Ping, University of Wisconsin-Madison

Symposium Support

**Platinum**

Gordon and Betty Moore Foundation

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION QT06.01: Quantum Defects in Oxides and Emerging Insulators

Session Chairs: Benjamin Pingault and Yaser Silani

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 444

**1:30 PM \*QT06.01.01**

**Electronic and Coherence Properties of Spin Defects in Oxides** Giulia Galli and Yu Jin; University of Chicago, United States

**2:00 PM \*QT06.01.02**

**Energy Levels and Spin States of Open-Shell Quantum Defects from the Spin-Flip Bethe-Salpeter Approach** David A. Strubbe; University of California, Merced, United States

**2:30 PM QT06.01.03**

**Growth and Characterization of Er Doped CaMoO<sub>4</sub> Thin Films on Silicon for Quantum Applications** Ignas Masiulionis<sup>1,2</sup>, Bonnie Lin<sup>3</sup>, Sungjoon Kim<sup>2</sup>, Gregory D. Grant<sup>1,2</sup>, Angel Yanguas-Gil<sup>2</sup>, Jeffrey W. Elam<sup>2</sup>, Jiefei Zhang<sup>2</sup>, James M. LeBeau<sup>3</sup>, David Awschalom<sup>1,2</sup> and Supratik Guha<sup>1,2</sup>; <sup>1</sup>The University of Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Massachusetts Institute of Technology, United States

**2:45 PM QT06.01.04**

**Controlled Formation of Sn-Li Donor in ZnO for Quantum Applications** Xingyi Wang<sup>1</sup>, Lasse Vines<sup>2</sup>, Michael Titze<sup>3</sup>, Vasileios Niaouris<sup>1</sup>, Jeong Rae Kim<sup>4</sup>, Erik A. Perez Caro<sup>5</sup>, Shimin Zhang<sup>5</sup>, Yuan Ping<sup>5</sup>, Joseph Falson<sup>4</sup> and Kai-Mei Fu<sup>1,1,6</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>University of Oslo, Norway; <sup>3</sup>Sandia National Laboratories, United States; <sup>4</sup>California Institute of Technology, United States; <sup>5</sup>University of Wisconsin-Madison, United States; <sup>6</sup>Pacific Northwest National Laboratory, United States

**3:00 PM BREAK**

**3:30 PM QT06.01.05**

**Transition Metal Complex in Zinc Oxide as Deep-Level Spin Defect Qubits** Shimin Zhang<sup>1</sup>, Taejoon Park<sup>2</sup>, Erik A. Perez Caro<sup>1</sup>, Kejun Li<sup>3</sup>, Yanyong Wang<sup>4</sup>, Jorge D Vega Bazantes<sup>4</sup>, Ruiqi Zhang<sup>4</sup>, Jianwei Sun<sup>4</sup>, Kaimei Fu<sup>5</sup>, Hosung Seo<sup>2</sup> and Yuan Ping<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>Sungkyunkwan University, Korea (the Republic of); <sup>3</sup>University of California, Santa Cruz, United States; <sup>4</sup>Tulane University, United States; <sup>5</sup>University of Washington, United States

**3:45 PM QT06.01.06**

**First Principles Investigation of Er-Doped CeO<sub>2</sub> as a Solid-State Qubit Platform** Vrinda Somjit<sup>1</sup>, Yu Jin<sup>2</sup>, Jinsoo Park<sup>2</sup>, Weiguo Jing<sup>3</sup>, Matteo Giantomassi<sup>3</sup>, Gian-Marco Rignanese<sup>3</sup> and Giulia Galli<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>Université Catholique de Louvain, Belgium

**4:00 PM QT06.01.07**

**Ion Implantation and Spin Dynamics of Defects in Silicon Clathrates for Quantum Application** Joseph Briggs<sup>1</sup>, Yinan Liu<sup>1</sup>, Shei Sia Su<sup>2</sup>, Michael Titze<sup>2</sup>, Meenakshi Singh<sup>1</sup>, Reuben Collins<sup>1</sup> and Carolyn Koh<sup>1</sup>; <sup>1</sup>Colorado School of Mines, United States; <sup>2</sup>Sandia National Laboratories, United States

**4:15 PM QT06.01.08**

**Room Temperature Quantum Emitters in Aluminum Nitride Epilayers on Silicon** Joseph K. Cannon<sup>1</sup>, Sam Bishop<sup>1</sup>, Katie Eggleton<sup>1</sup>, Huseyin Yağci<sup>1</sup>, Rachel Clark<sup>1</sup>, Sherif Ibrahim<sup>1</sup>, John Hadden<sup>1</sup>, Saptarsi Ghosh<sup>2</sup>, Menno Kappers<sup>2</sup>, Rachel A. Oliver<sup>2</sup> and Anthony Bennett<sup>1</sup>; <sup>1</sup>Cardiff University, United Kingdom; <sup>2</sup>University of Cambridge, United Kingdom

SESSION QT06.02: Diamond Quantum Science and Applications

Session Chairs: F. Joseph Heremans and Susumu Takahashi

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 444

**8:00 AM \*QT06.02.01**

**Scalable Parallel Measurement and Control Over Individual Nitrogen-Vacancy Centers in Diamond** Shimon Kolkowitz; University of California, Berkeley, United States

**8:30 AM \*QT06.02.02**

**Massively Multiplexed Covariance Magnetometry with Diamond Quantum Sensors** Zeeshawn Kazi, Kai-Hung Cheng, Jared Rovny, Lila S. Nassar, Alexander C. Pakpour-Tabrizi, Faranak Bahrami, Bichen Zhang, Yifan Zhang, Rhine Samajdar, Sarang Gopalakrishnan, Jeff D. Thompson and Nathalie P. de Leon; Princeton University, United States

**9:00 AM \*QT06.02.03**

**Engineering Materials Platforms for Solid-State Quantum Technologies** F. Joseph P. Heremans<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>University of Chicago, United States

**9:30 AM \*QT06.02.04**

**Probing NV and SiV Charge States Dynamics Using High-Voltage Nanosecond Pulse** Susumu Takahashi; University of Southern California, United States

**10:00 AM BREAK**

**10:30 AM \*QT06.02.05**

**Integrated Diamond Quantum Networks** Mihir Bhaskar; ., United States

**11:00 AM QT06.02.06**

**Creation and Engineering of Nitrogen-Related Defects in Diamond with Nanosecond Ultraviolet Laser Pulses** Jiaxin Ye, Rafael B. Serpa, Charles Parker, Jason Amsden, April Brown and Jeffrey Glass; Duke University, United States

**11:15 AM QT06.02.07**

**All-in-One Quantum Diamond Microscope for Sensor Characterization** Connor A. Roncaioli<sup>1,2</sup>, Connor Hart<sup>2</sup>, Ronald Walsworth<sup>2</sup> and Donald P. Fahey<sup>1</sup>; <sup>1</sup>U.S. Army Research Laboratory, United States; <sup>2</sup>University of Maryland, United States

**11:30 AM QT06.02.08**

**Creating Strongly Interacting Dipolar Spin Ensembles in Diamond for Quantum Technologies** Lillian B. Hughes<sup>1</sup>, Simon Meynell<sup>1,2</sup>, Weijie Wu<sup>3</sup>, Shreyas Parthasarathy<sup>1</sup>, Lingjie Chen<sup>1</sup>, Emily Davis<sup>4</sup>, Kunal Mukherjee<sup>5</sup>, Norman Yao<sup>3</sup> and Ania Jayich<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara, United States; <sup>2</sup>Simon Fraser University, Canada; <sup>3</sup>Harvard University, United States; <sup>4</sup>New York University, United States; <sup>5</sup>Stanford University, United States

**11:45 AM QT06.02.09**

**Surface Composition and Spin Properties of Near-Surface NV Center Ensembles in Diamond Across Various Oxidative Surface Treatments** Ricardo Vidrio, Yuhan Tong, Maryam Zahedian and Jennifer Choy; University of Wisconsin-Madison, United States

SESSION QT06.03: Understanding and Optimizing Quantum Coherence

Session Chairs: Jeffrey McCallum and Hosung Seo

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 444

**1:30 PM \*QT06.03.01**

**A Quantum Register for a Semiconductor Qubit—The Nuclei, There and Back Again** Mete Atatüre; University of Cambridge, United Kingdom

**2:00 PM \*QT06.03.02**

**Origins of Dielectric Loss in Materials for Superconducting Qubits** Chris G. Van de Walle; University of California, Santa Barbara, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*QT06.03.03**

**Decoherence of NV Spin Ensembles in a Paramagnetic Defect Bath in Diamond** Hosung Seo<sup>1,2,3</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Ajou University, Korea (the Republic of)

**4:00 PM QT06.03.04**

**Controlling Interactions Between High Frequency Phonons and Single Quantum Systems Using Phononic Crystals** Kazuhiro Kuruma<sup>1,2</sup>, Benjamin Pingault<sup>3,4,2</sup>, Cleaven Chia<sup>2</sup>, Michael Haas<sup>2</sup>, Graham Joe<sup>2</sup>, Daniel Rimoli Assumpcao<sup>2</sup>, Sophie Weiyi Ding<sup>2</sup>, Chang Jin<sup>2</sup>, C.J. Xin<sup>2</sup>, Matthew Yeh<sup>2</sup>, Neil Sinclair<sup>2</sup> and Marko Loncar<sup>2</sup>; <sup>1</sup>The University of Tokyo, Japan; <sup>2</sup>Harvard University, United States; <sup>3</sup>Argonne National Laboratory, United States; <sup>4</sup>The University of Chicago, United States

**4:15 PM QT06.03.05**

**Highly Coherent Nuclear and Electron Spin States in an Isotopically-Purified Semiconductor Diode** Cyrus Zeledon<sup>1</sup>, Benjamin Pingault<sup>1,2</sup>, Jonathan Marcks<sup>1,2</sup>, Mykyta Onizhuk<sup>1</sup>, Yeghishe Tsaturyan<sup>1</sup>, Benjamin Soloway<sup>1</sup>, Hiroshi Abe<sup>3</sup>, Jawad Ul-Hassan<sup>4</sup>, Takeshi Ohshima<sup>3</sup>, F. Joseph P. Heremans<sup>2,1</sup>, Nguyen T. Son<sup>4</sup>, Giulia Galli<sup>1</sup>, Christopher P. Anderson<sup>5</sup> and David Awschalom<sup>1,2</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>National Institutes for Quantum Science and Technology, Japan; <sup>4</sup>Linköping University, Sweden; <sup>5</sup>University of Illinois at Urbana-Champaign, United States

**4:30 PM QT06.03.06**

**Efficient Heuristics for Screening Databases for Quantum Point Defects with Long Dephasing Times** Jordan Chapman<sup>1</sup> and Vsevolod Ivanov<sup>1,2,2</sup>; <sup>1</sup>Virginia Tech National Security Institute, United States; <sup>2</sup>Virginia Tech, United States

**4:45 PM QT06.03.07**

**Low-Temperature Magnetotransport in Type II Si Clathrates with Na donors** Sam M. Saiter, Joseph Briggs, Yinan Liu, Meenakshi Singh, Carolyn Koh and Reuben Collins; Colorado School of Mines, United States

SESSION QT06.04: Silicon and Silicon Carbide Defect Qubits

Session Chairs: Christopher Anderson and Lillian Hughes

Thursday Morning, April 10, 2025

Summit, Level 4, Room 444

**8:00 AM \*QT06.04.01**

**Quantum Spintronics with Silicon Carbide and Oxides** Cyrus Zeledon<sup>1</sup>, Jonghoon Ahn<sup>2</sup>, Christina Wicker<sup>1</sup>, Nolan Bitner<sup>1,2</sup>, Jiefei Zhang<sup>2</sup>, Benjamin Pingault<sup>1,2</sup>, Supratik Guha<sup>1,2</sup>, F. Joseph P. Heremans<sup>1,2</sup> and David Awschalom<sup>1,2</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States

**8:30 AM \*QT06.04.02**

**Electrical Modulation of Diode-Integrated Telecom Color Centers in Silicon** Evelyn L. Hu<sup>1</sup>, Aaron Day<sup>2</sup>, Chaoshen Zhang<sup>1</sup>, Chang Jin<sup>1</sup>, Hanbin Song<sup>2</sup>, Madison Sutula<sup>1</sup>, Alp Sipahigil<sup>2</sup>, Mihir Bhaskar<sup>3</sup> and Denis Sukachev<sup>3</sup>; <sup>1</sup>Harvard University, United States; <sup>2</sup>University of California, Berkeley, United States; <sup>3</sup>AWS Center for Quantum Networking, United States

**9:00 AM \*QT06.04.03**

**Scalable Semiconductor Quantum Photonic Systems** Jelena Vuckovic; Stanford University, United States

**9:30 AM \*QT06.04.04**



**Cavity-Coupled Telecom Spin-Photon Interfaces in Silicon** Songtao Chen; Rice University, United States

**10:00 AM BREAK**

**10:30 AM QT06.04.05**

**Purcell-Enhanced T Centers in Bus-Coupled Cavity Arrays** Lukasz Komza<sup>1,2</sup>, Xueyue Zhang<sup>1,1</sup>, Hanbin Song<sup>1,2</sup> and Alp Sipahigil<sup>1,2,1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**10:45 AM QT06.04.06**

**High-Yield, Low-Loss Nanophotonic Devices with Integrated Spin Defects in SiC-on-Insulator** Jason Lipton, Brett Yurash, Adam Sorensen, John Vajo, Tong Wang, Sam Whiteley, Biqin Huang, Xiwei Bai, Jason Graetz and Shanying Cui; HRL Laboratories, United States

**11:00 AM QT06.04.07**

**Understanding and Identifying New Quantum Defects in Silicon Using High-Throughput Computational Screening** Geoffroy Hautier<sup>1</sup>, Yihuang Xiong<sup>1</sup>, Shay McBride<sup>1</sup>, Jiongzhi Zheng<sup>1</sup>, Xueyue Zhang<sup>2</sup>, Hanbin Song<sup>2</sup>, Alp Sipahigil<sup>2,3</sup> and Sinead M. Griffin<sup>3</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>University of California, Berkeley, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**11:15 AM QT06.04.08**

**Imaging the 3D Structure of Rare-Earth Dopant Defects and Clusters in SiC by Multislice Electron Ptychography** Shake Karapetvan<sup>1</sup>, Steven Zeltmann<sup>1</sup>, Arkady Krasheninnikov<sup>2</sup>, Malcolm Thomas<sup>1</sup>, Ute A. Kaiser<sup>3</sup>, Johannes Biskupek<sup>3</sup> and David A. Muller<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Helmholtz-Zentrum Dresden-Rossendorf, Germany; <sup>3</sup>Institute of Quantum Optics and Central Facility Materials Science Electron Microscopy, Germany

**11:30 AM QT06.04.09**

**Comprehensive Analysis of Formation Mechanism of Vacancy Complexes in 4H-SiC** Taishi Kimura<sup>1,2</sup>, Jonghoon Ahn<sup>2</sup>, Nazar Deegan<sup>2</sup>, Katherine Harmon<sup>2</sup>, Christina Wicker<sup>3</sup>, Nolan Bitner<sup>3</sup>, Alan Dibos<sup>2</sup>, Jiefei Zhang<sup>2</sup>, Benjamin Pingault<sup>2,3</sup>, Cunzhi Zhang<sup>3</sup>, Giulia Galli<sup>2,3</sup>, Akira Uedono<sup>4</sup>, David Awschalom<sup>2,3</sup> and F. Joseph P. Heremans<sup>2,3</sup>; <sup>1</sup>Toyota Motor North America, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>The University of Chicago, United States; <sup>4</sup>University of Tsukuba, Japan

**11:45 AM QT06.04.10**

**Bright Single-Photon Source in a Silicon Chip by Nanoscale Positioning of a Color Center in a Microcavity** Yoann Baron<sup>1</sup>, Baptiste Lefaucher<sup>1</sup>, Jean-baptiste Jager<sup>1</sup>, Vincent Calvo<sup>1</sup>, Christian Elsässer<sup>1</sup>, Giuliano Coppola<sup>1</sup>, Frédéric Mazen<sup>1</sup>, Sébastien Kerdiles<sup>1</sup>, Anais Dreau<sup>2</sup>, Felix Cache<sup>2</sup> and Jean-michel Gerard<sup>1</sup>; <sup>1</sup>CEA, France; <sup>2</sup>University of Montpellier, France

SESSION QT06.05: Computational Design of Defect Qubits

Session Chairs: Geoffroy Hautier and Yuan Ping

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 444

**1:30 PM \*QT06.05.01**

**Generating Effective Models for Strongly Correlated Point Defects** Cyrus Dreyer; Stony Brook University, United States

**2:00 PM \*QT06.05.02**

**Advanced Ab Initio Methodologies for Modeling Color Centers for Quantum Technologies** Viktor Ivády<sup>1,2</sup>; <sup>1</sup>Eötvös Loránd University, Hungary; <sup>2</sup>Linköping University, Sweden

**2:30 PM BREAK**

**3:00 PM \*QT06.05.03**

**Symmetry-Guided and Data-Driven Discovery of Quantum Defects in Two-Dimensional Materials** Qimin Yan; Northeastern University, United States

**3:30 PM QT06.05.04**

**First Principles Modeling of the Optical Activity of the C-Center in Silicon—Interplay of Localized Vibrations and Bulk Phonon Modes** Rokas Silkinis<sup>1</sup>, Marek Maciaszek<sup>2,1</sup>, Vytautas Zalandauskas<sup>1</sup>, Marianne E. Bathen<sup>3</sup>, Lasse Vines<sup>3</sup>, Audrius Alkauskas<sup>1</sup> and Lukas Razinkovas<sup>1,3</sup>; <sup>1</sup>Center for Physical Sciences and Technology (FTMC), Lithuania; <sup>2</sup>Faculty of Physics, Warsaw University of Technology, Poland; <sup>3</sup>University of Oslo, Norway

**3:45 PM QT06.05.05**

**First Principles Computations of the Stark Shift Effect in a Defect-Bound-Exciton Color Center—The Case of the T Center in Silicon** Louis Alaerts<sup>1</sup>, Yihuang Xiong<sup>1</sup>, Sinead M. Griffin<sup>2,2</sup> and Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**4:00 PM QT06.05.06**

**Identifying High Performance Spectrally-Stable Color Centers in Diamond** Yihuang Xiong<sup>1</sup>, Shay McBride<sup>1</sup>, Xiang Zhang<sup>2</sup>, Pulickel Ajayan<sup>2</sup>, Sinead M. Griffin<sup>3</sup> and Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Rice University, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**4:15 PM QT06.05.07**

**Bonding Character as a Descriptor for Huang-Rhys Factors in Optically Active Defects** Fatimah F. Habis<sup>1,2</sup> and Yuanxi Wang<sup>1</sup>; <sup>1</sup>University of North Texas, United States; <sup>2</sup>Jazan University, Saudi Arabia

**4:30 PM QT06.05.08**

**High-Throughput Search of Group IV-Related Quantum Defects in 4H-SiC** Shibu Meher, Manoj Dey and Abhishek Kumar Singh; Indian Institute of Science Bangalore, India

**4:45 PM QT06.05.09**

**Defect-Induced Tuning of Exchange Bias Probed Using Au<sup>8+</sup> Ion Irradiation in Full Heusler Alloy Co<sub>2</sub>FeAl Coupled with Ir<sub>8</sub>Mn<sub>92</sub> Antiferromagnet** Sanjay K. Kedia<sup>1,2</sup>; <sup>1</sup>Inter-University Accelerator Centre, New Delhi, India; <sup>2</sup>Indian Institute of Technology Delhi, India

SESSION QT06.06: Poster Session

Session Chairs: Christopher Anderson and Jacopo Simoni

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**QT06.06.01**

**Cerium Oxide Nanostructures with Spin Defects for Quantum Information Processing** Emily Miura-Stempel and Brandi Cossairt; University of Washington, United States

**QT06.06.02**

**Observation of Thallium Donors in ZnO Created Through Ion Implantation** Dennis Naughton<sup>1</sup>, Xingyi Wang<sup>1</sup>, Erik A. Perez Caro<sup>2</sup>, Shimin Zhang<sup>2</sup>, Jeong Rae Kim<sup>3</sup>, Joseph Falson<sup>3</sup>, Yuan Ping<sup>2</sup> and Kaimei Fu<sup>1,1,4</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>University of Wisconsin–Madison, United States; <sup>3</sup>California Institute of Technology, United States; <sup>4</sup>Pacific Northwest National Laboratory, United States

**QT06.06.03**

**Spin Relaxation Times in Transition Metal-Based Defects Spin Qubits** Jacopo Simoni, Shimin Zhang, Erik A. Perez Caro, Gabriele Riva and Yuan Ping; University of Wisconsin–Madison, United States

**QT06.06.04**

**The Effect of Annealing on the in Donor-Bound Exciton Line in Zinc Oxide Nanorods** Eden Price, Xingyi Wang, Xinqi Li, Jacob Baillie, James De Yoreo, Kaimei Fu and Daniel Gamelin; University of Washington, United States

**QT06.06.05**

**One-Step Site-Specific Creation of Quantum Emitters in Hexagonal Boron Nitride** Sofiya Karankova<sup>1,2</sup>, Yeunjeong Lee<sup>1,3</sup>, Chaun Jang<sup>1</sup>, Yong-Won Song<sup>1,2</sup> and Hyowon Moon<sup>1,2</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea National University of Science and Technology, Korea (the Republic of); <sup>3</sup>Korea University, Korea (the Republic of)

**QT06.06.06**

**First Principles Evaluation of Deep-Level Spin Defects in Zinc Oxide** Erik A. Perez Caro<sup>1</sup>, Shimin Zhang<sup>1</sup>, Taejoon Park<sup>2</sup>, Kejun Li<sup>3</sup>, Yanyong Wang<sup>4</sup>, Jorge D Vega Bazantes<sup>4</sup>, Ruiqi Zhang<sup>4</sup>, Jianwei Sun<sup>4</sup>, Kaimei Fu<sup>5</sup>, Hosung Seo<sup>2</sup> and Yuan Ping<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison, United States; <sup>2</sup>Sungkyunkwan University, Korea (the Republic of); <sup>3</sup>University of California, Santa Cruz, United States; <sup>4</sup>Tulane University, United States; <sup>5</sup>University of

Washington, United States

SESSION QT06.07: Defects in 2D Materials for Quantum Science and Technology

Session Chairs: Zeeshawn Kazi and Tongcang Li

Friday Morning, April 11, 2025

Summit, Level 4, Room 444

**8:00 AM \*QT06.07.01**

**An Electron-Nuclear Spin Quantum Register in Hexagonal Boron Nitride** Tongcang Li; Purdue University, United States

**8:30 AM \*QT06.07.02**

**Coupled Defect Spin Pairs for Quantum Technology** Song Li<sup>1</sup>, Anton Pershin<sup>1</sup>, Gergo Thiering<sup>1</sup> and Adam Gali<sup>1,2</sup>; <sup>1</sup>Hungary & Budapest University of Technology and Economics, Hungary; <sup>2</sup>MTA-WFK Lendület "Momentum" Semiconductor Nanostructures Research Group, Hungary

**9:00 AM \*QT06.07.03**

**Ab Initio Design of Quantum Defects in 2D Transition Metal Dichalcogenides, 2D and 3D Oxides** Xiuyao Lang and Kyeongjae Cho; The University of Texas at Dallas, United States

**9:30 AM QT06.07.04**

**Modeling Candidate Color Centers in 2D Materials—Hexagonal Boron Nitride** Peter A. Schultz, Jesse J. Lutz and Leopoldo Diaz; Sandia National Laboratories, United States

**9:45 AM QT06.07.05**

**Optically Resolved Exchange Splittings in the Doped van der Waals Ferromagnet CrBr<sub>3</sub>:Yb<sup>3+</sup>** Thom Snoeren, Kimo Pressler and Daniel R. Gamelin; University of Washington, United States

**10:00 AM BREAK**

**10:30 AM QT06.07.06**

**Revealing Single-Photon Emitter Formation in Torn and Strained 2D Single-Layer Transition Metal Dichalcogenides** John P. Fix, Joseph Stage, Andrew Lingley and Nicholas J. Borys; Montana State University, United States

**10:45 AM QT06.07.07**

**Identification of Defect-Induced Emission Peaks in Vanadium Doped WSe<sub>2</sub>** Weiru Chen<sup>1</sup>, Yihuang Xiong<sup>1</sup>, Elyse Barré<sup>2</sup>, Daria Blach<sup>2</sup>, Leyi Loh<sup>3</sup>, Yuan Chen<sup>3</sup>, Kenji Watanabe<sup>4</sup>, Takashi Taniguchi<sup>4</sup>, Su Ying Quek<sup>3</sup>, Eda Goka<sup>3</sup>, Archana Raja<sup>2</sup> and Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>National University of Singapore, Singapore; <sup>4</sup>National Institute for Materials Science, Japan

**11:00 AM QT06.07.08**

**Carbon Chain Tetramer as the Blue Quantum Emitter (B-Center) in Hexagonal Boron Nitride—An Ab Initio Study** Marek Maciaszek<sup>1,2</sup> and Lukas Razinkovas<sup>2,3</sup>; <sup>1</sup>Faculty of Physics, Warsaw University of Technology, Poland; <sup>2</sup>Center for Physical Sciences and Technology (FTMC), Lithuania; <sup>3</sup>Centre for Materials Science and Nanotechnology, Department of Physics, University of Oslo, Norway

**11:15 AM QT06.07.09**

**Electrostatically Tunable Hexagonal Boron Nitride Single Photon Emitters Integrated in Silicon Nitride Waveguide for Scalable Quantum Photonic Devices** Kristina L. Malinowski<sup>1</sup>, Holland K. Frieling<sup>1</sup>, Claudio U. Hail<sup>1</sup>, Benjamin Koltenbah<sup>2</sup>, Pankaj K. Jha<sup>3</sup> and Harry A. Atwater<sup>1</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>The Boeing Company, United States; <sup>3</sup>Syracuse University, United States

**11:30 AM QT06.07.10**

**Simulation of Screw Dislocations in Smb<sub>6</sub> Topological Insulator Using DFT and Active Learning** Marios P. Sotiriou, Moon-Ki Choi and Harley T. Johnson; University of Illinois at Urbana-Champaign, United States

SESSION QT06.08: Emerging Qubits, Interfaces and Creation Techniques

Session Chairs: Jennifer Choy and Jacopo Simoni

Friday Afternoon, April 11, 2025  
Summit, Level 4, Room 444

**1:30 PM \*QT06.08.01**

**Designing Molecular Color Centers with Broken Symmetry** [Danna E. Freedman](#); Massachusetts Institute of Technology, United States

**2:00 PM \*QT06.08.02**

**Interfacing Biomolecules with Coherent Quantum Sensors** [Peter Maurer](#); University of Chicago, United States

**2:30 PM BREAK**

**3:00 PM \*QT06.08.03**

**Heterogeneous Integration of Solid State Defect and Dopant Qubit Systems on Silicon** Gregory D. Grant<sup>1</sup>, Connor Horn<sup>1</sup>, Ignas Masiulionis<sup>1</sup>, Claire McDermott<sup>1</sup>, Sagar Seth<sup>1</sup>, Christina Wicker<sup>1</sup>, Cyrus Zeledon<sup>1</sup>, Swarnabha Chattaraj<sup>2</sup>, Robert M. Pettit<sup>3</sup>, Manish Singh<sup>3</sup>, Sean Sullivan<sup>3</sup>, Jiefei Zhang<sup>2</sup>, Alan Dibos<sup>2</sup>, F. Joseph P. Heremans<sup>2</sup>, David Awschalom<sup>2,1</sup> and [Supratik Guha](#)<sup>2,1</sup>; <sup>1</sup>University of Chicago, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>memQ Inc., United States

**3:30 PM \*QT06.08.04**

**Optical and Chemical Control of Diamond Interfaces for Quantum Sensing** [Jennifer Choy](#); University of Wisconsin–Madison, United States

**4:00 PM \*QT06.08.05**

**Integrated Quantum Technologies with Diamond Membranes** [Alexander A. High](#); University of Chicago, United States

**4:30 PM QT06.08.06**

**Self-Aligned Quasi-1D Chains of NV Centers Formed by Swift Heavy Ions Irradiation for Quantum Information Processing** [Wei Liu](#)<sup>1</sup>, Arun Persaud<sup>1</sup>, Kaushalya Jhuria<sup>1</sup>, Qing Ji<sup>1</sup>, Ed Barnard<sup>1</sup>, Shaul Aloni<sup>1</sup>, Hunter Ocker<sup>1</sup>, Nishanth Anand<sup>1</sup>, Saahit Mogan<sup>1</sup>, Zhao Hao<sup>1</sup>, Aleksii Leino<sup>2</sup>, Chloé Nozais<sup>2</sup>, Maria Eugenia Toimil-Molares<sup>3</sup>, Flyura Djurabekova<sup>2</sup> and Thomas Schenkel<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory, United States; <sup>2</sup>University of Helsinki, Finland; <sup>3</sup>Materials Research Department, GSI Helmholtzzentrum für Schwerionenforschung, Germany

**4:45 PM QT06.08.07**

**Leveraging Modern CMOS Technology in Advancing Quantum Computing** [Haoxiong Yan](#), Jake Rochman, Zihao Yang, Ruoyu Li, Leslie Du, Mingwei Zhu, Nag Patibandla, Rutger Thijssen, Robert Blum, Zhebo Chen and Robert Visser; Applied Materials, Inc., United States

# SYMPOSIUM SB01

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Soft Materials in Human—Machine Interfaces—Design, Integration and Performance  
April 8 - April 10, 2025

Symposium Organizers

Vivian Feig, Stanford University  
Christina Tringides, Rice University  
Hyunwoo Yuk, Korea Advanced Institute of Science and Technology  
Tao Zhou, The Pennsylvania State University

Symposium Support

**Bronze**  
SanaHeal, Inc.

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\* Invited Paper  
+ JMR Distinguished Invited Speaker  
^ MRS Communications Early Career Distinguished Presenter

SESSION SB01.01: Soft Materials for Electronic Interface

Session Chairs: Hyunwoo Yuk and Tao Zhou

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 337

**10:30 AM \*SB01.01.01**

**Autonomous Self-Recognized Self-Healing Electronics and Artificial Muscle Based on Periodic Dynamic Polymers** [Zhenan Bao](#); Stanford University, United States

**11:00 AM SB01.01.02**

**Autonomous Oxygen Doping of Intrinsically Stretchable Polymer Semiconductors for Skin Electronics** [MinWoo Jeong](#)<sup>1</sup>, Min Hyouk Kim<sup>1</sup>, Jun Su Kim<sup>1</sup>, Tae Uk Nam<sup>1</sup>, Ngoc Thanh Phuong Vo<sup>1</sup>, Kyu Ho Jung<sup>1</sup>, Hye Rin Chang<sup>1</sup>, Thuy An Nguyen<sup>1</sup>, Tae Il Lee<sup>2</sup> and Jin Young Oh<sup>1</sup>; <sup>1</sup>Kyung Hee University, Korea (the Republic of); <sup>2</sup>Gachon University, Korea (the Republic of)

**11:15 AM \*SB01.01.03**

**Stretchable e-Skins for Future Human-Caring Robots** [Nanshu Lu](#); The University of Texas at Austin, United States

SESSION SB01.02: Soft Biointerfaces

Session Chairs: Xiao Yang and Tao Zhou

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 337

**1:30 PM \*SB01.02.01**

**Adhesive Nonfibrotic Human-Machine Interfaces for Bioelectronics, Drug Delivery and Cell Therapy** [Xuanhe Zhao](#); Massachusetts Institute of Technology, United States

**2:00 PM SB01.02.02**

**Injectable Photoacoustic Hydrogel for Minimally Invasive Retinal Prostheses** [Zhiyi Du](#), Yueming Li, Ji-Xin Cheng and Chen Yang; Boston University, United States

**2:15 PM SB01.02.03**

**Additively Manufactured Soft and Stretchable Neural Probes for Recordings at Single-Neuron Level** [Marzia Momin](#), Luyi Feng, Salahuddin Ahmed, Jiashu Ren, Arafat Hossain, Sulin Zhang and Tao Zhou; Pennsylvania State University, United States

**2:30 PM BREAK**

**3:00 PM \*SB01.02.04**

**Soft, 3D Mesostructures as Biointerfaces—From Organoid Research to Fetoscopic Surgery** [John A. Rogers](#); Northwestern University, United States

**3:30 PM SB01.02.05**

**Miniaturized, Flexible AC Electroosmotic Pumps Based on Laser-Micropatterned Electrodes for Wearable and Implantable Ultra-Low-Flow-Rate Drug Delivery** [Massimo Mariello](#) and Christopher M. Proctor; University of Oxford, United Kingdom

SESSION SB01.03: Bioadhesive Interfaces

Session Chairs: Hyunwoo Yuk and Tao Zhou

Tuesday Afternoon, April 8, 2025  
Summit, Level 3, Room 337

**3:45 PM \*SB01.03.01**

**Embodying Physical Intelligence and Resilience in Bioadhesives** [Jianyu Li](#); McGill University, Canada

**4:15 PM SB01.03.02**

**Bacteria-Inspired Bioadhesives for Enhanced Mucoadhesion and Drug Delivery** [Evan B. Johnston](#) and Jianyu Li; McGill University, United States

**4:30 PM \*SB01.03.03**

**Bioadhesive and Immune-Compatible Polymer Bioelectronics** [Sihong Wang](#); University of Chicago, United States

SESSION SB01.04: Soft Hybrid Materials and Devices

Session Chairs: Christina Tringides and Tao Zhou

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 337

**8:00 AM SB01.04.01**

**Soft and Stretchable Electronics Using Liquid Metals** [Sungjune Park](#); Sungkyunkwan University, Korea (the Republic of)

**8:15 AM SB01.04.02**

**Mineral-Originated Bioelectronics for Inhibition via Lithium Electrochemistry** [Zhe Cheng](#), Chong Liu and Bozhi Tian; The University of Chicago, United States

**8:30 AM SB01.04.03**

**Design of Surfactant-Like Crosslinker—Photopatternable Conductive Hydrogels with Strong Adhesion to Hydrophobic Substrates** [Seungyeon Lee](#) and Jiheong Kang; Seoul National University, Korea (the Republic of)

**8:45 AM SB01.04.04**

**High-Resolution Patterning of Magnetic Liquid-Metal Nanohybrid Particles for Flexible Electronics** [Moohyun Kim](#)<sup>1,2</sup>, Heehun Kim<sup>1,2</sup> and Jae-Hyun Lee<sup>1,2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>IBS CNM, Korea (the Republic of)

SESSION SB01.05: Soft Materials for Wearable Sensors and Electronics

Session Chairs: Christina Tringides and Tao Zhou

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 337

**9:00 AM \*SB01.05.01**

**Advanced Janus Electrode and Nanomesh Strain Sensor for Robust, Long-Term Biosignal Monitoring** [Takao Someya](#)<sup>1,2</sup>, Suksmandhira Harimurti<sup>3</sup>, Sunghoon Lee<sup>2,1</sup>, Kento Yamagishi<sup>1</sup> and Tomoyuki Yokota<sup>1</sup>; <sup>1</sup>The University of Tokyo, Japan; <sup>2</sup>RIKEN, Japan; <sup>3</sup>Telekom University, Indonesia

**9:30 AM SB01.05.02**

**E-Textile Based Flexible Wearable Bioelectronic System for Human–Machine Interaction and Health Monitoring** [Xiaochang Pei](#), Anita Ghandehari, Jerome Rajendran, Shingirirai Chakoma, Jorge Alfonso Tavares Negrete and Rahim Esfandyarpour; University of California, Irvine, United States

**9:45 AM BREAK**

**10:15 AM \*SB01.05.03**

**Skin-Interfaced Wearable Biosensors** [Wei Gao](#); California Institute of Technology, United States

10:45 AM SB01.05.04

**Temporary Tattoo Electrodes and Biorobotics—Novel Translations** [Marina Galliani](#)<sup>1,2</sup>, Laura M. Ferrari<sup>1,2,3</sup>, Michele Foggetti<sup>1,2</sup>, Simona Crea<sup>1,2</sup> and Francesco Greco<sup>1,2,2</sup>; <sup>1</sup>Scuola Superiore Sant'Anna, BioRobotics Inst, Italy; <sup>2</sup>Scuola Superiore Sant'Anna, Italy; <sup>3</sup>Université Côte d'Azur, France

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## SYMPOSIUM SB02

Flexible, Stretchable Biointegrated Materials, Devices and Related Mechanics

April 7 - April 11, 2025

Symposium Organizers

Yeonsik Choi, Yonsei University

Keon Jae Lee, Korea Advanced Institute of Science & Technology

Nanshu Lu, The University of Texas at Austin

John Rogers, Northwestern University

Symposium Support

**Bronze**

*APL Electronic Devices*

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB02.05/SB01.06: Joint Session: Emerging Soft and Flexible Solutions for Human–Machine Interfaces

Session Chairs: Yeonsik Choi and Tao Zhou

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 336

11:00 AM \*SB01.06/SB02.05.01

**Soft and Flexible Neurotechnology for Human-Machine Interfaces** [George G. Malliaras](#); University of Cambridge, United Kingdom

11:30 AM \*SB01.06/SB02.05.02

**Wearable Bioadhesive Ultrasound—Innovation and Translation** [Xuanhe Zhao](#); Massachusetts Institute of Technology, United States

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## SYMPOSIUM SB01

Soft Materials in Human—Machine Interfaces—Design, Integration and Performance

April 8 - April 10, 2025

Symposium Organizers

Vivian Feig, Stanford University

Christina Tringides, Rice University

Hyunwoo Yuk, Korea Advanced Institute of Science and Technology

Tao Zhou, The Pennsylvania State University

Symposium Support

**Bronze**

SanaHeal, Inc.

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB01.07: Soft Materials for Actuators

Session Chairs: Hyunwoo Yuk and Tao Zhou

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 337

**1:45 PM \*SB01.07.01**

**Multimodal, Implantable Soft Robotic Actuators for Mechanotherapy and Drug Delivery** Debkalpa Goswami; Cleveland Clinic and Case Western Reserve University, United States

**2:15 PM SB01.07.02**

**Zwitterionic Dielectric Elastomer with Ultrahigh Permittivity for Actuators** Xuanyi Hu, Teck Lip Dexter Tam and Pooi See Lee; Nanyang Technological University, Singapore

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SB01.08: Functional and Smart Polymer Materials

Session Chairs: Christina Tringides and Hyunwoo Yuk

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 337

**3:30 PM \*SB01.08.01**

**Conductive Hydrogels and Elastomer Nanocomposites for Soft Bioelectronics** Dae-Hyeong Kim<sup>1,2</sup>; <sup>1</sup>Institute for Basic Science, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**4:00 PM SB01.08.02**

**Spatial Programming of Mechanical Stiffness for Versatile Photomechanical Jumps in Liquid Crystal Polymers** Min Jeong Hahm<sup>1</sup>, Woongbi Cho<sup>1</sup>, Jisoo Jeon<sup>2</sup> and Jeong Jae Wie<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Georgia Institute of Technology, United States

**4:15 PM SB01.08.03**

**Heterojunction Design of Intrinsic Stretchable Conjugated Polymer and Perovskite Quantum Dots for Soft Photosynaptic Device** Wei Cheng Chen; National Taiwan University, Taiwan

**4:30 PM SB01.08.04**

**Electrochemical Performance of PEDOT:PSS Stimulation Electrodes** Gerwin Dijk, Nicholas Siemons and Alberto Salleo; Stanford University, United States

**4:45 PM SB01.08.05**

**Vertical Integration Approach for Fabrication of Customizable Neurophysiology Probes** Magdalena Slowikowski, Atharva Sahasrabudhe and Polina Anikeeva; Massachusetts Institute of Technology, United States



SESSION SB01.09: Poster Session: Soft Materials for Human Interface

Session Chairs: Christina Tringides and Hyunwoo Yuk

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB01.09.01**

**Graphene-Based Electrochemical Sweat Sensor** [Mina Arefi](#), Shuyun Zhuo, Chris M. Williams and Shideh Kabiri Ameri; Queen's University, Canada

**SB01.09.02**

**Universal Cryogenic Transfer of Liquid Metal Particles in Polymers for Wafer-Scale Stretchable Electronics** [Dohoon Lee](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**SB01.09.03**

**Flexible, Adhesive Dry Electrodes with Bio-Inspired Microstructures for Improved Electrophysiological Signal Acquisition in Maternal Health** [Ryan M. Andersen](#), Chansoo Kim, Junyi Zhao, Naiyan Wu, Yiheng Zhang, Shuoyan Liu, Shantanu Chakrabartty, Yong Wang and Chuan Wang; Washington University in St. Louis, United States

**SB01.09.04**

**Seamless Interfacial Connections for Long-Term Skin Monitoring** [Jinyoung Kim](#)<sup>1</sup>, Dong-hee Kang<sup>1</sup>, Jisoo Jeon<sup>1</sup>, Sehyun Park<sup>1</sup>, Gwendolyn Bryan<sup>2</sup>, Christopher E. Tabor<sup>3</sup>, James FitzPatrick<sup>4</sup>, Yury Gogotsi<sup>4</sup>, Timothy J. Broderick<sup>2</sup>, Morley Stone<sup>2</sup> and Vladimir Tsukruk<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>The Institute for Human & Machine Cognition, United States; <sup>3</sup>Air Force Research Laboratory, United States; <sup>4</sup>Drexel University, United States

**SB01.09.05**

**Highly Conductive, Flexible Ionic Laser-Induced Graphene for Iontronic Applications** [So Young Kim](#), Ji Hong Kim, Hayoung Oh, Elvis K. Boahen, Zhengyang Kong and Do Hwan Kim; Hanyang University, Korea (the Republic of)

**SB01.09.06**

**Tunable P123DA/PEDOT:PSS Electrodes for Optimizing Actuation Performance** [Eunyoung Kim](#), Jian-Cheng Lai, Lukas Michalek, Weichen Wang, Chengyi Xu, Hao Lyu, Weilai Yu, Hyunchang Park, Yoko Tomo, Samuel Root, Byeongmoon Lee, Jaeho Park, Byeonghak Park, Shiyuan Wei, Chuanzhen Zhao and Zhenan Bao; Stanford University, United States

**SB01.09.07**

**An Adhesive Hydrogel Sponge for Non-Compressible Wound Hemostasis** [Mengyuan Zhou](#) and Jianfeng Zang; Huazhong University of Science & Technology, China

**SB01.09.08**

**A Flexible, Biocompatible, Passive Cooling Film for Electronic Devices** [Yue Cao](#), Jiechen Wang and Pingfan Wu; FutureWei Technology, United States

**SB01.09.09**

**On-Body Surface Bio-Compatible Integration Technology of Film Electrode for Realization of Sensory Organ-Free Insect Motion Control** [Shumpei Katayama](#)<sup>1,2</sup>, Keigo Ando<sup>1,2</sup>, Sunghoon Lee<sup>1</sup>, Zhi Jiang<sup>3</sup>, Xiaodong Chen<sup>3</sup>, Tomoyuki Yokota<sup>4,4</sup>, Hirotaka Sato<sup>3</sup>, Shinjiro Umezu<sup>2</sup>, Kenjiro Fukuda<sup>1,1</sup> and Takao Someya<sup>1,4,1</sup>; <sup>1</sup>RIKEN, Japan; <sup>2</sup>Waseda University, Japan; <sup>3</sup>Nanyang Technological University, Singapore; <sup>4</sup>The University of Tokyo, Japan

**SB01.09.10**

**Implementation of Reactive Accelerated Aging as an *In Vitro* Method for Degradation Studies of Polymers** Alina Schadenhofer, Sebastian Bihler and [Julia Koerner](#); Leibniz University Hannover, Germany

**SB01.09.11**

**Highly Stable and Continuous Biomarker Monitoring via Alternating Current Reverse Iontophoresis** [Yi Jeong Choi](#), Myung Kyun Choi and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

**SB01.09.12**

**Ingestible Capsule Enable Circular Nutrition Storage and Supply for Short Bowel Syndrome Treatment** [Na Li](#) and Jianfeng Zang; Huazhong University of Science & Technology, China

**SB01.09.13**

**High-Fidelity Electrophysiological Signal Recording from the Gastrointestinal Tract Using Soft Nanomembrane-Based Electrode Arrays** Dongjun Jung, Camille E. Cunin and Polina Anikeeva; Massachusetts Institute of Technology, United States Minor Outlying Islands

**SB01.09.14**

**Multimodal Soft Actuators for Skin-Compatible Haptic Feedback** Shanshan Yao; Stony Brook University, The State University of New York, United States

**SB01.09.15**

**Neurotransmitter Detection Using Thermally Drawn Carbon Nanotube Fiber Electrode Arrays** Ethan Frey, Atharva Sahasrabudhe and Polina Anikeeva; Massachusetts Institute of Technology, United States

**SB01.09.16**

**Event-Driven Stretchable Strain Monitor Using Positive Piezoconductive Strain Switch** Yuji Isano, Shoki Kato, Tamami Takano, Munkhzaya Purevdorj, Nyamjargal Ochirkhuyag and Hiroki Ota; Yokohama National University, Japan

**SB01.09.17**

**Preparation of Crosslinker-Free PHEA Hydrogel Bioadhesive via *In Situ* Polymerization Under Continuous Mixing** Byoung Soo Kim, Seo Yoon Kim and Ji Won Kang; Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of)

**SB01.09.18**

**Bioinspired Printable Tough Adhesive with Tunable Mechanics via Molecular Topology Design** Tianwei Du and Zhenwei Ma; BC Cancer, Canada

SESSION SB01.10: Soft Neural Interfaces

Session Chairs: Zhe Chen and Hyunwoo Yuk

Thursday Morning, April 10, 2025

Summit, Level 3, Room 337

**8:30 AM \*SB01.10.01**

**3D Printing as a Rapid Prototyping Approach for Multimodal and Soft Bioelectronics** Ivan Minev<sup>1,2</sup>; <sup>1</sup>Leibniz Institute for Polymer Research, Germany; <sup>2</sup>TUD Dresden University of Technology, Germany

**9:00 AM SB01.10.02**

**Biodegradable Bionic Hydrogel Microelectrode Arrays with Stem Cell Transplantation and Electrically-Controlled Drug Delivery Applied for Treating Peripheral Nerve Injury and Brain Disorders** Wei-Chen Huang, Wan-Lou Lei and Tzu-Ya Cheng; National Yang Ming Chiao Tung University, Taiwan

**9:15 AM \*SB01.10.03**

**Next-Generation Biomedical and Neural Interfaces Using Multifunctional Thermally Drawn Fibers with Soft Materials** Seongjun Park; Seoul National University, Korea (the Republic of)

**9:45 AM SB01.10.04**

**Neuromorphic Sensorimotor Loop Embodied by Monolithically Integrated, Low-Voltage, Soft e-Skin** Weichen Wang; Stanford University, United States

**10:00 AM BREAK**

SESSION SB01.11: Soft Sensors and Devices

Session Chairs: Weichen Wang and Hyunwoo Yuk

Thursday Morning, April 10, 2025

Summit, Level 3, Room 337

**10:30 AM \*SB01.11.01**

**Soft Materials-Enabled Sensing and Stimulation for Translational Applications** [Bozhi Tian](#); University of Chicago, United States

**11:00 AM SB01.11.02**

**A Smart Mask for Breath Condensate Harvesting and Molecular Detection** [Wenzheng Heng](#)<sup>1</sup>, Shukun Yin<sup>1</sup>, Harry B. Rossiter<sup>2</sup> and Wei Gao<sup>2</sup>; <sup>1</sup>California Institute of Technology, United States; <sup>2</sup>University of California, Los Angeles, United States

**11:15 AM \*SB01.11.03**

**Sensors and Displays Conformable to Skin Wrinkles for Seamless Human-Machine Interaction** [Naoji Matsuhsa](#); University of Tokyo, Japan

**11:45 AM SB01.11.04**

**Using Soft Stimuli-Responsive Materials for Creating Self-Powered “Intelligent” Functional Systems** [Siowling Soh](#); National University of Singapore, Singapore

SESSION SB01.12: Liquid Metal Enabled Soft Materials and Interfaces

Session Chairs: Wenzheng Heng and Tao Zhou

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 337

**1:30 PM SB01.12.01**

**Self-Assembly Enabled Printable Asymmetric Stretchable Conductor for Human Interface** [Salahuddin Ahmed](#), Marzia Momin, Jiashu Ren, Hyunjin Lee and Tao Zhou; Pennsylvania State University, United States

**1:45 PM SB01.12.02**

**Synthesis of Elongated Liquid Metal Droplets for Enhanced Thermal Management in Soft Matter** [Ren-Mian Chin](#) and Mohammad H. Malakooti; University of Washington, United States

**2:00 PM SB01.12.03**

**Additive Manufacturing of Elastic Conductors with Slippery Liquid Metal Particles** [Hyeonseok Jeong](#) and Jiheong Kang; Seoul National University, Korea (the Republic of)

**2:15 PM SB01.12.04**

**Universal Assembly of Liquid Metal Particles in Polymers Enables Elastic Printed Circuit Board** [Wonbeom Lee](#)<sup>1</sup> and Jiheong Kang<sup>2</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**2:30 PM BREAK**

SESSION SB01.13: Advanced Manufacturing of Soft Materials and Interfaces

Session Chairs: Christina Tringides and Tao Zhou

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 337

**3:00 PM \*SB01.13.01**

**AI/ML Directed High-Performance Actuation and Sensing in 3D/4D Printed Polymer Materials** [Rigoberto C. Advincula](#); The University of Tennessee/Oak Ridge National Laboratory, United States

**3:30 PM SB01.13.02**

**Hybrid 3D Printing of Artificial SA-II Afferents Using Engineered Composites with Negative Piezoresistance** [Mina Lee](#), Michael Sotzing and Alex Chortos; Purdue University, United States

**3:45 PM SB01.13.03**

**3D Cryoprinting for the Manufacture of Large-Scale, Interface-Free and Interconnected Porous Biopolymeric Scaffolds** [Samantha Baker-Jones](#), Malavika Nair and Patrick Grant; University of Oxford, United Kingdom

**4:00 PM SB01.13.04**

**Advanced Manufacturing Technology Facilitates the Integration of Electrical Impedance Tomography in Human-Computer Interaction** [Xupeng Lu](#) and Mitch Guijun Li; The Hong Kong University of Science and Technology, Hong Kong

**4:15 PM SB01.13.05**

**Dynamic Building Facades Using Large Area, Milli-Fluidic Layers** Maya Dai and [Benjamin Hatton](#); University of Toronto, Canada

**4:30 PM SB01.13.06**

**Facile Fabrication of Soft Sensors for the Tactile Perception of Modulus** [Arielle E. Berman](#)<sup>1</sup>, Chengyi Xu<sup>1</sup>, Samuel Root<sup>1</sup>, Levent Beker<sup>2</sup> and Zhenan Bao<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>Koç University, Turkey

**4:45 PM SB01.13.07**

**Electrospun Nylon-11 Triboelectric Yarns for Enhanced Energy Harvesting In Durable Smart Textiles** [Piotr K. Szewczyk](#) and Urszula Stachewicz; AGH University of Krakow, Poland

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## SYMPOSIUM SB02

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Flexible, Stretchable Biointegrated Materials, Devices and Related Mechanics  
April 7 - April 11, 2025

Symposium Organizers

Yeonsik Choi, Yonsei University  
Keon Jae Lee, Korea Advanced Institute of Science & Technology  
Nanshu Lu, The University of Texas at Austin  
John Rogers, Northwestern University

Symposium Support

**Bronze**

*APL Electronic Devices*

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB02.01: Materials for Flexible and Stretchable Devices I

Session Chairs: Onur Parlak and Shanshan Yao

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 336

**10:30 AM \*SB02.01.01**

**Physisorbed Antibodies Biolayer Polarization Variability Decreases upon Electric-Field Cycling** Cinzia Di Franco<sup>1</sup>, Eleonora Macchia<sup>2</sup>, Gaetano Scamarcio<sup>2</sup> and [Luisa Torsi](#)<sup>2</sup>; <sup>1</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>University of Bari A. Moro, Italy

**11:00 AM \*SB02.01.02**

**Beyond the Bend—Next-Gen Bioelectronics for Human and Machine Synergy** [Muhammad M. Hussain](#)<sup>1</sup>, Min S. Kim<sup>1</sup>, Dhiya Belkadi<sup>1</sup>, Yusuf Adebakin<sup>1</sup>,

Mujeeb Yousuf<sup>1</sup>, Wedyan Babatain<sup>2</sup>, Uttam Das<sup>3</sup>, Nadeem Qaiser<sup>3</sup> and Nazek El-Atab<sup>3</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Massachusetts Institute of Technology, United States; <sup>3</sup>King Abdullah University of Science and Technology, Saudi Arabia

**11:30 AM SB02.01.03**

**Precision Electrocrystallization of Conductive Charge-Transfer Complex for Flexible Gas Sensors Toward Breath Monitoring** Ren Wang; University of New South Wales, Australia

SESSION SB02.02/EL14.02: Joint Session: Innovations in Stretchable and Flexible Electronics for Wearable Integration

Session Chairs: Yeonsik Choi and Huanyu Zhou

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 336

**1:30 PM \*SB02.02/EL14.02.01**

**Stretchable Integrated Circuits Based on Intrinsically Stretchable Materials** Zhenan Bao; Stanford University, United States

**2:00 PM \*SB02.02/EL14.02.02**

**Stretchable Artificial Synapses and Displays for Next-Generation Wearable Electronics** Tae-Woo Lee; Seoul National University, Korea (the Republic of)

**2:30 PM \*SB02.02/EL14.02.03**

**Flexible and Stretchable QLEDs and Integration with Sensors and Mobile Robots** Dae-Hyeong Kim<sup>1,2</sup>; <sup>1</sup>Institute for Basic Science, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**3:00 PM BREAK**

SESSION SB02.03: Flexible Optoelectronics

Session Chairs: Soongwon Cho and Kaiyan Qiu

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 336

**3:30 PM \*SB02.03.01**

**Tuning Properties of Conjugated Polyelectrolytes for Opto-Electronic Devices** Thuc-Quyen Nguyen; University of California, Santa Barbara, United States

**4:00 PM \*SB02.03.02**

**Transfer Printing Enabling Micro-LED Assembly for Flexible Displays** Junhyung Kim and Seok Kim; Pohang University of Science and Technology, Korea (the Republic of)

**4:30 PM SB02.03.03**

**Full Integration of Stretchable Inorganic Transistors and Circuits on Molecularly Tailored Elastic Platforms** Seung-Han Kang<sup>1</sup>, Seung Beom Shin<sup>2</sup>, Jeong-Wan Jo<sup>3</sup>, Jaehyun Kim<sup>4</sup>, Myung-Gil Kim<sup>2</sup>, Jong-Woong Kim<sup>2</sup> and Sung Kyu Park<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of); <sup>3</sup>University of Cambridge, United Kingdom; <sup>4</sup>Dongguk University, Korea (the Republic of)

**4:45 PM SB02.03.04**

**Stiffness and Thermal Conductivity of Liquid Metal Elastomer Composites with Secondary Solid Particles—Modeling and Experiment** Lijun Zhou, Sebastian Bustos and Mohammad H. Malakooti; University of Washington, United States

SESSION SB02.04: Energy Systems in Wearables

Session Chairs: Massimo Mariello and Ye Tian

Wednesday Morning, April 9, 2025  
Summit, Level 3, Room 336

**8:30 AM SB02.04.01**

**Flexible and Wearable Thermoelectric Devices for Personal Cooling and Thermal Haptic Sensations** Tianshi Feng, Yu Pei, Sarath Adapa, Jiedong Wang and Renkun Chen; University of California, San Diego, United States

**8:45 AM SB02.04.02**

**Temperature-Strain-Pressure Multimodal Sensor Based on Copper(I) Iodide Nanoparticles Embedded Highly Stretchable Thermoelectric Fiber for Wearable Electronics** Kukro Yoon and Taeyoon Lee; Yonsei University, Korea (the Republic of)

**9:00 AM \*SB02.04.03**

**Towards Wireless Flexible Printed Electronics** Ana Claudia Arias; University of California, Berkeley, United States

**9:30 AM BREAK**

**10:00 AM \*SB02.04.04**

**From Energy Autonomous Wearables to Mycelium-Derived Materials for Flexible Electronics** Martin Kaltenbrunner; Johannes Kepler University, Austria

**10:30 AM \*SB02.04.05**

**Designing IoT Components with Flexible Electronics for Wearables** Ravi Silva; University of Surrey, United Kingdom

SESSION SB02.06: Smart Sensors and Bioelectronics for Healthcare

Session Chairs: Mohamed Elsharif and Joe Troughton

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 336

**1:30 PM \*SB02.06.01**

**Bioelectronics on the Fingertip** Joseph Wang; University of California, San Diego, United States

**2:00 PM SB02.06.02**

**Machine Learning Assisted Epidermal Sensors for Silent Speech Recognition** Shanshan Yao and Penghao Dong; Stony Brook University, United States

**2:15 PM SB02.06.03**

**Large-Scale, Cost-Effective Pressure Mattress Using Flexible Touch Sensor** Donho Lee<sup>1</sup>, Hyeonseok Han<sup>1</sup>, Jungrak Choi<sup>2</sup>, Jiwon Moon<sup>1</sup> and Inkyu Park<sup>1</sup>; <sup>1</sup>KAIST, Korea (the Republic of); <sup>2</sup>Electronics and Telecommunications Research Institute, Korea (the Republic of)

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SB02.06.04**

**Advanced Materials for Wearable Biomedical Devices—Innovations in Tele-Healthcare and Beyond** Chi Hwan Lee; Purdue University, United States

**4:00 PM \*SB02.06.05**

**Smart and Connected Sensors and Bioelectronics for Human-Machine Interfaces and Advanced Healthcare** W. Hong Yeo; Georgia Institute of Technology, United States

**4:30 PM SB02.06.06**

**Epidermal Sensors for Medical Diagnostics** Onur Parlak; Karolinska Institutet, Sweden

**4:45 PM SB02.06.07**

**3D-Printed Wearable Colorimetric and Electrochemical Health Monitors for *In Situ* Sweat and Interstitial Fluid Analysis and Biomarker Detection** Kaiyan Qiu; Washington State University, United States

SESSION SB02.07: Poster Session: Flexible, Stretchable Biointegrated Materials, Devices and Related Mechanics

Session Chairs: Wubin Bai, Yeonsik Choi and Changsheng Wu

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB02.07.01**

**Exploring Multi-Drug Therapeutics Within a 3D Microphysiological Kidney Cancer-on-Chip Platform** Upasana Gupta and Ravi Kumar Arun; Indian Institute of Technology Jammu, India

**SB02.07.02**

**Thermal Stress-Based Fabrication of Ultrasensitive Crack-Based Strain Sensor** Woojin Lee, Yoonnam Kim and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

**SB02.07.03**

**Biodegradable Fiber Electronics for Ecofriendly Devices** Yongwu Kim, Kyung-Sub Kim, Jae-Young Bae and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

**SB02.07.04**

**Flexible Miniaturized Photometer Probe for Real-Time Metabolic Intrinsic Fluorescence Imaging** Jingyuan Feng<sup>1,2</sup>, Dane Hintermueller<sup>1</sup>, Li Ding<sup>1,3</sup>, Jiabo Li<sup>2</sup>, Mingzheng Wu<sup>1,2</sup> and John A. Rogers<sup>1</sup>; <sup>1</sup>Northwestern Querrey Simpson Institute for Bioelectronics (QSIB), United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>Union Hospital, Tongji Medical College, China

**SB02.07.05**

**Bioresorbable Electrical Stimulator with Isograft for Maximized Functional Recovery** Jung Hwangbo<sup>1</sup>, Yameng Xu<sup>2</sup> and Yeonsik Choi<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Washington University in St. Louis, United States

**SB02.07.06**

**Eagle Eye-Inspired Tunable Fovea Imaging System for Adaptive Central Magnification** Jisang Ha<sup>1,2</sup> and Dae-Hyeong Kim<sup>1,2</sup>; <sup>1</sup>Institute for Basic Science(IBS), Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**SB02.07.07**

**Flexible Magnetic Ellipse Arrays for Radio Frequency Applications** Seungha Yoon; Korea Institute of Industrial Technology, Korea (the Republic of)

**SB02.07.08**

**Stimuli-rEponsive Polyurethanes for Bioresorbable Electronic Medicine** Gyuhyeon Sim and Yeonsik Choi; Yonsei University, Korea (the Republic of)

**SB02.07.09**

**Soft and Minimally-Invasive Bioelectronics for Cardiac Electro-Modulation and Localized Drug Delivery** Chanhui Park, Dae-Hyeong Kim and Seonghyeon Nam; Seoul National University, Korea (the Republic of)

**SB02.07.10**

**Soft and Stretchable Nanomembrane-Based Electrode Arrays for High-Fidelity Electrophysiological Signal Recording of the Gastrointestinal Tract** Camille E. Cunin, Dongjun Jung, Aristide Gumyusenge and Polina Anikeeva; Massachusetts Institute of Technology, United States

**SB02.07.11**

**Intrinsically Stretchable Polymer Semiconductor Doping System Enabled by Ambient Oxygen Molecules for Skin Electronics** MinWoo Jeong<sup>1</sup>, Min Hyouk Kim<sup>1</sup>, Jun Su Kim<sup>1</sup>, Tae Uk Nam<sup>1</sup>, Ngoc Thanh Phuong Vo<sup>1</sup>, Kyu Ho Jung<sup>1</sup>, Hye Rin Chang<sup>1</sup>, Thuy An Nguyen<sup>1</sup>, Tae Il Lee<sup>2</sup> and Jin Young Oh<sup>1</sup>; <sup>1</sup>Kyung Hee University, Korea (the Republic of); <sup>2</sup>Gachon University, Korea (the Republic of)

**SB02.07.12**

**Intrinsically Stretchable Active-Matrix Memory Transistor Array Enabled by Metal Nanoparticle Floating Gate for Skin-Like Electronics** Hye Rin Chang<sup>1</sup>, Tae Uk Nam<sup>1</sup>, Ngoc Thanh Phuong Vo<sup>1</sup>, MinWoo Jeong<sup>1</sup>, Kyu Ho Jung<sup>1</sup>, Seon Hoo Park<sup>1</sup>, Thuy An Nguyen<sup>1</sup>, Tae Il Lee<sup>2</sup>, Jin Young Oh<sup>1</sup> and Seung

Hwan Lee<sup>1</sup>; <sup>1</sup>Kyung Hee University, Korea (the Republic of); <sup>2</sup>Gachon University, Korea (the Republic of)

#### **SB02.07.13**

**Skin-Inspired Stretchable and Autonomous Self-Healing Transistors Based on Supramolecular Polymer** Ngoc Thanh Phuong Vo<sup>1</sup>, Tae Uk Nam<sup>1</sup>, MinWoo Jeong<sup>1</sup>, Jun Su Kim<sup>1</sup>, Kyu Ho Jung<sup>1</sup>, Hye Rin Chang<sup>1</sup>, Thuy An Nguyen<sup>1</sup>, Yeongjun Lee<sup>2</sup>, Guorong Ma<sup>3</sup>, Xiaodan Gu<sup>3</sup>, Jeffrey B.-H. Tok<sup>4</sup>, Tae Il Lee<sup>5</sup>, Zhenan Bao<sup>4</sup> and Jin Young Oh<sup>1</sup>; <sup>1</sup>Kyung Hee University, Korea (the Republic of); <sup>2</sup>Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of); <sup>3</sup>The University of Southern Mississippi, United States; <sup>4</sup>Stanford University, United States; <sup>5</sup>Gachon University, Korea (the Republic of)

#### **SB02.07.14**

**Helically Wrapped CNT-Based Yarn Strain Sensor for Multi-Modal Human Motion Sensing** Jae Myeong Lee, Changsoon Choi and Seon Jeong Kim; Hanyang University, Korea (the Republic of)

#### **SB02.07.15**

**Intrinsically Stretchable Phototransistor for Skin-Like Visible-NIR Sensor with Polymer-QD-Polymer Multi-Layered Hybrid Films** Thuy An Nguyen, Tae Uk Nam, Jun Hyung Jeong, Ngoc Thanh Phuong Vo, MinWoo Jeong, Kyu Ho Jung, Seon Hoo Park, Hye Rin Chang, Seong Jun Kang and Jin Young Oh; Kyung Hee University, Korea (the Republic of)

#### **SB02.07.16**

**Novel High-Permittivity Low Young Modulus Elastomer Dielectrics for Bioelectronics** Hao Gu<sup>1,2</sup>, Adrian Bele<sup>3</sup>, Codrin Tugui<sup>1</sup> and Mihai Duduta<sup>1</sup>; <sup>1</sup>University of Connecticut, United States; <sup>2</sup>Lynbrook High School, United States; <sup>3</sup>Institute of Macromolecular Chemistry Petru Poni, Romania

#### **SB02.07.17**

**Analytical and Numerical Modeling of a Passive Low-Cost Inertial Fluidic Acceleration Sensor** Gabriel M. Pesek, Abby Kuba, Ethan Lowe, Bridget Dunn, Juan Aceros, Lindsay Toth and Christopher Oshman; University of North Florida, United States

#### **SB02.07.18**

**Printed Ion-Selective Electrodes with Silicone** Carolyn Schwendeman, Lucas Lahann, Carol Baumbauer, Payton Goodrich and Ana Claudia Arias; University of California, Berkeley, United States

SESSION SB02.08: Bioelectronic Implants

Session Chairs: Soongwon Cho, Philipp Gutruf and Kento Yamagishi

Thursday Morning, April 10, 2025

Summit, Level 3, Room 336

#### **8:00 AM SB02.08.01**

**Bioelectronic Drug-Free Control of Opportunistic Pathogens Through Selective Excitability** Saehyun Kim; University of Chicago, United States

#### **8:15 AM SB02.08.02**

**Thin-Film Encapsulations for Compliant Implantable Bioelectronics—Advanced Materials and Characterization Methods Based on Bioresorbable Magnesium Permeability-Sensing Structures** Massimo Mariello<sup>1</sup>, Yves Letier<sup>2</sup> and Stephanie P. Lacour<sup>2</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>EPFL, Switzerland

#### **8:30 AM SB02.08.03**

**A Microfluidic Wound Dressing for Active Control of the Wound Environment** Mahsa Karimi and Benjamin Hatton; University of Toronto, Canada

#### **8:45 AM \*SB02.08.04**

**3D Printed Liquid-Metal Neural Interfaces for Precision Neural Stimulation and Recording** Jang-ung Park<sup>1,1,2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Yonsei-IBS Institute, Korea (the Republic of)

#### **9:15 AM \*SB02.08.05**

**An Implantable Piezoelectric Ultrasoundstimulator (ImpPULS) for Deep Brain Activation** Canan Dagdeviren; Massachusetts Institute of Technology, United States



**9:45 AM BREAK**

**10:15 AM \*SB02.08.06**

**Implantable, 2D Material-Based Sensor for Neural Recording and Stimulation** [Jong-Hyun Ahn](#); Yonsei University, Korea (the Republic of)

**10:45 AM \*SB02.08.07**

**Functional Devices for hEalthcare Applications Based on Biological-to-Electrical Signal Transduction** [Sohini Kar-Narayan](#); University of Cambridge, United Kingdom

**11:15 AM SB02.08.08**

**Wirelessly-Powered Ingestible Electronic Capsule for Non-Invasive Gastrointestinal Optogenetics** [Mohamed Elsharif](#)<sup>1</sup>, Rawan Badr El-Din<sup>1</sup>, Zhansaya Makhambetova<sup>1</sup>, Heba Naser<sup>1</sup>, Maylis Boitet<sup>1</sup>, Rahul Singh<sup>1</sup>, Keonghwan Oh<sup>1</sup>, Revathi Sukesan<sup>1</sup>, Sohmyung Ha<sup>1,2</sup> and Khalil Ramadi<sup>1,2</sup>; <sup>1</sup>New York University Abu Dhabi, United Arab Emirates; <sup>2</sup>New York University, United States

**11:30 AM SB02.08.09**

**A Bright Idea—Ultrafast Laser Processing for Next Generation Neural Interfaces** [Joe Troughton](#) and Christopher Proctor; University of Oxford, United Kingdom

**11:45 AM SB02.08.10**

**An Electronics-Free Ultrasonic Sensor for Continuous and Wireless Monitoring of Deep Tissue Strains** [Ye Tian](#); Case Western Reserve University, United States

SESSION SB02.09: Materials for Flexible and Stretchable Devices II

Session Chairs: Benjamin Hatton and Sunghoon Lee

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 336

**1:30 PM \*SB02.09.01**

**Anisotropic Thermal Conductivity for High Performance Deformable Electronics** [Tae-il Kim](#); Sungkyunkwan University, Korea (the Republic of)

**2:00 PM \*SB02.09.02**

**Flexible Electronic and Ionic Composites with Actuation Functionalities** [Pooi See Lee](#)<sup>1,2</sup>; <sup>1</sup>Nanyang Technological University, Singapore; <sup>2</sup>SHARE, Smart Grippers for Soft Robotics (SGSR), Campus for Research Excellence and Technological Enterprise (CREATE), Singapore

**2:30 PM SB02.09.03**

**Skin-Conformal Nano-Electrodes for High-Fidelity Electrophysiological Signal Monitoring in Dynamic and Underwater Environments** [Jinyoung Kim](#)<sup>1</sup>, Sehyun Park<sup>1</sup>, Jisoo Jeon<sup>1</sup>, Dong-hee Kang<sup>1</sup>, Gwendolyn Bryan<sup>2</sup>, James FitzPatrick<sup>3</sup>, Yury Gogotsi<sup>3</sup>, Timothy J. Broderick<sup>2</sup>, Morley Stone<sup>2</sup> and Vladimir Tsukruk<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>The Institute for Human & Machine Cognition, United States; <sup>3</sup>Drexel University, United States

**2:45 PM SB02.09.04**

**Wireless Skin-Interfaced and Contact-Free Sensors for Multi-Modal Biomechanical Monitoring** [Changsheng Wu](#); National University of Singapore, Singapore

**3:00 PM BREAK**

**3:30 PM \*SB02.09.05**

**Wearable Ultrasound Technology** [Sheng Xu](#); University of California, San Diego, United States

**4:00 PM \*SB02.09.06**

**Self-Healing Soft Printed Circuits and Bioelectronics with Liquid Metal** [Carmel Majidi](#); Carnegie Mellon University, United States

**4:30 PM SB02.09.07**

**Bioinspired Interfacially Engineered Flexible Island for Highly Stretchable Electronics** [Osman Gul](#)<sup>1,2</sup>, Hye Jin Kim<sup>2,3</sup> and Inkyu Park<sup>1</sup>; <sup>1</sup>Korea

Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Electronics and Telecommunications Research Institute, Korea (the Republic of);  
<sup>3</sup>University of Science and Technology, Korea (the Republic of)

**4:45 PM SB02.09.08**

**Highly Flexible Devices Based on Double Gated Organic Thin Film Transistor for Tactile Sensing** Piero Cosseddu, Antonello Mascia and Mattia Concas; University of Cagliari, Italy

SESSION SB02.10: Wearable Devices and Technology

Session Chairs: Piero Cosseddu and Jinyoung Kim

Friday Morning, April 11, 2025

Summit, Level 3, Room 336

**8:30 AM SB02.10.01**

**Multimodal Sensing Flexible E-textile System for Maternal Health Monitoring** Chansoo Kim, Junyi Zhao, Ryan M. Andersen, Weilun Li, Naiyan Wu, Shantanu Chakrabartty, Yong Wang and Chuan Wang; Washington University in St. Louis, United States

**8:45 AM SB02.10.02**

**Battery-Free, Wireless Three-Axial Sensor Array to Prevent Pressure Injury** Jiwon Moon, Hyeonseok Han, Seokjoo Cho, Donho Lee and Inkyu Park; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**9:00 AM SB02.10.03**

**Biosymbiotic Electronics—Chronic Health Insight Beyond Epidermal Turnover Limits** Philipp Gutruf; The University of Arizona, United States

**9:15 AM SB02.10.04**

**Leveraging Sensor-Algorithm Synergy for Advancing Muscle-Tracking Technology** Wubin Bai; University of North Carolina at Chapel Hill, United States

**9:30 AM \*SB02.10.05**

**Sensor Glove with Extended Energy Storage for Motor Disorder Evaluation** Tse Nga Ng; University of California, San Diego, United States

**10:00 AM BREAK**

**10:30 AM \*SB02.10.06**

**Ultra-Soft and Durable Skin Electronics for Next-Generation Wearable Devices** Sunghoon Lee<sup>1,2</sup>, Tomoyuki Yokota<sup>2</sup>, Kenjiro Fukuda<sup>1</sup> and Takao Someya<sup>1,2</sup>; <sup>1</sup>RIKEN, Japan; <sup>2</sup>The University of Tokyo, Japan

**11:00 AM \*SB02.10.07**

**Haptic Artificial Muscle Skin for Extended Reality** Qibing Pei; University of California, Los Angeles, United States

**11:30 AM SB02.10.08**

**Skin-Conformal Wearable System for Electromyographic Analysis of Palm Muscles During Baseball Pitching** Kento Yamagishi<sup>1,2</sup>, Shinji Takeoka<sup>2</sup>, Tomoyuki Nagami<sup>3</sup> and Toshinori Fujie<sup>4</sup>; <sup>1</sup>The University of Tokyo, Japan; <sup>2</sup>Waseda University, Japan; <sup>3</sup>Kitasato University, Japan; <sup>4</sup>Institute of Science Tokyo, Japan

**11:45 AM SB02.10.09**

**A Soft, Skin Interfaced Microfluidic Band with Colorimetric Sensor Suites for Monitoring Dynamic Sweat Biochemistry During Exercise** Soongwon Cho<sup>1,2</sup>, Samy M. Shaban<sup>3,3,4</sup>, Ruihao Song<sup>1,1</sup>, Haohui Zhang<sup>1</sup>, Dasom Yang<sup>1,3</sup>, Min-jae Kim<sup>3,3</sup>, Xiuyuan Li<sup>1</sup>, Yirui Xiong<sup>1,1</sup>, Sarena Wapnick<sup>1</sup>, Roozbeh Ghaffari<sup>1,2,5</sup>, Yonggang Huang<sup>1,1,1</sup>, Dong-hwan Kim<sup>3,3</sup> and John A. Rogers<sup>1,2,1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Northwestern, United States; <sup>3</sup>Sungkyunkwan University, Korea (the Republic of); <sup>4</sup>Egyptian Petroleum Research Institute, Egypt; <sup>5</sup>Epicore Biosystems, Inc., United States

# SYMPOSIUM SB03

Biopolymers for Electronics and Robotics

April 7 - April 10, 2025

Symposium Organizers

Pietro Cataldi, Italian Institute of Technology

Florian Hartmann, Max Planck Institute

Laia Mogas-Soldevila, University of Pennsylvania

Dimitrios Papageorgiou, Queen Mary University of London

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB03.01: Biodegradable Substrates for Electronics

Session Chairs: Pietro Cataldi and Dimitrios Papageorgiou

Monday Morning, April 7, 2025

Summit, Level 3, Room 332

**10:00 AM \*SB03.01.01**

**Sustainable Solution Processing for Additive Fabrication of Electronic Devices** Sophie Koh, Carla B. Milsted and Ana Claudia Arias; University of California, Berkeley, United States

**10:30 AM \*SB03.01.02**

**Stretchable and Biodegradable Elastomers for Transient Electronics** Suk-Won Hwang; Korea University, Korea (the Republic of)

**11:00 AM SB03.01.03**

**Cellulose Oleogel-Based OleoPlast for Sustainable Electronic Substrates and Conductive Composites** Leonardo Lamanna, Annalisa Perrone, Veronica Ortis, Marco Friuli, Luca Cafuero, Christian Demitri and Alessandro Sannino; Università del Salento, Italy

**11:15 AM SB03.01.04**

**Anomalous Enhancement of Dielectric Strength in Polymer Thin Films** Gabriel O. Mogbojuri, Ryan Kadavy, Odin Taylor, Caden Chittick, Binzhi Liu, Shaghayegh Abtahi, Sharif Tasnim Mahmud, Kaitlyn Hillery, Nayanathara Hendeniya, Xiaoli Tan and Boyce Chang; Iowa State University of Science and Technology, United States

SESSION SB03.02: Biopolymers for Robotics

Session Chairs: Pietro Cataldi and Dimitrios Papageorgiou

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 332

**1:30 PM \*SB03.02.01**

**Engineering Soft Functional Polymer Interfaces for Biohybrid Robots** Ritu Raman; Massachusetts Institute of Technology, United States

**2:00 PM \*SB03.02.02**

**Materials and Methods for Biodegradable Soft Robotic Systems** Martin Kaltenbrunner; Johannes Kepler University, Austria

**2:30 PM SB03.02.07**

**Light-Triggered Paper/Polymer Bilayer Actuators in Mechatronics** Ambrose A. Melvin, Minkyu Shin, Seewoo Kim and Jeong-Woo Cho; Sogang

University, Korea (the Republic of)

**2:45 PM BREAK**

**3:15 PM \*SB03.02.04**

**Functional Protein Materials for Bioinspired Robotics** Chuqi Huang, Zenghao Zhang and [Abdon Pena-Francesch](#); University of Michigan, United States

**3:45 PM \*SB03.02.05**

**Edible Electronic Devices and Power Sources for Future Edible Electronic Systems** [Mario Caironi](#); Istituto Italiano di Tecnologia, Italy

**4:15 PM SB03.02.06**

**Self-Propelled Morphing Matter for Small-Scale Swimming Soft Robots** [Chuqi Huang](#)<sup>1</sup>, Natalie Pinchin<sup>2</sup>, Hamed Shahsavan<sup>2</sup> and Abdon Pena-Francesch<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>University of Waterloo, Canada

**4:30 PM SB03.02.03**

**Biomimetic Composites of Aramid Nanofibers for Structural Energy in Robotics** [Nicholas A. Kotov](#); University of Michigan, United States

SESSION SB03.03: Biopolymers for Wearables, Devices and Sensors I

Session Chairs: Pietro Cataldi and Dimitrios Papageorgiou

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 326

**8:30 AM SB03.03.01**

**Closed-Loop Recycling of Wearable Electronic Textiles** Marzia Dulal<sup>1</sup>, [Shaila Afroj](#)<sup>2</sup>, Rashedul Islam<sup>1</sup>, Minglonghai Zhang<sup>3</sup>, Yadie Yang<sup>3</sup>, Hong Hu<sup>3</sup>, Kostya S. Novoselov<sup>4</sup> and Nazmul Karim<sup>5</sup>; <sup>1</sup>UWE Bristol, United Kingdom; <sup>2</sup>University of Exeter, United Kingdom; <sup>3</sup>The Hong Kong Polytechnic University, Hong Kong; <sup>4</sup>National University of Singapore, Singapore; <sup>5</sup>University of Southampton, United Kingdom

**8:45 AM SB03.03.02**

**Wearable Body Temperature Sensing with Autonomous Self-Regulated Joule Heating and Passive Cooling for Healthcare Applications** [Hongxu Guo](#)<sup>1</sup>, Lichang Lu<sup>1</sup>, Fiona L. Hatton<sup>1</sup>, Lulu Xu<sup>1</sup>, Eileen Yu<sup>1</sup>, Ton Peijs<sup>2</sup>, Emiliano Bilotti<sup>3</sup>, Han Zhang<sup>4</sup> and Yi Liu<sup>1</sup>; <sup>1</sup>Loughborough University, United Kingdom; <sup>2</sup>University of Warwick, United Kingdom; <sup>3</sup>Imperial College London, United Kingdom; <sup>4</sup>Queen Mary University of London, United Kingdom

**9:00 AM \*SB03.03.03**

**Novel Materials and Device Architectures for Wearables** [George G. Malliaras](#); University of Cambridge, United Kingdom

**9:30 AM \*SB03.03.04**

**Sustainable Approaches for Next-Generation Wearable E-Textiles** [Nazmul Karim](#)<sup>1</sup>, Marzia Dulal<sup>2</sup> and Shaila Afroj<sup>3</sup>; <sup>1</sup>University of Southampton, United Kingdom; <sup>2</sup>UWE Bristol, United Kingdom; <sup>3</sup>University of Exeter, United Kingdom

**10:00 AM BREAK**

**10:30 AM \*SB03.03.05**

**Redefining Electronics Through Sustainable Biopolymers** [Luisa Petti](#), Ahmed Rasheed, Giuseppe Ciccone, Camilla Febo, Guglielmo Trentini and Manuela Ciocca; Free University of Bozen-Bolzano, Italy

**11:00 AM \*SB03.03.06**

**Biohybrid Photosynthetic Living Materials and Devices** [Eleni Stavriniidou](#); Linköping University, Sweden

**11:30 AM SB03.03.07**

**Biobased Electrically Conductive Hardening BioPaste for Underwater Coral Reef Restoration** [Gabriele Corigliano](#)<sup>1,2</sup>, Valerio Isa<sup>2</sup>, Paolo Galli<sup>2</sup>, Simone Montano<sup>2</sup>, Marco Contardi<sup>1,2</sup>, Pietro Cataldi<sup>1</sup> and Athanassia Athanassiou<sup>1</sup>; <sup>1</sup>Istituto Italiano di Tecnologia, Italy; <sup>2</sup>DISAT UNIMiB, Italy

**11:45 AM SB03.03.08**

**DIW 3D Printing of Flexible Electrochemical Implant Sensor Array Based on Silk Fibroin** [Jaeho Kim](#)<sup>1</sup>, Eun Shik Choi<sup>1</sup>, SeungHyun Park<sup>2</sup>, Hong Nam

Kim<sup>3</sup> and WonHyoung Ryu<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Pukyong National University, Korea (the Republic of); <sup>3</sup>Korea Institute of Science and Technology, Korea (the Republic of)

SESSION SB03.04: Sustainable Strategies for Electric Circuits

Session Chairs: Pietro Cataldi and Dimitrios Papageorgiou

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 326

**1:30 PM \*SB03.04.01**

**From Silk Fibres to Multifunctional Biodegradable Materials** Emiliano Bilotti and Qichen Zhou; Imperial College London, United Kingdom

**2:00 PM SB03.04.02**

**A Corn-Based Conductive Glue as Multi-Functional Tool for Edible Electronics: Interconnecting Devices and Food Monitoring** Noemí Contreras Pereda<sup>1</sup>, Valerio Galli<sup>1,2</sup>, Valerio F. Annese<sup>1</sup>, Giulia Coco<sup>1,2</sup>, Athanassia Athanassiou<sup>1</sup>, Alessandro Luzio<sup>1</sup> and Mario Caironi<sup>1</sup>; <sup>1</sup>Istituto Italiano di Tecnologia, Italy; <sup>2</sup>Department of Physics, Politecnico di Milano, Piazza Leonardo da Vinci, 32, Italy

**2:15 PM SB03.04.03**

**Laser-Induced Microporous Graphite Electrodes on Leaves as a Bio-Based Substrate** Jai Mangal and Ramesh Adhikari; Colgate University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SB03.04.04**

**Bio-Derived Laser Induced Graphene for Sustainable Electronics** Francesco Greco<sup>1,2,3</sup>; <sup>1</sup>Sant'Anna School of Advanced Studies, Italy; <sup>2</sup>TUGraz, Austria; <sup>3</sup>Scuola Superiore Sant'Anna, Italy

**4:00 PM SB03.04.05**

**Hemp-Derived Cannabinoids and Cannabinoid-Based Biopolymers for Synthesis and Formulation of Conductive Copper Ink Composites** Michael Sotzing<sup>1</sup>, Gregory Sotzing<sup>2</sup> and Alex Chortos<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Connecticut, United States

**4:15 PM SB03.04.06**

**Surface Optimisation of Cellulose Membranes for Development of a Sustainable and Efficient Low-Grade Waste Heat Harvester** Anjali Ashokan<sup>1</sup>, Kamil Rahme<sup>1</sup>, Padman Narayanasamy<sup>2</sup>, Subhajit Biswas<sup>1</sup>, Kafil Razeeb<sup>2</sup> and Justin Holmes<sup>1</sup>; <sup>1</sup>University College Cork, Ireland; <sup>2</sup>Tyndall National Institute, Ireland

**4:30 PM \*SB03.04.07**

**Bioderived Cellulose-Based Materials for Green Electronics** Yu Jun Tan; National University of Singapore, Singapore

SESSION SB03.05: Biopolymers for Wearables, Devices and Sensors II

Session Chairs: Pietro Cataldi and Dimitrios Papageorgiou

Thursday Morning, April 10, 2025

Summit, Level 3, Room 326

**9:00 AM SB03.05.01**

**3D-Printed Wearable Multimodal Electronics for Environment Sensing and Health Monitoring** Kaiyan Qiu; Washington State University, United States

**9:15 AM \*SB03.05.02**

**Strategy for Interfaces Between Ultra-Flexible Polymer Electronics and Biological Surfaces** Kenjiro Fukuda<sup>1</sup> and Takao Someya<sup>1,2</sup>; <sup>1</sup>RIKEN, Japan; <sup>2</sup>The University of Tokyo, Japan

**9:45 AM BREAK**

10:15 AM \*SB03.05.03

**Materials and Approaches to Eco-Sustainable Magnetoelectronics** [Denys Makarov](#); Helmholtz-Zentrum Dresden-Rossendorf e.V., Germany

10:45 AM \*SB03.05.04

**Designing Calcium-Binding Repeat Proteins as Biomolecular Actuators** Marina P. Chang, Alana P. Gudinas, Michelle C. Quan and [Danielle J. Mai](#); Stanford University, United States

# SYMPOSIUM SB04

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Bioinspired Macromolecular Assembly and Inorganic Crystallization—From Fundamental Science to Applications  
April 7 - April 9, 2025

## Symposium Organizers

Chun-Long Chen, Pacific Northwest National Laboratory  
Fabrizio Gelain, ASST Grande Ospedale Metropolitano Niguarda  
Nathaniel Rosi, University of Pittsburgh  
Tiffany Walsh, Deakin University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB04.01: Biomimetic Crystallization I

Session Chairs: Chun-Long Chen and Nathaniel Rosi

Monday Morning, April 7, 2025

Summit, Level 3, Room 324

8:30 AM \*SB04.01.01

**Bio-Inspired Routes to Functional Inorganic Nanomaterials for Assembly and Catalysis** [Marc R. Knecht](#); University of Miami, United States

9:00 AM \*SB04.01.02

**Mechanically Bonded Plasmonic Nanomachines** [Jwa-Min Nam](#); Seoul National University, Korea (the Republic of)

9:30 AM \*SB04.01.03

**Entropy-Driven Thermodynamics of Ca<sup>2+</sup>-Heparin Group Interactions and Implications for the Kinetics of CaCO<sub>3</sub> Nucleation** Brenna Knight, Connor Gallagher, Michael Schulz, Kevin Edgar and [Patricia M. Dove](#); Virginia Tech, United States

10:00 AM BREAK

10:30 AM \*SB04.01.04

**Peptide Mediated Synthesis of Chiral Gold Nanoparticle** [Ki Tae Nam](#); Seoul National University, Korea (the Republic of)

11:00 AM SB04.01.05

**Biomolecules-Templated Plasmonic Supramolecular Assembly and Emergent Chiroptical Behaviors** [Mengqi Sun](#)<sup>1</sup>, Hao Shen<sup>1</sup>, Jundai Shen<sup>2</sup>, Oleg Gang<sup>2</sup>, David Baker<sup>1</sup> and David S. Ginger<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Columbia University, United States

11:15 AM SB04.01.06

**Bone-Inspired Self-Limiting Crystal Growth Triggered and Tunable by Force** Sung Hoon Kang<sup>1,2</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Johns Hopkins University, United States

**11:30 AM \*SB04.01.07**

**Biological and Bio-Inspired Templating of Highly Ordered Metal Oxides** David Kisailus; University of California, Irvine, United States

SESSION SB04.02: Biomimetic Crystallization II

Session Chairs: Nathaniel Rosi and Tiffany Walsh

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 324

**1:30 PM \*SB04.02.01**

**Understanding the Role of Ligands in Crystal Growth, Assembly and Resulting Structures via *In Situ* Techniques** Dongsheng Li; Pacific Northwest National Laboratory, United States

**2:00 PM SB04.02.02**

**Phase Separation via Controlled Chain-Growth to Tailor Bicontinuous Monoliths** Senthilkumar Duraivel, Harsha Koganti, Reagan Dreiling, Tyler Ball, Brett Fors and Eric Dufresne; Cornell University, United States

**2:15 PM SB04.02.03**

**Soft Biomaterials Associating Microfibrillar Collagen I with Nanostructured Chitosan: from Gel to Microparticles** Enguerran E. Devernois<sup>1</sup>, Thibaud Coradin<sup>2,1</sup>, Christophe Helary<sup>2,1</sup>, Gervaise Mosser<sup>2,1</sup> and Jerome Charliac<sup>2,1</sup>; <sup>1</sup>Sorbonne Université, France; <sup>2</sup>Centre National de la Recherche Scientifique, France

**2:30 PM SB04.02.04**

**Two-Step Crystallization of Lennard-Jones Particles within the Core-Shell Nucleation Model** Thomas Philippe; Condensed Matter Physics Laboratory, Ecole polytechnique, France

**2:45 PM BREAK**

**3:15 PM \*SB04.02.05**

**Active Nanostructures from Bioinspired Self-Assembly of Nanoparticles** So-Jung Park; Ewha Womans University, Korea (the Republic of)

**3:45 PM SB04.02.06**

**Bioinspired Programmable Growth of Semiconductor Mesostructures via Artificial Phototropism** Azhar I. Carim; California Institute of Technology, United States

**4:00 PM SB04.02.07**

**Interactions of Boron Nitride Nanotube with Anti-Cancer Drug Melphalan for Targeted Delivery—A First-Principles Study** Gayathri K and Vidya Ravindran; Anna University, India

**4:15 PM SB04.02.08**

**Probing the Dynamic and Structural Morphology of Biomembrane-Nanoclay 2D Films on Various Subphases** Akash Mishra and Sunita Srivastava; Indian Institute of Technology Bombay, India

**4:30 PM SB04.02.09**

**Advances in Processing and Tunability of Keratinous Biomaterials** Victor A. Roman<sup>1,2</sup>, Jonathan Roth<sup>2,1</sup> and Sanaz Farajollahi<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory, United States; <sup>2</sup>BlueHalo, United States

SESSION SB04.03: Macromolecular Assembly I

Session Chairs: Chun-Long Chen and Nathaniel Rosi

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 324

**10:30 AM \*SB04.03.01**

**Bio-Inspired Supramolecular Design of Materials for Energy and Advanced Medicine** [Samuel I. Stupp](#); Northwestern University, United States

**11:00 AM \*SB04.03.02**

**Self-Assembling Peptides—From a Discovery in a Yeast Protein to Diverse Uses and Beyond** [Shuguang Zhang](#); Massachusetts Institute of Technology Media Lab, United States

**11:30 AM SB04.03.03**

**Tailoring Functionalized Self-Assembling Peptides for Regenerative Medicine Applications** [Fabrizio Gelain](#)<sup>1,2</sup>; <sup>1</sup>IRCCS Casa Sollievo Della Sofferenza, Italy; <sup>2</sup>ASST Grande Ospedale Metropolitano Niguarda, Italy

**11:45 AM SB04.03.04**

**Assembly of Sequence-Defined Peptoids into Crystalline Nanomaterials as Carbonic Anhydrase Mimics for Promoted Hydration and Sequestration of CO<sub>2</sub>** [Progyateg Chakma](#) and Chun-Long Chen; Pacific Northwest National Laboratory, United States

SESSION SB04.04: Macromolecular Assembly II

Session Chairs: Fabrizio Gelain and Tiffany Walsh

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 324

**1:30 PM \*SB04.04.01**

**Genetically Engineered Phages for Nanomedicine and Targeted Therapies** [Chuanbin Mao](#); The Chinese University of Hong Kong, Hong Kong

**2:00 PM \*SB04.04.02**

**Mesoporous Peptide Frameworks Assembled from Amphiphilic Collagen Triple Helices** Anthony R. Perez<sup>1</sup>, Douglas Zhang<sup>1</sup>, Yiwen He<sup>2</sup>, Nathaniel Rosi<sup>2</sup> and [Andrea Merg](#)<sup>1</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>University of Pittsburgh, United States

**2:30 PM \*SB04.04.03**

**Precision Engineering of Peptoid Nanosheet Lattices to Create 1D Crystalline Nanofibers** [Ronald N. Zuckermann](#); Lawrence Berkeley National Laboratory, United States

**3:00 PM BREAK**

**3:30 PM \*SB04.04.04**

**Biomolecules for Non-Biological Things—Peptide ‘Bundlemer’ Design for Model Colloidal Particle Creation and Interparticle Lattice Assembly** [Darrin J. Pochan](#); University of Delaware, United States

**4:00 PM SB04.04.05**

**Bond-Centric Modular Design of Protein Assemblies** [Shunzhi Wang](#); University of Washington, United States

**4:15 PM SB04.04.06**

**Self-Assembling E. Coli Secreted Protein A (EspA) as a Potential Building Block for Filaments and Engineered Biomaterials with Three-Fold Architectural Hierarchy** Moran Elias-Mordechai, May Morhaim, Maya G. Pelah, Jürgen Jopp, Neta Sal-Man and [Ronen Berkovich](#); Ben-Gurion University of the Negev, Israel

**4:30 PM \*SB04.04.07**

**Adaptive and Space-Filling Peptide Self-Assembly** [Rein Ulijn](#); City University of New York, United States

SESSION SB04.05: Poster Session: Bioinspired Macromolecular Assembly and Inorganic Crystallization—From Fundamental Science to Applications

Session Chairs: Chun-Long Chen and Tiffany Walsh

Tuesday Afternoon, April 8, 2025



5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB04.05.01**

**Amphiphilic Collagen Mimetic Peptides Self-Assemble into Crystalline Nanoparticles** Anthony R. Perez<sup>1</sup>, Yiwen He<sup>2</sup> and Andrea Merg<sup>1</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>University of Pittsburgh, United States

**SB04.05.02**

**Protein-Encapsulated Metal Organic Frameworks (MOFs) for Enhanced Stability and Targeted Drug Delivery** Sajid Ur Rehman, Kun Ma and Junfeng Wang; Hefei Institutes of Physical Sciences, China

**SB04.05.03**

**Investigating the Origin of Reddish-Pink Coloration in Male Anna's Hummingbird (*Calypte Anna*)** Sangyeop Kim<sup>1,2</sup>, Jihun Kang<sup>1,2</sup>, Seunghwan Moon<sup>1,2</sup>, Liliana D'Alba<sup>3,4</sup>, Matthew Shawkey<sup>3</sup> and Jong-Souk Yeo<sup>1,2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>BK21 Graduate Program in Intelligent Semiconductor Technology, Yonsei University, Korea (the Republic of); <sup>3</sup>Evolution and Optics of Nanostructures Group, Department of Biology, Ghent University, Belgium; <sup>4</sup>Evolutionary Ecology Group, Naturalis Biodiversity Center, Netherlands

**SB04.05.04**

**Revealing the Reasons for the Absence of Pheomelanin-Based Structural Colors in Bird Feathers** Sangyeop Kim<sup>1,2</sup>, Deok-Jin Jeon<sup>1</sup>, Wanjie Xie<sup>3</sup>, Liliana D'Alba<sup>3,4</sup>, Matthew Shawkey<sup>3</sup> and Jong-Souk Yeo<sup>1,2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>BK21 Graduate Program in Intelligent Semiconductor Technology, Yonsei University, Korea (the Republic of); <sup>3</sup>Ghent University, Belgium; <sup>4</sup>Evolutionary Ecology Group, Naturalis Biodiversity Center, Netherlands

**SB04.05.05**

**pH-Responsive Biocomposite System for Controlled Drug Delivery** Brittani Ambrosi, Michael Chen, Kyle Gerlach, Rachel Tschetter and Patricia M. Dove; Virginia Tech, United States

**SB04.05.06**

**Yeast as Biocatalysts—A Novel Route to Aliphatic-Enhanced Humic-Like Materials** Mahmoud Ahmed<sup>1</sup>, Tsung-Hung Wu<sup>1</sup>, S. Venkatesan<sup>2</sup>, Sin-Kai Yang<sup>1</sup>, H. M. Nail<sup>1</sup> and Yu-Min Tzou<sup>1</sup>; <sup>1</sup>National Chung Hsing University, Taiwan; <sup>2</sup>Vignan's Foundation for Science, India

**SB04.05.07**

**Single Shot Laser-Induced Shockwave Crystallization in Nitrate Solutions by Photochemical and Photochemical-Free Processes** Musab H. Ahmed, Watheq Al-Basheer, Ahmed El-Zohry, Abdulaziz Aljalal and Khaled Gasmii; King Fahd University of Petroleum and Minerals, Saudi Arabia

**SB04.05.08**

**Construction of Hierarchically Porous Frameworks for PFAS Removal and Sensing** Kunyu Wang<sup>1,2</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>Texas A&M University, United States

SESSION SB04.06: Macromolecular Assembly III

Session Chairs: Chun-Long Chen and Fabrizio Gelain

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 324

**9:00 AM \*SB04.06.01**

**Hierarchical Assembly of Protein-DNA and Peptide-DNA Nanomaterials** Nicholas Stephanopoulos; Arizona State University, United States

**9:30 AM SB04.06.02**

**Designing Peptoid Assemblies as Programmable Materials for Chemical and Biological Neutralization** Thi Kim Hoang Trinh<sup>1</sup>, Baylie Phillips<sup>2</sup>, Xiaojie Lin<sup>2</sup>, Erika Figgins<sup>3</sup>, Miqin Zhang<sup>2</sup>, Gill Diamond<sup>3,4</sup>, Ronald N. Zuckermann<sup>5</sup> and Chun-Long Chen<sup>1,2</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of Washington, United States; <sup>3</sup>University of Louisville School of Dentistry, United States; <sup>4</sup>University of Louisville, United States; <sup>5</sup>Lawrence Berkeley National Laboratory, United States

**9:45 AM SB04.06.03**

**Self-Assembly and Morphological Transitions in Silk Protein Coacervates Induced by Liquid–Liquid Phase Separation** Sejun Yang and Ki Hoon Lee; Seoul National University, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM SB04.06.04**

**Peptide Nanotube Arrays as a Substrate for Electrical and Physical Stimulation for Neural Cell Differentiation** Milana C. Vasudev, Jordan E. Pagliuca, Parthiv Ravikumar and Grace Rahme; University of Massachusetts Dartmouth, United States

**10:45 AM SB04.06.05**

**Assembly of Multiblock Peptoids into Highly Crystalline Nanosheets** Renyu Zheng<sup>1,2</sup>, Thi Kim Hoang Trinh<sup>2</sup>, Wenhao Zhou<sup>1</sup>, Shuai Zhang<sup>2</sup> and Chun-Long Chen<sup>2,1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

**11:00 AM SB04.06.06**

**Cryo-ET as a Direct Method to Measure Colloidal Protein-Protein Interactions** Ekaterina Poliukhina, Quy K. Ong and Francesco Stellacci; École Polytechnique Fédérale de Lausanne, Switzerland

**11:15 AM SB04.06.07**

**Tuning Porous Hierarchical Networks via Phase Separation of Protein-Cellulose Condensates for Heart Tissue Applications** Hamideh R. Alanagh, S. Mohammad Amin Ojag, Adam Hendricks, Theodorus G.M. van de Ven and Matthew Harrington; McGill University, Canada

**11:30 AM SB04.06.08**

**Self-Assembled Crystalline Peptoid Assemblies as Tunable Scaffolds for Directed Calcium Carbonate Mineralization** Evan Angelo Mondarte, Botao Hao, Alexander Bard, Jinhui Tao, Chun-Long Chen and James De Yoreo; Pacific Northwest National Laboratory, United States

**11:45 AM SB04.06.09**

**Fiber-Based Thermal Insulation Coatings Inspired by Cactus Hairs** Daniel P. Ura and Urszula Stachewicz; AGH University of Krakow, Poland

# SYMPOSIUM SB05

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Emerging Bioresponsive Nanomaterials for Theranostics  
April 8 - April 10, 2025

Symposium Organizers

Dale Huber, Sandia National Laboratories  
Daishun Ling, Shanghai Jiao Tong University  
Linh Nguyen, University College London  
Nguyen Thanh, Univ College London  
Yongfeng Zhao, Jackson State University

Symposium Support

**Silver**

Jackson State University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB05.01: Multifunctional Nanocarriers for Biomedicine

Session Chairs: Nguyen Thanh and Yongfeng Zhao

Tuesday Morning, April 8, 2025  
Summit, Level 3, Room 335

**10:30 AM \*SB05.01.01**

**Polymer Dots as Versatile Nanoscale Luminescent Probes—From Near-IR Bioimaging to Real-Time Nanoparticle-Protein Interaction Studies**

Kushani H. Mendis and [Zeev Rosenzweig](#); University of Maryland, Baltimore County, United States

**11:00 AM SB05.01.02**

**Synthesis of Ternary I-III-VI Quantum Dots for Biomedical Applications** [Aoife Kavanagh](#), Lorenzo Branzi, Vera Kuznetsova and Yuri K. Gun'ko;

Trinity College Dublin, Ireland

**11:15 AM SB05.01.03**

**Anisotropic Magnetic Heating for Adaptive Thermal Ablation** [Sangmo Liu](#) and Yadong Yin; University of California, Riverside, United States

**11:30 AM \*SB05.01.04**

**pH-Responsive Magnetic Iron Oxide Nanogels of Seed-Nanoflower-Chitosan for Cancer Treatments—*In Vitro* Studies** [Nguyen T. Thanh](#); University College London, United Kingdom

SESSION SB05.02: Machine Learning and Multifunctional Nanomaterials

Session Chairs: Daishun Ling and Linh Nguyen

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 335

**1:30 PM \*SB05.02.01**

**Machine Learning-Guided Discovery of DNA-Stabilized Nanocluster Emitters for Deep Tissue Bioimaging** [Stacy Copp](#); University of California, Irvine, United States

**2:00 PM SB05.02.02**

**NIR Luminescent Nd-Doped LuPO<sub>4</sub> Nanoparticles for In Vivo Imaging** [Olof Eskilson](#)<sup>1</sup>, Padryk Merkl<sup>1</sup>, Abhilash Kulkarni<sup>2</sup>, Anandi Narayana Moorthy<sup>1</sup>, Elina Bletska<sup>1</sup>, Anshika Maheshwari<sup>1</sup>, Uliana Kostiv<sup>2</sup>, Haipeng Liu<sup>1</sup>, Birgitta Henriques Normark<sup>1</sup>, Jerker Widengren<sup>2</sup> and Georgios Sotiriou<sup>1</sup>; <sup>1</sup>Karolinska Institute, Sweden; <sup>2</sup>KTH Royal Institute of Technology, Sweden

**2:15 PM SB05.02.03**

**Improving Biological Performance of Calcium Phosphate Bone Graft with Garlic-Extract Nanoemulsions** [Priya Kushram](#) and Susmita Bose; Washington State University, United States

**2:30 PM \*SB05.02.04**

**Synthetic Antibody-Based Nanotechnology—Harnessing Molecular Imprinting for Advanced Diagnostics, Research and Therapeutic Applications**

Alessandro Poma, [Latifa Allalou](#) and Xiaohan Ma; University College London, United Kingdom

**3:00 PM BREAK**

SESSION SB05.03: Responsive Nanomaterials

Session Chairs: Dale Huber, Daishun Ling, Linh Nguyen and Yongfeng Zhao

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 335

**3:30 PM SB05.03.01**

**Enzyme-Responsive Self-Assembling Nanoprobes for Precision Optical Imaging in Targeted Tumor Imaging** [Swati Tanwar](#); Johns Hopkins University,

United States

**3:45 PM SB05.03.02**

**Bioinspired Tumor-Targeting Theranostic Polymers** Mingfeng Wang; The Chinese University of Hong Kong, Shenzhen, China

**4:00 PM SB05.03.03**

**Radiation Responsive Nanoscale Metal-Organic-Frameworks for Chemoradiation and Molecular Imaging** Eunseo Choi, Megan Neufeld and Conroy Sun; Oregon State University, United States

SESSION SB05.04: Poster Session: Emerging Bioresponsive Nanomaterials for Theranostics

Session Chairs: Dale Huber, Daishun Ling, Linh Nguyen and Yongfeng Zhao

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB05.04.01**

**Sustainable Synthesis of Carbon Dots from Multiwalled Carbon Nanotubes for Cancer Imaging and Treatment.** Jithin Varghese, Oxana V. Kharissova, Sanal K. Chadran and Boris I. Kharissoy; Universidad Autónoma de Nuevo León, Mexico

**SB05.04.02**

**Graphene Quantum Dots as Intracellular Calcium Influx Regulators** Gaeun Bae, Yejun Lee and Byung Hee Hong; Seoul National University, Korea (the Republic of)

**SB05.04.03**

**Enhanced Long-Distance Translocation via Targeted Delivery of Sucrose-Coated Nanocarriers with Chemical Cargoes to Plant Vasculature** Su-Ji Jeon<sup>1,2</sup> and Juan Pablo Giraldo<sup>2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>University of California, Riverside, United States

**SB05.04.04**

**Multicompartmental Mucoadhesive Nanoparticles to Manage Xerostomia and Hyposalivation-Induced Cavities** Albert Chang<sup>1</sup>, Livia Tenuta<sup>2</sup> and Joerg Lahann<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>University of Michigan–Ann Arbor, United States

**SB05.04.05**

**Mucopenetrating Janus Nanoparticles (JNPs) Targeting Oral Squamous Cell Carcinoma** Yifei He<sup>1</sup>, Albert Chang<sup>2</sup>, Joerg Lahann<sup>2</sup> and Susan Mallery<sup>3</sup>; <sup>1</sup>University of Michigan–Ann Arbor, United States; <sup>2</sup>University of Michigan–Ann Arbor, United States; <sup>3</sup>The Ohio State University, United States

**SB05.04.06**

**Multi-Responsive Black TiO<sub>2</sub>-Based Nanocomposite Hydrogels for Synergistic Antibacterial Therapies** Tzu-Ying Wang and Yi-Cheun Yeh; National Taiwan University, Taiwan

**SB05.04.07**

**Rationally Designed PBAE Nanoparticles Enable Precision of Delivery Therapeutic to Pulmonary Endothelial Cells** Zicheng Deng<sup>1</sup>, Donglu Shi<sup>2,2</sup> and Vladimir Kalinichenko<sup>1,3</sup>; <sup>1</sup>University of Arizona College of Medicine-Phoenix, United States; <sup>2</sup>University of Cincinnati, United States; <sup>3</sup>Phoenix Children's Hospital, United States

**SB05.04.08**

**Biological Nanothermometry Based on Fluorescent Nanodiamonds** Francisco A. Pedroza-Montero, Diego Soto-Puebla, Erika Silva-Campa, Alexel J. Burgara-Estrella, Mónica Acosta-Elías, Karla Santacruz-Gómez, Marcelino Barbosa, Rodrigo Meléndrez-Amavizca and Osiris Alvarez-Bajo; Universidad de Sonora, Mexico

**SB05.04.09**

**Delivery of Retinal Gene Therapies via a Telechelic Poly(ethylene glycol)-Based Material** James Westbay<sup>1</sup>, Leah C. Byrne<sup>1</sup>, Jose-Alain Sahel<sup>1</sup>, William A. Beltran<sup>2</sup> and Morgan V. DiLeo<sup>1</sup>; <sup>1</sup>University of Pittsburgh, United States; <sup>2</sup>University of Pennsylvania, United States

**SB05.04.10**

**Neuropathological Analysis of the Brain Tumors After Magnetothermal Treatment in Animal Models** Maryam Golshahi and Hamed Arami; Arizona State University, United States

**SB05.04.11**

**Probing the pH-Dependent Electronic Structure of Au Nanoparticles Using X-Ray Absorption Spectroscopy—Toward Advancing Photothermal Drug Therapy** Gabriela Imbir<sup>1</sup>, Anna Wach<sup>2,1</sup>, Joanna Czapla-Masztafiak<sup>1</sup>, Anna Wojcik<sup>1,3</sup>, Jacinto Sá<sup>1,4</sup> and Jakub Szlachetko<sup>2</sup>; <sup>1</sup>Polish Academy of Sciences, Poland; <sup>2</sup>Jagiellonian University, Poland; <sup>3</sup>AGH University of Krakow, Poland; <sup>4</sup>Uppsala University, Sweden

**SB05.04.12**

**Enhanced Stability of Triangular Silver Nanoparticles with N-Doped Graphene Oxide Quantum Dots** Volodymyr Zaitsev<sup>1,2</sup>, Jessica F. Rodrigues<sup>1</sup> and Albina Mikhralieva<sup>1</sup>; <sup>1</sup>Pontifical Catholic University of Rio de Janeiro, Brazil; <sup>2</sup>National University of Kyiv-Mohyla Academy, Ukraine

**SB05.04.13**

**Comparative Assessment of Change in Surface Properties and Biocompatibility of Ti6Al4V ELI and Ti13Nb13Zr Alloys after Titanium Dioxide Nanotube (TNT) Growth** Hrishikesh P. Jadhav, Komal A. Joshi, Sankara Sarma V Tatiparti, Sanjay Pande and Rakesh Mote; Indian Institute of Technology Bombay, India

**SB05.04.14**

**Renal Clearable Iron Oxide Nanoparticles for a Potential Dual Modality Imaging of T<sub>1</sub>-Weighted MRI and PET** Pohlee Cheah<sup>1</sup>, liying Sun<sup>2</sup>, Jing Qu<sup>1</sup>, Dexing Zeng<sup>2</sup> and Yongfeng Zhao<sup>1</sup>; <sup>1</sup>Jackson State University, United States; <sup>2</sup>Oregon Health & Science University, United States

SESSION SB05.05: Transformative Nanomedicine

Session Chairs: Nguyen Thanh and Yongfeng Zhao

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 335

**8:30 AM \*SB05.05.01**

**Transformative Nanomedicine—From Bench to Clinic** Menghuan Tang, Yangxiong Li, Tzu-yin Lin and Yuanpei Li; University of California, Davis, United States

**9:00 AM \*SB05.05.02**

**Ultra Small Iron Oxide Nanoparticle to Replace Gd Complexes as T<sub>1</sub> Contrast Agents for MRI** Nguyen T. Thanh; University College London, United Kingdom

**9:30 AM \*SB05.05.03**

**Designing Orthopaedic Regenerative Implants for Diabetic Patients** Gavin Jell; University College London, United Kingdom

**10:00 AM BREAK**

SESSION SB05.06: Emerging Nanotechnologies in Cancer Immunotherapy

Session Chairs: Daishun Ling and Yongfeng Zhao

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 335

**10:30 AM \*SB05.06.01**

**Unlock the Adaptive Immune Repertoire with Polymeric Nanoparticle Adjuvant for the Next-Generation Vaccine Development** Qian Yin; University of Texas at Austin, United States

**11:00 AM SB05.06.02**

**PAMAM Dendritic Nanoparticle-Loaded Hydrogels—A Dual Approach to Enhance Immune Response and Induce Immunogenic Cell Death in Cancer Therapy** Endris Y. Hanurry<sup>1,2</sup>, Yihenew Birhan<sup>2</sup>, Chih-Chia Cheng<sup>2</sup>, Tefera Mekonnen<sup>2</sup>, Vinothini Arunagiri<sup>2</sup>, Haile F. Darge<sup>2</sup> and Hsieh-Chih

Tsai<sup>2,3,4</sup>; <sup>1</sup>University of Messina, Italy; <sup>2</sup>National Taiwan University of Science and Technology, Taiwan; <sup>3</sup>R&D Center for Membrane Technology, Chung Yuan Christian University, Taiwan; <sup>4</sup>Advanced Membrane Materials Center, National Taiwan University of Science and Technology, Taiwan

**11:15 AM SB05.06.03**

**Tumor Microenvironment Responsive Semiconducting Polymer Nanoparticles for Cancer Theranostics** [Steven Wu](#)<sup>1</sup> and Mingjian Chen<sup>2</sup>; <sup>1</sup>University of South Dakota, United States; <sup>2</sup>Central South University, China

**11:30 AM \*SB05.06.04**

**Designed Synthesis and Assembly of Inorganic Nanomaterials for Medical and Healthcare Applications** [Taeghwan Hyeon](#)<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

SESSION SB05.07: Magnetic Nanoparticles for Therapy and Imaging

Session Chairs: Dale Huber and Linh Nguyen

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 335

**2:00 PM \*SB05.07.01**

**Magnetic Nanoparticle Design and Characterization Considerations for Magnetic Particle Imaging (MPI)** [Carlos Rinaldi-Ramos](#); University of Florida, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SB05.08: Advances in Magnetic Resonance Imaging

Session Chairs: Daishun Ling and Linh Nguyen

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 335

**3:30 PM \*SB05.08.01**

**Stimuli-Responsive Polymer-Based Micro- and Nanoscale Theranostics** Ziwei Zhang<sup>1</sup>, Connor Wells<sup>1</sup>, Gemma-Louise Davies<sup>2</sup> and [Gareth Williams](#)<sup>1</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>University of Birmingham, United Kingdom

**4:00 PM \*SB05.08.02**

**Harnessing the Potential of Metallic Nanohybrids in Cancer Theranostics** [Clare Hoskins](#); University of Strathclyde, United Kingdom

**4:30 PM \*SB05.08.03**

**Developing MRI-Based Therapeutic and Diagnostic Tools—From Cancer to Chemical Weapons** [Gemma-Louise Davies](#); University of Birmingham, United Kingdom

SESSION SB05.09: Responsive Biomaterials for Infectious Disease

Session Chairs: Nguyen Thanh and Yongfeng Zhao

Thursday Morning, April 10, 2025

Summit, Level 3, Room 335

**8:30 AM \*SB05.09.01**

**Inflammation-Responsive Drug Delivery Systems** [Tram Dang](#); Nanyang Technological University, Singapore

**9:00 AM SB05.09.02**

**Flame-Made Nanoparticles as Biological Drugs Nanocarriers Towards Effective Treatment of Bacterial Wounds Infections** [Niki Karouta](#), Anandi

Narayana Moorthy, Birgitta Henriques Normark and Georgios Sotiriou; Karolinska Institutet, Sweden

**9:15 AM SB05.09.03**

**Point of Care Diagnostics for Infectious Diseases Based on Novel Nanoparticles with Peroxidase Mimetic Activity** Edith M. Kutorglo<sup>1,2</sup>, Sebastian Shine Kwarpong<sup>2</sup>, Eric Kyei-Baafour<sup>2</sup>, Linda Eva Amoah<sup>2</sup>, Miroslav Soos<sup>1</sup> and Kwadzo Asamoah Kusi<sup>2</sup>; <sup>1</sup>University of Chemistry and Technology, Czechia; <sup>2</sup>Noguchi Memorial Institute for Medical Research, College of Health Sciences, University of Ghana, Ghana

**9:30 AM \*SB05.09.04**

**Engineering Responsive Nanobiomaterials Against Infections** Georgios Sotiriou<sup>1,2</sup>; <sup>1</sup>Karolinska Institutet, Sweden; <sup>2</sup>Stockholm University, Sweden

**10:00 AM BREAK**

SESSION SB05.10: Multifunctional Nanomaterials for Sensor

Session Chairs: Daishun Ling and Linh Nguyen

Thursday Morning, April 10, 2025

Summit, Level 3, Room 335

**10:30 AM \*SB05.10.01**

**Proximity-Based DNA Nanotechnology with a Target-to-DNA Converter for High Signal Gain** Yan Shan Ang and Lin-Yue L. Yung; National University of Singapore, Singapore

**11:00 AM SB05.10.02**

**Nanoparticle-Virus Chimeras for Tissue-Specific Systemic Delivery** Keisuke Nagao<sup>1</sup>, Emmanuel Vargas Paniagua<sup>1</sup>, Katherine Lei<sup>1</sup>, Jacob L. Beckham<sup>1</sup>, Peyton Worthington<sup>1</sup>, Marie Manthey<sup>1</sup>, Florian Koehler<sup>1</sup>, Ye Ji Kim<sup>1</sup>, Elian Malkin<sup>1</sup>, Michika Onoda<sup>1</sup>, Noah Kent<sup>1</sup>, Shota Michida<sup>2</sup>, Emily Crespin Guerra<sup>1</sup>, Robert J. Macfarlane<sup>1</sup> and Polina Anikeeva<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>The University of Tokyo, Japan

**11:15 AM SB05.10.03**

**Biocompatible Ln-UCNPs Synthesized and Functionalized via Microwave-Assisted Technique** Gloria L. Jimenez Miranda<sup>1</sup>, Isela Padilla-Rosales<sup>2</sup>, Monika Brzychczy-Wloch<sup>3</sup>, Daniel Morales-Martínez<sup>4</sup>, Carlos Vazquez-Lopez<sup>5</sup>, Patryk Szymczak<sup>1</sup> and Domini Dorosz<sup>1</sup>; <sup>1</sup>AGH University of Krakow, Poland; <sup>2</sup>National Autonomous University of Mexico (UNAM), Mexico; <sup>3</sup>Jagiellonian University, Poland; <sup>4</sup>University of Padova, Italy; <sup>5</sup>Center for Research and Advanced Studies of the National Polytechnic Institute, Mexico

**11:30 AM \*SB05.10.04**

**Stimuli-Responsive Polymer Particles and Templates—Sensor and Delivery Functions** Rigoberto C. Advinula; The University of Tennessee/Oak Ridge National Laboratory, United States

SESSION SB05.11: Responsive Biomaterials and Tissue Engineering

Session Chairs: Dale Huber and Yongfeng Zhao

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 335

**1:30 PM SB05.11.01**

**Clinical Evidence-Based Development of Probiotic Liquid Dressings to Regulate the Wound Microenvironment for Infected Wound Healing Promotion** Zhe Yin<sup>1,2</sup>, Ka Li<sup>1</sup> and Yanting Han<sup>1</sup>; <sup>1</sup>Sichuan University, China; <sup>2</sup>Affiliated Tumor Hospital of Xinjiang Medical University, China

**1:45 PM SB05.11.02**

**Resveratrol Nanoparticles on Hydroxyapatite-Coated Ti64 Implants for Enhanced Bone Integration in Load-Bearing Applications** Aditi Dahiya and Susmita Bose; Washington State University, United States

**2:00 PM \*SB05.11.03**

**Ion-Responsive Nano-Probes** [Fangyuan Li](#); Shanghai Jiaotong University School of Medicine, China

# SYMPOSIUM SB06

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Biopolymer Solutions for Climate Change  
April 7 - April 8, 2025

## Symposium Organizers

Steven Larson, US Army Corps of Engineers  
Wilson Lee, Estee Lauder Corporation  
Miriam Rafailovich, SUNY-Stony Brook  
Michael Rubinstein, Duke University

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB06.01: Biopolymer Hierarchical Structures—Hydration, Self Assembly and Gels

Session Chairs: Eugenia Kumacheva and Aaron Sloutski

Monday Morning, April 7, 2025

Summit, Level 3, Room 325

### 8:30 AM \*SB06.01.01

**Role of Melanin in Structural Colors and Radiation Protection** [Ali Dhinojwala](#); The University of Akron, United States

### 9:00 AM SB06.01.02

**Using Graphene for Stabilizing Chitosan-Gold Hydrogels** [Radha Perumal Ramasamy](#)<sup>1</sup>, Vinod Kumar Aswal<sup>2</sup> and Miriam H. Rafailovich<sup>3</sup>; <sup>1</sup>Anna University, India; <sup>2</sup>Bhabha Atomic Research Centre, India; <sup>3</sup>Stony Brook University, United States

### 9:15 AM SB06.01.03

**Analyzing the Rheology of a *Rhizobium Tropici*-Produced Entangled Exopolysaccharide and Its Effect on Soil Stability** [Damien Crowley](#)<sup>1</sup>, Yiwei Fang<sup>2</sup> and Miriam H. Rafailovich<sup>2</sup>; <sup>1</sup>Wantagh High School, United States; <sup>2</sup>Stony Brook University, The State University of New York, United States

### 9:30 AM \*SB06.01.04

**Hydrogels and Long Range Ordering of Polyelectrolyte Complexes** [Eyal Zussman](#); Technion–Israel Institute of Technology, Israel

### 10:00 AM BREAK

### 10:30 AM \*SB06.01.05

**Hierarchically Structured Phtoglycogen Aerogels for Atmospheric Water Harvesting** [Eugenia Kumacheva](#), Yingshan Ma, Ian Kenalty and Yuhang Huang; University of Toronto, Canada

### 11:00 AM SB06.01.06

**Controlling Ice Formation—An *Ab Initio* Guided Modeling Framework of Cellulose in Water** [Aakash Kumar](#) and Dilip Gersappe; Stony Brook University, The State University of New York, United States

### 11:15 AM SB06.01.07

**Hydrophobic-Hydrophilic Electrospun Fibers for Improving Fog Water Collection** [Katarzyna Marszałik](#), Joanna Knapczyk-Korczak and Urszula



Stachewicz; AGH University of Krakow, Poland

SESSION SB06.02: Biopolymers for Structural Reinforcement

Session Chairs: Rachael Floreani and Radha Perumal Ramasamy

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 325

**1:30 PM \*SB06.02.01**

**Short-Term and Long-Term Performance of Biopolymer Remediated Soils** [Sherif L. Abdelaziz](#) and Mohammadhasan Sasar; Virginia Tech, United States

**2:00 PM SB06.02.02**

**Thin Film Characterization for Exploring Candidate Biopolymers for Biocomposites** [Andrew C. Lesh](#)<sup>1</sup>, Alan Liu<sup>1</sup>, Barney Miao<sup>1</sup>, Reinhold H.

Dauskardt<sup>1</sup>, David J. Loftus<sup>2</sup> and Michael D. Lepech<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>NASA Ames Research Center, United States

**2:15 PM SB06.02.03**

**Dielectric Spectroscopy Studies of Biopolymer Produced by Rhizobium Tropici** [Radha Perumal Ramasamy](#)<sup>1</sup>, Yiwei Fang<sup>2</sup> and Miriam H. Rafailovich<sup>2</sup>;

<sup>1</sup>Anna University, India; <sup>2</sup>Stony Brook University, United States

**2:30 PM BREAK**

**3:00 PM \*SB06.02.04**

**Biogels as Soil Amendment Materials** [Dilip Gersappe](#); Stony Brook University, The State University of New York, United States

**3:30 PM SB06.02.05**

**High Performance Bioplastics by Using Blend-Based Design Approach** [Surojit Gupta](#) and Yun Ji; University of North Dakota, United States

**3:45 PM \*SB06.02.06**

**The Whey Forward—The Future of Food Engineering and New Uses for an Old Problem** [Rachael A. Floreani](#); University of Vermont, United States

**4:15 PM SB06.02.07**

**Novel Front Contacts for Hydrophobic Gas Diffusion Layers Enable High Energy Efficiency and Durability for Electrochemical CO<sub>2</sub> Reduction to C<sub>2+</sub> Products** [Michell Marufu](#), Maxwell Goldman, Eric A. Krall, Andrew Wong and Sarah Baker; Lawrence Livermore National Laboratory, United States

SESSION SB06.03: Biopolymers for Mitigation of Soil Erosion I

Session Chairs: Sherif Abdelaziz and Ali Dhinojwala

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 325

**10:30 AM \*SB06.03.01**

**INDUSTRY TRACK: Biopolymer Study for Surface Erosion Resistance and Slope Stability of Levees** [Lucas A. Walshire](#); U.S. Army Corps of Engineers, United States

**11:00 AM SB06.03.02**

**Utilizing Biopolymers for Improving Outcomes for Nature-Based Solutions and Mitigating Coastal Erosion** [Jennifer M. Boothby](#)<sup>1</sup>, Meera Kesavan<sup>1</sup>,

Sanika Mehta<sup>1</sup>, Doug Trigg<sup>1</sup>, Christopher Overcash<sup>2,3</sup> and Benjamin Zaitchik<sup>3</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory, United States;

<sup>2</sup>Anchor QEA, United States; <sup>3</sup>Johns Hopkins University, United States

**11:15 AM SB06.03.03**

**Cellulose Nanocrystals (CNC) Based Functional Materials for Electronic, Energy and Environmental Applications** [Amit K. Sonker](#)<sup>1,2</sup>; <sup>1</sup>VTT Technical

Research Center of Finland, United States; <sup>2</sup>Chalmers University of Technology, Sweden

**11:30 AM \*SB06.03.04**

**Influence of Fines Content on the Average Gradient of Backward Erosion Piping** Samantha Lucker; U.S. Army Corps of Engineers, United States

SESSION SB06.04: Biopolymers for Mitigation of Soil Erosion II

Session Chairs: Dilip Gersappe and Samantha Lucker

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 325

**1:30 PM \*SB06.04.01**

**Advancing Biopolymer Technologies for Climate-Resilient Infrastructure and Eco-Engineered Slope Stabilization** Marta Miletic<sup>1</sup> and Pania Newell<sup>2</sup>;

<sup>1</sup>San Diego State University, United States; <sup>2</sup>The University of Utah, United States

**2:00 PM SB06.04.02**

**Rhizobium Tropici-Produced Biopolymer—Analyzing Its Impact on the Phenotype and Genotype of Arabidopsis Thaliana** Tei Kim<sup>1</sup>, Christian Chan<sup>2</sup>,

Emily Tarrab<sup>3</sup>, Arohi Mahajan<sup>4</sup>, Seohee Park<sup>5</sup>, Michelle Guo<sup>6</sup>, Craig Chen<sup>7</sup>, Cosmo Perfetti<sup>7</sup>, Aaron Sloutski<sup>7</sup>, Marcia Simon<sup>7</sup>, Jay Gao<sup>7</sup> and Miriam H. Rafailovich<sup>7</sup>; <sup>1</sup>Stanford Online High School, United States; <sup>2</sup>South Side High School, United States; <sup>3</sup>Yeshivah of Flatbush Joel Braverman High School, United States; <sup>4</sup>Cambridge International Foundation School, India; <sup>5</sup>Dwight School Seoul, Korea (the Republic of); <sup>6</sup>Tesoro High School, United States; <sup>7</sup>Stony Brook University, The State University of New York, United States

**2:15 PM SB06.04.03**

**Structure Formation in Biogels for Soil Amendment** Shoumik Saha and Dilip Gersappe; Stony Brook University, The State University of New York, United States

**2:30 PM BREAK**

SESSION SB06.05: Biodegradable Alternatives for Sustainable Manufacturing

Session Chairs: Marta Miletic and Shoumik Saha

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 325

**3:00 PM SB06.05.01**

**Closed-Loop Biopolymer Resins for Sustainable Additive Manufacturing** Josh Worch<sup>1</sup> and Andrew P. Dove<sup>2</sup>; <sup>1</sup>Virginia Tech, United States; <sup>2</sup>University of Birmingham, United Kingdom

**3:15 PM SB06.05.02**

**High-Performance Biomass and Paper-Based Materials for Plastics Replacement** Xiaohui Wang; South China University of Technology, China

**3:30 PM \*SB06.05.03**

**Biopolymer Produced by Rhizobium Tropici—Chemistry, Water Retention and Interactions with Clays** Yiwei Fang<sup>1</sup>, Rick Qian<sup>1</sup>, Steven Yang<sup>1</sup>, Damien Crowley<sup>1</sup>, Aaron Sloutski<sup>1</sup>, Marcia Simon<sup>1</sup>, Jay Gao<sup>1</sup>, Miriam H. Rafailovich<sup>1</sup>, Steven Larson<sup>2</sup> and Dilip Gersappe<sup>1</sup>; <sup>1</sup>Stony Brook University, The State University of New York, United States; <sup>2</sup>U.S. Army Corps of Engineers, United States

**4:00 PM SB06.05.04**

**A Feasibility Study of Biodegradable Polymer Packaging for Toiletries** Nafis R. Azimi, Uruchaya Sonchaeng and Nattinee Bumbudsanpharoke; Kasetsart University, Thailand

**4:15 PM SB06.05.05**

**Reversible Conductance Modulation in Metalated DNA Using pH-Dependent Transmetalation** Arpan De<sup>1</sup>, Brandon Lu<sup>2</sup>, Yoel P. Ohayon<sup>2</sup>, Karol Woloszyn<sup>2</sup>, William Livernois<sup>1</sup>, Lara Perren<sup>2</sup>, Chu-fan Yang<sup>2</sup>, Chengde Mao<sup>3</sup>, Antia Botana<sup>4</sup>, Joshua Hihath<sup>4</sup>, James W. Canary<sup>2</sup>, Ruojie Sha<sup>2</sup>, M. P. Anantram<sup>1</sup> and Simon Vecchioni<sup>2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>New York University, United States; <sup>3</sup>Purdue University, United States; <sup>4</sup>Arizona State University, United States

SESSION SB06.06: Poster Session: Biopolymer Solutions for Climate Change

Session Chairs: Miriam Rafailovich and Eyal Zussman

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB06.06.01**

**Broadband Dielectric Spectroscopy and Small- Angle Neutron Scattering Studies of Graphene-Chitosan Composites** Radha Perumal Ramasamy<sup>1</sup> and Vinod Kumar Aswal<sup>2</sup>; <sup>1</sup>Anna University, India; <sup>2</sup>Bhabha Atomic Research Centre, India

**SB06.06.02**

**Development of Rapid-Set Clay-Based Concrete with Frontal Polymerization for Additive Manufacturing of Sustainable Infrastructure** Nicolas Gonsalves, Ashlei Morgan, Heidi Thiele and Devin Roach; Oregon State University, United States

**SB06.06.03**

**Investigating the Role of Biopolymer Associations in Soil Mechanics and Stability** Dennis Liu<sup>1</sup>, Jinxuan Ding<sup>1</sup>, Yiwei Fang<sup>1</sup>, Miriam H. Rafailovich<sup>1</sup> and Steve Larson<sup>2</sup>; <sup>1</sup>Stony Brook University, The State University of New York, United States; <sup>2</sup>U.S. Army Corps of Engineers, United States

**SB06.06.04**

**Rhizobium Tropici-Produced Biopolymer Impact on Soil and Plants** Tei Kim<sup>1</sup>, Emily Tarrab<sup>2</sup>, Christian Chan<sup>3</sup>, Arohi Mahajan<sup>4</sup>, Seohee Park<sup>5</sup>, Michelle Guo<sup>6</sup>, Craig Chen<sup>7</sup>, Cosmo Perfetti<sup>7</sup>, Aaron Sloutski<sup>7</sup>, Marcia Simon<sup>7</sup>, Jay Gao<sup>7</sup> and Miriam H. Rafailovich<sup>7</sup>; <sup>1</sup>Stanford Online High School, United States; <sup>2</sup>Yeshivah of Flatbush Joel Braverman High School, United States; <sup>3</sup>South Side High School, United States; <sup>4</sup>Cambridge International Foundation School, India; <sup>5</sup>Dwight School Seoul, Korea (the Republic of); <sup>6</sup>Tesoro High School, United States; <sup>7</sup>Stony Brook University, The State University of New York, United States

## SYMPOSIUM SB07

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Stimuli-Responsive Smart Materials for Intelligent Systems

April 8 - April 10, 2025

Symposium Organizers

Hedan Bai, ETH Zurich

Po-Yen Chen, University of Maryland

Jouha Min, University of Michigan

Sioyoung Soh, National University of Singapore

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB07.01: Soft Responsive Materials for Intelligent Systems I

Session Chairs: Po-Yen Chen and Jouha Min

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 334

**10:30 AM \*SB07.01.01**

**Liquid Metals as Responsive Components for Building Intelligent Systems** Michael Dickey; North Carolina State University, United States

**11:00 AM \*SB07.01.02**

**Advancing Physical Intelligence for Autonomous Soft Robots** Ximin He; University of California, Los Angeles, United States

**11:30 AM SB07.01.03**

**Advanced Phototactic Soft Actuators—Model-Informed Control of Liquid Crystal Polymers Using Wide Beam Light** Yu Jun Tan; National University of Singapore, Singapore

**11:45 AM SB07.01.04**

**Thermal and Light Dual Responsive Membrane for Passive Temperature Regulation** Lihong Lao<sup>1,2</sup>, Jiayu Liu<sup>1</sup>, Abigail Serrano<sup>1</sup>, Dajie Xie<sup>1</sup>, Sujan Dewanjee<sup>1</sup>, Shailesh N. Joshi<sup>3</sup> and Paul V. Braun<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States; <sup>2</sup>Syracuse University, United States; <sup>3</sup>Toyota Research Institute of North America, United States

SESSION SB07.02: Smart Soft Actuators and Bioelectronics I

Session Chairs: Hedan Bai and Po-Yen Chen

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 334

**1:30 PM SB07.02.01**

**Selective Thermal Actuation of Microheater Based on Laser-Induced Graphene** Jun-Hee Na, MoonYoung Choi and Kitae Kim; Chungnam National University, Korea (the Republic of)

**1:45 PM SB07.02.02**

**Additively Manufactured Micro-Lattice Dielectrics for Multiaxial Capacitive Sensors** Arielle E. Berman<sup>1</sup>, Kaiwen Hsiao<sup>2</sup>, Samuel Root<sup>1</sup>, Hojung Choi<sup>1</sup>, Daniel Ilyn<sup>1</sup>, Chengyi Xu<sup>1</sup>, Emily Stein<sup>1</sup>, Mark Cutkosky<sup>1</sup>, Joseph DeSimone<sup>1</sup> and Zhenan Bao<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>Texas A&M University, United States

**2:00 PM \*SB07.02.03**

**Body-Temperature Responsive Softening Bioelectronic Devices** Jae-Woong Jeong; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**2:30 PM SB07.02.04**

**Soft, Stimuli-Responsive Liquid Crystal Elastomer Structures for Intelligent Systems** Xueju (Sophie) Wang; University of Connecticut, United States

**2:45 PM BREAK**

SESSION SB07.03: Soft Responsive Materials for Intelligent Systems II

Session Chairs: Hedan Bai and Siowling Soh

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 334

**3:15 PM \*SB07.03.01**

**Stretchable Magnetic Materials and Devices for Soft Robotics** Nathan Lazarus; University of Delaware, United States

**3:45 PM SB07.03.02**

**Transparent, Patternable and Stretchable Conducting Polymer Solid Electrode for Dielectric Elastomer Actuators** Eunyoung Kim, Jian-Cheng Lai, Lukas Michalek, Weichen Wang, Chengyi Xu, Hao Lyu, Weilai Yu, Hyunchang Park, Yoko Tomo, Samuel Root, Byeongmoon Lee, Jaeho Park, Byeonghak

Park, Shiyuan Wei, Chuanzhen Zhao and Zhenan Bao; Stanford University, United States

**4:00 PM SB07.03.03**

**Cephalopod-Inspired Magnetic Shape-Morphing System for Dynamically Reconfigurable 3D Displays and Soft Robotics** [Subin Oh](#) and Jae-Woong Jeong; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**4:15 PM SB07.03.04**

**Rapidly Switchable Core-Shell Smart Adhesives Triggered by Magnetic Field** [Tao Wang](#) and Yang Zhao; University of Science and Technology of China, China

**4:30 PM SB07.03.05**

**Study of Multifunctional Soft Actuators with Large-Deformation Based on PDMS and PI/Graphene Composite Structure for Biomimetic Applications** [Jincong Chen](#)<sup>1</sup>, Luchen Deng<sup>2</sup>, Changquan Lai<sup>2,2</sup> and Haiyan Zhao<sup>1</sup>; <sup>1</sup>Tsinghua University, China; <sup>2</sup>Nanyang Technological University, Singapore

SESSION SB07.04: Poster Session: Stimuli-Responsive Smart Materials for Intelligent Systems

Session Chairs: Hedan Bai and Siowling Soh

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB07.04.01**

**Measurement of the Propulsion Dynamics of Light-Activated Janus Particles via Optical Microscopy and Optical Tweezers** [Katherine I. Requejo Roque](#)<sup>1</sup>, Cristhian Canari Chumpitaz<sup>2</sup>, Vida Jamali<sup>3</sup>, Ricardo Ruiz<sup>4</sup>, A Paul Alivisatos<sup>5</sup> and Carlos Bustamante<sup>1</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Stanford University, United States; <sup>3</sup>Georgia Institute of Technology, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States; <sup>5</sup>The University of Chicago, United States

**SB07.04.02**

**Electrospun Thermo-Responsive PVA/PNIPAM Nanofibers for Drug Delivery Applications** [Gianluca Ciarleglio](#), Elisa Toto, Susanna Laurenzi and Maria Gabriella Santonicola; Sapienza University of Rome, Italy

**SB07.04.03**

**Thermo-Adaptive Tunable Color Display with an Artificial Synapse Based on Ion-Gel Transistor** [Gwanho Kim](#), Seokyeong Lee and Cheolmin Park; Yonsei University, Korea (the Republic of)

**SB07.04.04**

**Tuning Selectivity of SnS<sub>2</sub>-Based Gas Sensor via *In Situ* Growth of 2D Metal-Organic Frameworks for Molecular Sieving** [Soomin Lee](#), Seon Ju Park, Ho Won Jang and Hee Ryeong Kwon; Seoul National University, Korea (the Republic of)

**SB07.04.05**

**Ultrasensitive Dual Detection of Hydrogen and Ammonia Using Pd-W<sub>18</sub>O<sub>49</sub> Nanowire MEMS Chemoresistive Gas Sensor** [Seon Ju Park](#), Soomin Lee, Hee Ryeong Kwon and Ho Won Jang; Seoul National University, Korea (the Republic of)

**SB07.04.06**

**Magnetic Stimuli Responsive Soft Robotic Display System Enabled by Quantum Dot Light Emitting Diode** [Jioh Yoo](#) and Cheolmin Park; Yonsei University, Korea (the Republic of)

**SB07.04.07**

**Coupled Induced-Charge Electroosmosis Dynamics—A Coarse-Grained Framework for Efficient Simulation of Electrokinetic Colloidal Systems** [Haoqing Zhang](#) and Zachary Sherman; University of Washington, United States

**SB07.04.08**

**Integration of Moiré Patterned Hydrogels for Biosensing Applications in Smart Intraocular Lens** [Yunji Eom](#), Soongeun Kwon, Hak-Jong Choi, Junhyoung Ahn and JaeJong Lee; Korea Institute of Machinery and Materials, Korea (the Republic of)

**SB07.04.09**

**Selective Directional Liquid Transport on Shoot Surfaces of *Crassula Muscosa*** [Ling Yang](#)<sup>1</sup>, Wei Li<sup>1</sup>, Jiaoyuan Lian<sup>2</sup>, Hengjia Zhu<sup>1</sup>, Qiyu Deng<sup>1</sup>, Yiyuan Zhang<sup>1</sup>, Jiaqian Li<sup>1,3</sup>, Xiaobo Yin<sup>1</sup> and Liqiu Wang<sup>2</sup>; <sup>1</sup>The University of Hong Kong, China; <sup>2</sup>The Hong Kong Polytechnic University, Hong Kong; <sup>3</sup>Shandong University, China

**SB07.04.10**

**Improving Mechanical Properties of Liquid Crystal Elastomers Through Molecular-Level Engineering for Artificial Muscles** [Oh Kee Woong](#); Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**SB07.04.11**

**Stimuli-Responsive Microscale Mechanical Logic** [Abhinav Parakh](#), Widiyanto P. Moestopo, Elaine Lee and Caitlyn C. Krikorian (Cook); Lawrence Livermore National Laboratory, United States

**SB07.04.12**

**Thermal Responsive Hydrogels with Programmable Shape Memory Properties Enabled by Phase Separation for Personal Protective Equipment** [Wen Mei](#); The Hong Kong Polytechnic University, Hong Kong

**SB07.04.13**

**Structure-Property-Actuation Evaluation of Magneto-Responsive Micropillar Arrays with Shape Fixability via Covalent Adaptable Networks** [Hojun Moon](#)<sup>1</sup>, Jae Gyeong Lee<sup>1</sup>, Woongbi Cho<sup>1</sup>, Jisoo Jeon<sup>2</sup>, Jeong Eun Park<sup>3</sup> and Jeong Jae Wie<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Georgia Institute of Technology, United States; <sup>3</sup>University of Michigan–Ann Arbor, United States

SESSION SB07.05: Soft Responsive Materials for Intelligent Systems III

Session Chairs: Po-Yen Chen and Jouha Min

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 334

**8:30 AM \*SB07.05.01**

**Stimulus-Responsive Transport Properties of Polymer Hydrogels** [Eugenia Kumacheva](#); University of Toronto, Canada

**9:00 AM \*SB07.05.02**

**Embodying Physical Intelligence in Gels** [David H. Gracias](#); Johns Hopkins University, United States

**9:30 AM SB07.05.03**

**Scalable Wet Spinning of Graphene Liquid Crystalline Elastomer Composite Filaments for Responsive Soft Actuators** [Antonio P. Martinez](#), Kunyu Wang, Jong Bin Kim, Lucy Decker, Christopher Murray and Shu Yang; University of Pennsylvania, United States

**9:45 AM SB07.05.04**

**Cholesteric Liquid Crystal Elastomer Tubes with Highly Strain-Sensitive Structural Colors and Adjustable Spatial Configurations** [Jong Bin Kim](#), Shangsong Li, Kunyu Wang, Yinding Chi and Shu Yang; University of Pennsylvania, United States

**10:00 AM BREAK**

SESSION SB07.06: Smart Soft Actuators and Bioelectronics II

Session Chairs: Jouha Min and Siowling Soh

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 334

**10:30 AM \*SB07.06.01**

**Multi-Stimuli Responsive Soft Matter for Autonomous Actuation and Logic Operations** [Chiara Daraio](#); California Institute of Technology, United States

**11:00 AM \*SB07.06.02**

**Soft Electrochemical Actuators for Advanced Neural Interfaces** Chaoqun Dong; University of Cambridge, United Kingdom

**11:30 AM SB07.06.03**

**Thermoresponsive Dynamic Composites for Broad Spectrum Anti-Fouling** Gregory Parisi and Samantha McBride; University of Pennsylvania, United States

**11:45 AM SB07.06.04**

**Optimizing Thermo-Responsive Polymers for Enhanced Mechanical Durability Under Fatigue Loading** Gustavo Felicio Perruci<sup>1</sup>, Leshi Feng<sup>1</sup>, Chengqian Huang<sup>1</sup>, Shuang Cui<sup>1</sup>, Paul Meyer<sup>2</sup> and Hongbing Lu<sup>1</sup>; <sup>1</sup>The University of Texas at Dallas, United States; <sup>2</sup>National Renewable Energy Laboratory, United States

SESSION SB07.07. Micro- and Nano-Scale Actuation and Intelligence I

Session Chairs: Hedan Bai and Siowling Soh

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 334

**1:45 PM \*SB07.07.01**

**Enzyme Pumps—From Nanoscale Actuation to Macroscale Motion** Ayusman Sen; The Pennsylvania State University, United States

**2:15 PM SB07.07.02**

**Smart Hybrid Anti-Bacterial Membrane for Safe Drinking Water** Abhishek Saji Kumar<sup>1</sup>, Sui Yang<sup>1</sup>, Rayane Akoumeh<sup>2</sup> and Shuai Feng<sup>1</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Qatar University, Qatar

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SB07.08: Smart Soft Actuators and Bioelectronics III

Session Chairs: Po-Yen Chen and Siowling Soh

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 334

**3:30 PM \*SB07.08.01**

**Discovering Magnetoelasticity in Soft Matter for Bioelectronics** Jun Chen; University of California, Los Angeles, United States

**4:00 PM \*SB07.08.02**

**Dynamic Radiative Thermoregulation for Human-Building-Energy Nexus** Po-Chun Hsu; The University of Chicago, United States

**4:30 PM SB07.08.03**

**High-Resolution, Multifunctional Variable Stiffness Electronics by Solution-Processible, Chemically-Sintered Liquid Metal Ink** Simok Lee<sup>1</sup>, Gunhee Lee<sup>2</sup>, Jae-Woong Jeong<sup>1</sup>, Seongjun Park<sup>2</sup> and Steve Park<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**4:45 PM SB07.08.04**

**3D Mechanochromic Sensors from Core-Shell Cholesteric Liquid Crystal Elastomers** Alicia Ng<sup>1</sup>, Rodrigo Telles<sup>2</sup>, Katherine S. Riley<sup>3</sup>, Jennifer A. Lewis<sup>2</sup>, Caitlyn C. Krikorian (Cook)<sup>3</sup>, Elaine Lee<sup>3</sup> and Shu Yang<sup>1</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>Harvard University, United States; <sup>3</sup>Lawrence Livermore National Laboratory, United States

SESSION SB07.09. Assemblies of Stimuli-Responsive Materials I

Session Chairs: Hedan Bai and Po-Yen Chen

Thursday Morning, April 10, 2025

Summit, Level 3, Room 334

**8:30 AM \*SB07.09.01**

**From Compartmentalized Colloids to Stimuli-Responsive Materials** [Joerg Lahann](#); University of Michigan, United States

**9:00 AM \*SB07.09.02**

**Molecular Alignment Technology Based on Scanning Wave Photopolymerization of Liquid Crystals** [Atsushi Shishido](#); Institute of Science Tokyo, Japan

**9:30 AM SB07.09.03**

**3D Printing of Materials with Light-Responsive Optical Properties for All-Optical Processing** Francesca D'Elia<sup>1</sup>, Sibilla Orsini<sup>2</sup>, Lorenzo Lavista<sup>3,2</sup>, Dario Pisignano<sup>3,2</sup> and [Andrea Camposeo](#)<sup>2</sup>; <sup>1</sup>NEST, Scuola Normale Superiore, Italy; <sup>2</sup>NEST, Istituto Nanoscienze-CNR and Scuola Normale Superiore, Italy; <sup>3</sup>Dipartimento di Fisica, Università di Pisa, Italy

**9:45 AM SB07.09.04**

**Harnessing Cyclopentadiene-Maleimide Chemistry and Cyclic Polymer Networks for Stimuli-Responsive and Adaptable Thermosets** [Komal Na](#), Javier Read de Alaniz and Angela Pitenis; University of California, Santa Barbara, United States

**10:00 AM BREAK**

SESSION SB07.10: Soft Responsive Materials for Intelligent Systems IV

Session Chairs: Jouha Min and Siowling Soh

Thursday Morning, April 10, 2025

Summit, Level 3, Room 334

**10:30 AM \*SB07.10.01**

**Bioinspired Active Topography for Biofilm Control** [Dacheng Ren](#); Syracuse University, United States

**11:00 AM \*SB07.10.02**

**Self-Oscillating Polymer Materials—Gels, Vesicles, Micelles, Coacervates, Linear Polymers and Polymer Brushes Exhibiting Life-Like Autonomous Behaviors** [Ryo Yoshida](#); The University of Tokyo, Japan

**11:30 AM SB07.10.03**

**Protein-Based Biomaterials Mimic the Architecture of Muscles While Performing Macroscopic Motions** Sanam Bista, Joel Nowitzke and [Ionel Popa](#); University of Wisconsin-Milwaukee, United States

**11:45 AM SB07.10.04**

**Automated +1 Topological Defects Driven Locomotions of Light-Responsive Liquid Crystalline Networks** [Jae Gyeong Lee](#), Min Jeong Hahm, Woongbi Cho and Jeong Jae Wie; Hanyang University, Korea (the Republic of)

SESSION SB07.11: Assemblies of Stimuli-Responsive Materials II

Session Chairs: Hedan Bai and Siowling Soh

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 334

**1:30 PM \*SB07.11.01**

**Validating the Interfacial Electronic Structure of Molecules at High Voltages and Temperature Gradients** [Hyo Jae Yoon](#); Korea University, Korea (the



Republic of)

**2:00 PM \*SB07.11.02**

**Photo-Patternable Polymer Nanofilms for Humidity and Temperature Sensing and Recording** Wei Li; Texas Tech University, United States

**2:30 PM SB07.11.03**

**All-Optical Synaptic Response in Adaptive Organic Material** Angelo Angelini<sup>1</sup>, Federico Ferrarese Lupi<sup>1</sup>, Mateo Rosero Reaple<sup>1,2</sup>, Antonio Ocarino<sup>2</sup>, Francesca Frascella<sup>2</sup> and Gianluca Milano<sup>1</sup>; <sup>1</sup>Istituto Nazionale di Ricerca Metrologica, Italy; <sup>2</sup>Politecnico di Torino, Italy

**2:45 PM SB07.11.04**

**Responsive Smart Materials for Intelligent Enhanced Geothermal System Modulation** Danni Tang<sup>1</sup>, Aaron M. Baxter<sup>1</sup>, Bryan H. Abdulaziz<sup>1</sup>, Adam J. Hawkins<sup>2</sup>, Sean A. Fulcher<sup>1</sup>, Patrick Fulton<sup>1</sup>, Jefferson W. Tester<sup>1</sup>, Sarah Hormozi<sup>1</sup> and Ulrich Wiesner<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Clemson University, United States

**3:00 PM BREAK**

SESSION SB07.12: Micro- and Nano-Scale Actuation and Intelligence II

Session Chairs: Hedan Bai, Po-Yen Chen and Siowling Soh

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 334

**3:30 PM SB07.12.01**

**Understanding Bacteria Transport Through Partially Degraded Hydrogel Matrices for Living Material Applications** Jeffrey Reed<sup>1</sup>, Scott T. Retterer<sup>2,2</sup> and Ryan Hansen<sup>1</sup>; <sup>1</sup>Kansas State University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**3:45 PM SB07.12.02**

**Magnetic Swarm Intelligence—Versatile Task Execution by Mass Production of Programmable Microrobot Assemblies** Kijun Yang<sup>1</sup>, Sukyoung Won<sup>2</sup> and Jeong Jae Wie<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Inha University, Korea (the Republic of)

**4:00 PM SB07.12.03**

**Hybrid FFF-DIW System for 3D-Printed Reactive Unit Cells** Javier M. Morales Ferrer, Anthony M. Clay and Eric Wetzel; Army Research Laboratory, United States

**4:15 PM SB07.12.04**

**Switchable Smart Window Passive Radiative Cooling via Mechanical Stress** Tae-Ho Kim, Sang Jun Kim, Min Ku Kim and Young-Hoon Kim; Hanyang University, Korea (the Republic of)

**4:30 PM SB07.12.05**

**Engineering Polymer Brush Conformational Rearrangements in Solvent-Responsive Polymer Brushes by Tuning Copolymer Composition and Polymer Microstructure** Adam Humpal and Ramya Kumar; Colorado School of Mines, United States

## SYMPOSIUM SB08

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Polymer Nanofibers for Bio/Medical Applications

April 9 - April 11, 2025

Symposium Organizers

Luana Persano, Istituto Nanoscienze del Consiglio Nazionale delle Ricerche

Gregory Rutledge, Massachusetts Institute of Technology

Andrew Steckl, University of Cincinnati

Eyal Zussman, Technion

Symposium Support

**Bronze**

DOXA MICROFLUIDICS S.L.

Elmarco s.r.o.

Materic

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB08.01: Functional Textiles

Session Chairs: Susan Kozawa and Luana Persano

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 324

**1:30 PM \*SB08.01.01**

**Engineered Living Textiles for Biomedical Applications** [Jessica Schiffman](#); University of Massachusetts Amherst, United States

**2:00 PM SB08.01.02**

**Protein Fibers—Processing Techniques, Structural Mechanics and Emerging Opportunities** [Eyal Zussman](#); Technion–Israel Institute of Technology, Israel

**2:15 PM SB08.01.03**

**Development of Degradable Electrospun Polycaprolactone Filter Media for Filtering Facepiece Respirators** [Nathan Ewell](#)<sup>1</sup>, Sophie Fleishman<sup>1</sup>, Kristen Mulherin<sup>2</sup> and Gregory Rutledge<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Advanced Functional Fabrics of America, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SB08.02: Tissue Engineering

Session Chairs: Norbert Radacsi and Eyal Zussman

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 324

**3:30 PM \*SB08.02.01**

**Nanofiber-Based Scaffolds for Tissue Repair and Regeneration** [Younan Xia](#); Georgia Institute of Technology, United States

**4:00 PM SB08.02.02**

**Aligned PVA-BA/AgHAp Nanofiber Composites as Multifunctional Hemostatic, Antimicrobial and Reversibly Adhesive Wound Dressings** [Ruibo Hu](#)<sup>1</sup>, Jiadong Chen<sup>1</sup>, Xianfeng Zhou<sup>2</sup> and Nita Sahai<sup>1</sup>; <sup>1</sup>The University of Akron, United States; <sup>2</sup>Qingdao University of Science and Technology, China

**4:15 PM SB08.02.03**

**On Demand Electrospun Bandages for Orthopedic Wound Protection** [Jessica M. Andriolo](#), Cody Baumstarck, M. K. Hailer and Jack Skinner; Montana Technological University, United States

**4:30 PM \*SB08.02.04**

**Light-Responsive Fibrous Nanostructured Biomaterials for Wound Healing** [Filippo Pierini](#); Institute of Fundamental Technological Research, Poland

SESSION SB08.03: Biomedical Applications

Session Chairs: Blair Brettmann and Andrew Steckl

Thursday Morning, April 10, 2025

Summit, Level 3, Room 324

**8:30 AM \*SB08.03.01**

**Nanocatalyst-Functionalized High-Density Nanofibers for Bio and Environmental Applications** Il Doo Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of)

**9:00 AM SB08.03.02**

**Electrospun PLA/nHAp Coatings for Enhanced Biocompatibility of Titanium Implants** Gianluca Ciarleglio, Letizia Pagani, Elisa Toto, Susanna Laurenzi and Maria Gabriella Santonicola; Sapienza University of Rome, Italy

**9:15 AM SB08.03.03**

**pH-Responsive Carbopol Electrospun Fiber Membranes for Biomedical Applications** Robert W. Horvath<sup>1</sup>, Daewoo Han<sup>1</sup>, Burcu Uner<sup>2</sup>, Giovanni Pauletti<sup>2</sup> and Andrew Steckl<sup>1</sup>; <sup>1</sup>University of Cincinnati, United States; <sup>2</sup>University of Health Sciences & Pharmacy, United States

**9:30 AM SB08.03.04**

**In-Vitro Response to Bioinspired Helically Coiled Electrospun Fibers for Cardiac Patch Application** Alexi Switz, Darryl Dickerson and Anamika Prasad; Florida International University, United States

**9:45 AM SB08.03.05**

**Advanced Electrospun Three-Dimensional Nanofiber Based Scaffolds for Dialytic Applications** Martina Roso; University of Padova, Italy

**10:00 AM BREAK**

SESSION SB08.04: Sensors/Point-of-Care

Session Chairs: Filippo Pierini and Gregory Rutledge

Thursday Morning, April 10, 2025

Summit, Level 3, Room 324

**10:30 AM \*SB08.04.01**

**Polymer Nanofibers for Biomimetics, Sensing and Cell Control—Spinning, Molding, Printing and More** Dario Pisignano; University of Pisa, Italy

**11:00 AM SB08.04.02**

**M13 Bacteriophage-Gold Nanoparticle SERS Sensor for Metabolomics-Based Disease Diagnosis** Minsu Jang<sup>1</sup>, Tae-Young Jeong<sup>1</sup>, Sung-Jo Kim<sup>1</sup>, Yeonggwon Kim<sup>1</sup>, Chae Young Woo<sup>1</sup>, Hyung Woo Lee<sup>1,1,2</sup> and Jin-Woo Oh<sup>1,1,1</sup>; <sup>1</sup>Pusan National University, Korea (the Republic of); <sup>2</sup>Research Center of Energy Convergence Technology, Korea (the Republic of)

**11:15 AM SB08.04.03**

**Bioinspired Electronic Skin for Energy Harvesting and Health Monitoring—A Triboelectric Nanogenerator with Sweat Sensing Capabilities** Asma Akter, Md Mehedi Hasan Apu and Turki Nabieh Baroud; King Fahd University of Petroleum and Minerals, Saudi Arabia

**11:30 AM SB08.04.04**

**Biofluid-Specific Metabolome Sampling Membranes (MetaSAMPs) Produced by Electrospinning for Direct Point-of-Care Metabotyping Applications** Karen De Clerck, Eva Loccufier, Kimberly De Windt, Vera Plekhova and Lynn Vanhaecke; Ghent University, Belgium

SESSION SB08.05: Fundamentals/Processing

Session Chairs: Thomas Birschard, Dario Pisignano, Katerina Rubackova and Gareth Williams

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 324

**1:30 PM \*SB08.05.01**

**Improving Electrospinnability of Complex Solutions Through Integrated Chemistry-Processing Design** Shiqi Wei, Haley Carroll and Blair K. Brettmann; Georgia Institute of Technology, United States

**2:00 PM SB08.05.02**

**Organic Semiconducting Fibers and Microelectronics** Zhi Zhang; Peking University, China

**2:15 PM SB08.05.03**

**Composite Nanofiber Materials for Airborne Environmental DNA (eDNA) Collection** Yen B. Truong<sup>1</sup>, Heng Taing<sup>1</sup> and Oliver Berry<sup>2</sup>; <sup>1</sup>CSIRO, Australia; <sup>2</sup>CSIRO, Environomics Future Science Platform, Australia

**2:30 PM BREAK**

**3:00 PM \*SB08.05.04**

**From Skin Patches to Scaffolds with Controlled Electrical Environment for Cell Growth—Engineering Surface Properties of Electrospun Fibers** Urszula Stachewicz; AGH University of Krakow, Poland

**3:30 PM \*SB08.05.05**

**Evaluating the Impact of Processing Techniques on Fiber/MOF Composites** Susan Kozawa<sup>1,2</sup>, Laura Mundy<sup>3,1</sup>, Sergio Garibay<sup>3,1</sup> and Gregory Peterson<sup>1</sup>; <sup>1</sup>U.S. Army DEVCOM Chemical Biological Center, United States; <sup>2</sup>Oak Ridge Institute for Science and Education, United States; <sup>3</sup>Leidos Inc., United States

**4:00 PM SB08.05.06**

**Impact of Collecting and Spinning Electrode Configurations on the Physical Properties of Electrospun Bio-Polymer Nanofibers** Thomas E. Birchard, Joshua Manasco, Jiri Mařkarinec and Katerina Rubackova; Elmarco Inc, United States

**4:15 PM SB08.05.07**

**Bridging the Gap—Scaling Up Nanofiber Production for Biomedical Applications** Ronish M. Shrestha<sup>1</sup>, Stephen Farias<sup>1,2</sup> and Colin Harmer<sup>1</sup>; <sup>1</sup>Materic LLC, United States; <sup>2</sup>Johns Hopkins University, United States

**4:30 PM SB08.05.08**

**Sustainable Antibacterial Electrospun Fibers and Textures Using Hydrophobic Polymers** Serena Danti<sup>1,2</sup>, Bahareh Azimi<sup>1,2</sup>, Mario Milazzo<sup>1,2</sup>, Giuseppe Gallone<sup>1</sup>, Semih Esin<sup>1</sup>, Giovanna Batoni<sup>1</sup>, Alessandro Coatti<sup>3</sup>, Marco Giannetto<sup>3</sup>, Michelina Soccio<sup>3</sup>, Nadia Lotti<sup>3</sup> and Debora Puglia<sup>4</sup>; <sup>1</sup>University of Pisa, Italy; <sup>2</sup>INSTM, Italy; <sup>3</sup>University of Bologna, Italy; <sup>4</sup>University of Perugia, Italy

SESSION SB08.06: Poster Session: Polymer Nanofibers for Bio/Medical Applications

Session Chairs: Daewoo Han, Luana Persano, Gregory Rutledge and Eyal Zussman

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB08.06.01**

**Superhydrophobic Modification, Morphological Characterization and Comparison of the Surfaces of Camel Wool Fibers and Cashmere Wool Fibers with Silica Nanoparticles by AFM Method** Khongorzul Baasantseren<sup>1</sup>, Zolboo Altangerel<sup>2</sup>, Norovsuren Lasran<sup>2</sup> and Ganzorig Chimed<sup>1</sup>; <sup>1</sup>National University of Mongolia, Mongolia; <sup>2</sup>Mongolian University of Life Science, Mongolia

**SB08.06.02**

**Preparation of Anticancer Drug Loaded Glycyrrhizin Conjugated Chitosan for Selective Liver Targeting** Ariuntuuya Bayarmagnai<sup>1</sup>, Sarangerel Oidovsambuu<sup>2</sup>, Narangerel Adiyasuren<sup>1</sup> and Ganzorig Chimed<sup>1</sup>; <sup>1</sup>National University of Mongolia, Mongolia; <sup>2</sup>Mongolian Academy of Sciences, Mongolia

**SB08.06.03**

**Nanofiber-Based Drug Delivery Platform for Bio/Chem/Medical Applications** Daewoo Han and Andrew Steckl; University of Cincinnati, United States

**SB08.06.04**

**Bilayer Anti-Adhesive Sheets for the Prevention of Peritendinous Adhesions** [Komal A. Joshi](#) and Jayesh Bellare; Indian Institute of Technology Bombay, India

**SB08.06.05**

**A Cellulose Aerogel-Based Drug Delivery System Using Punica Granatum Extracts—Invention to Innovation** [Subharina Mahapatra](#)<sup>1</sup>, Jyotiraman De<sup>2</sup> and Manjula Hebbale<sup>1</sup>; <sup>1</sup>Bharati Vidyapeeth Dental College and Hospital Pune, India; <sup>2</sup>Indian Institute of Technology Bombay, India

**SB08.06.06**

**Embracing Remote Fields in Biofabrication for Neuromodulation** [Menglin Chen](#)<sup>1,2</sup>; <sup>1</sup>Aarhus University, Denmark; <sup>2</sup>ETH Zürich, Switzerland

**SB08.06.07**

**Mechanical Characterization of MAP Hydrogel for Soft Tissue Repair Applications** [Mohsen Motezaker](#), Emma Tiernan, James Daniero and Patrick E. Hopkins; University of Virginia, United States

**SB08.06.08**

**Tissue Engineering Using Bioinspired Fibrillation Engineering that Mimicked the Structure and Mechanics of Natural Tissue** [Ruoxuan Peng](#)<sup>1</sup>, Zhirui Dong<sup>2</sup>, Jing Ren<sup>1</sup> and Shengjie Ling<sup>1</sup>; <sup>1</sup>ShanghaiTech University, China; <sup>2</sup>Fudan University, China

**SB08.06.09**

**Sustainable Nitrogen-Carbon Dots Added Electrospun Fibrous Films for Active Packaging** [Bharath Perumal Pillai](#) and Ankit Tyagi; Indian Institute of Technology Jammu, India

**SB08.06.10**

**Polydopamine-Coated Silicone Hydrogel Lenses for Enhanced Ocular Drug Delivery Using Curcumin-Loaded Chitosan Nanoparticles** [Ashley He](#)<sup>1,2</sup>, Vincent Chen<sup>1</sup> and Jiashing Yu<sup>1</sup>; <sup>1</sup>National Taiwan University, Taiwan; <sup>2</sup>Santa Monica College, United States

**SB08.06.11**

**Enhancing Antimicrobial and UV-Resistance Properties of PC Blend and Recycled Cotton Fabric Through Ag/TiO<sub>2</sub> Nanocomposite** [Md. Belal U. Rabbi](#); Bangladesh University of Textiles, Bangladesh

**SB08.06.12**

**Water-Efficient Microgreen Cultivation in Space Using 3D-Printed Hydrogel Matrices with Nutrient Delivery Networks** [Ozlem Yasar](#)<sup>1</sup>, Ozgul Yasar-Inceoglu<sup>2</sup> and Thomas A. Alarcon<sup>1</sup>; <sup>1</sup>City University of New York, United States; <sup>2</sup>California State University, Chico, United States

**SB08.06.13**

**Programming of Fibril Orientation and Mechanical Response in Electron Beam Modified Collagen Type I Fibres** [Friedrich Schütte](#)<sup>1,2</sup>, Anastassiya Bublikova<sup>1</sup> and Stefan G. Mayr<sup>1,2</sup>; <sup>1</sup>Leibniz Institute of Surface Engineering (IOM), Germany; <sup>2</sup>Universität Leipzig, Germany

**SB08.06.14**

**Using Chemical Vapor Polymerization in Liquid Crystals to Synthesize Organized Arrays of End-Attached Polymeric Nanofibers and Interconnected Nanofibrous Membranes** [Soumyamouli Pal](#)<sup>1</sup>, Arit Patra<sup>2</sup>, John Kim<sup>2</sup>, Joerg Lahann<sup>2,2</sup> and Nicholas Abbott<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>University of Michigan—Ann Arbor, United States

**SB08.06.15**

**Real-Time *In Vivo* and *In Vitro* Mapping of Oxygen Gradients Using Ruthenium-Based Polymeric Nanoparticle Sensors—Advancing Biosensing Technology** [Ashish Kumar](#)<sup>1,2</sup>, Venkanagouda S. Goudar<sup>2</sup>, Chih-Cheng Chen<sup>1</sup> and Fan-Gang Tseng<sup>2,1</sup>; <sup>1</sup>Academia Sinica, Taiwan; <sup>2</sup>National Tsing Hua University, Taiwan

**SB08.06.16**

**Gap Electrospinning for Molecular Alignment Control in Piezoelectric Poly-L-Lactic Acid (PLLA) Nanofibers for Biosensing Applications** [QI Kang](#)<sup>1</sup>, Hiroaki Takehara<sup>1,2</sup> and Takanori Ichiki<sup>1,2</sup>; <sup>1</sup>University of Tokyo, Japan; <sup>2</sup>Innovation Center of NanoMedicine, Japan

**SB08.06.17**

**Prototyping a Flexible Antibiotic-Loaded Colorimetric Biosensor and Assessing Colorimetric Detection to External Stimuli via Machine Learning** [Naimul Hasan](#), Yan Li and Yu Sun; Colorado State University, United States

**SB08.06.18**

**Optical Characterization of the Vocal Fold Microenvironment in New Zealand White Rabbits** Emma Tiernan, Mohsen Motezaker, Claudia Gutierrez, Ryan Stepp, James Daniero and Patrick E. Hopkins; University of Virginia, United States

**SB08.06.19**

**Design, Fabrication and Characterization of Fibrous Acoustic Sensing Membranes for Biomedical Applications** Wenbo Li; The Hong Kong Polytechnic University, Hong Kong

**SB08.06.20**

**Laser-Induced Graphene Coated Wearable Smart Textile Electrodes for Biopotentials Signal Monitoring** Vidhya C M, Yogita Maithani, Sakshi Kapoor and Jitendra Pratap Singh; Indian Institute of Technology Delhi, India

SESSION SB08.07: Drug Delivery

Session Chair: Urszula Stachewicz

Friday Morning, April 11, 2025

Summit, Level 3, Room 324

**8:15 AM \*SB08.07.01**

**Advanced Nanofiber Drug Delivery Systems from Electrospinning—Recent Developments** Tian Ju, Ukrit Angkawitwong, Karolina Dziemidowicz and Gareth Williams; University College London, United Kingdom

**8:45 AM SB08.07.02**

**Encapsulation of Nerve Growth Factor in Core-Shell Nanofibers—Process Optimization and Release Modeling** Bhoomija Hariprasad and Mohammad Reza Abidian; University of Houston, United States

**9:00 AM SB08.07.03**

**Polymer Fibers Embedded with Small Molecule Drug and Copper Oxide Nanoparticles for Synergistic Local Cancer Therapy of Glioblastoma** Daewoo Han<sup>1</sup>, Ofek Fireman<sup>2</sup>, Iris Weitz<sup>2</sup>, Betty Tyler<sup>3</sup> and Andrew Steckl<sup>1</sup>; <sup>1</sup>University of Cincinnati, United States; <sup>2</sup>Braude College of Engineering, Israel; <sup>3</sup>Johns Hopkins University, United States

**9:15 AM SB08.07.04**

**Cytotoxicity Assessment of Bacterial Cellulose Nanoparticles for Targeted Drug Delivery** Gabrielle Balistreri, Eleftheria Roumeli and Elizabeth Nance; University of Washington, United States

**9:30 AM \*SB08.07.05**

**Nanofibrous Device for Immunosuppression-Free Delivery of Insulin-Producing Cells** Minglin Ma and Minseok Lee; Cornell University, United States

**10:00 AM BREAK**

**10:30 AM \*SB08.07.06**

**Hybrid Bioprinting and Electrospinning Technique for Vascularized Tissue Engineering** Norbert Radacsi; University of Edinburgh, United Kingdom

**11:00 AM SB08.07.07**

**A Facile Approach to Prepare Proliposomes via Electrospinning** Serdar Tort and N. Basaran Mutlu Agardan; Gazi University Faculty of Pharmacy, Turkey

**11:15 AM SB08.07.08**

**Nanofibrous Hydrogel Preparation via Electrospinning for Drug Delivery and Wound Healing** Shiqi Wei<sup>1</sup>, Reina Funatomi<sup>2</sup> and Blair K. Brettmann<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>Osaka University, Japan

**11:30 AM SB08.07.09**

**Oxygen-Releasing Coaxial Fiber Membranes for Sustained Viability of Transplanted Islet Cells** Brooke Campbell<sup>1</sup>, Daewoo Han<sup>1</sup>, Robert W. Horvath<sup>1</sup>, Hiroyuki Kato<sup>2</sup>, Hirotake Komatsu<sup>2</sup> and Andrew Steckl<sup>1</sup>; <sup>1</sup>University of Cincinnati, United States; <sup>2</sup>University of California, San Francisco, United States

**11:45 AM SB08.07.10**

**Centrifugally Spun Natural Fibers with Zinc Oxide Nanoparticles—A Novel Therapeutic Strategy for *Acne Vulgaris*** [Martina Rihova](#)<sup>1</sup>, Kristyna Cihalova<sup>2</sup>, Zbynek Heger<sup>2</sup> and Jan M. Macak<sup>1,3</sup>; <sup>1</sup>Central European Institute of Technology, Brno University of Technology, Czechia; <sup>2</sup>Mendel University, Czechia; <sup>3</sup>Center of Materials and Nanotechnologies, University of Pardubice, Czechia

# SYMPOSIUM SB09

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Bio/Solid Soft Molecular Interfaces—Biology Meets Materials and Technology  
April 8 - April 10, 2025

## Symposium Organizers

Yuhei Hayamizu, Tokyo Inst of Technology  
Hendrik Heinz, University of Colorado at Boulder  
Sahika Inal, King Abdullah University of Science and Technology  
Deniz Yucesoy, Izmir Institute of Technology

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB09.01: Lessons from Biology at the Molecular Dimensions I

Session Chairs: Hendrik Heinz and Deniz Yucesoy

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 333

### 10:30 AM SB09.01.01

**Development of Synthetic Cephalopod Granules for Bioinspired Coloration in Devices and Displays** [Kaitlyn Flynn](#) and Leila L. Deravi; Northeastern University, United States

### 10:45 AM SB09.01.02

**Programming Aliphatic Polyester Degradation by Engineered Bacterial Spores** [Ziyu Cui](#), Masamu Kawada, Yue Hui and Seunghyun Sim; University of California, Irvine, United States

### 11:00 AM \*SB09.01.03

**Colours With a Twist—Bio-Inspired Self-Assembled Chiral Architecture** [Silvia Vignolini](#); Max Planck Institute of Colloids and Interfaces, Germany

### 11:30 AM SB09.01.04

**Electromechanical Properties of DNA-CNT Complexes—Toward Functional Bio-Electronic Switches** [Olaiyan M. Alolaiyan](#)<sup>1,2</sup>, Arpan De<sup>1</sup> and M. P. Anantram<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>King Abdulaziz City for Science and Technology, Saudi Arabia

### 11:45 AM SB09.01.05

**A Window to Understanding Abiotic-Biotic Interfaces, Creation of Nanostructured Interface Arrays for Multimodal Imaging and Characterization of Pathogen-Surface Interactions** [Scott T. Retterer](#)<sup>1</sup>, Leslie Wilson<sup>1</sup>, Spenser R. Brown<sup>1</sup>, Reid Napier<sup>2</sup>, Ruben Millan-Solsona<sup>1</sup>, Marti Checa<sup>1</sup>, Lance Zhang<sup>1</sup>, Rama Vasudevan<sup>1</sup>, Sita Sirisha Madugula<sup>1</sup>, Lynnica N. Massenburg<sup>1</sup>, Alexis Williams<sup>1</sup>, Amber Webb<sup>1</sup>, Liam Collins<sup>1</sup>, Jennifer L. Morrell-Falvey<sup>1</sup> and Nickolay V. Lavrik<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>Oak Ridge Institute for Science and Education, United States

SESSION SB09.02: Lessons from Biology at the Molecular Dimensions II

Session Chairs: Silvia Vignolini and Deniz Yucesoy

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 333

**1:30 PM \*SB09.02.01**

**Biomolecules for Non-Biological Things—Peptide ‘Bundlemer’ Design for Model Colloidal Particle Creation and Hierarchical Solution Assembly**

Darrin J. Pochan; University of Delaware, United States

**2:00 PM \*SB09.02.02**

**Design Rules of Biointegrative Interfaces** Mehmet Sarikaya; DMXi, United States

**2:30 PM SB09.02.03**

**Unraveling Large Conductance Stochasticity in Single-Stranded RNA** Arpan De<sup>1</sup>, Arindam K. Das<sup>2</sup> and M. P. Anantram<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Eastern Washington University, United States

**2:45 PM BREAK**

**3:15 PM \*SB09.02.04**

**Bioinspired Polymer Sealants for Fetal Surgery** Phillip B. Messersmith<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**3:45 PM SB09.02.05**

**Exploring Electrohydrodynamics Based Functional Nanofibers as Multi-Dimensional Nano-Biointerfaces** Menglin Chen<sup>1,2</sup>; <sup>1</sup>Aarhus University, Denmark; <sup>2</sup>ETH Zürich, Switzerland

**4:00 PM SB09.02.06**

**Mechanism of Ligand-Activated Nanoparticles Binding to Target Cell-Surface Receptors by All-Atom Molecular Dynamics** Giulia Frigerio, Edoardo Donadoni, Paulo Siani, Jacopo Vertemara, Stefano Motta, Laura Bonati, Luca De Gioia and Cristiana Di Valentin; University of Milano-Bicocca, Italy

**4:15 PM SB09.02.07**

**Measurement of Carbon Composite Mass Across a Broad Range Using a Diamond Nanomechanical Oscillator** Donggeun Lee<sup>1</sup>, Seung-Woo Jeon<sup>1</sup>, Chang-Hwan Yi<sup>2</sup>, Yanghee Kim<sup>1</sup>, Yeeun Choi<sup>1</sup>, Il-Young Kim<sup>1</sup>, Dongyeon Daniel Kang<sup>1</sup>, Hojoong Jung<sup>1</sup>, Cherlhyun Jeong<sup>1</sup>, Jae-Pyoung Ahn<sup>1</sup>, Hee Chul Park<sup>3</sup>, Sang-Wook Han<sup>1</sup> and Chulki Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of); <sup>3</sup>Pukyong National University, Korea (the Republic of)

**4:30 PM SB09.02.08**

**A Layer-Based Model for Friction of Sliding Arrays** Jasreen Kaur; Lehigh University, United States

SESSION SB09.03: Synthesis, Restoration and Regeneration of Biological Hard Tissues I

Session Chairs: Yuhei Hayamizu and Hendrik Heinz

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 333

**8:30 AM SB09.03.01**

**3D-Printed Tricalcium Phosphate Scaffolds with Curcumin-Mg<sup>2+</sup> Complex for Enhanced Bone Tissue Engineering** Aditi Dahiya and Susmita Bose; Washington State University, United States

**8:45 AM SB09.03.02**

**Biomaterialization Using Solid Binding Peptides—A Case Study of Dental Remineralization** Deniz T. Yucesoy; Izmir Institute of Technology, Turkey

**9:00 AM \*SB09.03.03**

**3D Printed Biomaterials and Devices for Orthopedic and Dental Applications** Susmita Bose; Washington State University, United States



**9:30 AM BREAK**

**10:00 AM SB09.03.04**

**Effect of Silicic Acid on Dentin Remineralization—Biomaterial Interactions vs Biological Responses** Daline Mbitta Akoa<sup>1,2</sup>, Marine Pancrazi<sup>1,2</sup>, Christophe H elary<sup>2,1</sup>, Anne Poliard<sup>3</sup> and Thibaud Coradin<sup>2,1</sup>; <sup>1</sup>Sorbonne Universit , France; <sup>2</sup>CNRS, France; <sup>3</sup>Universit  Paris Cit , France

**10:15 AM SB09.03.05**

**Engineered Evolution of Self-Assembling Solid Binding Peptides Towards Simplicity** Siddharth Rath<sup>1</sup>, Tatum G. Hennig<sup>2</sup>, Zoey Surma<sup>3</sup>, Ayhan Yurtsever<sup>4</sup>, Linhao Sun<sup>4</sup>, Takeshi Fukuma<sup>4</sup> and Mehmet Sarikaya<sup>5</sup>; <sup>1</sup>Allen Institute for Brain Science, United States; <sup>2</sup>Altius Institute for Biomedical Sciences, United States; <sup>3</sup>University of Michigan, United States; <sup>4</sup>Kanazawa University, Japan; <sup>5</sup>DMXi, United States

**10:30 AM \*SB09.03.06**

**Biomimetic Solutions for Oral Health Impacts Overall Health** Malcolm L. Snead; University of Southern California, United States

**11:00 AM SB09.03.07**

**Cell Response Driven by Surface Charge as a Result of rGO and MXene Incorporation in Electrospun Polymer Scaffolds** Martyna Polak<sup>1</sup>, Piotr K. Szewczyk<sup>1</sup>, Krzysztof L. Berniak<sup>1</sup>, Mateusz Marzec<sup>1</sup>, Agnieszka M. Jastrzebska<sup>2</sup> and Urszula Stachewicz<sup>1</sup>; <sup>1</sup>AGH University of Krakow, Poland; <sup>2</sup>Warsaw University of Technology, Poland

**11:15 AM SB09.03.08**

**Dense Collagen Hydrogels Loaded with Anti-Sclerostin Monoclonal Antibodies as Biomaterials for Critical Size Calvaria Defect Repair** Ludovic Sicard<sup>1</sup>, Sophie Maillard<sup>1</sup>, Daline M'Bitta<sup>2</sup>, Coralie Torrens<sup>1</sup>, Catherine Chaussain<sup>1</sup> and Thibaud Coradin<sup>2</sup>; <sup>1</sup>Universit  Paris Cit , France; <sup>2</sup>CNRS, France

**11:30 AM SB09.03.09**

**Controlling the Outcomes of Templated Silicification by Genetic Engineering of a Thermoresponsive Silica-Binding Elastin-Like Polypeptide** William C. Wixson, Nada Naser and Francois Baneyx; University of Washington, United States

**11:45 AM SB09.03.10**

**Time-Resolved Insight into Microbially Induced Biocement Formation Using Non-Destructive Ultrasound Testing** Sarah A. Robbins<sup>1,2</sup>, Carson Willey<sup>1,2</sup>, Rhett Martineau<sup>2</sup>, Maneesh Gupta<sup>2</sup> and Mitchell Meade<sup>2</sup>; <sup>1</sup>Blue Halo, United States; <sup>2</sup>U.S. Air Force Research Laboratory, United States

SESSION SB09.04: Synthesis, Restoration and Regeneration of Biological Hard Tissues II

Session Chairs: Nurit Ashkenasy and Susmita Bose

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 333

**1:45 PM \*SB09.04.01**

**Critical Role of Protein-Mediated Inhibition of Mineralization in the Regulation of the Growth and Development of Tooth Enamel** Henry C. Margolis; University of Pittsburgh, United States

**2:15 PM SB09.04.02**

**Zinc-Doped 3D Printed Tricalcium Phosphate Scaffolds with Quercetin for Enhanced Bone Regeneration** Priya Kushram and Susmita Bose; Washington State University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SB09.05: High-Throughput Methodologies and Data Science

Session Chairs: Hendrik Heinz and Deniz Yucesoy

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 333

**3:30 PM \*SB09.05.01**

**Multiscale Small Molecule Interactomics and Behavioural Biomimetics Using the CANDO Platform** Ram Samudrala; University at Buffalo, The State University of New York, United States

**4:00 PM SB09.05.02**

**The Impact of Polymer Coating on Nanoparticles Interaction with Lipid Membranes Explored by Coarse-Grained Molecular Dynamics Simulations** Edoardo Donadoni<sup>1,2</sup>, Paulo Siani<sup>1</sup>, Giulia Frigerio<sup>1</sup>, Qiang Cui<sup>2</sup> and Cristiana Di Valentin<sup>1</sup>; <sup>1</sup>University of Milano-Bicocca, Italy; <sup>2</sup>Boston University, United States

**4:15 PM SB09.05.03**

**Can Martini Coarse-Grained Models Capture Anti-Biofouling Behavior of Polyelectrolyte Brush Coatings?** Christopher Walker, Seonghan Kim and Jan-Michael Carrillo; Oak Ridge National Laboratory, United States

SESSION SB09.06: Applications and Devices in Materials and Medicine I

Session Chairs: Yuhei Hayamizu and Hendrik Heinz

Thursday Morning, April 10, 2025

Summit, Level 3, Room 333

**8:30 AM SB09.06.01**

**Analyzing the Role of P12 in Preventing Non-Thrombogenic Clot Formation** Isabelle Chan<sup>1</sup>, Aryan Agahtehrani<sup>2</sup>, Vincent Lo<sup>3</sup>, Hunter Maguire<sup>4</sup>, David Sun<sup>5</sup>, Dylan Wang<sup>6</sup>, Xinyu You<sup>7</sup>, Calvin Yu<sup>8</sup>, Nikita Karnik<sup>9</sup>, Adam Hansen<sup>10</sup> and Miriam H. Rafailovich<sup>10</sup>; <sup>1</sup>Michael E. DeBakey High School for Health Professions, United States; <sup>2</sup>duPont Manual High School, United States; <sup>3</sup>Evergreen Valley High School, United States; <sup>4</sup>Garden City High School, United States; <sup>5</sup>Joseph A. Gregori High School, United States; <sup>6</sup>Trinity Preparatory School, United States; <sup>7</sup>Western Reserve Academy, United States; <sup>8</sup>Weston High School, United States; <sup>9</sup>Carnegie Mellon University, United States; <sup>10</sup>Stony Brook University, The State University of New York, United States

**8:45 AM SB09.06.02**

**Surface Modification of PEDOT:PSS Thin Films by Functional Nanomaterials** Shunsuke Yamamoto; Kyoto University, Japan

**9:00 AM \*SB09.06.03**

**Peptide-Driven Smart Surfaces and Interfaces for Electronic and Bioelectronic Applications** Nurit Ashkenasy; Ben-Gurion University of the Negev, Israel

**9:30 AM BREAK**

**10:00 AM SB09.06.04**

**Two-Dimensional (2D) Material Facilitated Surface-Enhanced Raman Spectroscopy Measurements of SARS CoV-2 Receptor Binding Domain (RBD)** Jeewan C. Ranasinghe<sup>1</sup>, Stephen K. Sanders<sup>1</sup>, Ziyang Wang<sup>1</sup>, Wenjing Wu<sup>1</sup>, Edgar Dimitrov<sup>2</sup>, Mauricio Terrones<sup>2</sup>, Alessandro Alabastri<sup>1</sup> and Shengxi Huang<sup>1</sup>; <sup>1</sup>Rice University, United States; <sup>2</sup>The Pennsylvania State University, United States

**10:15 AM SB09.06.05**

**N-Acetyl- $\beta$ -D-Glucosaminidase Activity Assay for Monitoring Insulin-Dependent Diabetes Using Ag-Porous Si SERS Substrate** Narsingh R. Nirala and Giorgi Shtenberg; ARO Volcani Center, Israel

**10:30 AM \*SB09.06.06**

**Designing and Characterising Bio-Interfaces for Healthcare Applications** Molly Stevens; University of Oxford, United Kingdom

**11:00 AM ^SB09.06.07**

**Smart Materials Decorated Metamaterial Sensors for Detecting and Isolating Extracellular Vesicles in Real-Time** Beyza Nur Küçük<sup>1,2</sup>, Eylul Gulsen Yilmaz<sup>1,2</sup>, Yusuf Aslan<sup>1,2</sup>, Özgecan Erdem<sup>2</sup>, Murat Alp Güngen<sup>1,2</sup>, Bengi Özgün Öztürk<sup>3</sup> and Fatih Inci<sup>1,2</sup>; <sup>1</sup>Bilkent University, Turkey; <sup>2</sup>Bilkent University UNAM, Turkey; <sup>3</sup>Hacettepe University, Turkey

**11:15 AM SB09.06.08**

**Innovative Cholesterol-Loaded Scaffolds for Enhanced Skin Regeneration and Wound Healing** Krzysztof L. Berniak<sup>1</sup>, Ahmadreza Moradi<sup>1</sup>, Agata Lichawska-Cieslar<sup>2</sup>, Weronika Szukala<sup>2</sup>, Jolanta Jura<sup>2</sup> and Urszula Stachewicz<sup>1</sup>; <sup>1</sup>AGH University of Krakow, Poland; <sup>2</sup>Jagiellonian University, Poland

**11:30 AM SB09.06.09**

**Advanced Cell Chip Technologies for 3D Model Drug Screening and Therapy Development** Duc-Trung Pham<sup>1</sup>, JaeHwan Park<sup>1,2</sup>, Sungho Park<sup>1,2</sup>, Paul K. J Park<sup>2</sup> and Sungbo Cho<sup>1,2,2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Gachon university, Korea (the Republic of)

**11:45 AM SB09.06.10**

**Building a Redox-Responsive Elastin-Like Polypeptide-Silica Nanoparticle System—From Steric Repulsion to Bridging Flocculation Through Disulfide Reduction** Zhixing Lin and Francois Baneyx; University of Washington, United States

SESSION SB09.07: Applications and Devices in Materials and Medicine II

Session Chairs: Sahika Inal and Deniz Yucesoy

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 333

**1:30 PM \*SB09.07.01**

**Machine Learning Guided Discovery and Design of Peptide and Peptide-Hybrids for Functional Biomaterials** Candan Tamerler; University of Kansas, United States

**2:00 PM SB09.07.02**

**Synergistic Nanostructured Polymer Surfaces with Dual Antimicrobial and Self-Cleaning Properties** Maya Endoh<sup>1</sup>, Tad Koga<sup>1</sup>, Aiden Gauer<sup>1</sup>, Daniel Razgonyaev<sup>1</sup>, Marko Zimic<sup>1</sup>, Michal Luchowski<sup>1</sup> and Jan-Michael Carrillo<sup>2</sup>; <sup>1</sup>Stony Brook University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**2:15 PM SB09.07.03**

**Ethanol Ice is a Negative Tone Resist that Enables Direct Electron Beam Lithography on Biological Membranes** Dylan Chiaro<sup>1</sup>, Arash Ghobadi<sup>1</sup>, Suchi Guha<sup>1,2</sup> and Gavin King<sup>1,2,2</sup>; <sup>1</sup>University of Missouri, United States; <sup>2</sup>University of Missouri–Columbia, United States

**2:30 PM SB09.07.04**

**Advanced Laser Fabrication of Magnetized Microcilia Arrays for Droplets Transportation** Min Tan and Mitch Guijun Li; The Hong Kong University of Science and Technology, Hong Kong

**2:45 PM SB09.07.05**

**Bioglass and Copper Added Ti6Al4V for Load-Bearing Implants** Lochan Upadhyay, Michael B. Myers, Bryson White, Susmita Bose and Amit Bandyopadhyay; Washington State University, United States

**3:00 PM BREAK**

**3:30 PM SB09.07.06**

**3DP Tricalcium Phosphate Scaffold with Polydopamine and Polycaprolactone Coatings for Controlled Release of Vitamin D3** Connor Toulou, Priya Kushram and Susmita Bose; Washington State University, United States

**3:45 PM SB09.07.07**

**The Molecular Basis for Non-Thrombogenic Clots Following Viral Infection** Dylan Wang<sup>1</sup>, Aryan Agahtehrani<sup>2</sup>, Isabelle Chan<sup>3</sup>, Vincent Lo<sup>4</sup>, Hunter Maguire<sup>5</sup>, David Sun<sup>6</sup>, Xinyu You<sup>7</sup>, Calvin Yu<sup>8</sup>, Nikita Karnik<sup>9</sup>, Adam Hansen<sup>10</sup> and Miriam H. Rafailovich<sup>10</sup>; <sup>1</sup>Trinity Preparatory School, United States; <sup>2</sup>duPont Manual High School, United States; <sup>3</sup>Michael E. DeBakey High School for Health Professions, United States; <sup>4</sup>Evergreen Valley High School, United States; <sup>5</sup>Garden City High School, United States; <sup>6</sup>Joseph A. Gregori High School, United States; <sup>7</sup>Western Reserve Academy, United States; <sup>8</sup>Weston High School, United States; <sup>9</sup>Carnegie Mellon University, United States; <sup>10</sup>Stony Brook University, The State University of New York, United States

**4:00 PM SB09.07.08**

**Drug-Eluting Liquid-Infused Variable Exopolyosis Release Cellular Backpacks** Pierce Cousins; Harvard University, United States

**4:15 PM SB09.07.09**

**Employing Nanoneedle Platforms to Transfect Human Stem Cells—Multiplexed Non-Viral Delivery of mRNA to hiPSCs Using Silicon Nanotube Arrays** [Jann Harberts](#)<sup>1</sup>, Yuan Jiang<sup>2</sup>, Maxim Gongalsky<sup>1</sup>, Raquel Sánchez-Salcedo<sup>1</sup>, Xuan Ho<sup>1</sup>, Roey Elnathan<sup>2</sup> and Nicolas Voelcker<sup>1</sup>; <sup>1</sup>Monash University, Australia; <sup>2</sup>Deakin University, Australia

**4:30 PM SB09.07.10**

**Impact of Surface Properties on Fibrinogen Adsorption and Thrombosis Development** [Aryan Agahtehrani](#)<sup>1</sup>, Isabelle Chan<sup>2</sup>, Vincent Lo<sup>3</sup>, Hunter Maguire<sup>4</sup>, David Sun<sup>5</sup>, Dylan Wang<sup>6</sup>, Xinyu You<sup>7</sup>, Calvin Yu<sup>8</sup>, Nikita Karnik<sup>9</sup>, Adam Hansen<sup>10</sup>, Peineng Wang<sup>10</sup>, Jawaad Sheriff<sup>10</sup> and Miriam H. Rafailovich<sup>10</sup>; <sup>1</sup>duPont Manual High School, United States; <sup>2</sup>Michael E. DeBakey High School for Health Professions, United States; <sup>3</sup>Evergreen Valley High School, United States; <sup>4</sup>Garden City High School, United States; <sup>5</sup>Joseph A. Gregori High School, United States; <sup>6</sup>Trinity Preparatory School, United States; <sup>7</sup>Western Reserve Academy, United States; <sup>8</sup>Weston High School, United States; <sup>9</sup>Carnegie Mellon University, United States; <sup>10</sup>Stony Brook University, The State University of New York, United States

**4:45 PM SB09.07.11**

**Differential Impacts of Hyperglycemia on Fibrin Formation and Thrombosis** [David Sun](#)<sup>1</sup>, Aryan Agahtehrani<sup>2</sup>, Isabelle Chan<sup>3</sup>, Vincent Lo<sup>4</sup>, Hunter Maguire<sup>5</sup>, Dylan Wang<sup>6</sup>, Xinyu You<sup>7</sup>, Calvin Yu<sup>8</sup>, Nikita Karnik<sup>9</sup>, Adam Hansen<sup>10</sup> and Miriam H. Rafailovich<sup>10</sup>; <sup>1</sup>Joseph A. Gregori High School, United States; <sup>2</sup>duPont Manual High School, United States; <sup>3</sup>Michael E. DeBakey High School for Health Professions, United States; <sup>4</sup>Evergreen Valley High School, United States; <sup>5</sup>Garden City High School, United States; <sup>6</sup>Trinity Preparatory School, United States; <sup>7</sup>Western Reserve Academy, United States; <sup>8</sup>Weston High School, United States; <sup>9</sup>Carnegie Mellon University, United States; <sup>10</sup>Stony Brook University, The State University of New York, United States

SESSION SB09.08: Poster Session: Bio/Solid Soft Molecular Interfaces—Biology Meets Materials and Technology

Session Chairs: Hendrik Heinz and Deniz Yucesoy

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB09.08.01**

**Spiky Gold Nanoparticles, a Nanoscale Approach to Enhanced Ex Vivo T-Cell Activation** [Fatemeh Esmaeili](#)<sup>1,2</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>University of Toronto, Canada

**SB09.08.02**

**Can Novel Bioceramics Withstand Osteoclastic Resorption or Act as a Vehicle to Deliver Local Therapies for Treatment of Fractures and Limit Bone Destruction of the Active Charcot Foot in Diabetes?** [Nina L. Petrova](#)<sup>1,2</sup>, Zelong Yan<sup>3</sup>, Eduardo Saiz<sup>3</sup>, Michael E. Edmonds<sup>1,2</sup>, Sarah Fearn<sup>3</sup>, Catherine Shanahan<sup>1</sup> and Peter K. Petrov<sup>3</sup>; <sup>1</sup>King's College London, United Kingdom; <sup>2</sup>King's College Hospital, United Kingdom; <sup>3</sup>Imperial College London, United Kingdom

**SB09.08.03**

**Theoretical Insights into Metallo-DNA Nanowires** Shiang-Bin Chiu<sup>1,2</sup>, [Arpan De](#)<sup>1</sup>, M. P. Anantram<sup>1</sup> and Paritosh Singh<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Department of Physics, University of Washington, United States

**SB09.08.04**

**Self-Assembled Antimicrobial Peptides (AMPs) via Biosilicification—An Effective Approach to Deliver and Coat AMPs** [Mi-Ran Ki](#), Tae-In Park and Seung Pil Park; Korea University, Korea (the Republic of)

**SB09.08.05**

**Gradient of Surface-Bound Laminin Protein for Neural Regeneration** [Ayesha Budhwani](#), Omid Dadras-Toussi, Sheereen Majd, Chandra Mohan and Mohammad Reza Abidian; University of Houston, United States

**SB09.08.06**

**Preparation of Exosome-Imprinted Biosensors for Breast Cancer Detection** Eylul Gulsen Yilmaz<sup>1</sup>, Fatih Inci<sup>2,1</sup> and [Yeseren Saylan](#)<sup>3</sup>; <sup>1</sup>Bilkent University UNAM, Turkey; <sup>2</sup>Bilkent University, Turkey; <sup>3</sup>Hacettepe University, Turkey

**SB09.08.07**

**The Influence of Amino Acid Sequence Length on Peptide Self-Assembly on Graphite** [Asahi Yu](#) and Yuhei Hayamizu; Institution of Science Tokyo, Japan

**SB09.08.08**

**Synthetic Small RNA-Based Tool for Target Gene Repression in Diverse Bacteria** Dongsoo Yang; Korea University, Korea (the Republic of)

**SB09.08.09**

**Development of Substrate-Independent Antifouling and Bactericidal Hydrogel Coatings via Visible Light Cross-Linking for Biomedical Applications** Soonjong Roh<sup>1,2</sup> and Jin Yoo<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of)

**SB09.08.10**

**96 Wells Nano-Paper for the Detection of Chikungunya Virus and Real Time Data Capture Using QR Code Interfaced with Web-Analytics Data Tracking** Pradakshina Sharma; Jamia Hamdard, India

**SB09.08.11**

**Luteinizing Hormone-Releasing Hormone (LHRH)-Conjugated Cancer Drug Delivery from Magnetite Nanoparticle-Modified Microporous Poly-Di-Methyl-Siloxane (PDMS) Systems for the Targeted Treatment of Triple Negative Breast Cancer Cells** Stanley C. Eluu<sup>1,2</sup> and Oko Augustine Okpani Oko<sup>3</sup>; <sup>1</sup>Nnamdi Azikiwe University, Nigeria; <sup>2</sup>Ebonyi State University, Nigeria; <sup>3</sup>David Umahi Federal University of Health Sciences, Nigeria

# SYMPOSIUM SB10

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Neuromorphic Biohybrids—Materials, Devices, Interfaces and Computing Principles  
April 8 - April 10, 2025

Symposium Organizers

Dmitry Kireev, University of Massachusetts Amherst  
Damia Mawad, University of New South Wales  
Francesca Santoro, RWTH Aachen University  
Yoeri van de Burgt, Technische Universiteit Eindhoven

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB10.01: Neuromorphics I

Session Chairs: Paschalis Gkoupidenis and Yoeri van de Burgt

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 332

**10:30 AM \*SB10.01.01**

**2D Materials and Devices for Bio-Inspired Computing** Saptarshi Das; The Pennsylvania State University, United States

**11:00 AM SB10.01.02**

**Mixed Proton-Electron Conductivity and Synaptic Plasticity in a Hydrogen-Bonded Coordination Polymer** Intek Song; Andong National University, Korea (the Republic of)

**11:15 AM SB10.01.03**

**Soft and Neuromorphic Robotics—Enhancing Soft Robotic Grippers Through In-Hardware Trainable Behaviour** Benn Proper, Irene Kuling and Yoeri van de Burgt; Eindhoven University of Technology, Netherlands

**11:30 AM \*SB10.01.04**

**Ferroelectric Nitrides for Non-Volatile Memory and Computing** Deep M. Jariwala; University of Pennsylvania, United States

SESSION SB10.02: Neuromorphics II

Session Chairs: Saptarshi Das and Yoeri van de Burgt

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 332

**1:30 PM \*SB10.02.01**

**Tailoring Organic Mixed Ionic-Electronic Conductors for Neuromorphic Devices** Scott T. Keene; Rice University, United States

**2:00 PM SB10.02.02**

**Realizing Neuron-Synapse Integration and Intrinsic Neuronal Plasticity in a Dual-Functional Memristor of Threshold and Memory Switching** Zih-Siao Liao, Kuan-Ting Chen, Kai-Shin Hsu, Wei-Lun Chen and Jen-Sue Chen; National Cheng Kung University, Taiwan

**2:15 PM SB10.02.03**

**An Organic Non-Volatile Memory with Ultra-Wide Dynamic Range for Neuromorphic Computing** Min-Jun Sung<sup>1</sup>, Tae-Woo Lee<sup>1</sup> and Tae-Lim Choi<sup>2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>ETH Zürich, Switzerland

**2:30 PM BREAK**

**3:00 PM \*SB10.02.04**

**Engineering Mixed Conductor Transport and Device Form Factor for Neuromorphic Applications** Jonathan Rivnay; Northwestern University, United States

**3:30 PM SB10.02.05**

**Neuromorphic Boolean Logic Implementation Using Ovonic Threshold Switch Devices** Unhyeon Kang<sup>1,2</sup> and Suyoun Lee<sup>1,3</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Seoul National University, Korea (the Republic of); <sup>3</sup>Korea University of Science and Technology, Korea (the Republic of)

**3:45 PM \*SB10.02.06**

**Organic Neuromorphic Bioelectronics** Paschalis Gkoupidenis; North Carolina State University, United States

SESSION SB10.03: Poster Session: Neuromorphic Biohybrids—Materials, Devices, Interfaces and Computing Principles

Session Chairs: Paschalis Gkoupidenis and Yoeri van de Burgt

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB10.03.01**

**Ultra-Low Energy SiO<sub>2</sub> CBRAM—Driving Intelligence at the Edge** Michael Liang<sup>1,2</sup>, Julia Rodrigues<sup>3,2</sup>, Pranav Choori<sup>2</sup>, Shawn Wagoner<sup>2</sup> and Ethan Ahn<sup>2</sup>; <sup>1</sup>Virginia Tech, United States; <sup>2</sup>George Mason University, United States; <sup>3</sup>The College of William & Mary, United States

**SB10.03.02**

**Soft Robots and Neuromorphic Circuits—Utilizing Reinforcement Learning to Move Towards All-Embracing Intelligence** Bob Huisman<sup>1,2</sup>, Yoeri van de Burgt<sup>1</sup> and Johannes Overvelde<sup>2,1</sup>; <sup>1</sup>Eindhoven University of Technology, Netherlands; <sup>2</sup>AMOLF, Netherlands

**SB10.03.03**

**Convergence of Human Olfactory Receptors and Organic Synaptic Devices** Hyunwoo Song<sup>1</sup>, Dongseok Moon<sup>1</sup>, Yousang Won<sup>1</sup>, Yeon Kyung Cha<sup>1</sup>, Jin Yoo<sup>1</sup>, Tai Hyun Park<sup>2</sup> and Joon Hak Oh<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Ewha Womans University, Korea (the Republic of)

**SB10.03.04**

**Liquid Crystal Elastomers as Neuromorphic Muscles** [Pei Zhang](#), Marco Fattori and Yoeri van de Burgt; Eindhoven University of Technology, Netherlands

**SB10.03.05**

**Real-Time Multi-Modal Extraction of Vision Data Through a Kernel-Based Array with Neuro-Inspired Computing Approach** [Hyeonseung Choi](#) and Dae-Hyeong Kim; Seoul National University, Korea (the Republic of)

**SB10.03.06**

**Synaptic Plasticity Mimicking in Pristine Leaf Device** [Andrew J. Savage](#) and Ramesh Adhikari; Colgate University, United States

**SB10.03.07**

**Integration of Organic Artificial Neurons in Control Systems** [Anthony Vorias](#) and Yoeri van de Burgt; Eindhoven University of Technology, Netherlands

**SB10.03.08**

**Emulation of Neural Processes by Natural Organic Honey-ReRAM Based Artificial Synaptic Devices** Zoe Templin and [Feng Zhao](#); Washington State University, United States

**SB10.03.09**

**High-Performance Optoelectronic ReRAM Device Based on SrTiO<sub>3</sub>/TaO<sub>x</sub> Heterostructure for Neuromorphic Visual Processing** [Yu-Shan Lin](#) and Tseung-Yuen Tseng; National Yang Ming Chiao Tung University, Taiwan

**SB10.03.10**

**Monolayer Graphene Enhanced SPR Sensors for Sensitive Detection of Cell Surface Marker Interactions with Peptides** [Ahmar Hasnain](#), Heiko Heilmann, Bernd Bufe and Alexey Tarasov; Kaiserslautern University of Applied Sciences, Germany

SESSION SB10.04: Bioelectronics

Session Chairs: Samuel Liu and Yoeri van de Burgt

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 332

**8:15 AM ^SB10.04.01**

**Enzymatic and Photo-Induced *In Situ* Polymerization of OMIECs for Soft Bioelectronic Interfaces** [Xenofon Strakosas](#); Linkoping University, Sweden

**8:45 AM \*SB10.04.02**

**Dynamic Mechanical Properties in Conducting Hydrogels for Bioencapsulating Electronics** [Alexandra Rutz](#); Washington University in St. Louis, United States

**9:15 AM SB10.04.03**

**Photopatternable Solid-State OECTs for Monolithic and Advanced Organic Electronics** [Charles-Théophile Coen](#) and Yoeri van de Burgt; TU Eindhoven, Netherlands

**9:30 AM \*SB10.04.04**

**Decoding Neural Intrinsic Dynamics with Flexible Brain-Machine Interfaces** [Jia Liu](#); Harvard University, United States

**10:00 AM BREAK**

SESSION SB10.05: Neuromorphics III

Session Chairs: Sahika Inal and Yoeri van de Burgt

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 332

**10:30 AM +SB10.05.01**

**Integrating Organic-Based Devices for Neuromorphic Computing** [Alberto Salleo](#); Stanford University, United States

**11:00 AM SB10.05.02**

**Tunable Spectrally Resolved Photodetectors and Hyperspectral In-Sensor Computing** [Yuxuan Cosmi Lin](#); Texas A&M University, United States

**11:15 AM SB10.05.03**

**A Single vOECT Architecture Integrating Bio-Hybrid Synapses and Spiking Circuits for Replicating Neuron Specialisation** [Giovanni Maria Matrone](#)<sup>1</sup>, Ruiheng Wu<sup>1</sup>, Zachary Laswick<sup>1</sup>, Yoeri van de Burgt<sup>2</sup> and Jonathan Rivnay<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Technische Universiteit Eindhoven, Netherlands

**11:30 AM \*SB10.05.04**

**Biocompatible Graphene Transistors for Multifunctional Neuromorphic Computing** [Samuel Liu](#)<sup>1</sup>, Dmitry Kireev<sup>2</sup>, Harrison Jin<sup>1</sup>, Patrick Xiao<sup>3</sup>, Christopher Bennett<sup>3</sup>, Deji Akinwande<sup>1</sup> and Jean Anne C. Incorvia<sup>1</sup>; <sup>1</sup>The University of Texas at Austin, United States; <sup>2</sup>University of Massachusetts Amherst, United States; <sup>3</sup>Sandia National Laboratories, United States

SESSION SB10.06: Neuromorphics IV

Session Chairs: Paschalis Gkoupidenis and Xenofon Strakosas

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 332

**1:30 PM \*SB10.06.01**

**Organic Electrochemical Neurons for Neuromorphic Sensing and Perception** [Simone Fabiano](#); Linköping University, Sweden

**2:00 PM SB10.06.02**

**Artificial Olfactory Sensor Systems via a Seamless Neuromorphic Architecture** [YoungWoo Jang](#)<sup>1</sup>, Jaehyun Kim<sup>2</sup> and Sung Kyu Park<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Dongguk University, Korea (the Republic of)

**2:15 PM SB10.06.03**

**Zero-Energy Neuromorphic Visual Computing with Photocurrent-Based Memory in ZnMgO/Se Synapses** Sergio Giraldo<sup>1</sup>, Kunal Tiwari<sup>1</sup>, Taizo Kobayashi<sup>2</sup>, Edgardo Saucedo<sup>1</sup> and [Zacharie Jehl Li-Kao](#)<sup>1,2</sup>; <sup>1</sup>Polytechnic University of Catalonia, Spain; <sup>2</sup>Ritsumeikan University, Japan

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM +SB10.06.04**

**The Organic Photoelectrochemical Transistor—A Light-Responsive Neuromorphic Device for Adaptive Sensing** [Sahika Inal](#); King Abdullah University of Science and Technology, Saudi Arabia

**4:00 PM SB10.06.05**

**Ohmic Contact Engineering for MoS<sub>2</sub> Neuromorphic Performance Enhancement** [Rifat Hasan Rupom](#), Shinoj S Nair, Eunho Cha, Oliver Chyan and Wonbong Choi; University of North Texas, United States

**4:15 PM SB10.06.06**

**Microstructure Controlled Organic Neuromorphic Electronics for Stochastic Update On-Chip Training** [Dae-Gyo Seo](#)<sup>1</sup>, Jongun Won<sup>1</sup>, Mohit Grag<sup>2</sup>, Sungsu Kang<sup>1</sup>, Hoichang Yang<sup>3</sup>, Jungwon Park<sup>1</sup>, Igor Zozoulenko<sup>4</sup>, Sangbum Kim<sup>1</sup> and Tae-Woo Lee<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Birla Institute of Technology and Science, India; <sup>3</sup>Inha University, Korea (the Republic of); <sup>4</sup>Linköping University, Sweden

**4:30 PM SB10.06.07**

**Synergistic Integration of VO<sub>x</sub>-Based Threshold Switching Memristor and ZrO<sub>x</sub>-Based Resistive Switching Memristor for Spiking Neural Networks** [Sheng-Jie Hong](#), Shuai Ming Chen, Chi-Chien Chen, Chen-Gang Jang and Jen-Sue Chen; National Cheng Kung University, Taiwan

**4:45 PM SB10.06.08**

**Photo-Enhanced Performance of Organic Memristors Based on Squaraine Nanowire Arrays** Aaron A. Cookson and [James Ryan](#); Swansea University, United Kingdom



SESSION SB10.07: Neuromorphics & Bioelectronics

Session Chairs: Simone Fabiano and Paschalis Gkoupidenis

Thursday Morning, April 10, 2025

Summit, Level 3, Room 332

**9:00 AM SB10.07.01**

**Evolution of OECT Devices Towards Adaptive Fast High-Amplification Sensors** [Niels J. Burghoorn](#) and Yoeri van de Burgt; Technische Universiteit Eindhoven, Netherlands

**9:15 AM \*SB10.07.02**

**Design of Mixed Conducting Organic Semiconductors for Electrochemical Transistors** [Iain McCulloch](#); Princeton University, United States

**9:45 AM SB10.07.03**

**Organic Ferroelectric Transistors as Synaptic Devices for Neural Image Recognition Networks** [Arash Ghobadi](#), Suchismita Guha and Evan Restuccia; University of Missouri-Columbia, United States

**10:00 AM BREAK**

**10:30 AM \*SB10.07.04**

**Closed-Loop Neuromodulation Approaches for Neural Networks of Cognition** [Jennifer Gelinias](#); University of California, Irvine, United States

**11:00 AM SB10.07.05**

**Stable, Fast, and Tunable Bilayer vOECTs via a Commodity Polymers Blending Approach for Specialized Spiking Neurons** [Zachary Laswick](#)<sup>1</sup>, Ariel Lifer<sup>2</sup>, Iain McCulloch<sup>3</sup>, Gitti Frey<sup>2</sup>, Giovanni Maria Matrone<sup>1</sup> and Jonathan Rivnay<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Technion-Israel Institute of Technology, Israel; <sup>3</sup>University of Oxford, United Kingdom

**11:15 AM SB10.07.06**

**High-Frequency Artificial Nerve Using Homogeneously Integrated Organic Electrochemical Transistors** Shijie Wang, [Bingjun Wang](#), Chao Zhao and Wei Ma; Xi'an Jiaotong University, China

**11:30 AM SB10.07.07**

**Soft Electronic Switches and Adaptive Logic Gates Based on Nanostructured Gold Networks** [Giacomo Nadalini](#), Francesca Borghi and Paolo Milani; University of Milan, Italy

# SYMPOSIUM SB11

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SynBioelectronics  
April 8 - April 10, 2025

Symposium Organizers

Claudia Cea, Massachusetts Institute of Technology  
Dion Khodagholy, University of California, Irvine  
Roisin Owens, University of Cambridge  
Jonathan Rivnay, Northwestern University

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\* Invited Paper  
+ JMR Distinguished Invited Speaker  
^ MRS Communications Early Career Distinguished Presenter

SESSION SB11.01: Hybrid Cell Therapies I  
Session Chairs: Claudia Cea and Jonathan Rivnay  
Tuesday Morning, April 8, 2025  
Summit, Level 3, Room 331

**10:30 AM \*SB11.01.01**

**Advances in Immunomodulatory Biomaterials for Targeted Immune System Interaction** Omid Veischi; Rice University, United States

**11:00 AM \*SB11.01.02**

**Advanced Materials for Oxygen Evolution Electrocatalysis to Support Cell-Based Therapeutics In Vivo** Tzahi Cohen-Karni; Carnegie Mellon University, United States

**11:30 AM SB11.01.03**

**Iontronic Devices for Controlled Drug Release with Electronic Precision** Marle Vleugels<sup>1</sup>, Nikolaus Poremba<sup>2</sup>, Christian Bayer<sup>3</sup>, Sebastian Hecko<sup>2</sup>, Donghak Byun<sup>1</sup>, Moa Hörberg<sup>1</sup>, Magnus Berggren<sup>1</sup>, Daniel Simon<sup>1</sup>, Linda Waldherr<sup>3</sup>, Hannes Mikula<sup>2</sup> and Johannes Bintinger<sup>2,1</sup>; <sup>1</sup>Linköping University, Sweden; <sup>2</sup>Technische Universität Wien, Austria; <sup>3</sup>Medical University of Graz, Austria

SESSION SB11.02: Hybrid Cell Therapies II  
Session Chairs: Claudia Cea and Jonathan Rivnay  
Tuesday Afternoon, April 8, 2025  
Summit, Level 3, Room 331

**1:30 PM \*SB11.02.01**

**Bioelectronic Devices for Minimally Invasive Cell Therapies** Siddharth Krishnan; Massachusetts Institute of Technology, United States

**2:00 PM \*SB11.02.02**

**Innovations in Biohybrid Devices Through ARPA-H Initiatives—Insights from THOR and REACT** Paul Sheehan; ARPA-H, United States

**2:30 PM \*SB11.02.03**

**Integrating Electrogenic Cells into Organoid Structures with Electrically Conductive Scaffolds Augments Function and Cell Therapy Production** James Stafford<sup>1</sup>, Abigail Myers<sup>1</sup>, Kathryn Laprade<sup>2</sup>, Zifang Zhao<sup>3</sup>, Toheeb Adegoke<sup>1</sup>, Baoning Sha<sup>3</sup>, Nofar Hemed<sup>4</sup>, Yangguang Ou<sup>1</sup>, Alberto Salles<sup>4</sup> and Dion Khodagholy<sup>5</sup>; <sup>1</sup>University of Vermont, United States; <sup>2</sup>RTI International, United States; <sup>3</sup>Columbia University, United States; <sup>4</sup>Stanford University, United States; <sup>5</sup>University of California, Irvine, United States

SESSION SB11.03: Bioelectronic Devices for Biological Applications  
Session Chairs: Claudia Cea and Dion Khodagholy  
Wednesday Morning, April 9, 2025  
Summit, Level 3, Room 331

**8:45 AM \*SB11.03.01**

**AI Driven Closed Loop Control of Cell Behavior with Bioelectronics** Marco Rolandi; University of California, Santa Cruz, United States

**9:15 AM \*SB11.03.02**

**Cyber-Secure Biological Systems** Rabia T. Yazicigil; Boston University, United States

**9:45 AM BREAK**

**10:15 AM \*SB11.03.03**

**Integrating Wearable and Implantable Devices to Create In-Body Networks of Electronic Therapeutics** [Alex Abramson](#); Georgia Institute of Technology, United States

**10:45 AM \*SB11.03.04**

**Biomembrane Sensors—Merging Synthetic Biology with Electronic Transducers** [Anna-Maria Pappa](#); Khalifa University, United Arab Emirates

**11:15 AM SB11.03.05**

**Genetic Circuits for Cellular Biosensing at the Cell—Device Interfaces** [Urartu Seker](#), Ilkay Cisol Koksaldi, Sila Kose and Dogus Akboga; Bilkent University, Turkey

**11:30 AM SB11.03.06**

**Continuous Physiological Interrogation with Wireless Battery-Free Implantables** [Philipp Gutruf](#); The University of Arizona, United States

**11:45 AM SB11.03.07**

**Spatial Control of Doping in Conducting Polymers Enables Complementary, Conformable, Implantable Internal Ion-Gated Organic Electrochemical Transistors** [Duncan Wisniewski](#); Columbia University, United States

SESSION SB11.04: Biosensors

Session Chairs: Claudia Cea and Dion Khodagholy

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 331

**1:30 PM \*SB11.04.01**

**Advancing Biomolecular Detection with Biomimetic Organic Electrochemical Transistors** [Sahika Inal](#); King Abdullah University of Science and Technology, Saudi Arabia

**2:00 PM \*SB11.04.02**

**The Single-Molecule with a Large Transistor (SiMoT) Technology—Advancing from State-of-the-Art Performance to Unraveling a New Sensing Mechanism** [Luisa Torsi](#); University of Bari A. Moro, Italy

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SB11.04.03**

**Bioelectronics for Recording from Dispersed Areas of the Nervous System** [Alexander J. Boys](#); Dartmouth College, United States

**4:00 PM SB11.04.04**

**Non-Destructive RNA Sampling with Hollow Nanostraws for Longitudinal Analysis of Living 2D and 3D Biological Systems** [Ying Jie Quek](#)<sup>1,2</sup>;  
<sup>1</sup>National University of Singapore, Singapore; <sup>2</sup>Agency for Science, Technology and Research, Singapore

**4:15 PM SB11.04.05**

**A Novel 3D Transmembrane Organic Electrochemical Transistor for Monitoring Growth of Fibroblast Cells** [Rachana Acharya](#), Douglas v. Niekerk, Maria Lopez Cavestany and Roisin Owens; University of Cambridge, United Kingdom

SESSION SB11.05: Cell Systems Integration

Session Chairs: Claudia Cea and Xenofon Strakosas

Thursday Morning, April 10, 2025

Summit, Level 3, Room 331

**10:30 AM \*SB11.05.01**

**The Merger of Synthetic Biology with Bioelectronics Enables Study of Hard-to-Reach Organelle Ion Channel Proteins** [Susan Daniel](#); Cornell University, United States

**11:00 AM \*SB11.05.02**

**Enzymatic *In Situ* Polymerization for Soft Bioelectronic Interfaces—Advancing Tissue-Compatible Conductors in Vivo** [Xenofon Strakosas](#); Linköping University, Sweden

**11:30 AM SB11.05.03**

**Biofabrication and Characterization of Living Conducting Microfibers** [Marika Iencharelli](#)<sup>1</sup>, Giuseppina Tommasini<sup>2</sup>, Graziano Preziosi<sup>1</sup>, Silvia Santillo<sup>1</sup>, Nicol Spallacci<sup>3</sup>, Mattia Zangoli<sup>3</sup>, Francesca Di Maria<sup>3</sup>, Maria Antonietta Ferrara<sup>1</sup>, Angela Tino<sup>1</sup> and Claudia Tortiglione<sup>1</sup>; <sup>1</sup>Istituto di Scienze Applicate e Sistemi Intelligenti “E. Caianiello”, Consiglio Nazionale delle Ricerche, Italy; <sup>2</sup>Instituto de Nanociencia y Materiales de Aragón, Spain; <sup>3</sup>Istituto per la Sintesi Organica e Fotoreattività, Consiglio Nazionale delle Ricerche, Italy

**11:45 AM SB11.05.04**

**4D Green Bioprinting—Plant-Based Living Biohybrid Hydrogels** [Erica Colaprico](#) and Eleni Stavrinidou; Linköping University, Sweden

SESSION SB11.06: Biohybrid and Soft Functional Interfaces

Session Chairs: Claudia Cea and Xenofon Strakosas

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 331

**1:30 PM \*SB11.06.01**

**Building 3D Hydrogel Platforms to Modulate Neural Cells** [Christina M. Tringides](#); Rice University, Switzerland

**2:00 PM \*SB11.06.02**

**Supporting Cells in Biohybrid Bioelectronics—3D Printed Conducting Scaffolds with Soft Tissue-Like Stiffness** [Alexandra Rutz](#); Washington University in St. Louis, United States

**2:30 PM BREAK**

**3:00 PM \*SB11.06.03**

**3D Bioelectronic Platforms for Neuron Regeneration** [Achilleas Savva](#); Delft University of Technology, United Kingdom

**3:30 PM \*SB11.06.04**

**Magnetolectric Bioelectronics—Enabling Reliable Wireless Communication and Precisely Controlled Networks** [Fatima Alrashdan](#); Rice University, United States

**4:00 PM \*SB11.06.05**

**Additive Manufacturing of Multiscale Composite Materials for Bioelectronic Applications** [Tyler Ray](#)<sup>1,2</sup>; <sup>1</sup>University of Hawaii at Manoa, United States; <sup>2</sup>John A Burns School of Medicine at the University of Hawaii at Manoa, United States

SESSION SB11.07: Poster Session: Emerging Biohybrid Innovations

Session Chairs: Claudia Cea and Xenofon Strakosas

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB11.07.01**

**Photothermally Responsive Biohybrid Material Platform for Biofilm Disruption** Pari Dhungana, Jonathan Caguiat and [Byung-Wook Park](#); Youngstown State University, United States

**SB11.07.02**

**Flexible and Durable Bioengineered Artificial Blood Vessels** Dong Yeop Lee, Junggi Choi and Seon Jeong Kim; Hanyang University, Korea (the Republic of)

**SB11.07.03**

**Impacts of Chlorine Counterions on Electronic Properties of Metal-Modified DNA** Sachal Shaikh, M. P. Anantram, William Livernois and Arpan De; University of Washington, United States

**SB11.07.04**

**Fundamental Studies of Proteins Signal Transduction Pathway in Electrically Stimulated Human Dermal Fibroblasts (HDF) Leading to Formation of ECM Proteins** Katarzyna Slowinska<sup>1</sup>, Catherine Obiajulu<sup>1</sup> and Kazuyuki Miyazawa<sup>2</sup>; <sup>1</sup>California State University, Long Beach, United States; <sup>2</sup>Shiseido Co., Ltd., Japan

## SYMPOSIUM SB12

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Soft, Healable Conducting Polymers and Hydrogels for Bioelectronic Interfaces and Wearables  
April 8 - April 10, 2025

Symposium Organizers

Fabio Cicoira, Ecole Polytechnique de Montreal  
Anna-Maria Pappa, Khalifa University  
Jadranka Travas-Sejdic, Univ of Auckland  
Shiming Zhang, The University of Hong Kong

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SB12.01: Hydrogels for Wearable Bioelectronics I

Session Chairs: Anna-Maria Pappa and Shiming Zhang

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 323

**11:00 AM \*SB12.01.01**

**Hybrid Assembly of Microfibrillar Networks for Tissue-Mimetic Hydrogels and Soft Bioelectronics** Lizhi Xu; The University of Hong Kong, Hong Kong

**11:30 AM SB12.01.02**

**Stretchable and Self-Adhesive Conducting Polymers for High-Quality Biopotential Monitoring** Jianyong Ouyang; National University of Singapore, Singapore

**11:45 AM SB12.01.03**

**3D Printable, Flexible, Ionic Conductive Hydrogel and Organohydrogel for Tactile Sensors** Giorgio Mogli<sup>1</sup>, Stefano Stassi<sup>1</sup>, Ignazio Roppolo<sup>1</sup> and Annalisa Chiappone<sup>2</sup>; <sup>1</sup>Politecnico di Torino, Italy; <sup>2</sup>Università degli Studi di Cagliari, Italy

SESSION SB12.02: Hydrogels for Wearable Bioelectronics II

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 323

**1:30 PM \*SB12.02.01**

**Development of Solid-State Organic Electrochemical Transistors for Bioelectronic Interfaces, Multi-Tactile Sensing and Processing** [Wei Lin Leong](#);

Nanyang Technological University, Singapore

**2:00 PM \*SB12.02.02**

**Three-Dimensional Conducting Biomimetic Architectures for Tissue Regeneration and Wound Healing Applications** [Charalampos Pitsalidis](#);

Khalifa University of Science and Technology, United Arab Emirates

**2:30 PM SB12.02.03**

**Skin-Compatible and Conductive Thermogel Adhesive for Wearable Bioelectronics** [Junhak Lee](#) and Yeonsik Choi; Yonsei University, Korea (the Republic of)

**2:45 PM SB12.02.04**

**All-Flexible Thermogalvanic Cells with High Power Generation from Body Heat** [Jaejin Choi](#)<sup>1</sup>, Jeongmin Mo<sup>2</sup>, Sang Beom Kim<sup>1</sup>, Jinhan Cho<sup>2</sup> and Jaeyoung Jang<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**3:00 PM BREAK**

**3:30 PM \*SB12.02.05**

**Stretchable, Hair-compatible, Adhesive and Paintable EEG Electrodes (SHAPE)** [Nanshu Lu](#); The University of Texas at Austin, United States

**4:00 PM SB12.02.06**

**Self-Healing and Anti-Freezing Stretchable Hydrogels for Reliable Wearable Health Monitoring** [Seokkyoon Hong](#), Taewoong Park and Chi Hwan Lee; Purdue University, United States

**4:15 PM SB12.02.07**

**A Stretchable Enzymatic Hydrogel** [Binbin Cui](#), Haixuan Luo and Shiming Zhang; The University of Hong Kong, China

SESSION SB12.03: Poster Session: Soft, Healable Conducting Polymers and Hydrogels for Bioelectronic Interfaces and Wearables

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SB12.03.01**

**Zn-Metal-Organic Framework-Based Hydrogel as a Bifunctional Electrocatalyst for Hydrogen Peroxide Fuel Cells and Its Electrochemical Sensing**

[Manaswini Ravipati](#) and Sushmee Badhulika; Indian Institute of Technology Hyderabad, India

**SB12.03.02**

**Surface Chemistry-Engineered Hydrogel-Based Ionic Transistor for Ultra-Sensitive and Rapid Detection of Pharmaceutical Contaminants in Water**

[Anjali Sreekumar](#), Kavish Saini and Sreepasad T. Sreenivasan; University of Texas at El Paso, United States

**SB12.03.03**

**Advanced Flexible Physical Sensors with Independent Detection Mechanisms of Pressure and Strain Stimuli for Overcoming Signal Interference**

[Tsogbayar Dashdendev](#), Jisu Park and Hwa Sung Lee; Hanyang University, Korea (the Republic of)

**SB12.03.04**

**Understanding the Design of Ultrathin Polyzwitterionic Coatings for Anti-Fouling Applications** [Charini P. Maladeniya](#), Panagiotis Christakopoulos, Iliia

N. Ivanov, Liam Collins, Marti Checa, Ruben Millan-Solsona, Benjamin L. Doughty, Marea Blake, Jan-Michael Carrillo, Seonghan Kim, Scott T. Retterer, Rajeev Kumar and Rigoberto Advincula; Oak Ridge National Laboratory, United States

**SB12.03.05**

**Formation of Carbon Dots on Hydrogel by Using Femtosecond Laser** Keita Uchiyama<sup>1</sup>, Kosuke Tsukada<sup>1</sup> and Mitsuhiro Terakawa<sup>2,1</sup>; <sup>1</sup>Keio University, Japan; <sup>2</sup>Keio Univ., Japan

**SB12.03.06**

**Preparation of Adhesive Conductive Hydrogels with Desirable Mechanical Properties** Ai Nin Yang, Mandy Nguyen, Nishtha Pant, Hashil Alismaili, Laure V. Kayser and Charles Dhong; University of Delaware, United States

**SB12.03.07**

**Standardizing Electrochemical Characterizations of Conductive Hydrogels** Rachel Daso<sup>1</sup>, Robert Posey<sup>2</sup>, Jonathan Rivnay<sup>1,1</sup> and Joshua Tropp<sup>2</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Texas Tech University, United States

**SB12.03.08**

**Modulating the Structures and Properties of Chitosan/Polydextran Hydrogels Through Crosslinker Design** Pei Han Lin and Yi-Cheun Yeh; National Taiwan University, Taiwan

**SB12.03.09**

**Design and Application of Innovative High-Entropy Alloy Electrodes for Metal Oxide Varistors** Cheng-Hsien Yeh<sup>1,1</sup>, Ming-Chih Chu<sup>1</sup>, Hsuan-Ta Wu<sup>2</sup>, Bernard H. Liu<sup>1,1</sup>, Wen-Dung Hsu<sup>1,1</sup> and Chuan-Feng Shih<sup>1,1</sup>; <sup>1</sup>National Cheng Kung University, Taiwan; <sup>2</sup>Minghsin University of Science and Technology, Taiwan

SESSION SB12.04: Bioelectronic Hydrogels—Materials Properties and Devices I

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 323

**8:45 AM \*SB12.04.01**

**Electrogelation Approaches for Building Hybrid Stacks of Electronic and Ionic Conductive Materials** Ivan Minev<sup>1,2</sup>; <sup>1</sup>Leibniz Institute for Polymer Research, Germany; <sup>2</sup>TUD Dresden University of Technology, Germany

**9:15 AM ^SB12.04.02**

**Electrochemical Modulation of Mechanical Properties and Volume of Glycolated Polythiophenes** Eleni Stavrinidou; Linköping University, Sweden

**9:45 AM SB12.04.03**

**Modulus Mapping of 3D Printed PEGDA Hydrogels in Hydrated Condition** Mohammad H. Khalili, Susan A. Impey and Adrianus Indrat Aria; Cranfield University, United Kingdom

**10:00 AM BREAK**

**10:30 AM \*SB12.04.04**

**Stimuli-Responsive Conductive Hydrogels** Laure V. Kayser; University of Delaware, United States

**11:00 AM SB12.04.05**

**Porous Channel Organic Electrochemical Transistor for Biosensing Applications** Kensuke Ito; The University of Tokyo, Japan

**11:15 AM SB12.04.06**

**Dipeptide Nanotube Reinforced Hydrogels for Neurological Ailments** Jordan E. Pagliuca<sup>1</sup>, Parthiv Ravikumar<sup>1</sup>, Alecsander DaSilva<sup>1</sup>, Prathyushakrishna Macha<sup>1,2</sup> and Milana C. Vasudev<sup>1</sup>; <sup>1</sup>University of Massachusetts Dartmouth, United States; <sup>2</sup>Molecular Devices Danaher, United States

SESSION SB12.05: Bioelectronic Hydrogels—Materials Properties and Devices II

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 323

**1:30 PM \*SB12.05.01**

**Semiconducting Hydrogels for Bioelectronics** [Ting Lei](#); Peking University, China

**2:00 PM SB12.05.02**

**Ultra-Low Percolation Threshold and High Conductivity in Liquid Metal-Polymer Composites Without Sintering** [Yugin Wang](#), Li liu, Shih-Hao Chiu, Jiangtao Qu, Moonika Widjajana, Francois Marie Allieux, Kourosh Kalantar Zadeh, Nur Adania Nor Azman and Mohammad Bagher Ghasemian; The University of Sydney, Australia

**2:15 PM SB12.05.03**

**Functional Hydrogel Microneedle Sensors Integrated with Different Recognition Probes for Continuous In Vivo Monitoring** [Mahla Poudineh](#); University of Waterloo, Canada

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SB12.05.04**

**AI-Driven Flexible and Soft Bioelectronics** [Jia Liu](#); Harvard University, United States

**4:00 PM SB12.05.05**

**Hydrogel Transistors and Circuits** [Huang Hao](#) and Shiming Zhang; The University of Hong Kong, Hong Kong

SESSION SB12.06: Bioelectronic Hydrogels—Cellular Interfaces I

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Thursday Morning, April 10, 2025

Summit, Level 3, Room 323

**9:00 AM \*SB12.06.01**

**Hydrogel Biointerfaces for Living Bioelectronics and Electroceuticals** [Bozhi Tian](#); University of Chicago, United States

**9:30 AM SB12.06.02**

**Soft pNIPAM-PPy Hydrogels as a Platform for Controlled Drug Release and Mechanical Stimulation of Brain Cells** [Kirill Zhurenkov](#)<sup>1,2</sup>, Matthew Horrocks<sup>1,2</sup>, Darren Svirskis<sup>1</sup>, Bronwen Connor<sup>1</sup> and Jenny Malmström<sup>1,2</sup>; <sup>1</sup>The University of Auckland, New Zealand; <sup>2</sup>MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand

**9:45 AM SB12.06.03**

**The Effects of Elastic and Viscoelastic Extracellular Matrices on Lung Epithelial Cell Mechanobiology** [Ariell Smith](#), Arvind Gopinath and Roberto Andresen Eguiluz; University of California, Merced, United States

**10:00 AM BREAK**

**10:30 AM \*SB12.06.04**

**Developing Multifunctional Hydrogels for Improved Interfaces with Biological Systems** [Christina M. Tringides](#); Rice University, Switzerland

**11:00 AM SB12.06.05**

**Direct Laser Writing of Soft and All-Organic Microelectrodes via Two-Photon Polymerization for Potential Neural Recording and Stimulation Applications** [Mohammad Reza Abidian](#) and Omid Dadras-Toussi; University of Houston, United States

**11:15 AM SB12.06.06**

**Adhesive Gel Electrodes for Real-Time Plant Electrophysiological Monitoring, Electrical Stimulation and Wireless Plant-to-Plant Communication**



Catherine Crichton, Heiko Kabutz, Taylor Sharpe, Nicholas Bruno, Elliot Strand, Kaushik Jayaram, Eloise Bihar and Gregory L. Whiting; University of Colorado Boulder, United States

**11:30 AM \*SB12.06.07**

**Electronic Hydrogels—Bioinspired Applications in Bioelectronics, Precision Agriculture and Smart Plant Monitoring** Eloise Bihar<sup>1</sup>, Catherine Crichton<sup>2</sup>, Elliot Strand<sup>2</sup>, Megan N. Renny<sup>2</sup>, Robert McLeod<sup>2</sup> and Gregory L. Whiting<sup>2,2</sup>; <sup>1</sup>University at Buffalo, The State University of New York, United States; <sup>2</sup>University of Colorado Boulder, United States

SESSION SB12.07: Bioelectronic Hydrogels—Cellular Interfaces II

Session Chairs: Fabio Cicoira, Anna-Maria Pappa and Shiming Zhang

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 323

**1:45 PM \*SB12.07.01**

**Rubbery Bioelectronics for Cardiac Sensing and Modulation** Cunjiang Yu; University of Illinois at Urbana-Champaign, United States

**2:15 PM SB12.07.02**

**Soft Porous Micro-Fiber Bioelectrodes for Advanced Multimodal Neural Mapping** Neha Suvindran<sup>1,2</sup>, Marja D. Sepers<sup>1</sup>, Harishkumar Narayana<sup>2,3</sup>, Amir Servati<sup>3</sup>, Lynn Raymond<sup>1</sup> and Peyman Servati<sup>1,2</sup>; <sup>1</sup>The University of British Columbia, Canada; <sup>2</sup>Flexible Electronics and Energy Lab (FEEL), Canada; <sup>3</sup>Texavie Technologies Inc, Canada

**2:30 PM BREAK**

**3:00 PM SB12.07.03**

**Controlled Electronic Properties, Microstructure and Degradation Stability of MXene by Integration Into a 3D Porous PNIPAAm Hydrogel-Based Composite** Sitao Wang<sup>1</sup>, Gerald Gerlach<sup>1</sup> and Julia Koerner<sup>2</sup>; <sup>1</sup>Technische Universität Dresden, Germany; <sup>2</sup>Leibniz University Hannover, Germany

**3:15 PM SB12.07.04**

**Electrochemical Transistor Resonance Spectroscopy** Xinyu Tian and Shiming Zhang; The University of Hong Kong, Hong Kong

**3:30 PM SB12.07.05**

**Soft, Stretchable and Patterned Hydrogel Electrodes for Small-Nerve Interfacing and Compound Muscle Action Potential Recording** Md Saifur Rahman and Limei Tian; Texas A&M University, United States

**3:45 PM \*SB12.07.06**

**Tri-System-Integrated Systems for Ultra-Flexible Optoelectronic Devices with High Mechanical-Electrical-Humidity Stability** Wallace C. Choy; University of Hong Kong, China

# SYMPOSIUM SF01

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Thermal Transport in Materials

April 7 - April 11, 2025

Symposium Organizers

Tianli Feng, University of Utah

Hyejin Jang, Seoul National University

Yee Kan Koh, National University of Singapore

Zhiting Tian, Cornell University

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF01.01: Recent Advances in Nanoscale Heat Transfer

Session Chairs: Jun Liu and Wee-Liat Ong

Monday Morning, April 7, 2025

Summit, Level 3, Room 348

**10:30 AM SF01.01.01**

**Direct Sensing of Interfacial Heat Transfer Between Identical Atomic Layers Using Femtosecond Diffraction** Touhid Ahmed<sup>1</sup>, Fredrik Eriksson<sup>2</sup>, Erik Fransson<sup>2</sup>, Amalya C. Johnson<sup>3</sup>, Felipe de Quesada<sup>3</sup>, Aidan O'Beirne<sup>3</sup>, Henrique Ribeiro<sup>3</sup>, Archana Raja<sup>4</sup>, Xiaozhe Shen<sup>5</sup>, Aaron Lindenberg<sup>3</sup>, Tony F. Heinz<sup>3</sup>, Fang Liu<sup>3</sup>, Paul Erhart<sup>2</sup> and [Aditya Sood](#)<sup>1</sup>; <sup>1</sup>Princeton University, United States; <sup>2</sup>Chalmers University, Sweden; <sup>3</sup>Stanford University, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States; <sup>5</sup>SLAC National Accelerator Laboratory, United States

**10:45 AM SF01.01.02**

**Universal Wave Dynamics in Heat Conduction and Implications for Transient and Nanoscale Heat Transfer** [Yi Zeng](#)<sup>1</sup>, Judith Vidal<sup>1</sup>, Benjamin Tzou<sup>2</sup>, David Crawford<sup>2</sup> and Jianjun Dong<sup>2</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Auburn University, United States

**11:00 AM SF01.01.03**

**Machine Learning-Assisted 3D Printing of Thermoelectric Materials of Ultrahigh Performances at Room Temperature** [Kaidong Song](#), Guoyue Xu, Ali Newaz Mohammad Tanvir, Tengfei Luo and Yanliang Zhang; University of Notre Dame, United States

**11:15 AM SF01.01.04**

**Atomic Insight for Regulation of Thermal Boundary Resistance Between Silicon and AlN via Machine Learning Potential** [Weitao Wang](#), Yunhui Wu, Sebastian Volz and Masahiro Nomura; The University of Tokyo, Japan

**11:30 AM SF01.01.05**

**Understanding Thermal Transport in Amorphous Si Using Wigner Transport Equation** Jin Yang<sup>1</sup>, Alan McGaughey<sup>2</sup> and [Wee-Liat Ong](#)<sup>1</sup>; <sup>1</sup>Zhejiang University, China; <sup>2</sup>Carnegie Mellon University, United States

**11:45 AM SF01.01.06**

**Enhanced Coherent Far-Field Thermal Emission in Bilayer Polar Dielectric Nanoribbons** [Yue Wen](#), Sichao Li, Jingxuan Wang and Sunmi Shin; National University of Singapore, Singapore

SESSION SF01.02: Novel Phenomena of Phonons and Charges

Session Chairs: Masahiro Nomura and Aditya Sood

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 348

**1:30 PM ^SF01.02.01**

**Extreme Thermal Conductivity and Chiral Phonons in Two-Dimensional Hybrid Metal Halide Perovskites** [Jun Liu](#); North Carolina State University, United States

**2:00 PM SF01.02.02**

**Chiral Phonons and Related Novel Effects** [Lifa Zhang](#); Nanjing Normal University, China

**2:15 PM SF01.02.03**

**Quantum Effects on Thermal Transport** [Bo Sun](#), Yufeng Wang and Yizhe Liu; Tsinghua University, China

**2:30 PM SF01.02.04**

**Thermal Transport Probe to the Quantum Spin Liquid State of  $\alpha$ -RuCl<sub>3</sub>** [Jiaqiang Yan](#), Heda Zhang, Andrew May and Michael McGuire; Oak Ridge National Laboratory, United States

**2:45 PM BREAK**

SESSION SF01.03: Thermal Properties of Materials

Session Chairs: Ashutosh Giri and Ming Hu

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 348

**3:30 PM \*SF01.03.01**

**Stacking Order, Thickness and Strain Dependent Thermal Conductivity of ReS<sub>2</sub>** [Yaguo Wang](#); The University of Texas at Austin, United States

**4:00 PM \*SF01.03.02**

**Graphite Thermal Tesla Valve** [Masahiro Nomura](#); The University of Tokyo, Japan

**4:30 PM SF01.03.03**

**Optimization of Thermal and Electrical Properties in Amorphous Carbon Thin Films for Phase Change Memory Electrodes** [Jae Young Hwang](#)<sup>1</sup>, Dokyun Kim<sup>1</sup>, Hyejin Jang<sup>1</sup>, So-Yeon Lee<sup>2</sup> and Young-Chang Joo<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Kumoh National Institute of Technology, Korea (the Republic of)

SESSION SF01.04: Thermal Transport: Fundamentals to Applications

Session Chairs: Jonathan Malen and Zhiting Tian

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 348

**10:30 AM \*SF01.04.01**

**Revisiting Exergy and Chemical Potential Concepts** [Gang Chen](#); Massachusetts Institute of Technology, United States

**11:00 AM \*SF01.04.02**

**Thermal Transport in Layered Materials, Devices and Systems** [Eric Pop](#); Stanford University, United States

**11:30 AM \*SF01.04.03**

**Extreme Control of Heat Conduction in High-Aspect-Ratio Nanomaterial Assemblies** [Junichiro Shiomi](#); The University of Tokyo, Japan

SESSION SF01.05: Thermal Properties of Soft Materials

Session Chairs: Yee Kan Koh and Junichiro Shiomi

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 348

**1:30 PM +SF01.05.01**

**Low and High Thermal Conductivity in Soft Materials** [David Cahill](#); University of Illinois, United States

**2:00 PM \*SF01.05.02**

**Thermal Transport in Two-Dimensional Polymers and Polymer Chains with Tacticity Control** [Jonathan A. Malen](#)<sup>1</sup>, Yuxing Liang<sup>1</sup>, Kiana Treaster<sup>2</sup>, Ayan Majumder<sup>3</sup>, Manoj Settipalli<sup>1</sup>, Kanishka Panda<sup>3</sup>, Shravan Godse<sup>1</sup>, Rupam Roy<sup>2</sup>, Ratul Mali<sup>3</sup>, Zhongyong Wang<sup>3</sup>, Yuxuan Luan<sup>3</sup>, Brent Sumerlin<sup>2</sup>, Edgar Meyhofer<sup>3</sup>, Pramod Sangi Reddy<sup>3</sup>, Alan McGaughey<sup>1</sup> and Austin Evans<sup>2</sup>; <sup>1</sup>Carnegie Mellon University, United States; <sup>2</sup>University of Florida, United States;

<sup>3</sup>University of Michigan–Ann Arbor, United States

**2:30 PM SF01.05.03**

**Solid Polymer Films with the Thermoelectric Figure of Merit of >1** Jianyong Ouyang; National University of Singapore, Singapore

**2:45 PM SF01.05.04**

**Engineering Defect-Induced Vibrations to Enhance Thermal Transport in Polymer Materials** Yanfei Xu; University of Massachusetts Amherst, United States

**3:00 PM BREAK**

SESSION SF01.06: Theory and Modeling of Phonons

Session Chairs: Tianli Feng and Ziqi Guo

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 348

**3:30 PM \*SF01.06.01**

**Phonon Mode-Resolved Anharmonic Heat Capacity of Solids** Alan McGaughey, Ethan Meitz and Gerald Wang; Carnegie Mellon University, United States

**4:00 PM \*SF01.06.02**

**Symmetry Insights into Phonons, Interactions and Thermal Transport** Lucas Lindsay; Oak Ridge National Laboratory, United States

**4:30 PM SF01.06.03**

**Anharmonic Lattice Dynamics, Phase Transitions and Thermal Transport in Light-Element Crystalline Perovskites** Jiongzhi Zheng<sup>1</sup>, Changpeng Lin<sup>2</sup>, Geoffroy Hautier<sup>1</sup> and Nicola Marzari<sup>2,3</sup>; <sup>1</sup>Dartmouth College, United States; <sup>2</sup>École Polytechnique Fédérale de Lausanne (EPFL), Switzerland; <sup>3</sup>Paul Scherrer Institute, Switzerland

**4:45 PM SF01.06.04**

**THERMACOND, a Computational Code for Lattice Thermal Conductivity from Harmonic and Anharmonic Force Constants** Safoura Nayeb Sadeghi<sup>1</sup>, Sangyeop Lee<sup>2</sup> and Keivan Esfarjani<sup>1</sup>; <sup>1</sup>University of Virginia, United States; <sup>2</sup>University of Pittsburgh, United States

SESSION SF01.07: Honoring the Memory of Dr. Natalio Mingo I

Session Chairs: Tianli Feng and Lucas Lindsay

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 348

**8:30 AM SF01.07.01**

**Natalio Mingo's Legacy of Open-Source Codes—ShengBTE, almaBTE and QSCAILD** Wu Li<sup>1</sup>, Jesús Carrete<sup>2</sup> and Ambroise van Roekeghem<sup>3</sup>; <sup>1</sup>Eastern Institute of Technology, Ningbo, China; <sup>2</sup>CSIC-Universidad de Zaragoza, Spain; <sup>3</sup>CEA-Grenoble, France

**8:45 AM \*SF01.07.02**

**Impacts of Mingo's Theories on Thermal Transport Measurements of Materials** Li Shi; The University of Texas at Austin, United States

**9:15 AM ^SF01.07.03**

**Atomistic Green's Function for Thermal Interface Modeling** Zhiting Tian; Cornell University, United States

**9:30 AM SF01.07.04**

**Large Electron-Phonon Drag and Asymmetry in the Thermopower of the Topological Semimetal  $\theta$ -Phase Tantalum Nitride** David Broido and Chunhua Li; Boston College, United States

**9:45 AM SF01.07.05**

**Nanostructure Thermal Conductivity Modeling Efforts from Ages Past** [Lucas Lindsay](#); Oak Ridge National Laboratory, United States

**10:00 AM BREAK**

**10:30 AM \*SF01.07.06**

**Pushing the Limits of Thermal Transport to Address Electronics, Energy and Climate Challenges** [Xiulin Ruan](#); Purdue University, United States

**11:00 AM \*SF01.07.07**

**Nanoscale Thermal Transport—Beyond the Classical Size Effect** [Deyu Li](#); Vanderbilt University, United States

**11:30 AM SF01.07.08**

**New Insights into Phonon and Photon Heat Carrier Dynamics** [Tianli Feng](#), Janak Tiwari and Khalid Adnan; University of Utah, United States

**11:45 AM SF01.07.09**

**Investigating Non-Equilibrium Effects Due to Electron-Phonon Interaction at Metal-Insulator Interfaces** [Jinchen Han](#) and Sangyeop Lee; University of Pittsburgh, United States

SESSION SF01.08: Honoring the Memory of Dr. Natalio Mingo II

Session Chairs: Alan McGaughey and Xiaojia Wang

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 348

**1:30 PM \*SF01.08.01**

**Understanding and Tailoring Thermal Transport in Perovskite Oxides** [Xiaojia Wang](#); University of Minnesota Twin Cities, United States

**2:00 PM \*SF01.08.02**

**Thermal Transport of Phonons Using Infrared Probes—Thin Films, High Temperatures and Interfacial Polaritons** [Patrick E. Hopkins](#); University of Virginia, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SF01.08.03**

**Enhanced Peltier Cooling Through Electron Gas Expansion and Thomson Cooling** [Mona Zebarjadi](#)<sup>1</sup>, Farjana Tonni<sup>1</sup>, Kazuaki Yazawa<sup>2</sup> and Ali Shakouri<sup>2</sup>; <sup>1</sup>University of Virginia, United States; <sup>2</sup>Purdue University, United States

**4:00 PM SF01.08.04**

**Pushing the Limits of Heat Conduction in Coordination Polymers** [Ashutosh Giri](#); University of Rhode Island, United States

**4:15 PM SF01.08.05**

**The Phonon Quantum of Thermal Conductance—Are Simulations and Measurements Estimating the Same Quantity?** [Carlos Polanco](#)<sup>1,2</sup>, Ambroise van Roekeghem<sup>1</sup> and Natalio Mingo<sup>1</sup>; <sup>1</sup>CEA Grenoble, France; <sup>2</sup>KLA corporation, United States

**4:30 PM SF01.08.06**

**Differentiable Phonon Hydrodynamic Simulations for Inverse Design and Material Property Extraction** [Giuseppe Romano](#); Massachusetts Institute of Technology, United States

**4:45 PM SF01.08.07**

**Atomistic Thermal Modeling of GAA FETs Using Machine Learning Potentials** [Mayur P. Singh](#), Rinku Dutta, Suman Datta and Satish Kumar; Georgia Institute of Technology, United States

SESSION SF01.09: Poster Session I

Session Chairs: Tianli Feng and Yee Kan Koh

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF01.09.01**

**Size Effects and Temperature Dependence in Thermal Conductivity of  $\gamma$ -Ga<sub>2</sub>O<sub>3</sub> Films** [Steve Park](#), Yuxing Liang, Jingyu Tang, Abhishek Pathak, Lisa Porter and Jonathan A. Malen; Carnegie Mellon University, United States

**SF01.09.02**

**A Thermal Boundary Resistance model via mean free path suppression functions and a Gibbs excess approach** [Eleonora Isotta](#)<sup>1</sup>, Ryohei Nagahiro<sup>2</sup>, Alesanmi Odufisan<sup>1</sup>, Junichiro Shiomi<sup>2</sup>, Oluwaseyi Balogun<sup>1</sup> and Jeff Snyder<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>The University of Tokyo, Japan

**SF01.09.03**

**ML-assisted acceleration of Phonon Scattering Simulation: Methods and Applications** [Ziqi Guo](#), Zherui Han, Dudong Feng, Abdulaziz Alkandari, Krutarth Khot, Guang Lin and Xiulin Ruan; Purdue University, United States

**SF01.09.04**

**Donor Effect and Physical Properties Accelerating Metal Volatilization in Magnesium Oxides.** [Sujin Ha](#)<sup>1,2</sup>, Kyung-Hoon Cho<sup>2</sup>, Young Kook Moon<sup>1</sup>, Jong-Jin Choi<sup>1</sup>, Byung-Dong Hahn<sup>1</sup>, Hyunae Cha<sup>1</sup> and Cheol-Woo Ahn<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science, Korea (the Republic of); <sup>2</sup>Kumoh National Institute of Technology, Korea (the Republic of)

**SF01.09.05**

**Pushing the Limits of Dielectric-based Microchannel Cooling using Encapsulated Phase Change Material Slurries** [Vivek V. Manepalli](#)<sup>1</sup>, Roshith Mittakolu<sup>1</sup>, Akshaya Sridhar<sup>1</sup>, Vivek Pandey<sup>1</sup>, Clayton Pullins<sup>2</sup>, Michael Barako<sup>2</sup> and Damena Agonafer<sup>1</sup>; <sup>1</sup>University of Maryland College Park, United States; <sup>2</sup>Northrop Grumman Corporation, United States

**SF01.09.06**

**Phonon Transport in K<sub>3</sub>SbS<sub>4</sub> Solid-State Battery Incorporating an Ion Diffusion Mechanism Using Machine Learning** [Hao-Jen You](#)<sup>1</sup>, Yi-Ting Chiang<sup>1</sup>, Arun Bansil<sup>2</sup> and Hsin Lin<sup>1</sup>; <sup>1</sup>Academia Sinica, Taiwan; <sup>2</sup>Northeastern University, United States

**SF01.09.07**

**Synthesis, Structure & Properties of CuBiSeCl<sub>2</sub>: A Chalcogenide Material with Low Thermal Conductivity** [Cara J. Hawkins](#), Jon Newnham, Batoul Almoussawi, Nataliya Gulay, Samuel Goodwin, Marco Zanella, Troy Manning, Luke Daniels, Matthew Dyer, Tim Veal, John Claridge and Matthew Rosseinsky; University of Liverpool, United Kingdom

**SF01.09.08**

**Flexible Thermal Insulation Based On The Nature Inspired Electrospun Fibers** [Joanna Knapczyk-Korczak](#), Piotr K. Szewczyk, Krzysztof L. Berniak, Mateusz Marzec, Maksymilian Frac, Waldemar Pichór and Urszula Stachewicz; AGH University of Krakow, Poland

**SF01.09.09**

**Development of high thermal conductive composites using epoxy/hBN via magnetic alignment approach** [Sidra Ajmal](#), Arumugam M. Kumar, Abul Fazal Arif and Syed Sohail Akhtar; King Fahd University of Petroleum and Minerals, Saudi Arabia

**SF01.09.10**

**Machine learning driven method for real-time prediction of thermal conductivity of heterogenous composites and heat distribution in battery packs** [Shinto M. Francis](#)<sup>1</sup>, Andrew Ferebee<sup>1</sup>, Sajib K. Mohonta<sup>1</sup>, Pooja Puneet<sup>1</sup>, Yi Ding<sup>2</sup> and Ramakrishna Podila<sup>1</sup>; <sup>1</sup>Clemson University, United States; <sup>2</sup>U.S. Army DEVCOM-GVSC, United States

**SF01.09.11**

**Comparative Study on Thermal Conductivity and Mechanical Properties of Porous-structured Polyurethane Composites with Open-cell Nanoporous Silica Aerogel vs. Closed-cell Hollow Silica Microspheres** [Younghwan Kwon](#); Daegu Univ, Korea (the Republic of)

**SF01.09.12**

**Geometric optimization of Cu<sub>2</sub>Se-based thermoelectric materials for enhanced power generation** [Jungsoo Lee](#), Seungjun Choo and Jae Sung Son; Pohang University of Science and Technology, Korea (the Republic of)

**SF01.09.13**

**Thermal Transport Properties of Ni-Containing High-Entropy Alloys** [Byungjun Kang](#), Dong Whan Kim, Chan Park, Eun Soo Park and Hyejin Jang; Seoul National University, Korea (the Republic of)

**SF01.09.14**

**Designing Thermally Conductive Electrospun Fibers, Mats, and Yarns** [Ahmadreza Moradi](#) and Urszula Stachewicz; AGH University of Krakow, Poland

**SF01.09.15**

**Tuning the thermal conductivity of linear and network polyester polymers from 0.09 to 0.45 W/(m K)** [Nusrat Chowdhury](#), Peng Lan, Sooyeon Yeon and David Cahill; University of Illinois at Urbana-Champaign, United States

**SF01.09.16**

**Understanding the Interplay of Thermal and Laser Intensity Effects on Plasmonic Photocatalysis Using Upconverting Nanoparticle Thermometry** [Laura Signor](#) and Andrea Pickel; University of Rochester, United States

**SF01.09.17**

**Optimizing the thermoelectric properties of AgSbTe<sub>2</sub> by Spark Plasma Sintering** [Ranganayakulu K. Vankayala](#), Min Nan Ou and Yang Yuan Chen; Acadmeia Sinica, Taiwan

**SF01.09.18**

**Multifunctional, flexible, and biodegradable phase change composites for Dual-mode thermal management of lithium-ion batteries** [Lichang Lu](#)<sup>1</sup>, Haosong He<sup>1</sup>, Hongxu Guo<sup>1</sup>, Ignacio Martin-Fabiani<sup>1</sup>, Ton Peijs<sup>2</sup>, Emiliano Bilotti<sup>3</sup>, Han Zhang<sup>4</sup>, Ashley Fly<sup>1</sup> and Yi Liu<sup>1</sup>; <sup>1</sup>Loughborough University, United Kingdom; <sup>2</sup>The University of Warwick, United Kingdom; <sup>3</sup>Imperial College London, United Kingdom; <sup>4</sup>Queen Mary University of London, United Kingdom

**SF01.09.19**

**Leveraging Ronchi Rulings as Reconfigurable Microscale Joule Heaters** [Benjamin Harrington](#), Chi Zhang, Xiaoshan Liu, Asa Gulbrandsen and Andrea Pickel; University of Rochester, United States

**SF01.09.20**

**Operando Temperature Characterization Inside Lithium Batteries via Upconverting Nanoparticle Thermometry** [Ziyang Ye](#), Fei Hu, Wyatt Tenhaeff and Andrea Pickel; University of Rochester, United States

**SF01.09.21**

**High-Efficiency Heat Dissipation Coating Implemented with Stepwise Thermally Conductive Pathway using Polymer-Nanocoated Thermal Filler** [Jisu Park](#)<sup>1</sup>, Tsogbayar Dashdende<sup>1</sup>, Minseob Lim<sup>1</sup>, Taehoon Hwang<sup>1</sup>, Jungyoon Seo<sup>1</sup>, Eun Ko<sup>1</sup>, Yumin Kim<sup>1</sup>, Siyoung Lee<sup>2</sup>, Yong-Ho Choa<sup>1</sup> and Hwa Sung Lee<sup>1</sup>; <sup>1</sup>Hanyang University, Korea (the Republic of); <sup>2</sup>University of Pennsylvania, United States

**SF01.09.22**

**Phonon Modes in FeCrAl Alloys** [Alexander T. Fuller](#) and Jacob Eapen; North Carolina State University, United States

**SF01.09.23**

**High-speed Infrared Imaging and Multiphysics Modeling for Prediction of Three-Dimensional Thermal Characteristics during Selective Laser Melting** [Vijay Kumar](#), Kaitlyn M. Mullin, Hyunggon Park, Tresa Pollock and Yangying Zhu; University of California, Santa Barbara, United States

**SF01.09.24**

**Effects of Material Density and Structural Anisotropy on Thermal Conductivity of Carbon Nanotube Network Materials** [Alexey N. Volkov](#)<sup>1</sup> and Leonid V. Zhigilei<sup>2</sup>; <sup>1</sup>University of Alabama, United States; <sup>2</sup>University of Virginia, United States

**SF01.09.25**

**Building a high-throughput phonon database and fundamental understanding of anharmonicity and thermal conductivity in lead-free double halide perovskites** [Hrushikesh P. Sahasrabudde](#)<sup>1,2</sup>, Jiongzhi Zheng<sup>3</sup>, Geoffroy Hautier<sup>3</sup> and Anubhav Jain<sup>2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Dartmouth College, United States

**SF01.09.26**

**Dynamic EUV scatterometry measurements of nanoscale heat flow in 3D geometries and next-generation semiconductors** [Brendan McBennett](#)<sup>1,2</sup>, Joshua Knobloch<sup>2</sup>, Albert Beardo Ricol<sup>2</sup>, Emma Nelson<sup>2</sup>, Theodore Culman<sup>2</sup>, Anya Grafov<sup>2</sup>, Na Li<sup>2</sup>, Yuka Esashi<sup>2</sup>, Michael Tanksalvala<sup>1,2</sup>, Justin Shaw<sup>1</sup>, Henry Kapteyn<sup>2</sup> and Margaret Murnane<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology, United States; <sup>2</sup>STROBE, JILA, University of Colorado Boulder, United States

**SF01.09.27**

**Chemical-Bonding Unrelated Asymmetric F-Orbital in Rare Earth Oxides Suppresses Lattice Thermal Conductivity** Mitsuki Yoshimura<sup>1</sup>, Ahrong Jeong<sup>1</sup>, Hyeoujun Kong<sup>1</sup>, Zhiping Bian<sup>1</sup>, Jason Tam<sup>2</sup>, Bin Feng<sup>2</sup>, Yuichi Ikuhara<sup>2</sup>, Ichiro Terasaki<sup>3</sup>, Kwanhong Park<sup>4</sup>, Jaekwang Lee<sup>4</sup> and Hiromichi Ohta<sup>1</sup>; <sup>1</sup>Hokkaido University, Japan; <sup>2</sup>The University of Tokyo, Japan; <sup>3</sup>Nagoya University, Japan; <sup>4</sup>Pusan National University, Korea (the Republic of)

**SF01.09.28**

**Designing Nanoscale Thermal Transport Structures Through Mathematical Principles** Xin Wu<sup>1</sup>, Xin Huang<sup>1</sup>, Yunhui Wu<sup>1</sup>, Zheyong Fan<sup>2</sup>, Sebastian Volz<sup>1</sup>, Qiang Han<sup>3</sup> and Masahiro Nomura<sup>1</sup>; <sup>1</sup>The University of Tokyo, Japan; <sup>2</sup>Bohai University, China; <sup>3</sup>South China University of Technology, China

**SF01.09.29**

**Measuring the Cross-Plane Thermal Conductivity of 2D Hybrid Perovskite with Vibrational-Pump-Visible-Probe Spectroscopy** Peijun Guo and Du Chen; Yale University, United States

SESSION SF01.10: Device Thermal Management

Session Chairs: Renkun Chen and Taeyong Kim

Thursday Morning, April 10, 2025

Summit, Level 3, Room 348

**8:30 AM \*SF01.10.01**

**Design Thermal Transport in Materials—Semiconductor Thermal Management, Quantum Devices and Biotechnology** Yongjie Hu; University of California, Los Angeles, United States

**9:00 AM \*SF01.10.02**

**Controlling Thermal Transport in Electronics** Amy Marconnet; Purdue University, United States

**9:30 AM \*SF01.10.03**

**Heat Dissipation and the Lower Limits of Microwave Noise in High Electron Mobility Transistors** Austin J. Minnich; California Institute of Technology, United States

**10:00 AM BREAK**

SESSION SF01.11: Personal Thermal Management

Session Chairs: Yongjie Hu and Amy Marconnet

Thursday Morning, April 10, 2025

Summit, Level 3, Room 348

**10:30 AM \*SF01.11.01**

**Materials, Devices and Systems for Thermoelectric Personal Cooling** Renkun Chen; University of California, San Diego, United States

**11:00 AM \*SF01.11.02**

**Functional Materials for Radiative Thermal Management (Radiative Cooling and Heating)** Seung Hwan Ko; Seoul National University, Korea (the Republic of)

**11:30 AM SF01.11.03**

**Enhancing the Interfacial Thermal Transport Across Porous/Solid Interfaces via Adsorbates** Guang Wang and Yanguang Zhou; HKUST, Hong Kong

**11:45 AM SF01.11.04**

**Water Droplet Evaporation in Air—Effects of Interfacial Thermal and Mass Diffusion Resistance** Wazih Tausif, Jordan Hartfield and Zhi Liang; Missouri University of Science and Technology, United States



SESSION SF01.12: Engineering of Thermal Properties

Session Chairs: Richard Wilson and Qiye Zheng

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 348

**1:30 PM \*SF01.12.01**

**Influence of Defects on the Thermal Conductivity Across Temperature in Ultra High Thermal Conductivity Semiconductors** Richard B. Wilson, Songrui Hou and Frank Angeles; University of California, Riverside, United States

**2:00 PM SF01.12.02**

**Controlling Thermal Functionality via Light-Driven Transitions in Ferroelectrics** Claudio Cazorla<sup>1</sup>, Carlos Escorihuela<sup>1</sup>, Sebastian Bichelmaier<sup>2</sup>, Jesus Carrete<sup>3</sup>, Josep Lluís Tamarit<sup>1</sup>, Jorge Iniguez-Gonzalez<sup>4,5</sup> and Riccardo Rurali<sup>6</sup>; <sup>1</sup>Universitat Politècnica de Catalunya, Spain; <sup>2</sup>Technische Universität Wien, Austria; <sup>3</sup>Instituto de Nanociencia y Materiales de Aragón, Spain; <sup>4</sup>Luxembourg Institute of Science and Technology, Luxembourg; <sup>5</sup>University of Luxembourg, Luxembourg; <sup>6</sup>Institut de Ciència de Materials de Barcelona, Spain

**2:15 PM SF01.12.03**

**Enhancing Heat Dissipation Through Binders by Percolation** Yi Jiang and Yee Kan Koh; National University of Singapore, Singapore

**2:30 PM BREAK**

**3:00 PM SF01.12.04**

**Low-Temperature Sintered Magnesium as a Heat-Dissipating Material with Defect Control and a High-Thermal-Conductivity Composite with a Separated Structure** Hyunae Cha, Sujin Ha, Young Kook Moon, Jong-Jin Choi, Byung-Dong Hahn and Cheol-Woo Ahn; Korea Institute of Materials Science, Korea (the Republic of)

**3:15 PM SF01.12.05**

**Orthotropic Thermal Conductivities of Carbon Fiber Reinforced Thermoplastic Composites** Jin Ho Kang<sup>1</sup>, Brian W. Grimsley<sup>1</sup>, Christopher Wohl<sup>1</sup>, Rodolfo I. Ledesma<sup>2</sup>, Roberto J. Cano<sup>1</sup>, Tyler B. Hudson<sup>1</sup> and Thammaia Sreekantamurthy<sup>1</sup>; <sup>1</sup>NASA Langley Research Center, United States; <sup>2</sup>Analytical Mechanics Associates, Inc, United States

SESSION SF01.13: Modeling and Machine Learning for Phonons

Session Chairs: Tianli Feng and Xiulin Ruan

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 348

**3:30 PM \*SF01.13.01**

**Machine Learning for Phonons in Inorganic Crystals** Ming Hu; University of South Carolina, United States

**4:00 PM \*SF01.13.02**

**Differentiable Hybrid Machine Learning Framework for Nanoscale Thermal Transport** Tengfei Luo, Wenjie Shang, Jiahang Zhou, Jyoti Panda, Yi Liu and Jianxun Wang; University of Notre Dame, United States

**4:30 PM SF01.13.03**

**Thermal Transport in  $\text{Al}_x\text{Ga}_{1-x}\text{N}$ —Impact of Mass and Force Field Disorder** Hariharan Ramasubramanian, Abhishek Pathak, Alexander Echols and Alan McGaughey; Carnegie Mellon University, United States

**4:45 PM SF01.13.04**

**Energy Transport in Superionic Crystals** Yanguang Zhou; The Hong Kong University of Science and Technology, Hong Kong

SESSION SF01.14: Poster Session II

Session Chairs: Zhiting Tian and Qiye Zheng

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF01.14.01**

**Influence of the Disordered Behaviour of Cu atoms on the Thermoelectric Performance of Cu<sub>4</sub>TiSe<sub>4</sub>** [Shipeng Bi](#)<sup>1</sup>, Alexander G. Squires<sup>2</sup> and David Scanlon<sup>2</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>University of Birmingham, United Kingdom

**SF01.14.02**

**Experimental Observation of Quasi-ballistic Thermal Transport and Extraction of Phonon Mean Free Paths in Graphite** [Nikhil Malviya](#) and Navaneetha Krishnan Ravichandran; Indian Institute of Science Bangalore, India

**SF01.14.03**

**Development of Wide-Field Photothermal Microscopy System for High-Sensitivity Photothermal Detection and Analysis of Individual Gold Nanoparticles** [Ki Soo Chang](#); Korea Basic Science Institute, Korea (the Republic of)

**SF01.14.04**

**Modulation Of Thermoelectric Transport Properties In 2d-mos<sub>2</sub> Using Molecular Surface Charge Transfer Doping** [Chan Woong Kim](#)<sup>1</sup>, Seonhye Youn<sup>2</sup>, Dong Hwan Kim<sup>3</sup>, Wooyoung Lee<sup>2</sup>, Jeongmin Kim<sup>3</sup> and Jong Wook Roh<sup>1</sup>; <sup>1</sup>Kyungpook National University, Korea (the Republic of); <sup>2</sup>Yonsei University, Korea (the Republic of); <sup>3</sup>Daegu Gyeongbuk Institute of Science and Technology, Korea (the Republic of)

**SF01.14.05**

**Enhancing Thermal Conductivity in Epoxy Composites with Inorganic Thermally Conductive Fillers for Semiconductor Packaging** [Daeyul Kwon](#), Jaeyoung Ye, Minji Choi, Jaehyun Park and Youngjae Yoo; College of Engineering, Chung-Ang University, Korea (the Republic of)

**SF01.14.06**

**Metric for quantifying the elastic and inelastic thermal transport at interfaces** [Yixin Xu](#) and Yanguang Zhou; The Hong Kong University of Science and Technology, Hong Kong

**SF01.14.07**

**Temperature and Doping Level Effect on Silicon Thermal Conductivity** [Carlos Acosta](#)<sup>1</sup>, Raja Sen<sup>2</sup>, Mélanie Brouillard<sup>3</sup>, Jean-François Robillard<sup>4</sup>, Nicolas Horny<sup>5</sup>, Jéléna Sjakste<sup>2</sup>, Lorenzo Paulatto<sup>6</sup>, Nathalie Vast<sup>6</sup>, Severine Gomes<sup>7</sup> and Pierre-Olivier Chapuis<sup>7</sup>; <sup>1</sup>Centre d'Énergétique et de Thermique de Lyon (CETHIL), France; <sup>2</sup>Institut Polytechnique de Paris, France; <sup>3</sup>Université de Lille, France; <sup>4</sup>Institut d'Électronique, de Microélectronique et de Nanotechnologie (IEMN), France; <sup>5</sup>Université de Reims Champagne-Ardenne, France; <sup>6</sup>Sorbonne Université, France; <sup>7</sup>Université de Lyon, France

**SF01.14.08**

**Development of Functionally graded Al metal matrix layered hybrid composite reinforced with CNT, Y<sub>2</sub>O<sub>3</sub> & SiC** [Rajat Gupta](#), Kausik Chattopadhyay and N. K. Mukhopadhyay; Indian Institute of Technology, India

**SF01.14.09**

**Tunability of the Electronic Properties of Epitaxial Bi (111) Films Using Printable Ion-gel Gating** [Jagannath Jena](#)<sup>1</sup>, Heather Kurtz<sup>2</sup>, Justin S. Woods<sup>1</sup>, Junyi Yang<sup>1</sup>, Eugene Ark<sup>1</sup>, Fateme Mahdikhany<sup>2</sup>, Vinod K. Sangwan<sup>2</sup>, Mark C. Hersam<sup>2</sup> and Anand Bhattacharya<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Northwestern University, United States

**SF01.14.10**

**Phonon transport across semiconductor interfaces** [Qinshu Li](#)<sup>1</sup> and Bo Sun<sup>1,2</sup>; <sup>1</sup>Tsinghua-Berkeley Shenzhen Institute, Tsinghua University, China; <sup>2</sup>Tsinghua SIGS and Guangdong Provincial Key Laboratory of Thermal Management Engineering & Materials, China

**SF01.14.11**

**Novel Phonon Thermal & Thermoelectric Transport Property in 2D Quantum Materials** [Yunshan Zhao](#); Nanjing Normal University, China

**SF01.14.12**

**Interfacial Thermal Radiation Driven by Hot Electrons in Non-Equilibrium** [Saman Zare](#)<sup>1</sup>, William D. Hutchins<sup>1</sup>, Mehran Habibzadeh<sup>2</sup>, Joshua D. Caldwell<sup>3</sup>, Sheila Edalatpour<sup>2</sup> and Patrick E. Hopkins<sup>1</sup>; <sup>1</sup>University of Virginia, United States; <sup>2</sup>University of Maine, United States; <sup>3</sup>Vanderbilt University,

United States

**SF01.14.13**

**Thermal conductivity measurement of individual MXene (Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub>) flakes** [Minyoung Lee](#), Yeongcheol Park and Jae H. Seol; Gwangju Institute of Science and Technology, Korea (the Republic of)

**SF01.14.14**

**Improving Thermoelectric Performance of Nanoribbons via doping and strain** [Jun Beom Park](#) and Michael T. Pettes; Los Alamos National Laboratory, United States

**SF01.14.15**

**Thermoreflectance of optical phonon resonances** [William D. Hutchins](#), Saman Zare, Daniel M. Hirt and Patrick E. Hopkins; University of Virginia, United States

**SF01.14.16**

**Anomalous mass dependence of phonon thermal transport in lanthanum monopnictides and its origin in the nature of chemical bonding** [Safoura Nayebedeh](#) and Keivan Esfarjani; University of Virginia, United States

**SF01.14.17**

**Thermal Conductivity Switching in Sm<sub>1-x</sub>Gd<sub>x</sub>S** [Ankita Saha](#); OHIO STATE UNIVERSITY, United States

**SF01.14.18**

**Modulating Thermal Conductivity in Materials with Organic Bilayers** [Rahil Ukani](#), Qichen Song, Catherine Thai, Yookyung Moon, Hong Ki Kim and Jarad A. Mason; Harvard University, United States

**SF01.14.19**

**High-Flux and Stable Thin Film Evaporative Cooling from Fiber Membranes with Interconnected Pores** [Tianshi Feng](#), Yu Pei, Haowen Zhang, Atharva Joshi and Renkun Chen; University of California, San Diego, United States

**SF01.14.20**

**Solid-state Laser Refrigeration of Yb-doped CaF<sub>2</sub> Microspheres for Levitated Optomechanics** [Sankhya Hirani](#)<sup>1</sup>, Max Chen<sup>2</sup>, Maxwell Gregoire<sup>2</sup> and Peter Pauzauskis<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Air Force Research Laboratory, United States

**SF01.14.21**

**Observation of Heat Conduction in Nanoscale Polaritonic Waveguides** [Yu Pei](#), Li Chen, Wonjae Jeon, Zhaowei Liu and Renkun Chen; University of California, San Diego, United States

**SF01.14.22**

**Strain-Engineered Enhancement of Thermoelectric Properties in SnS Monolayer: Fully Ab Initio and Accelerated Calculations** [Raveena Gupta](#)<sup>1</sup> and Chandan Bera<sup>2</sup>; <sup>1</sup>University of Liege, Belgium; <sup>2</sup>Institute of Nano Science and Technology, India

**SF01.14.23**

**An Efficient Ab Initio Approach to Compute Electronic Transport Properties—The Example of NbFeSb** [Bhawna Sahni](#)<sup>1</sup>, Zhen Li<sup>1</sup>, Rajeev Dutt<sup>1</sup>, Patrizio Graziosi<sup>2</sup> and Neophytos Neophytou<sup>1</sup>; <sup>1</sup>University of Warwick, United Kingdom; <sup>2</sup>Consiglio Nazionale delle Ricerche, Italy

**SF01.14.24**

**Thermal transport of oxide and nitride nuclear fuels after irradiation** [Zilong Hua](#)<sup>1</sup>, Amey Khanolkar<sup>1</sup>, Ella K. Pek<sup>1</sup>, Saqeeb Adnan<sup>2</sup>, Kaustubh Bawane<sup>1</sup>, Anshul Kamboj<sup>1</sup>, J. Matthew Mann<sup>3</sup>, Jennifer Watkins<sup>1</sup>, Marat Khafizov<sup>2</sup> and David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>The Ohio State University, United States; <sup>3</sup>Air Force Research Laboratory, United States

**SF01.14.25**

**High-Temperature Nonreciprocal Thermal Radiative Properties of Semiconductors** [Bo Zhao](#) and Bardia Nabavi; University of Houston, United States

**SF01.14.26**

**Nonlocal Effects in Near-Field Radiative Heat Transfer and Surface Heat Absorption** [Raul Esquivel-Sirvent](#); Universidad Nacional Autonoma de Mexico, Mexico

**SF01.14.27**

**Extracting Thermal Boundary Conductance of Arbitrarily Aligned Grain Boundaries with Beam Offset Hyperspectral Frequency Domain Thermoreflectance Imaging** [Wyatt Hodges](#)<sup>1</sup>, Jakob Bates<sup>1</sup>, Eleonora Isotta<sup>2</sup>, Amun Jarzembki<sup>1</sup>, Anthony McDonald<sup>1</sup>, Toai Ton-That<sup>1</sup>, Luis Jauregui<sup>1</sup>, Ping Lu<sup>1</sup>, Jeff Snyder<sup>2</sup> and Oluwaseyi Balogun<sup>2</sup>; <sup>1</sup>Sandia National Laboratories, United States; <sup>2</sup>Northwestern University, United States

**SF01.14.28**

**Tailoring Polar Side Chain Ratio and Distribution in Conjugated Polymers—A Path to High-Performance Thermoelectrics** [Daeyeon Lee](#) and BongSoo Kim; Ulsan National Institute of Science and Technology, Korea (the Republic of)

**SF01.14.29**

**Effect of Reinforcements on Strength and High-Temperature Thermal Conductivity Properties of Silica Aerogel Insulation Materials** Seung Jun Yeo<sup>1,2</sup>, Sukyung Kim<sup>1</sup>, So Youn Mun<sup>1,2</sup>, Mantae Kim<sup>1</sup>, Kwangyoun Cho<sup>1</sup> and [Hyung Mi Lim](#)<sup>1</sup>; <sup>1</sup>Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of); <sup>2</sup>Pusan National University, Korea (the Republic of)

**SF01.14.30**

**Temperature Profiles and Heat Conduction in Individual Suspended 1D and 2D Nanostructures by Scanning Thermal Microscopy** [Severine Gomes](#)<sup>1</sup>, Jose Manuel Sojo Gordillo<sup>2</sup>, Cleophanie Brochard<sup>3</sup>, Carlos Acosta<sup>1</sup>, Gerard Gadea-Diez<sup>2</sup>, Pascal Vincent<sup>4</sup>, Julien Chaste<sup>3</sup> and Pierre-Olivier Chapuis<sup>1</sup>; <sup>1</sup>CETHIL, UMR CNRS 5008, INSA Lyon, UCBL, Université de Lyon, France; <sup>2</sup>University of Basel Klingelbergstrasse 82, Switzerland; <sup>3</sup>Université Paris-Saclay, CNRS, Centre de Nanosciences et de Nanotechnologies, France; <sup>4</sup>Université de Lyon, Université Claude Bernard Lyon 1, CNRS Institut Lumière Matière, France

**SF01.14.31**

**Investigation of Thermal Transport Properties in van der Waal Layered Materials With Threading Screw Dislocations** [Siyang Li](#)<sup>1,2</sup>, Haoye Sun<sup>3</sup> and Daryl C. Chrzan<sup>1,2</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Texas A&M University, United States

SESSION SF01.15: Phonon Polariton and Radiative Heat Transfer

Session Chairs: Yee Kan Koh and Ella Pek

Friday Morning, April 11, 2025

Summit, Level 3, Room 348

**9:00 AM \*SF01.15.01**

**Quasi-Ballistic Heat Conduction of Long-Range Surface Phonon Polaritons Coupled to Thermal Reservoirs** [Sunmi Shin](#); National University of Singapore, Singapore

**9:30 AM SF01.15.02**

**Heat Transport Across Nanometre Sized Gaps** Oscar Mateos-Lopez<sup>1</sup>, Ruben Lopez-Nebreda<sup>1</sup>, Juan Jose Garcia Esteban<sup>1</sup>, P.M. Martinez<sup>2</sup>, Nicolas Agrait<sup>1</sup>, [Guilherme Vilhena](#)<sup>2</sup> and Juan Carlos Cuevas Rodríguez<sup>1</sup>; <sup>1</sup>Universidad Autónoma de Madrid, Spain; <sup>2</sup>Spanish National Research Council, Spain

**9:45 AM BREAK**

**10:15 AM SF01.15.03**

**Phonon Polariton-Mediated Thermal Transport in Low-Loss Boron Nitride Nanotubes** [Zhiliang Pan](#)<sup>1</sup>, Guanyu Lu<sup>2</sup>, Joshua D. Caldwell<sup>1</sup> and Deyu Li<sup>1</sup>; <sup>1</sup>Vanderbilt University, United States; <sup>2</sup>Northwestern University, United States

**10:30 AM SF01.15.04**

**Multiscale Multiphysics Simulation of hBN Thermal and Radiative Properties** [Ziqi Guo](#), Ioanna Katsamba, Daniel Carne, Dudong Feng, Kellan Moss, Emily Barber, Ziqi Fang, Andrea L. Felicelli and Xiulin Ruan; Purdue University, United States

SESSION SF01.16: Nanoscale Thermal Transport

Session Chairs: Ziqi Guo and Sunmi Shin

Friday Morning, April 11, 2025

Summit, Level 3, Room 348

**11:00 AM SF01.16.01**

**Heat Conduction in Semiconductors Studied Using a Data-Driven Solution of the Peierls-Boltzmann Equation** [Navaneetha Krishnan Ravichandran](#); Indian Institute of Science, India

**11:15 AM SF01.16.02**

**Experimental Validation of First-Principles Calculation on Fission Product Effect in ThO<sub>2</sub> Thermal Transport** [Ella K. Pek](#)<sup>1</sup>, Linu Malakkal<sup>1</sup>, Zilong Hua<sup>1</sup>, Amey Khanolkar<sup>1</sup>, J. Matthew Mann<sup>2</sup>, Karl Rickert<sup>3</sup>, Timothy A. Prusnick<sup>3</sup>, Marat Khafizov<sup>4</sup> and David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Air Force Research Laboratory, United States; <sup>3</sup>KBR, United States; <sup>4</sup>The Ohio State University, United States

**11:30 AM SF01.16.03**

**Impact of Dynamic Jahn-Teller Effect on the Thermal Transport in U<sub>x</sub>Th<sub>1-x</sub>O<sub>2</sub> System** Saqeeb Adnan<sup>1</sup>, Zilong Hua<sup>2</sup>, Puspa Upreti<sup>3</sup>, Shuxiang Zhou<sup>2</sup>, Sabin Regmi<sup>2</sup>, Krzysztof Gofryk<sup>2</sup>, J. Matthew Mann<sup>4</sup>, David Hurley<sup>2</sup>, Michale Manley<sup>3</sup> and [Marat Khafizov](#)<sup>1</sup>; <sup>1</sup>The Ohio State University, United States; <sup>2</sup>Idaho National Laboratory, United States; <sup>3</sup>Oak Ridge National Laboratory, United States; <sup>4</sup>Air Force Research Laboratory, United States

**11:45 AM SF01.16.04**

**Investigating the Phonon Contribution to the Total Thermal Conductivity of Ru and W Films and Validation of Wiedemann-Franz Law** [Md. Rafiqul Islam](#) and Patrick Hopkins; University of Virginia, United States

SESSION SF01.17: Nanoscale Thermometry

Session Chairs: Shuang Cui and Yu Wang

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 348

**1:30 PM SF01.17.01**

**Optical Super-Resolution Nanothermometry via Stimulated Emission Depletion Imaging** [Andrea Pickel](#), Ziyang Ye and Benjamin Harrington; University of Rochester, United States

**1:45 PM SF01.17.02**

**A Unifying Analytical Framework for Frequency-Domain Thermal Metrology Using Sensor Functions** [Ashwath M. Bhat](#) and Chris Dames; University of California, Berkeley, United States

**2:00 PM SF01.17.03**

**Distinguishing Amorphous and Anisotropic Heat Transport in Sb<sub>2</sub>S<sub>3</sub> via Thermal Conductivity Imaging** [Eleonora Isotta](#)<sup>1</sup>, Rosemary Wynnchenko<sup>2</sup>, Binayak Mukherjee<sup>3</sup>, Jack Kaman<sup>4</sup>, Jeff Snyder<sup>1</sup>, Himanshu Jain<sup>4</sup> and Oluwaseyi Balogun<sup>1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Wellesley College, United States; <sup>3</sup>Luxembourg Institute of Science and Technology, Luxembourg; <sup>4</sup>Lehigh University, United States

**2:15 PM SF01.17.04**

**Nanoscale Laser Flash Measurements of Ballistic and Diffusive Heat Currents in Si, Diamond and AlN Thin-Films** [Samreen Khan](#) and Richard B. Wilson; University of California, Riverside, United States

**2:30 PM SF01.17.05**

**Boundary Conditions Dictate Frequency Dependence of Thermal Conductivity in Silicon** [Yizhe Liu](#) and Bo Sun; Tsinghua University, China

**2:45 PM SF01.17.06**

**Probing the Effect of Phonon Mode-Conversion on the Thermal Conductivity of Thin Films Made of III-V Compounds** [Sarvesh S. Medhekar](#), Vasumathy Ravishankar and Navaneetha Krishnan Ravichandran; Indian Institute of Science Bangalore, India

**3:00 PM BREAK**

SESSION SF01.18: Thermoelectrics and Energy Storage

Session Chairs: Eleonora Isotta and Yanguang Zhou

Friday Afternoon, April 11, 2025  
Summit, Level 3, Room 348

**3:30 PM SF01.18.01**

**Moisture Reactivated Calcium Sorbents for Long Duration Thermochemical Energy Storage** Shuang Cui<sup>1,2</sup>; <sup>1</sup>The University of Texas at Dallas, United States; <sup>2</sup>National Renewable Energy Laboratory, United States

**3:45 PM SF01.18.02**

**Anisotropic Thermoelectric Transport Study in Two-Dimensional Heterostructures and Superlattices** Yu Wang<sup>1</sup>, Li Shi<sup>2</sup>, David Johnson<sup>3</sup>, Steve Cronin<sup>4</sup> and Arun Majumdar<sup>1</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>The University of Texas at Austin, United States; <sup>3</sup>University of Oregon, United States; <sup>4</sup>University of Southern California, United States

**4:00 PM SF01.18.03**

**Enhanced Charge Transport at the Interface in P3HT-Tellurium Nanowires Hybrid Materials for High Thermoelectric Performance** Pawan Kumar; Institute of Materials Research and Engineering, Singapore

**4:15 PM SF01.18.04**

**(Ag,Cu)<sub>2</sub>(S,Se,Te)-Based Auxetic Thermoelectric Metamaterials for Efficient and Durable Power Generation** Seong Eun Yang<sup>1</sup>, Youngtaek Oh<sup>2</sup> and Jae Sung Son<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of)

**4:30 PM SF01.18.05**

**Excellent Thermoelectric Performance of Bi<sub>2</sub>MO<sub>4</sub>Cl (M = Y, La, and Bi) Derived from Ultra-Low Lattice Thermal Conductivity Due to Weak Ionic Bonding** Shipeng Bi<sup>1</sup>, Alexander G. Squires<sup>2</sup>, Christopher Savory<sup>2</sup>, Kieran B. Spooner<sup>2</sup>, Dan Han<sup>3</sup> and David Scanlon<sup>2</sup>; <sup>1</sup>University College London, United Kingdom; <sup>2</sup>University of Birmingham, United Kingdom; <sup>3</sup>Jilin University, China

**4:45 PM SF01.18.06**

**Near-Interface Effects on Interfacial Phonon Transport—Competition Between Phonon-Phonon Interference and Phonon-Phonon Scattering** Yixin Xu and Yanguang Zhou; The Hong Kong University of Science and Technology, Hong Kong

## SYMPOSIUM SF02

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Complex Oxide Epitaxial Thin Films  
April 8 - April 11, 2025

Symposium Organizers

Marta Gibert, Technische Universität Wien  
Megan Holtz, Colorado School of Mines  
Tae Heon Kim, Korea Institute of Science and Technology  
Le Wang, Pacific Northwest National Laboratory

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SESSION SF02.01: Superconducting Infinite-Layer Nickelates

Session Chairs: Danfeng Li and Le Wang

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 321

**10:30 AM \*SF02.01.01**

**Correlated Phases in Thin Film Nickelates** [Harold Y. Hwang](#)<sup>1,2</sup>; <sup>1</sup>Stanford University, United States; <sup>2</sup>SLAC National Accelerator Laboratory, United States

**11:00 AM \*SF02.01.02**

**High-Temperature Superconducting Oxide Without Copper at Ambient Pressure** [Ariando Ariando](#); National University of Singapore, Singapore

**11:30 AM \*SF02.01.03**

**Superconducting Nd<sub>1-x</sub>EuxNiO<sub>2</sub> (NENO) Thin Films Using *In Situ* MBE Synthesis** [Charles H. Ahn](#); Yale University, United States

SESSION SF02.02: Superconducting Infinite-Layer Nickelates

Session Chairs: Julia Mundy and Le Wang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 321

**1:30 PM ^SF02.02.01**

**Novel Thin-Film Nickelates and Oxide Heterostructures by Design** [Danfeng Li](#); City University of Hong Kong, Hong Kong

**2:00 PM \*SF02.02.02**

**Studies of Charge Ordering and Superconductivity in the Parent Infinite Layer Nickelates** [Kyle Shen](#)<sup>1</sup>, Christopher Parzyck<sup>1</sup>, Yi Wu<sup>1</sup>, David Hawthorn<sup>2</sup> and Darrell G. Schlom<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>University of Waterloo, Canada

**2:30 PM BREAK**

**3:00 PM \*SF02.02.03**

**Electronic Structure of Superconducting Square-Planar Nickelates** [Antia Botana](#)<sup>1</sup> and LaBollita Harrison<sup>2</sup>; <sup>1</sup>Arizona State University, United States; <sup>2</sup>Flatiron Institute, United States

**3:30 PM SF02.02.04**

**Synthesis of Superconducting Infinite-Layer Nickelate Thin Films by Aluminium Sputtering Deposition** Dongxin Zhang<sup>1</sup>, Aravind Raji<sup>2,3</sup>, Luis Moreno Vicente-Arche<sup>1</sup>, Alexandre Gloter<sup>2</sup>, Manuel Bibes<sup>1</sup> and [Lucia Iglesias](#)<sup>1</sup>; <sup>1</sup>Laboratoire Albert Fert, CNRS, Thales, Université Paris-Saclay, France; <sup>2</sup>Laboratoire de Physique des Solides, CNRS, Université Paris-Saclay, France; <sup>3</sup>Synchrotron SOLEIL, France

SESSION SF02.03: Interface Superconductivity and Other Superconducting Systems

Session Chairs: Kyle Shen and Le Wang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 321

**3:45 PM \*SF02.03.01**

**Electron-Electron Correlations Alongside Strong Electron-Phonon Coupling in Superconducting LiTi<sub>2</sub>O<sub>4</sub>** [Julia Mundy](#)<sup>1</sup>, Zubia Hasan<sup>1</sup>, Grace A. Pan<sup>1</sup>, Suk Hyun Sung<sup>1</sup>, LaBollita Harrison<sup>2</sup>, Shekhar Sharma<sup>2</sup>, Ismail El Baggari<sup>1</sup>, Antia Botana<sup>2</sup>, Brendan D. Faeth<sup>3</sup> and Alberto De la Torre<sup>4</sup>; <sup>1</sup>Harvard University, United States; <sup>2</sup>Arizona State University, United States; <sup>3</sup>Cornell University, United States; <sup>4</sup>Northeastern University, United States

**4:15 PM \*SF02.03.02**

**Superconductivity at Interfaces of the Quantum Paraelectric  $\text{KTaO}_3$**  [Anand Bhattacharya](#); Argonne National Laboratory, United States

SESSION SF02.04: Poster Session

Session Chairs: Marta Gibert, Megan Holtz, Tae Heon Kim and Le Wang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF02.04.01**

**Site-Selective Polar Compensation of Mott Electrons in a Double Perovskite Heterointerface** [Nandana Bhattacharya](#)<sup>1</sup>, Arpita Sen<sup>2</sup>, Jianwei Zhang<sup>3</sup>, Ranjan K. Patel<sup>1</sup>, Siddharth Kumar<sup>1</sup>, Prithwijit Mandal<sup>1</sup>, Suresh C. Joshi<sup>1</sup>, Shashank Ojha<sup>1</sup>, Jyotirmay Maity<sup>1</sup>, Zhan Zhang<sup>4</sup>, Hua Zhou<sup>4</sup>, Fanny Rodolakis<sup>4</sup>, Padraic Shafer<sup>5</sup>, Christoph Klewe<sup>5</sup>, John Freeland<sup>4</sup>, Zhenzhong Yang<sup>3</sup>, Umesh Waghmare<sup>2</sup> and Srimanta Middey<sup>1</sup>; <sup>1</sup>Indian Institute of Science, Bangalore, India; <sup>2</sup>Jawaharlal Nehru Centre for Advanced Scientific Research, India; <sup>3</sup>East China Normal University, China; <sup>4</sup>Argonne National Laboratory, United States; <sup>5</sup>Lawrence Berkeley National Laboratory, United States

**SF02.04.02**

**Morphology and Property Tuning in ZnO-Ni Hybrid Metamaterials in Vertically Aligned Nanocomposite (VAN) Form** [Nirali Bhatt](#)<sup>1</sup>, Elizabeth Quigley<sup>1</sup>, Shiyu Zhou<sup>1</sup>, Jianan Shen<sup>1</sup>, Juanjuan Lu<sup>1</sup>, Yizhi Zhang<sup>1</sup>, Aleem Siddiqui<sup>2</sup>, Raktim Sarma<sup>2</sup> and Haiyan Wang<sup>1</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>Sandia National Laboratories, United States

**SF02.04.03**

**Dewetting and Ab Initio Modeling of Nickel-Based Nanocrystals** [Riley Hultquist](#), David H. Simonne, Sayantan Mondal and Ericmoore Jossou; Massachusetts Institute of Technology, United States

**SF02.04.04**

**Epitaxial Growth and Electronic Structure of Sub-Stoichiometric  $\text{WO}_x$  Thin Films with Tunable Atomic Defect Tunnels** [Jueli Shi](#)<sup>1</sup>, Krishna Prasad Koirala<sup>1</sup>, Le Wang<sup>1</sup>, Minju Choi<sup>1</sup>, Mark Bowden<sup>1</sup>, Hua Zhou<sup>2</sup>, Yang Yang<sup>3</sup>, Peter V. Sushko<sup>1</sup> and Yingge Du<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Brookhaven National Laboratory, United States

**SF02.04.05**

**Protonation-Driven Polarization Retention Failure in Nano-Columnar Lead-Free Ferroelectric Thin Films** [Tae Heon Kim](#)<sup>1,2</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>University of Ulsan, Korea (the Republic of)

**SF02.04.06**

**Enhanced Phase Transition in Vanadium Oxide Thin Film Grown on AlN/Si(111) and Its Superior Broadband Photodetection** [Multi Kumari](#)<sup>1</sup>, Basanta Roul<sup>1,2</sup>, S. B. Krupanidhi<sup>1</sup> and K. K. Nanda<sup>1,3,4</sup>; <sup>1</sup>Indian Institute of Science, India; <sup>2</sup>Central Research Laboratory, Bharat Electronics, India; <sup>3</sup>Institute of Physics, India; <sup>4</sup>Homi Bhabha National Institute, India

**SF02.04.07**

**Epitaxial Integration of Multilayer Perovskite Oxide Devices on Silicon** [Seonghyeon Kim](#)<sup>1</sup>, Nicole Volkmer<sup>2</sup>, Juhan Kim<sup>1</sup>, Jongkyoung Ko<sup>1</sup>, Jihoon Seo<sup>1</sup>, Roman Engel-Herbert<sup>2</sup> and Kookrin Char<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Paul-Drude-Institut für Festkörperelektronik, Germany

**SF02.04.08**

**World Best Quality Thin Film NiO on Sapphire Substrate** [Manoj Singh](#) and Sushobhan Avasthi; Indian Institute of Science, Bangalore, India

**SF02.04.09**

**Anomalous Surface Behavior in Temperature-Dependent LEED Study of  $\text{Sr}_3\text{Ir}_2\text{O}_7$**  [Peace I. Adegbite](#), Arjun Subedi, Yuanyuan Zhang, Xia Hong, Takashi Komesu and Peter A. Dowben; University of Nebraska-Lincoln, United States

**SF02.04.10**

**Synthesis and Valence Control of Unconventional Ruddlesden-Popper Nickelates by Integrated Electrochemistry Approaches** [Bohan Feng](#)<sup>1</sup>, Wei Wang<sup>1</sup>, Jiawei Huang<sup>2</sup>, Yin Wen<sup>3</sup>, Tianyi Li<sup>4</sup>, Qingyu Kong<sup>5</sup>, Zhengang Dong<sup>1</sup>, Linfeng Fei<sup>2</sup>, Yang Ren<sup>1</sup>, Qi Liu<sup>1</sup> and Danfeng Li<sup>1</sup>; <sup>1</sup>City University of Hong Kong, China; <sup>2</sup>Nanchang University, China; <sup>3</sup>Spallation Neutron Source Science Center, China; <sup>4</sup>Argonne National Laboratory, United States; <sup>5</sup>Synchrotron



Soleil, L'Orme des Merisiers, France

**SF02.04.11**

**Investigation of Temperature-Dependent Properties of BaZrO<sub>3</sub> Single Crystal** Yoon Seok Oh<sup>1</sup>, Syed Bilal Junaid<sup>2</sup>, Furqanul Hassan Naqvi<sup>2</sup>, Joon Woo Lee<sup>1</sup>, Hei Woong Lee<sup>1</sup>, Byeong-Gwan Cho<sup>3</sup>, Tae-Yeong Koo<sup>3</sup>, Dirk Wulferding<sup>4</sup> and Jae-Hyeon Ko<sup>2</sup>; <sup>1</sup>Ulsan National Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Hallym University, Korea (the Republic of); <sup>3</sup>Pohang Accelerator Laboratory, Korea (the Republic of); <sup>4</sup>Center for Correlated Electron Systems, Institute for Basic Science, Korea (the Republic of)

**SF02.04.12**

**Doping Effect on Electronic and Electrochemical Properties of High-Entropy Perovskite Oxide Thin Films** Le Wang<sup>1</sup>, Andrew Ho<sup>2</sup>, Minju Choi<sup>1</sup>, Jueli Shi<sup>1</sup>, Mark Bowden<sup>1</sup>, Dongchen Qi<sup>3</sup>, Tiffany Kaspar<sup>1</sup> and Yingge Du<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Santa Rosa Junior College, United States; <sup>3</sup>Queensland University of Technology, Australia

**SF02.04.13**

**Combinatorial Materials Discovery Approach for Proton Incorporation in BaZr<sub>m</sub>Fe<sub>n</sub>Y<sub>(1-(m+n))</sub>O<sub>3-d</sub> Epitaxial Thin Films** Supriyo Majumder<sup>1</sup>, Alexia Popescu<sup>2</sup>, Zhen Jiang<sup>1</sup>, Guennadi A. Evmenenko<sup>1</sup>, Paul A. Chery<sup>1</sup>, D. Bruce Buchholz<sup>1</sup>, Nicola H. Perry<sup>2</sup>, Christopher Wolverton<sup>1</sup>, Sossina M. Haile<sup>1,1</sup> and Michael J. Bedzyk<sup>1,1</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>University of Illinois at Urbana-Champaign, United States

SESSION SF02.05: Composition-Structure-Property Relationships in Complex Oxide Thin Films

Session Chairs: Marta Gibert and Tae Heon Kim

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 321

**8:00 AM \*SF02.05.01**

**High-Performance Superconducting Wires via Strain-Driven Self-Assembly for Large-Scale Applications in Energy Generation, Transmission and Storage** Amit Goyal; SUNY-Buffalo, United States

**8:30 AM \*SF02.05.02**

**Valence Flexibility and Structural Complexity in Epitaxial Cr-Based Complex Oxides** Yingge Du; Pacific Northwest National Laboratory, United States

**9:00 AM SF02.05.03**

**Molecular Beam Epitaxy Growth and Characterization of FeWO<sub>4</sub> Thin Films with Controlled Oxygen Stoichiometry** John Hylak and Harry A. Atwater; California Institute of Technology, United States

**9:15 AM SF02.05.04**

**Tuning Stoichiometry for Enhanced Spin-Charge Interconversion in Transition Metal Oxides** Hetian Chen<sup>1</sup>, Dingsong Jiang<sup>1</sup>, Qinghua Zhang<sup>2</sup>, Yuhan Liang<sup>1</sup>, Jingchun Liu<sup>1</sup>, Aihua Tang<sup>1</sup>, Yahong Chai<sup>1</sup>, Pu Yu<sup>1</sup>, Tianxiang Nan<sup>1</sup> and Di Yi<sup>1</sup>; <sup>1</sup>Tsinghua University, China; <sup>2</sup>Chinese Academy of Sciences, China

**9:30 AM \*SF02.05.05**

**Toward Ultrafast Metal-Insulator Transition of Vanadium Dioxide** Si-Young Choi; Pohang University of Science and Technology, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM \*SF02.05.06**

**Formation of Planar Metasurfaces in Oxide Thin Films via Synchronized Ionic Gating** Stuart S. Parkin; Max Planck Institute of Microstructure Physics, Germany

**11:00 AM SF02.05.07**

**Nano Engineered Solid State Ionic Metal Oxides for Near-Room Temperature Oxygen Conductivity** Baby Dhanalakshmi; Denmark Technical University, Denmark

**11:15 AM SF02.05.08**

**In Situ Characterization of Cobalt Nanoparticle Exsolution During Topotactic Transformations in Lanthanum-Strontium-Cobaltite Thin Films.**

Matthew Frame<sup>1</sup>, Ishmam Nihal<sup>1</sup>, Izoah Snowden<sup>1</sup>, Dongwoo Kim<sup>2</sup>, Gustavo Z. Giroto<sup>2</sup>, Maximilian Jaugstetter<sup>2</sup>, Christoph Klewe<sup>2</sup>, Alpha N'Diaye<sup>2</sup>, Ivan K. Schuller<sup>3</sup>, Slavomir Nemsak<sup>2</sup> and Yayoi Takamura<sup>1</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>University of California, San Diego, United States

**11:30 AM \*SF02.05.09**

**Controlling Metal Exsolution on Epitaxial Oxides by External Drivers—Role of Elastic Strain and Ion Irradiation** Bilge Yildiz; Massachusetts Institute of Technology, United States

SESSION SF02.06: High-Entropy Oxide Thin Films

Session Chairs: Christoph Baeumer and Marta Gibert

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 321

**1:30 PM \*SF02.06.01**

**Polarization Stability and Its Influence on Electrocaloric Effects of High Entropy Perovskite Oxide Epitaxial Films** Yeongwoo Son<sup>1</sup>, Sai Venkata Gayathri Ayyagari<sup>1</sup>, John Barber<sup>2</sup>, Kae Nakamura<sup>1</sup>, Christina Rost<sup>2</sup>, Nasim Alem<sup>1</sup> and Susan E. Trolier-McKinstry<sup>1</sup>; <sup>1</sup>The Pennsylvania State University, United States; <sup>2</sup>Virginia Tech, United States

**2:00 PM SF02.06.02**

**Resistive Switching Mechanism of Memristors Based on High Entropy Oxide** Jia De Cheng<sup>1</sup>, Jing Yuan Tsai<sup>1</sup>, Chun Wei Huang<sup>2</sup>, Ying-Hao Chu<sup>3</sup> and Wen-Wei Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University, Taiwan; <sup>2</sup>Feng Chia University, Taiwan; <sup>3</sup>National Tsing Hua University, Taiwan

**2:15 PM SF02.06.03**

**High-Entropy Superparaelectric BTO-HZAO Thin Films for Energy Storage Applications** Jiaqi Zhang and Jiyan Dai; The Hong Kong Polytechnic University, Hong Kong

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SF02.07: Metastable Phases and Defects in Complex Oxides

Session Chairs: Yingge Du and Tae Heon Kim

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 321

**3:30 PM \*SF02.07.01**

**Stabilizing Metastable Phases in Thin Films—Approaches and Benefits** Sverre M. Selbach; NTNU Norwegian University of Science and Technology, Norway

**4:00 PM SF02.07.02**

**Surface Triggered Stabilization of Metastable Charge-Ordered Phase in SrTiO<sub>3</sub>** Kitae Eom<sup>1</sup>, ByoungHo Min<sup>1</sup> and Jaichan Lee<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Sungkyunkwan University, Korea (the Republic of)

**4:15 PM SF02.07.03**

**Defect Complexion Induced Electrostriction in Doped Ceria—Origin and Implications** Yue Qi<sup>1</sup>, Boyuan Xu<sup>1</sup>, Anatoly Frenkel<sup>2</sup> and Igor Lubomirsky<sup>3</sup>; <sup>1</sup>Brown University, United States; <sup>2</sup>Stony Brook University, The State University of New York, United States; <sup>3</sup>Weizmann Institute of Science, Israel

**4:30 PM SF02.07.04**

**Defect Formation and Migration at Misfit Dislocations in Mismatched Oxide Heterostructures** Jason Rakowsky, Jake Chetney, Stephen Fritz, William Ebmeyer and Pratik P. Dholabhai; Rochester Institute of Technology, United States

**4:45 PM SF02.07.05**

**Thickness and Substrate Dependent Resistive Transitions and Magnetoresistance in Oxygen Deficient Strontium Titanate Thin Films** Rajeswari M.

Kolagani<sup>1</sup>, R. Shipra<sup>1</sup>, Marcus Rose<sup>1</sup>, Shiva Pokhrel<sup>1</sup>, Michael Osofsky<sup>1</sup>, Vera Smolyaninova<sup>1</sup> and Ryan Paxson<sup>2</sup>; <sup>1</sup>Towson University, United States;  
<sup>2</sup>University of Maryland, United States

SESSION SF02.08: Emergent Magnetic and Topological Properties in Complex Oxide Thin Films

Session Chairs: Tae Heon Kim and Hiroshi Takatsu

Thursday Morning, April 10, 2025

Summit, Level 3, Room 321

**8:30 AM \*SF02.08.01**

**Interfacing Weyl Fermions and Magnetic Monopoles—A Quantum Encounter** Jak Chakhalian; Rutgers, The State University of New Jersey, United States

**9:00 AM SF02.08.02**

**Robust Biaxial Anisotropy and Switchable Néel Vectors in LaFeO<sub>3</sub> Epitaxial Films—An Attractive Platform for Antiferromagnetic Spintronics** Fengyuan Yang, Joseph Lanier, Justin Michel and Jose Flores; The Ohio State University, United States

**9:15 AM SF02.08.03**

**Investigating Interfacial Exchange Interaction and Antiferromagnetic Moment Orientations in La<sub>0.5</sub>Sr<sub>0.5</sub>FeO<sub>3</sub> / La<sub>0.7</sub>Sr<sub>0.3</sub>MnO<sub>3</sub> Bilayers** Ishmam Nihal<sup>1</sup>, Matthew Frame<sup>1</sup>, Izoah Snowden<sup>1</sup>, Dayne Sasaki<sup>2</sup>, Christoph Klewe<sup>2</sup>, Barat Achinuq<sup>2</sup>, Andreas Scholl<sup>2</sup> and Yayoi Takamura<sup>1</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States

**9:30 AM \*SF02.08.04**

**Exotic Magnetotransport in Correlated Topological Oxide Heterostructures** Jeongkeun Song and Ho Nyung Lee; Oak Ridge National Laboratory, United States

**10:00 AM BREAK**

**10:30 AM \*SF02.08.05**

**Revealing Emergent Phenomena in Complex Oxides Using High Magnetic Fields** Km Rubi<sup>1,2</sup>; <sup>1</sup>Los Alamos National Laboratory, United States; <sup>2</sup>National High Magnetic Field Laboratory, United States

**11:00 AM SF02.08.06**

**Thermal Laser Epitaxy for Ultraclean Heterostructures** Brendan D. Faeth<sup>1,2</sup>, Hans Boschker<sup>2</sup>, Felix V. Hensling<sup>3</sup>, Lena Majer<sup>3</sup>, Varun Harbola<sup>3</sup>, Jochen Mannhart<sup>3</sup> and Wolfgang Braun<sup>2</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>epiray GmbH, Germany; <sup>3</sup>Max Planck Institute for Solid State Research, Germany

**11:15 AM \*SF02.08.07**

**Topological Polar Microdomains Enabling Spatial Light Field Manipulation** Haoying Sun<sup>1</sup>, Pengcheng Chen<sup>1</sup>, Wei Mao<sup>1</sup>, Changqing Guo<sup>2</sup>, Yueying Li<sup>1</sup>, Jierong Wang<sup>1</sup>, Wenjie Sun<sup>1</sup>, Duo Xu<sup>1</sup>, Bo Hao<sup>1</sup>, Tingjun Zhang<sup>1</sup>, Jianan Ma<sup>1</sup>, Jiangfeng Yang<sup>1</sup>, Zhequan Cao<sup>1</sup>, Zhengbin Gu<sup>1</sup>, Houbing Huang<sup>2</sup>, Peng Wang<sup>3</sup>, Yong Zhang<sup>1</sup>, Di Wu<sup>1</sup> and Yuefeng Nie<sup>1</sup>; <sup>1</sup>Nanjing University, China; <sup>2</sup>Beijing Institute of Technology, China; <sup>3</sup>University of Warwick, United Kingdom

SESSION SF02.09: Metamaterial Designs and Novel Functional Oxides

Session Chairs: Marta Gibert and Le Wang

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 321

**1:30 PM +SF02.09.01**

**Multifunctional Hybrid Metamaterial Designs Towards Advanced Device Applications** Haiyan Wang; Purdue University, United States

**2:00 PM \*SF02.09.02**

**Development of Novel Functional Oxides and Mixed-Anion Compounds Using Strain and Electric Field** Hiroshi Takatsu; Kyoto University, Japan

**2:30 PM \*SF02.09.03**

**Epitaxial Growth of Bi<sub>2</sub>O<sub>2</sub>X Films and Related Heterostructures** Ying-Hao Chu; National Tsing Hua University, Taiwan

**3:00 PM BREAK**

SESSION SF02.10: Complex Oxide Thin Films for (Photo)Electrochemical Applications

Session Chairs: Jueli Shi and Le Wang

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 321

**3:30 PM \*SF02.10.01**

**Complex Oxide Electrocatalyst Surfaces and Interfaces** Christoph Baeumer<sup>1,2</sup>; <sup>1</sup>University of Twente, Netherlands; <sup>2</sup>Forschungszentrum Jülich GmbH, Germany

**4:00 PM SF02.10.02**

**Ferromagnetic Catalysts for Spin Dependent OER** Emma V. Minne<sup>1</sup>, Lucas Korol<sup>2</sup>, Silvia Mauri<sup>3</sup>, Anatoliy Vereshchagin<sup>4</sup>, Vadim Ratovskii<sup>1</sup>, Ellen Kiens<sup>1</sup>, Jan Behrends<sup>4</sup>, Robert J. Green<sup>2</sup>, Gertjan Koster<sup>1</sup>, Piero Torelli<sup>3</sup> and Christoph Baeumer<sup>1,5</sup>; <sup>1</sup>University of Twente, Netherlands; <sup>2</sup>University of Saskatchewan, Canada; <sup>3</sup>Consiglio Nazionale delle Ricerche, Italy; <sup>4</sup>Freie Universität Berlin, Germany; <sup>5</sup>Forschungszentrum Juelich GmbH, Germany

**4:15 PM SF02.10.03**

**Sustainable and Cyclic Synthesis of 2D Co(OH)<sub>2</sub> Nanosheets for Scalable Production of High-Performance Electrocatalysts** Derui Wang<sup>1</sup>, Ziyi Zhang<sup>2</sup>, Corey Carlos<sup>1</sup>, Yutao Dong<sup>1</sup> and Xudong Wang<sup>1</sup>; <sup>1</sup>University of Wisconsin, United States; <sup>2</sup>The University of Texas at Austin, United States

**4:30 PM \*SF02.10.04**

**Bulk and Interfacial Engineering of Epitaxial Bismuth Vanadate Thin Film Photoanodes for Solar Water Splitting** Mingzhao Liu; Brookhaven National Laboratory, United States

SESSION SF02.11: Electronics, Neuromorphic Devices and Membranes

Session Chairs: Chen Ge and Tae Heon Kim

Friday Morning, April 11, 2025

Summit, Level 3, Room 321

**8:15 AM SF02.11.01**

**Electrical Switching Properties of Planar Thin-Film Metal-Insulator-VO<sub>2</sub>-Metal Capacitors** Christina Bestebe and Helmut Karl; University of Augsburg, Germany

**8:30 AM \*SF02.11.02**

**Opening the Neuromorphic Design Space—Engineering Spin Crossover Devices with Compositionally Complex Oxides** Elliot J. Fuller; Sandia National Laboratories, United States

**9:00 AM SF02.11.03**

**Rare-Earth Nickelates as Memristive Devices** Foelke Janssen<sup>1,2</sup> and Beatriz Noheda<sup>1,2</sup>; <sup>1</sup>University of Groningen, Netherlands; <sup>2</sup>CogniGron - Groningen Cognitive Systems and Materials Center, Netherlands

**9:15 AM SF02.11.04**

**Oxide-Oxide Vertically Aligned Nanocomposite Memristor as High-Performance Electronic Synapses via Interface Engineering** Zedong Hu, Hongyi Dou, Juanjuan Lu, Abhijeet Choudhury, Katrina N. Evancho, Jialong Huang, Zhengliang Lin and Haiyan Wang; Purdue University, United States

**9:30 AM \*SF02.11.05**

**Neuromorphic Devices Using Iono-Physical Coupling Effects** Shinbuhm Lee; DGIST, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM SF02.11.06**

**Investigating Insulator–Metal Transitions in  $Ti_2O_3/MnTiO_3$  Superlattices** [Hengrui Zhang](#), James M. Rondinelli and Wei Chen; Northwestern University, United States

**10:45 AM SF02.11.07**

**Elucidating Heterogeneous Li Insertion Using Single Crystalline and Freestanding Layered Oxide Thin Film** [Chihyun Nam](#)<sup>1</sup>, Jinkyu Chung<sup>1</sup>, Jae Young Kim<sup>1</sup>, Tae Hyung Lee<sup>1</sup>, Juwon Kim<sup>1</sup>, Namdong Kim<sup>2</sup>, David A. Shapiro<sup>3</sup>, Ho Won Jang<sup>1</sup> and Jongwoo Lim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**11:00 AM SF02.11.08**

**Stacking Ferroic Oxide Membranes with Controlled Twist Angles** [Tianlin Li](#), Qiuchen Wu, Yibo Wang, Martin Centurion and Xia Hong; University of Nebraska-Lincoln, United States

**11:15 AM \*SF02.11.09**

**Super-Tetragonal  $Sr_4Al_2O_7$ —A Versatile Sacrificial Layer for High-Integrity Freestanding Oxide Membranes** [Lingfei Wang](#); University of Science and Technology of China, China

SESSION SF02.12: Ferroelectrics and Multiferroics

Session Chairs: Elliot Fuller and Tae Heon Kim

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 321

**1:30 PM \*SF02.12.01**

**Emerging Functional Heterointerfaces Enabled by Ferroelectric Oxide Thin Films and Membranes** [Xia Hong](#); University of Nebraska-Lincoln, United States

**2:00 PM SF02.12.02**

**Effect of Depolarization Field in Perovskite Ferroelectric-FETs Made of PZT and  $BaSnO_3$**  [Jongkyoung Ko](#), Hahoon Lee and Kookrin Char; Seoul National University, Korea (the Republic of)

**2:15 PM \*SF02.12.03**

**Robust Ferroelectricity and Phase Switching in Freestanding Hafnia-Based Membranes** Hai Zhong<sup>1</sup>, Xinyan Li<sup>1</sup>, Zhuohui Liu<sup>1</sup>, Qinghua Zhang<sup>1</sup>, Lin Gu<sup>2</sup>, Kuijuan Jin<sup>1</sup> and [Chen Ge](#)<sup>1</sup>; <sup>1</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>2</sup>Tsinghua University, China

**2:45 PM BREAK**

**3:15 PM \*SF02.12.04**

**Rhombohedral R3 Phase of Mn-Doped  $Hf_{0.5}Zr_{0.5}O_2$  Epitaxial Films with Robust Ferroelectricity** Jiasheng Guo<sup>1</sup>, Lei Tao<sup>2</sup>, Xing Xu<sup>3</sup>, Ce-wen Nan<sup>1</sup>, Shixuan Du<sup>2,4</sup>, Chonglin Chen<sup>3</sup> and [Jing Ma](#)<sup>1</sup>; <sup>1</sup>Tsinghua University, China; <sup>2</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>3</sup>The University of Texas at San Antonio, United States; <sup>4</sup>Songshan Lake Materials Laboratory, China

**3:45 PM SF02.12.05**

**Investigations of van der Waals Epitaxial Growth of Aurivillius Phase Ferroelectrics and Multiferroics** [Anurag Pritam](#), Debismita Dutta, Sabir Hussain and Lynette Keeney; Tyndall National Institute, University College Cork, Ireland

**4:00 PM SF02.12.06**

**Self-Powered Pyroelectric Sensing in Compositionally Graded Relaxor Thin Films** [Ching-Che \(Leo\) Lin](#)<sup>1,1</sup>, Tae Joon Park<sup>1,2</sup>, Sreekeerthi Pamula<sup>1</sup>, Tae Yeon Kim<sup>3</sup>, Djamila Lou<sup>1</sup> and Lane Martin<sup>3</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Lawrence Berkeley National Laboratory, United States; <sup>3</sup>Rice University, United States

**4:15 PM SF02.12.07**

**Influence of Electrodes Materials on External Quantum Efficiency of Bulk Photovoltaic Effects in Electrode/Mn-Doped BiFeO<sub>3</sub>/SrRuO<sub>3</sub> Structures** Seiji Nakashima, Ryoma Takagi, Yoshiki Kagobayashi, Kouta Nakatsuka, Ai I. Osaka, Shunjiro Fujii and Hironori Fujisawa; University of Hyogo, Japan

**4:30 PM SF02.12.08**

**Epitaxial In-Plane Ferroelectric BaTiO<sub>3</sub> Integration on Si Through a Single MgO Buffer Layer for Electro-Optic Applications** Yeswanth Pattipati, Sandeep Vura and Srinivasan Raghavan; Indian Institute of Science, India

## SYMPOSIUM SF03

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From Robotic Toward Autonomous Materials

April 8 - April 10, 2025

### Symposium Organizers

Simona Aracri, The University of Edinburgh

Jeffrey Lipton, Northeastern University

Yoav Matia, Ben-Gurion University

Robert Shepherd, Cornell University

### Symposium Support

**Silver**

Berkshire Grey

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF03.01: Embodied Autonomy

Session Chairs: Yoav Matia and Robert Shepherd

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 322

**10:30 AM \*SF03.01.01**

**From Living Systems to Real-World Robotics: The Power of Robophysical Models** Daniel Goldman; Georgia Institute of Technology, United States

**11:00 AM SF03.01.02**

**Untethered Film-Balloon (FiBa) Soft Robots** Michinao Hashimoto; Singapore University of Technology and Design, Singapore

**11:15 AM SF03.01.03**

**Bone-Inspired Autonomous Material and Its Application to Reprogrammable Self-Folding Structures** Sung Hoon Kang<sup>1,2</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Johns Hopkins University, United States

**11:30 AM \*SF03.01.04**

**Liquid Metal Composites for Multifunctional Robotic Materials** Michael D. Bartlett; Virginia Tech, United States

SESSION SF03.02: Biohybrid Autonomous Materials

Session Chairs: Jeffrey Lipton and Yoav Matia

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 322

**1:30 PM \*SF03.02.01**

**Nature Healed by Nature—Eco-Friendly, Advanced Underwater Materials for Coral Reef Conservation and Restoration** Marco Contardi<sup>1,2</sup>;

<sup>1</sup>University of Milano-Bicocca, Italy; <sup>2</sup>Istituto Italiano di Tecnologia, Italy

**2:00 PM SF03.02.02**

**Imaging-Guided, Bioresorbable Acoustic Hydrogel Microrobots** Hong Han, Xiaotian Ma and Wei Gao; California Institute of Technology, United States

**2:15 PM \*SF03.02.03**

**Plant-Inspired Robotic Phenotype** Emanuela Del Dottore, Alessio Mondini and Barbara Mazzolai; Istituto Italiano di Tecnologia, Italy

**2:45 PM SF03.02.04**

**Shape Effect of Elastic Supporting Component in Array-Electrode-Type-Electrostatic-Chucks for Next-Generation Semiconductor Fabrication**

Yuiko Futagi, Yuki Taoka and Shigeki Saito; Institute of Science Tokyo, Japan

**3:00 PM BREAK**

SESSION SF03.03: Embodied Perception

Session Chairs: Jeffrey Lipton and Robert Shepherd

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 322

**8:30 AM \*SF03.03.01**

**Magneto-electronics for Magnetically Aware Soft-Bodied Robots** Denys Makarov; Helmholtz-Zentrum Dresden-Rossendorf e.V., Germany

**9:00 AM SF03.03.02**

**Large-Area, Metamorphic, Self-Healable and Energy-Harvesting Triboelectric Skins for Self-Powered Actively-Perceiving Soft Robotics** Ying-Chih Lai;

National Chung Hsing University, Taiwan

**9:15 AM SF03.03.03**

**Multimodal Textile Haptic Interface for Phygital Sensory Augmentation** Hanqing Jiang; Westlake University, China

**9:30 AM \*SF03.03.04**

**Laser Induced Graphene for Soft Robotics** Francesco Greco<sup>1,2,3</sup>; <sup>1</sup>Sant'Anna School of Advanced Studies, Italy; <sup>2</sup>Scuola Superiore Sant'Anna, Italy;

<sup>3</sup>TUGraz, Austria

**10:00 AM BREAK**

SESSION SF03.04: Shape Morphing Materials

Session Chairs: Simona Aracri and Robert Shepherd

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 322

**10:30 AM \*SF03.04.01**

**Polydimethylsiloxane Sponges as Bending Actuators and Ion Absorbers—Reversible Dual Action at Micro and Macro Scales** Bilge Baytekin<sup>1</sup> and

Esma Mutlutürk<sup>2</sup>; <sup>1</sup>Bilkent University, Turkey; <sup>2</sup>Haci Bayram Veli University, Turkey

**11:00 AM SF03.04.02**

**Self-Assembly and Self-Healing in a Metallic Foam Made of Electroplating Microrobots** Lucas C. Hanson, William Reinhardt and Marc Miskin;

University of Pennsylvania, United States

**11:15 AM SF03.04.03**

**Intelligent Self-Healing Artificial Muscle—Mechanisms for Damage Detection and Autonomous Repair of Puncture Damage** Eric Markvicka, Ethan Krings and Patrick McManigal; University of Nebraska Lincoln, United States

**11:30 AM \*SF03.04.04**

**Harnessing the Stimuli-Response of Liquid Crystalline Elastomers in Robotics** Timothy White; University of Colorado, United States

SESSION SF03.05: Soft Robotic Materials

Session Chairs: Yoav Matia and Robert Shepherd

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 322

**1:30 PM \*SF03.05.01**

**Polycatenated Architected Materials for Load Adaptive Soft Structures** Chiara Daraio; California Institute of Technology, United States

**2:00 PM \*SF03.05.02**

**The Power of Paper (and String)** Ankur Mehta; University of California, Los Angeles, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SF03.06: Architected Autonomous Materials I

Session Chairs: Simona Aracri and Jeffrey Lipton

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 322

**3:30 PM \*SF03.06.01**

**Harnessing Coupled Learning Theory for Adapting Fluidic Networks in Soft Robots** James H. Pikul; University of Wisconsin–Madison, United States

**4:00 PM SF03.06.02**

**Digital Composite with Reprogrammable Mechanical Behaviors** Yun Bai<sup>1</sup>, Heling Wang<sup>2</sup>, Xuebo Yuan<sup>3</sup> and Xiaoyue Ni<sup>1</sup>; <sup>1</sup>Duke University, United States; <sup>2</sup>Tsinghua University, China; <sup>3</sup>Southwest Jiaotong University, China

**4:15 PM \*SF03.06.03**

**When Design = Planning** Cynthia Sung; University of Pennsylvania, United States

**4:45 PM \*SF03.06.04**

**DNA-Based Soft Robotic Materials** Gaurav Arya; Duke University, United States

SESSION SF03.07: Poster session

Session Chairs: Simona Aracri and Jeffrey Lipton

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF03.07.01**

**Biodegradable, Shape Morphing Structure to Program the Stepwise Control of Cerebral Blood Flow for Vascular Regeneration** Sungeun Kim, Seunghun Han, Sumin Kim, Sehwan Park, Bon Jekal and Jahyun Koo; Korea University, Korea (the Republic of)



SESSION SF03.08: Architected Autonomous Materials II

Session Chairs: Simona Aracri, Jeffrey Lipton, Yoav Matia and Robert Shepherd

Thursday Morning, April 10, 2025

Summit, Level 3, Room 322

**8:00 AM SF03.08.01**

**Optical Manipulation and Manufacturing Strategies of Intelligent Springs** Habeom Lee<sup>1</sup>, Sungmin Park<sup>2,3</sup>, Dong-Gyun Kim<sup>2,3</sup> and Hyun Kim<sup>2,3</sup>; <sup>1</sup>Pusan National University, Korea (the Republic of); <sup>2</sup>Korea Research Institute of Chemical Technology, Korea (the Republic of); <sup>3</sup>University of Science and Technology, Korea (the Republic of)

**8:15 AM \*SF03.08.02**

**Autonomous Kirigami Materials Enable Active Shape Shifting in Insect Robots** Kaushik Jayaram, Heiko Kabutz, Parker McDonnell, Alexander Hedrick and Hari Krishna Hari Prasad; University of Colorado Boulder, United States

**8:45 AM SF03.08.03**

**Predictive Design of Ultrastretchable Electrodes with Strain-Insensitive Performance via Machine Intelligence** Po-Yen Chen; University of Maryland, United States

**9:00 AM \*SF03.08.04**

**Magneto-Mechanical Metamaterials for Tunable Mechanical, Acoustic and Electromagnetic Properties** Ruike Renee Zhao; Stanford University, United States

**9:30 AM BREAK**

SESSION SF03.09: Embodied Physical Intelligence

Session Chairs: Jeffrey Lipton and Yoav Matia

Thursday Morning, April 10, 2025

Summit, Level 3, Room 322

**10:00 AM \*SF03.09.01**

**Particle Swarm Metamaterials for Information Display, Memory and Encryption** Zenghao Zhang, Jeffery Raymond, Joerg Lahann and Abdon Pena-Francesch; University of Michigan, United States

**10:30 AM \*SF03.09.02**

**Multistable Physical Neural Networks** Amir Gat and Eran Ben-Haim; Technion–Israel Institute of Technology, Israel

**11:00 AM SF03.09.03**

**Microscopic Robots that Sense, Think, Act and Compute** Maya Lassiter<sup>1</sup>, Jungho Lee<sup>2</sup>, Kyle Skelil<sup>1</sup>, Li Xu<sup>2</sup>, Lucas C. Hanson<sup>1</sup>, William Reinhardt<sup>1</sup>, Dennis Sylvester<sup>2</sup>, Mark Yim<sup>1</sup>, David Blaauw<sup>2</sup> and Marc Miskin<sup>1</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>University of Michigan, United States

**11:15 AM \*SF03.09.04**

**Harnessing Intrinsic Dynamics for Signal Processing** Phil Buskohl; Air Force Research Laboratory, United States

SESSION SF03.10: Printing Autonomous Materials

Session Chairs: Jeffrey Lipton and Robert Shepherd

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 322

**1:30 PM \*SF03.10.01**

**Embedding Cell-Like Material Properties into 3D Printed Scaffolding for Autonomous Materials Applications** [Thomas Angelini](#); University of Florida, United States

**2:00 PM \*SF03.10.02**

**Hierarchical contact tuning in soft robotic grippers** [Kaitlyn Becker](#)<sup>1</sup>, Anna Doris<sup>1</sup>, Yeonsu Jung<sup>2</sup>, Charlotte Folinus<sup>1</sup>, James Weaver<sup>3</sup>, Clark Teeple<sup>2</sup>, Moritz Graule<sup>2</sup>, Daniel Baum<sup>4</sup>, L Mahadevan<sup>2</sup> and Robert Wood<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>Harvard University, United States; <sup>3</sup>WYSS Institute, United States; <sup>4</sup>Zuse Institute of Berlin, Germany

**2:30 PM BREAK**

**3:00 PM SF03.10.03**

**Multifunctional Materials via Multimaterial Computational Design and Fabrication** [Robert MacCurdy](#); CU Boulder, United States

**3:15 PM \*SF03.10.04**

**Multistage Photochemistries and Advanced Manufacturing for Soft Machines** [Thomas J. Wallin](#); Massachusetts Institute of Technology, United States

# SYMPOSIUM SF04

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Flexoelectric Engineering of Functional Materials, Structures and Devices  
April 7 - April 8, 2025

Symposium Organizers

Jiangyu Li, Southern University of Science and Technology  
Anna Morozovska, Institute of Physics  
Jan Seidel, Univ of New South Wales  
Pradeep Sharma, University of Houston

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF04.01: Flexoelectric I

Session Chair: Neus Domingo Marimon

Monday Morning, April 7, 2025

Summit, Level 3, Room 320

**8:00 AM \*SF04.01.01**

**Mechanical Modulation of Electroresistance in 2D Semiconductors** [Alexei L. Gruverman](#); University of Nebraska-Lincoln, United States

**8:30 AM \*SF04.01.02**

**Mechanically Gated Transistor Enabled by Flexoelectricity** [Boyuan Huang](#); Southern University of Science and Technology, China

**9:00 AM SF04.01.03**

**Strain Modulation and Piezoelectric Response in Chemical Vapor Deposition Grown MoS<sub>2</sub> Monolayers** [Sabir Hussain](#)<sup>1</sup>, Lynette Keeney<sup>1</sup> and Tariq Abbas<sup>2,3</sup>; <sup>1</sup>Tyndall National Institute, University College Cork, Ireland; <sup>2</sup>National Center for Nanoscience and Technology, China; <sup>3</sup>University of Chinese

Academy of Sciences, China

**9:15 AM SF04.01.04**

**Flexomagnetolectric Effect in Sr<sub>2</sub>IrO<sub>4</sub> Thin Films** Runyu Lei; Beijing Normal University, China

**9:30 AM BREAK**

SESSION SF04.02: Flexoelectric II

Session Chairs: Alexei Gruverman and Changjian Li

Monday Morning, April 7, 2025

Summit, Level 3, Room 320

**10:00 AM \*SF04.02.01**

**Flexoelectric Effects Under an AFM Tip** Marti Checa<sup>1</sup>, Christina Stefani<sup>2</sup>, Kyle Kelley<sup>1</sup>, Liam Collins<sup>1</sup>, Gustau Catalan<sup>2</sup>, Stephen Jesse<sup>1</sup> and Neus Domingo Marimon<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>Catalan Institute of Nanoscience and Nanotechnology, Spain

**10:30 AM SF04.02.02**

**Magnetolectric Coupling Induced by Flexoelectric Effect in Freestanding Oxide Thin Films** Luyong Zhang; Southern University of Science and Technology, China

**10:45 AM SF04.02.03**

**All-Liquid Metal Microparticles as Conductors, Solders, Vias Towards Stretchable Hybrid Electronics** Lixun Chen, Jinwei Cao and Xiaodong Chen; Nanyang Technological University, Singapore

**11:00 AM \*SF04.02.04**

**Flexoelectricity-Induced Novel Effects in Suspended Films** Yingzhuo Lun and Jiawang Hong; Beijing Institute of Technology, China

**11:30 AM \*SF04.02.05**

**Exploring the Unusual Nanotribology of Ferroelectric Domains and Domain Walls** Patrycja Paruch; University of Geneva, Switzerland

SESSION SF04.03: Flexoelectric III

Session Chairs: Boyuan Huang and Ming-Min Yang

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 320

**1:30 PM \*SF04.03.01**

**Switching at the Nanoscale—Domain Stability, Poling, Depoling and Relaxation Processes in Relaxor-Ferroelectrics** Nazanin Bassiri-Gharb<sup>1</sup>, G. Kevin Ligonde<sup>1</sup>, Isabella Stepanek<sup>1</sup> and Iaroslav Gaponenko<sup>1,2</sup>; <sup>1</sup>Georgia Institute of Technology, United States; <sup>2</sup>University of Geneva, Switzerland

**2:00 PM \*SF04.03.02**

**Flexoelectrical Generation of Quantum Electronic States in Oxide Cracks** Chan-Ho Yang; KAIST, Korea (the Republic of)

**2:30 PM BREAK**

**3:00 PM \*SF04.03.03**

**Flexoresponses in Ferrioc Systems Hosting Nanoscale Topological Structures** Weijin Chen, Linjie Liu and Yue Zheng; Sun Yat-sen University, China

**3:30 PM SF04.03.04**

**Design the Uniform Resistive Switching Devices via Atomic Scale Design** Changjian Li; Southern University of Science and Technology, Singapore

**3:45 PM SF04.03.05**

**Functionalized Gallium Nanoparticles for Enhanced Electrical Conductivity and Multifunctional Sensing Applications** Shih-Hao Chiu<sup>1,2</sup> and Kourosh Kalantar Zadeh<sup>1</sup>; <sup>1</sup>University of Sydney, Australia; <sup>2</sup>University of New South Wales, Australia

SESSION SF04.04: Flexoelectric IV

Session Chairs: Nazanin Bassiri-Gharb and Chan-Ho Yang

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 320

**10:30 AM \*SF04.04.01**

**Flexoelectricity Induced for Interfacial Polarization in Silicon-Based Barrier Layer Capacitors** Travis Peters, Ryan Hawks, Richard J. Meyer, Jr. and Susan E. Trolier-McKinstry; The Pennsylvania State University, United States

**11:00 AM \*SF04.04.02**

**Interface Piezoelectric Effect and Its Role in the Flexoelectric Effect** Ming-Min Yang<sup>1</sup>, He-Meng Sun<sup>1,2</sup> and Marin Alexe<sup>3</sup>; <sup>1</sup>Hefei National Laboratory, China; <sup>2</sup>University of Science and Technology of China, China; <sup>3</sup>University of Warwick, United Kingdom

SESSION SF04.05: Flexoelectric V

Session Chairs: Jiangyu Li and Lihua Shao

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 320

**1:30 PM SF04.05.01**

**Indium-Tin-Oxide Thin-Film Transistors with a Junctionless Structure for Improved Mechanical and Contact Stability** Seong-Pil Jeon<sup>1</sup>, Jeong-Wan Jo<sup>2</sup>, Dayul Nam<sup>1</sup>, Dong-won Kang<sup>1</sup>, Yong-Hoon Kim<sup>3</sup> and Sung Kyu Park<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>University of Cambridge, United Kingdom; <sup>3</sup>Sungkyunkwan University Advanced Institute of NanoTechnology, Korea (the Republic of)

**1:45 PM \*SF04.05.02**

**Shining Light on Flexoelectricity** Gustau Catalan<sup>1,2</sup> and Longlong Shu<sup>3</sup>; <sup>1</sup>Institut Català de Nanociència i Nanotecnologia, Spain; <sup>2</sup>ICREA, Spain; <sup>3</sup>Nanchang University, China

**2:15 PM \*SF04.05.03**

**Domains and Phase Transitions in Curved Ferroelectrics** Pavlo Zubko<sup>1,2</sup>; <sup>1</sup>London Centre for Nanotechnology, United Kingdom; <sup>2</sup>University College London, United Kingdom

**2:45 PM BREAK**

**3:15 PM \*SF04.05.04**

**Giant Flexoelectricity in Porous Materials for Sensing and Energy Harvesting** Lihua Shao; Beihang University, China

**3:45 PM SF04.05.05**

**Flexoelectricity in Suspended Membranes—Fundamentals** Jiangyu Li; Southern University of Science and Technology, China

**4:00 PM SF04.05.06**

**Flexoelectricity in Suspended Membranes—Applications** Jiangyu Li; Southern University of Science and Technology, China

**4:15 PM SF04.05.07**

**Electrical Transport Platform for Strongly Corrugated Complex Oxide Membranes** Minyong Han, Tiffany C. Wang and Harold Y. Hwang; Stanford University, United States

SESSION SF04.06: Poster Session: Flexoelectric  
Session Chairs: Jiangyu Li and Pradeep Sharma  
Tuesday Afternoon, April 8, 2025  
5:00 PM - 7:00 PM  
Summit, Level 2, Flex Hall C

**SF04.06.01**

**Observing and Modeling of Flexoelectricity at the Tip of Nanocracks** Mengkang Xu<sup>1</sup>, Xinpeng Tian<sup>2</sup>, Qian Deng<sup>3</sup>, Qun Li<sup>4</sup> and Shengping Shen<sup>4</sup>;  
<sup>1</sup>Southern University of Science and Technology, China; <sup>2</sup>Xi'an University of Technology, China; <sup>3</sup>Huazhong University of Science & Technology, China;  
<sup>4</sup>Xi'an Jiaotong University, China

**SF04.06.02**

**Anomalous High Young's Modulus of Ultrathin Freestanding PZT Films Caused by Strain Gradient Induced Flexoelectric Effects Revealed by Machine Learning Empowered Nanoindentation** Longji Lyu and Mengkang Xu; Southern University of Science and Technology, China

**SF04.06.03**

**Flexoelectricity in Self-Rolling Freestanding Heterogeneous Films** Shaoqing Xu, Yingzhuo Lun and Jiawang Hong; Beijing Institute of Technology, China

**SF04.06.04**

**Measurement of the Flexoelectric Coefficients in van der Waals Materials with Separation of Piezoelectricity** Chaobo Liang, Tingjun Wang, Yingzhuo Lun and Jiawang Hong; Beijing Institute of Technology, China

**SF04.06.05**

**Evaluating Non-Intrinsic Contribution in Flexoelectric Measurements** Tingjun Wang, Yingzhuo Lun and Jiawang Hong; Beijing Institute of Technology, China

**SF04.06.06**

**Emergence and Transformation of Polar Skyrmion Lattices via Flexoelectricity** Jianhua Ren, Linjie Liu, Weijin Chen and Yue Zheng; Sun Yat-sen University, China

**SF04.06.07**

**Domain Engineering the Flexoelectric Response of BaTiO<sub>3</sub>-SrTiO<sub>3</sub> Binary Films and BaTiO<sub>3</sub> Polycrystal—A Phase Field Study** Junyu Tao<sup>1,2</sup>, Weijin Chen<sup>1,2</sup> and Yue Zheng<sup>2</sup>; <sup>1</sup>Sun Yat-sen University, China; <sup>2</sup>Guangdong Provincial Key Laboratory of Magnetoelectric Physics and Devices, School of Physics, Sun Yat-sen University, China

**SF04.06.08**

**A Comparative Study on the Flexoelectric Effect in BaTiO<sub>3</sub>-Based Ceramics Modified with Transition Group Elements V, Mn and Ni** Yuyu Liu, Weijin Chen and Yue Zheng; Sun Yat-sen University, China

**SF04.06.09**

**The Flexoelectricity of Porous Materials and Their Applications** Hengchang Su<sup>1</sup>, Dongze Yan<sup>1</sup>, Jianxiang Wang<sup>2</sup> and Lihua Shao<sup>1</sup>; <sup>1</sup>Beihang University, China; <sup>2</sup>Peking University, China

**SF04.06.10**

**Scalable and Environmentally Friendly MXene-Tetrahedrites for Next-Generation Flexible Thermoelectrics** Deepa Madan<sup>1</sup>, Priyanshu Banerjee<sup>1</sup>, Jiyuan Huang<sup>1</sup>, Srushti Kulkarni<sup>1</sup>, Jacob Lombardo<sup>1</sup>, Swapnil Ambade<sup>2</sup>, Rohan Ambade<sup>3</sup>, Shreyasi Sengupta<sup>4</sup>, Zeev Rosenzweig<sup>4</sup>, Sunmi Shin<sup>5</sup> and Sichao Li<sup>5</sup>; <sup>1</sup>University of Maryland, Baltimore County, United States; <sup>2</sup>Johns Hopkins University, United States; <sup>3</sup>Advanced Research & Innovation Center, Khalifa University of Science & Technology, United Arab Emirates; <sup>4</sup>University of Maryland Baltimore County, United States; <sup>5</sup>National University of Singapore, Singapore

## SYMPOSIUM SF05

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Building Advanced Materials via Aggregation and Self-Assembly  
April 7 - April 11, 2025

Symposium Organizers

Kristen Fichthorn, The Pennsylvania State University  
Ting Han, Shenzhen University  
Ben Zhong Tang, The Chinese University of Hong Kong  
Xin Zhang, Pacific Northwest National Laboratory

Symposium Support

**Bronze**  
Protochips

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF05.01: Aggregation and Assembly I

Session Chairs: Kristen Fichthorn, Xiaoxu Li and Xin Zhang

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 347

**10:30 AM \*SF05.01.01**

**Self-Assembled Chiroptical Nanocomposites and Metamaterials for Extreme Conditions** Nicholas A. Kotov; University of Michigan, United States

**11:00 AM ^SF05.01.02**

**Towards Computation-Guided Design of Tunable Organic-Inorganic CdS Quantum Dot Binary Superlattices** Xin Qi; Dartmouth College, United States

**11:30 AM SF05.01.03**

**Colloidal Dispersions of Sterically and Electrostatically Stabilized PbS Quantum Dots** Ahhyun Jeong; The University of Chicago, United States

**11:45 AM SF05.01.04**

**Light-Directed Electrochemical Self-Organization of 3D Semiconductor Mesostructures** Natasha D. Reich and Azhar I. Carim; California Institute of Technology, United States

SESSION SF05.02: Aggregation and Assembly II

Session Chairs: Kristen Fichthorn, Xiaoxu Li, Xin Qi and Xin Zhang

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 347

**1:30 PM \*SF05.02.01**

**Understanding the Forces that Regulate Crystallization by Particle Attachment** James J. De Yoreo<sup>1,2</sup>, Elias Nakouzi<sup>1</sup>, Lili Liu<sup>1</sup>, Sakshi Yadav Schmid<sup>1,3</sup>, Dongsheng Li<sup>1</sup>, Benjamin A. Legg<sup>1</sup>, Peter Pauzaskie<sup>2,1</sup>, Chris Mundy<sup>1,2</sup>, Gregory K. Schenter<sup>1</sup> and Jaehun Chun<sup>1,4</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of Washington, United States; <sup>3</sup>École Polytechnique Fédérale de Lausanne, Switzerland; <sup>4</sup>The City College of New York, United States

**2:00 PM \*SF05.02.02**

**Evolution of Nano- and Micro-Structure of Tooth Enamel in Response to Dietary Changes in the Last 18 Million Years** Mackie C. O'Hara<sup>1</sup> and Pupa Gilbert<sup>2,3</sup>; <sup>1</sup>Purdue University, United States; <sup>2</sup>University of Wisconsin-Madison, United States; <sup>3</sup>Lawrence Berkeley National Laboratory, United States

**2:30 PM SF05.02.03**

**Directional Sliding Motion in Two-Dimensional Materials and Its Impact on the Resulting Hierarchical Structure** Xiaoxu Li<sup>1</sup>, Tuan A. Ho<sup>2</sup>, Honghu Zhang<sup>3</sup>, Lili Liu<sup>1</sup>, Ruipeng Li<sup>3</sup>, Ping P. Chen<sup>1</sup>, Sebastian T. Mergelsberg<sup>1</sup>, Kevin Rosso<sup>1</sup> and Xin Zhang<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>Sandia National Laboratories, United States; <sup>3</sup>Brookhaven National Laboratory, United States

**2:45 PM SF05.02.04**

**From Nano to Macro—Thinking Bigger in Nanoparticle Assembly** Robert J. Macfarlane; Massachusetts Institute of Technology, United States

**3:00 PM BREAK**

**3:30 PM \*SF05.02.05**

**Advances and New Developments in the Characterization of Nanoscale Processes Using Liquid-Phase TEM** Madeline Dukes, Katherine Marusak Stephens, Franklin Walden and John Damiano; Protochips, Inc., United States

**4:00 PM \*SF05.02.06**

**Programming Smart Dynamic Crystals** Luca Catalano<sup>1,2</sup>; <sup>1</sup>University of Modena and Reggio Emilia, Italy; <sup>2</sup>University of Rochester, United States

**4:30 PM SF05.02.07**

**In Situ Investigation of Large-Area Uniform Colloidal Crystal Fabrication** Christopher G. Passmore and Stephen Ebbens; The University of Sheffield, United Kingdom

**4:45 PM SF05.02.08**

**Dynamic Superlattice from Nanocrystal-Liquid Crystal Hybrid Materials** Shengsong Yang<sup>1,2</sup>, Dai-Bei Yang<sup>1</sup>, Yifan Ning<sup>1</sup>, Yugang Zhang<sup>3</sup>, Jeffery Saven<sup>1</sup> and Christopher Murray<sup>1</sup>; <sup>1</sup>University of Pennsylvania, United States; <sup>2</sup>The University of Chicago, United States; <sup>3</sup>Brookhaven National Laboratory, United States

SESSION SF05.03: Poster Session: Aggregation and Assembly

Session Chairs: Ting Han, Ben Zhong Tang and Xin Zhang

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF05.03.01**

**Improving Proton Exchange Membrane Fuel Cells by Thiol-Capped Silver Nanoparticles** Yuchen Bai<sup>1</sup>, Cynthia Qian<sup>2</sup>, Hongfan Deng<sup>3</sup>, Evan Ji<sup>4</sup>, Haoyan Fang<sup>5</sup>, Md Farabi Rahman<sup>5</sup> and Miriam H. Rafailovich<sup>5</sup>; <sup>1</sup>The Experimental High School Attached to Beijing Normal University, China; <sup>2</sup>Jericho High School, United States; <sup>3</sup>Hefei Thomas School, China; <sup>4</sup>Del Norte High School, United States; <sup>5</sup>Stony Brook University, United States

**SF05.03.02**

**Novel Tactoid Assemblies of Hydrophilic Quantum Dots—Self-Assembly Through Chromonic Liquid Crystal Phase Transitions** DaYeon Lee<sup>1</sup>, Samia I. Liba<sup>1</sup>, Timothy J. Atherton<sup>2</sup> and Linda S. Hirst<sup>1</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>Tufts University, United States

**SF05.03.03**

**Specific Ion Effects to Modulate Free-Standing Thin Silk Fibroin Films** Milad Arzani, Ngaatendwe Buhle Cathrine Pfukwa, Christopher Cheatum and Xuan Mu; The University of Iowa, United States

**SF05.03.04**

**Electrochemical Gelation of CdSe Nanoparticles—Consequences of Facets, Morphology and Anisotropy on Assembly Kinetics and Photocatalytic Water Splitting** Himanshu Yadav<sup>1</sup>, Sindy Liu<sup>2</sup>, Chansong Kim<sup>2</sup>, Qian Chen<sup>2</sup> and Stephanie L. Brock<sup>1</sup>; <sup>1</sup>Wayne State University, United States; <sup>2</sup>University of Illinois at Urbana-Champaign, United States

**SF05.03.05**

**Cellulose Nanofiber-Carbon Nanotube Composite Nickel/Nickel Oxide Multi-Functional Aerogels** Galen T. Mandes<sup>1</sup>, Paul D. Trackey<sup>1</sup>, Grant Lee<sup>1</sup>, Anthony W. Presot<sup>1</sup>, Catherine H. Brodsky<sup>1</sup>, Rosemary L. Calabro<sup>1</sup>, Nathan A. Burpeau<sup>1</sup>, Enoch Nagelli<sup>1</sup>, Stephen F. Bartolucci<sup>2</sup>, Joshua Maurer<sup>2</sup>, Gregory Peterson<sup>3</sup> and John Burpo<sup>1</sup>; <sup>1</sup>United States Military Academy, United States; <sup>2</sup>U.S. Army DEVCOM-Armaments Center, United States; <sup>3</sup>U.S. Army

DEVCOM-Chemical Biological Center, United States

**SF05.03.06**

**Liposome-Based Biosensor for Rare Earth Element Detection** Christopher I. Hamilton, Jessica M. Andriolo, Amos Taiswa, Casey M. McConnell, Marisa L. Pedulla and Jack Skinner; Montana Technological University, United States

**SF05.03.07**

**Activated Carbon/MOF Nanomembrane Composites Fabricated Through the Electrospinning Process for Protection Against Chemical Warfare Agents** Jaekyung Bae<sup>1</sup>, Hyungjun Kim<sup>2</sup>, Haechan Cho<sup>2</sup>, Jonghyeok Bang<sup>2</sup> and Youngho Jin<sup>2</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Chung-Ang University, Korea (the Republic of)

**SF05.03.08**

**Nanocluster Reaction-Driven *In Situ* Transformation of Colloidal Nanoparticles to Mesostructures** Paulami Bose and Thalappil Pradeep; Indian Institute of Technology Madras, India

**SF05.03.09**

**Magnetically Retrievable Nanoplatelets-Armored Emulsion Microreactor Platform for Efficient and Recyclable Enzymatic Catalysis** Seunghwan Lee, Bokgi Seo, Jaewon Shin and Jin Woong Kim; Sungkyunkwan University, Korea (the Republic of)

**SF05.03.10**

**One-Pot Double Emulsion Templated Cascade Microreactor Armored by Magnetic Responsive Anisotropic Colloid** Bokgi Seo<sup>1,2</sup>, Seunghwan Lee<sup>1</sup>, Jaewon Shin<sup>1</sup>, David A. Weitz<sup>2,2,2</sup> and Jin Woong Kim<sup>1</sup>; <sup>1</sup>Sungkyunkwan University, Korea (the Republic of); <sup>2</sup>Harvard University, United States

**SF05.03.11**

**Molecular Design for Smart Chiroptical Paints—Light-Adjustable and Polymerizable Spiral Structures Using Cyanostilbene-Based Reactive Mesogens** Seongmin Seo, Changhyeon Sung, Songeun Kim, Seunghun Kim and Kwang-Un Jeong; Jeonbuk National University, Korea (the Republic of)

**SF05.03.12**

**Self-Assembled Pt(II)-Terpyridine Based Metallomesogen for Advanced Optical Anticounterfeiting Codes** Changhyeon Sung, Seongmin Seo, Songeun Kim, Seunghun Kim and Kwang-Un Jeong; Jeonbuk National University, Korea (the Republic of)

**SF05.03.13**

**Imidazolium-Functionalized Diacetylene Amphiphiles—Secret Code Decryption Using Heating and Polarizer** Songeun Kim, Seunghun Kim, Seongmin Seo, Changhyeon Sung and Kwang-Un Jeong; Jeonbuk National University, Korea (the Republic of)

**SF05.03.14**

**Optical Switching of Cyanostilbene-Based AIEgen Smart Film Through Thermal and Photoinduced Monotropic Phase Transitions** Seunghun Kim, Seongmin Seo, Changhyeon Sung, Songeun Kim and Kwang-Un Jeong; Jeonbuk National University, Korea (the Republic of)

SESSION SF05.04: Aggregation and Assembly III

Session Chairs: Ting Han and Zijie Qiu

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 347

**8:00 AM SF05.04.01**

**Ultra-Bright Luminescent Lanthanide Nanoparticles for Time-Gated Bioanalysis and Imaging** Yihao Wang and Russ Algar; The University of British Columbia, Canada

**8:15 AM SF05.04.02**

**Unlocking the Potential of DNA-Assembled Plasmonic Nanoprobes for Precision Cancer Imaging and Therapy** Swati Tanwar; Johns Hopkins University, United States

**8:30 AM \*SF05.04.03**

**Design for Stimuli-Responsive Luminochromic Materials from Scratch Based on Heteroatom-Containing AIEgens** Kazuo Tanaka; Kyoto University,



Japan

**9:00 AM \*SF05.04.04**

**How Does Aggregation Influence Molecular Properties?** Zheng Zhao; The Chinese University of Hong Kong, Shenzhen, China

**9:30 AM \*SF05.04.05**

**Engineering the Assembly of Complex Nanoparticle Systems** Sharon C. Glotzer; University of Michigan, United States

**10:00 AM BREAK**

**10:30 AM \*SF05.04.06**

**Recent Progress on Photodynamic Therapy and Photothermal Therapy** Juyoung Yoon; Ewha Womans University, Korea (the Republic of)

**11:00 AM \*SF05.04.07**

**Polymeric Microparticles Generated via Confinement-Free Fluid Instability** Xu Deng<sup>1,2</sup>; <sup>1</sup>University of Electronic Science and Technology of China, China; <sup>2</sup><https://scholar.google.de/citations?user=Z3RzWoQAAAAJ&hl=en>, China

**11:30 AM SF05.04.08**

**Ultrafast Excited-State Dynamics and Inter-Chromophore Interactions in Self-Assembled Coordination Complexes** Lukas Rieland<sup>1</sup>, Tianyi Wang<sup>1</sup>, Sebastian Hütgens<sup>2</sup>, Andreas Stühler<sup>1</sup>, Marcel Schubert<sup>1</sup>, Malte C. Gather<sup>1</sup>, Arne Lützen<sup>2</sup> and Paul van Loosdrecht<sup>1</sup>; <sup>1</sup>University of Cologne, Germany; <sup>2</sup>University of Bonn, Germany

**11:45 AM SF05.04.09**

**Tuning Polymerization-Induced Self-Assembly in Epoxy Thermosets for Improved Static and Dynamic Properties** Brad H. Jones<sup>1</sup>, Kylie E. Van Meter<sup>1</sup>, Francesca C'deBaca<sup>1</sup>, Erin Nissen<sup>1</sup>, Angela Ku<sup>1</sup>, Michael Ford<sup>2</sup> and Jennifer Jordan<sup>3</sup>; <sup>1</sup>Sandia National Laboratories, United States; <sup>2</sup>Lawrence Livermore National Laboratory, United States; <sup>3</sup>Los Alamos National Laboratory, United States

SESSION SF05.05: Aggregation and Assembly IV

Session Chairs: Ting Han, Xiaoxu Li and Xin Zhang

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 347

**1:30 PM \*SF05.05.01**

**Armored Living Bacteriophage-Guided Intracellular Bacterial Targeting, Imaging and Elimination** Xuewen He; Soochow University, China

**2:00 PM \*SF05.05.02**

**Visualization of Polymer Fiber Microstructures by AIEgens** Yanhua Cheng; Donghua University, China

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SF05.05.03**

**Closed-Loop Recyclable and Multifunctional Dynamic Covalent Polymer Aerogels** Xinhai Zhang; Donghua University, China

**4:00 PM \*SF05.05.04**

**Inverse Design of 3D DNA-Assembled Lattices and Their Transformations** Oleg Gang; Columbia University/Brookhaven National Laboratory, United States

**4:30 PM SF05.05.05**

**Aggregated Synthesis of Superparamagnetic Nickel Ferrite Nanostructures** Naveen Narasimhachar Joshi<sup>1,2,3</sup> and Shivashankar S. A<sup>1</sup>; <sup>1</sup>Indian Institute of Science, India; <sup>2</sup>Indian Institute of Technology Kharagpur, India; <sup>3</sup>North Carolina State University, United States

**4:45 PM SF05.05.06**

**Engineering Specific Magnetic Interactions for Microscale Self-Assembly** Zexi Liang<sup>1</sup>, Melody Lim<sup>1</sup>, Chrisy Xiyu Du<sup>2</sup>, Michael Brenner<sup>2</sup>, Paul McEuen<sup>1</sup> and Itai Cohen<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Harvard University, United States

SESSION SF05.06: Aggregation and Assembly V

Session Chairs: Ting Han and Kazuo Tanaka

Thursday Morning, April 10, 2025

Summit, Level 3, Room 347

**8:00 AM \*SF05.06.01**

**Observation of the Aggregate Structures by Means of Environmentally Responsive Fluorophores** Gen-ichi Konishi<sup>1,2</sup>; <sup>1</sup>Institute of Science Tokyo, Japan; <sup>2</sup>Tokyo Institute of Technology, Japan

**8:30 AM \*SF05.06.02**

**Shining Through the Dark: Afterglow from Visible to NIR and the Role of Trace Doping** Parvej Alam; The Chinese University of Hong Kong, Shenzhen, China

**9:00 AM SF05.06.03**

**Ultrasensitive and On-Site Detection of Perfluoroalkyl Substances in Environmental Water Using Intelligently Designed AIE-Active Conjugated Polymer Systems** Sameer Hussain; Xi'an Jiaotong University, China

**9:15 AM SF05.06.04**

**Harnessing Anisotropic Particles in 3D Printable Silicone Inks** Lina Ghanbari and Michael Ford; Lawrence Livermore National Laboratory, United States

**9:30 AM BREAK**

**10:00 AM \*SF05.06.05**

**Rational Design and Precise Synthesis of Functional Luminogens in a Three-Dimensional World** Zijie Qiu; The Chinese University of Hong Kong, Shenzhen, China

**10:30 AM \*SF05.06.06**

**Exploring the Kinetics of Magic-Size Nanoparticle Self-Assembly with Simulations** Julia Dshemuchadse; Cornell University, United States

**11:00 AM SF05.06.07**

**Colloidal Crystallization—The Effect of Active Colloids on Interfacial and Sedimented Crystals** Nur Syazaliyana Azali and Stephen Ebbens; University of Sheffield, United Kingdom

**11:15 AM SF05.06.08**

**Self-Assembled Protein Nanofibril-Liquid Metal Gallium Biocomposites** Li Liu<sup>1,2</sup>, Francois-Marie Allieux<sup>1,2</sup>, Yi Shen<sup>1</sup> and Kourosh Kalantar-Zadeh<sup>1,2</sup>; <sup>1</sup>The University of Sydney, Australia; <sup>2</sup>University of New South Wales, Australia

**11:30 AM SF05.06.09**

**De Novo Design of Quasi Symmetric Protein Particles** Shunzhi Wang; University of Washington, United States

**11:45 AM SF05.06.10**

**Polymer Mobility Modulation with End Group Modification** Gunho Chang and Jiheong Kang; Seoul National University, Korea (the Republic of)

SESSION SF05.07: Aggregation and Assembly VI

Session Chairs: Ting Han, Xiaoxu Li, Zijie Qiu and Xin Zhang

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 347

**1:30 PM \*SF05.07.01**

**Enhancing Bioimaging Clarity: The Synergy of Aggregation-Induced Emission and Nonlinear Optics** Changhuo Xu; University of Macau, China

**2:00 PM SF05.07.02**

**Hybrid Silica Cage-Type Nanostructures from Triply Hydrophilic Block Copolymer Single Micelles** Anu Vashishtha, Anthony Phimpachanh, Thomas Gaillard, Julien Schmitt, Corine Gerardin, Gauthier Rydzek and Tangi Aubert; University of Montpellier, France

**2:15 PM SF05.07.03**

**Magnetic Decoupling for High-Yield, Time-Efficient Microscale Self-Assembly** Zexi Liang<sup>1</sup>, Melody Lim<sup>1</sup>, Qianze Zhu<sup>2</sup>, Francesco Mottes<sup>2</sup>, Chrisy Xiyu Du<sup>2</sup>, Michael Brenner<sup>1</sup>, Paul McEuen<sup>1</sup> and Itai Cohen<sup>1</sup>; <sup>1</sup>Cornell University, United States; <sup>2</sup>Harvard University, United States

**2:30 PM BREAK**

**3:00 PM \*SF05.07.04**

**Mechanochemical Fabrication of AIE-Active Materials for Diverse Applications** Jianquan Zhang<sup>1</sup>, Huilin Xie<sup>1,2</sup> and Ben Zhong Tang<sup>1,2</sup>; <sup>1</sup>The Chinese University of Hong Kong, Shenzhen, China; <sup>2</sup>The Hong Kong University of Science and Technology (HKUST), China

**3:30 PM SF05.07.05**

**Preparation of Super Spreading Polypropylene Fiber Membrane by Capillary Self-Assembly** Yue Ru and Zhong Wei; Sinopec, China

**3:45 PM SF05.07.06**

**Smart Colloidal Assembly and Nanopatterning—Surface-Polymerization and Templating for Sensing and Delivery** Rigoberto C. Advincula; The University of Tennessee/Oak Ridge National Laboratory, United States

SESSION SF05.08: Aggregation and Assembly VII

Session Chairs: Kristen Fichthorn and Xiaoxu Li

Friday Morning, April 11, 2025

Summit, Level 3, Room 347

**8:30 AM \*SF05.08.01**

**Woody Biomass-Based Aggregation-Induced Emission Materials** Xu-Min Cai; Nanjing Forestry University, China

**9:00 AM \*SF05.08.02**

**Applications of AIEgens in Glioblastoma Treatment and Phototheranostics** Yanhong Duo; Harvard University, United States

**9:30 AM SF05.08.03**

**Visualizing Interfacial Collective Reaction Behaviour of Li-S Batteries** Stanley Zhou<sup>1,2</sup>, Guiliang Xu<sup>2</sup>, Hong-Gang Liao<sup>1</sup>, Khalil Amine<sup>2</sup> and Shi-Gang Sun<sup>1</sup>; <sup>1</sup>Xiamen University, China; <sup>2</sup>Argonne National Laboratory, United States

**9:45 AM BREAK**

**10:15 AM \*SF05.08.05**

**Engineering of Colloidal Nanocrystals for Multifunctional Coatings** Hongyou Fan; Sandia National Laboratories, United States

**10:45 AM SF05.08.06**

**Aggregation and Removal of Impurity Nanoparticles via Insulator-Based Dielectrophoresis for Semiconductor Industry-Grade Material** Seungyun Lee<sup>1</sup>, Donggyu Lee<sup>1</sup>, Jinhyeok Jang<sup>2</sup>, Younghun Kim<sup>2</sup>, Yunho Kim<sup>2</sup>, Samjong Choi<sup>2</sup> and Jihyun Kim<sup>1</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Samsung Electronics, Korea (the Republic of)

**11:00 AM SF05.08.07**

**Superparamagnetic Mn-Based MOF as Electrode for Supercapacitors** Saumaya Kirti, Shobha Shukla and Shobha Shukla; Indian Institute of Technology Bombay, India

**11:15 AM SF05.08.08**

**Nanoscale Investigation of N-Heterocyclic Carbenes Self-Assembly on Metal Surfaces** Francesco Tumino<sup>1,2</sup>, Emmett DesRoche<sup>2,2</sup>, Shengzhuo Wang<sup>3</sup>, Emmanuel Jr. Adeniyi<sup>3</sup>, Uyen Nguyen<sup>3</sup>, Mark D. Aloisio<sup>1,2</sup>, Alastair B. McLean<sup>2,2</sup>, Matthew Neurock<sup>3</sup> and Cathleen M. Crudden<sup>1,2</sup>; <sup>1</sup>Queen's University,

Canada; <sup>2</sup>Queen's University, Canada; <sup>3</sup>University of Minnesota, United States

SESSION SF05.09: Aggregation and Assembly VIII

Session Chairs: Xiaoxu Li and Xin Zhang

Friday Afternoon, April 11, 2025

Summit, Level 3, Room 347

**1:30 PM SF05.09.01**

**Enhanced Transport and Assembly of Paramagnetic Colloids** [Ayca Ersoy](#) and Zachary Sherman; University of Washington, United States

**1:45 PM SF05.09.02**

**Revolutionizing Plasma Polymerized Long-Term Anti-Corrosion ppHMDSZ Coatings on Titanium and Stainless Steel** [Danang Tri Hartanto](#) and Meng-Jiy Wang; National Taiwan University of Science and Technology, Taiwan

**2:00 PM SF05.09.03**

**Laser Shockwave-Induced Transformation of SWCNTs into Multi-Layer Graphene** [Jianlin Li](#)<sup>1</sup>, Juyeon Seo<sup>1</sup>, Peiyun Feng<sup>1</sup>, Dina N. Oosthuizen<sup>1</sup>, Ahmed A. Busnaina<sup>1</sup>, Hyunyoung Jung<sup>2</sup>, Dongsik Kim<sup>3</sup> and Yung Joon Jung<sup>1</sup>; <sup>1</sup>Northeastern University, United States; <sup>2</sup>Gyeongsang National University, Korea (the Republic of); <sup>3</sup>Pohang University of Science and Technology, Korea (the Republic of)

**2:15 PM SF05.09.04**

**Ultra Broad 300-1150 nm Emitting Fe Doped Carbon Quantum Dots** Pushpendu Biswas and [Asha Bhardwaj](#); Indian Institute of Science, India

**2:30 PM SF05.09.05**

**Facile Room Temperature Synthesis and Directable Self-Assembly of Ultrasmall Antimony (III) Sulfide Nanoparticles for Li<sup>+</sup>/Na<sup>+</sup> Batteries** [Zachery R. Wylie](#), Guesang K. Lee, Soohyung Lee, Abdul Moez, Guodong Ren, Juan Carlos Idrobo, Lilo D. Pozzo and Vincent C. Holmberg; University of Washington, United States

**2:45 PM BREAK**

**3:15 PM SF05.09.06**

**Stabilizing Supramolecular Assemblies of Two-Dimensional J-Aggregates for Fundamental Optical Studies of Single Emitters** [Dimuthu H. Thanippuli Arachchi](#), Shelby E. Elder, Jonah R. Horowitz, Oliver Tye and Mounqi Bawendi; Massachusetts Institute of Technology, United States

**3:30 PM SF05.09.07**

**Regulating Magnetic Properties of Semiconducting Lanthanide-Based Metal-Organic Frameworks** [Huilin Qing](#), Katherine Mirica and Weiyang Li; Dartmouth College, United States

**3:45 PM SF05.09.08**

**Magnetic-Field Assisted Co-Reduction Synthesis of High Surface Area FeNi Nanowire Aerogels Electrocatalysts** [Rosemary L. Calabro](#)<sup>1</sup>, Alexander Ciampa<sup>1</sup>, Kennedy Munz<sup>1</sup>, Enoch Nagelli<sup>1</sup>, Stephen F. Bartolucci<sup>2</sup>, Joshua Maurer<sup>2</sup> and John Burpo<sup>1</sup>; <sup>1</sup>United States Military Academy, United States; <sup>2</sup>U.S. Army DEVCOM-Armaments Center, United States

**4:00 PM SF05.09.09**

**Crack-Resistant Dielectric Elastomer Artificial Muscles** [Jiyun Kim](#) and Jiheong Kang; Seoul National University, Korea (the Republic of)

## SYMPOSIUM SF06

Symposium Organizers

Luis Liz-Marzan, CIC biomaGUNE  
Ki Tae Nam, Seoul National University  
Zhiyong Tang, National Ctr for Nanosci & Tech  
Jihyeon Yeom, Korea Advanced Institute of Science and Technology

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF07.04/SF06.01: Joint Session: Advanced Chiral Materials

Session Chairs: Ki Tae Nam and Jihyeon Yeom

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 346

**1:30 PM SF07.04/SF06.01.01**

**Quantifying Chirality in Multiscale Nanostructured Systems** Jessica Ma<sup>1,1,1</sup>, Minjeong Cha<sup>1,1</sup>, Neel Moudgal<sup>1,1,1</sup>, Emine Turali-Emre<sup>2,1,1</sup>, Ji-Young Kim<sup>3,1,1</sup> and Nicholas A. Kotov<sup>1,1,1</sup>; <sup>1</sup>University of Michigan–Ann Arbor, United States; <sup>2</sup>Boğaziçi University, Turkey; <sup>3</sup>Rensselaer Polytechnic Institute, United States

**1:45 PM SF07.04/SF06.01.02**

**Controlling Chiral Emergence of Conjugated Polymers by Meniscus-Guided Coating** Kavinraaj Ella Elangovan, Chloe Lin, Bowen Hao, Yen-Chi Chen and Ying Diao; University of Illinois at Urbana-Champaign, United States

**2:00 PM SF07.04/SF06.01.03**

**Synthesis of Chiral Metasurface by Chemical Vapor Polymerization into the Self-Assembled Square Array of Smectic Liquid-Crystalline Defects** Arit Patra<sup>1</sup>, Soumyamouli Pal<sup>2</sup>, Jun Lu<sup>1</sup>, Nicholas A. Kotov<sup>1</sup>, Nicholas Abbott<sup>2</sup> and Joerg Lahann<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Cornell University, United States

**2:15 PM SF07.04/SF06.01.04**

**Near-Infrared CPL-Active Semiconductor Helices with Tunable Twist Counts** Kody G. Whisnant, Jun Lu, Bing Ni, Jonathan Schwartz, Jason Manassa, Robert Hovden and Nicholas A. Kotov; University of Michigan–Ann Arbor, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM SF07.04/SF06.01.05**

**Complex Chiral Nanodendrimers and Graph-Property Relationships for Chiroptical Activity** Alain Kadar<sup>1,1,1</sup>, Vera Kuznetsova<sup>1,1</sup>, Anita Gaenko<sup>1,1,1</sup>, Engin Er<sup>1,1</sup>, Tao Ma<sup>1</sup>, Kody G. Whisnant<sup>1,1,1</sup>, Bing Ni<sup>1,1,1</sup>, Ji-Young Kim<sup>1,1</sup>, Yurii K. Gun'ko<sup>2</sup> and Nicholas A. Kotov<sup>1,1,1</sup>; <sup>1</sup>University of Michigan–Ann Arbor, United States; <sup>2</sup>Trinity College Dublin, The University of Dublin, United Kingdom

**3:45 PM SF07.04/SF06.01.06**

**Terahertz Circular Dichroism in Chiral Perovskites** Sunihl Ma<sup>1,2</sup>, Sang Hyun Lee<sup>2</sup>, Ji-Young Kim<sup>3</sup> and Nicholas A. Kotov<sup>2</sup>; <sup>1</sup>Sungshin Women's University, Korea (the Republic of); <sup>2</sup>University of Michigan–Ann Arbor, United States; <sup>3</sup>Rensselaer Polytechnic Institute, United States

**4:00 PM SF07.04/SF06.01.07**

**Chiral Inorganic Nanoparticle-Based Aerogels** Susanna Tinello and Markus Niederberger; ETH Zürich, Switzerland

**4:15 PM \*SF07.04/SF06.01.08**

**Engineering Complexity Into Complex Particle Systems** Sharon C. Glotzer; University of Michigan, United States

SESSION SF06.02: Advanced Chiral Materials I  
Session Chairs: Ki Tae Nam and Jihyeon Yeom  
Thursday Morning, April 10, 2025  
Summit, Level 3, Room 340

**10:30 AM \*SF06.02.01**

**Transformable Plasmonic Helices** [Laura N. Liu](#); University of Stuttgart, Germany

**11:00 AM SF06.02.02**

**Combined Chiroptical and Magneto-Optical Studies of Chiral Nanocrystals** [Assaf Ben Moshe](#); Bar-Ilan University, Israel

SESSION SF06.03: Advanced Chiral Materials II

Session Chairs: Ki Tae Nam and Jihyeon Yeom  
Thursday Afternoon, April 10, 2025  
Summit, Level 3, Room 340

**1:30 PM \*SF06.03.01**

**Chiral Nanostructures** [Nicholas A. Kotov](#); University of Michigan, United States

**2:00 PM SF06.03.02**

**Chiral Nanomaterials and Their Applications** [Jihyeon Yeom](#); Korea Advanced Institute of Science and Technology, United States

**2:15 PM SF06.03.03**

**Ultrafast Optical Measurements of Chirality Induced Spin Selectivity in Chiral Materials** [Jacob Shelton](#)<sup>1</sup>, Jaiwan Tan<sup>1</sup>, Fan He<sup>2</sup>, Matthew C. Beard<sup>1</sup>, Jing Gu<sup>2</sup>, Nathan R. Neale<sup>1</sup> and Jao Van de Lagemaat<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>San Diego State University, United States

**2:30 PM SF06.03.04**

**Oriented Chiral Two-Dimensional Covalent-Organic Frameworks for Spintronic Devices** [Yu Zhong](#); Cornell University, United States

**2:45 PM SF06.03.05**

**Role of Chirality on Electron Transport in Peptides** [Rajarshi Samajdar](#), Moeen Meigooni, Seungjoo Yi, Xiaolin Liu, Jeffrey Moore, Emad Tajkhorshid and Charles M. Schroeder; University of Illinois at Urbana Champaign, United States

**3:00 PM BREAK**

**3:30 PM SF06.03.06**

**Photonically Enabled Chiral Bio-Organic Composites for Synaptic Transistors** [Moon Jong Han](#)<sup>1</sup> and Vladimir Tsukruk<sup>2</sup>; <sup>1</sup>Gachon University, Korea (the Republic of); <sup>2</sup>Georgia Institute of Technology, United States

**3:45 PM SF06.03.07**

**Suppressing the Hydrogen Evolution on Chiral Cu Electrodes for Efficient Electrochemical CO<sub>2</sub> Reduction** [Jaiwan Tan](#), Nathan R. Neale and Jao Van de Lagemaat; National Renewable Energy Laboratory, United States

**4:00 PM SF06.03.08**

**Two-Dimensional Chiral Aperiodic Topological Self-Assembly** [Karl-Heinz Ernst](#); Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**4:15 PM SF06.03.09**

**Innovative 2D Membrane Architecture for Advanced Chiral Molecules Separation** [Mathilde Moderne](#)<sup>1,2,3</sup>, Zakaria Anfar<sup>1,2,3</sup>, Wensen Wang<sup>4</sup>, Chrystelle Salameh<sup>1,2,5</sup>, Sebastien Balme<sup>1,2</sup> and Damien Voiry<sup>1,2,3</sup>; <sup>1</sup>European Institute of Membrane, France; <sup>2</sup>University of Montpellier, France; <sup>3</sup>CNRS, France; <sup>4</sup>Leibniz-Institut für Neue Materialien, Germany; <sup>5</sup>ENSCM, France

**4:30 PM SF06.03.10**

**Ultrafast Excitonic Transitions in Enantiopure Squaraine Thin Films** Robin Bernhardt<sup>1</sup>, Lukas Rieland<sup>1</sup>, Tianyi Wang<sup>1</sup>, Marvin F. Schumacher<sup>2</sup>, Arne Lützen<sup>2</sup>, Manuela Schiek<sup>3</sup> and Paul van Loosdrecht<sup>1</sup>; <sup>1</sup>University of Cologne, Germany; <sup>2</sup>University of Bonn, Germany; <sup>3</sup>Johannes Kepler Universität Linz, Austria

**4:45 PM SF06.03.11**

**Chiral Halide Perovskites for Optoelectronic Applications** Matthew Hautzinger and Matthew C. Beard; National Renewable Energy Laboratory, United States

SESSION SF06.04: Poster Session: Advanced Chiral Materials

Session Chairs: Ki Tae Nam and Jihyeon Yeom

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF06.04.01**

**Aromatic Solvent-Mediated Co-Crystallization for Transferred Chiroptical Transitions in Chiral Binaphthyl/ $\pi$ -Conjugated Polymer Hybrid Thin Films** Jung Ah Lim<sup>1</sup>, Hanna Lee<sup>1,2</sup>, Danbi Kim<sup>1,2</sup>, Changsoo Choi<sup>1</sup> and Jeong Ho Cho<sup>2</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Yonsei University, Korea (the Republic of)

**SF06.04.02**

**The Chiral Property of Anisotropic Gold Metamaterials** Shuai Feng and Sui Yang; Arizona State University, United States

**SF06.04.03**

**Details into the Interplay Between Magnetism and Topology in 3D Kagome Lattices—A Density Functional Theory Approach** Andres Camilo Garcia-Castro<sup>1</sup>, Carlos E. Ardila Gutierrez<sup>1</sup> and Aldo H. Romero<sup>2</sup>; <sup>1</sup>Universidad Industrial de Santander, Colombia; <sup>2</sup>West Virginia University, United States

**SF06.04.04**

**Exploiting Optical Asymmetry in N-Doped Chiral Carbon Dots and Their Application in Fluorescence OFF-ON Sensing of Hg<sup>2+</sup> and L-Cysteine** Angana Bhattacharya and Amita Pathak; Indian Institute of Technology Kharagpur, India

## SYMPOSIUM SF07

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Complexity Engineering of Materials Combining Order, Disorder and Hierarchical Organization

April 7 - April 10, 2025

Symposium Organizers

Paul Bogdan, University of Southern California

Samuel Chigome, Botswana Institute

Nicholas Kotov, University of Michigan

Molly Stevens, Imperial College London

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF07.01: Combining Order and Disorder

Session Chairs: Tianli Feng and Yee Kan Koh

Tuesday Morning, April 8, 2025

Summit, Level 3, Room 346

**10:30 AM \*SF07.01.01**

**Delaying Disorder in Flow via Ordered Phononic Subsurfaces** [Abigail Juhl](#)<sup>1</sup>, Caleb Barnes<sup>1</sup>, Albert Medina<sup>1</sup>, Carson Willey<sup>2,1</sup>, Vincent Chen<sup>2,1</sup>, Burak Tuna<sup>3</sup>, Rajan Kumar<sup>3</sup> and Kevin Rosenberg<sup>4,1</sup>; <sup>1</sup>Air Force Research Laboratory, United States; <sup>2</sup>BlueHalo, United States; <sup>3</sup>Florida State University, United States; <sup>4</sup>Spectral Energies, LLC, United States

**11:00 AM \*SF07.01.02**

**Beyond Nearest Neighbors—Pathway Engineering of Complex Nanoparticle Assemblies** [Qian Chen](#); University of Illinois at Urbana-Champaign, United States

**11:30 AM SF07.01.03**

**Graph-Theoretical Predictions of Two-Dimensional Stress Propagation Through Complex Strut Lattices** [Alain Kadar](#)<sup>1,1,1</sup>, Marcos Reyes-Martinez<sup>2</sup>, Steven Dunne<sup>1</sup>, Sharon C. Glotzer<sup>1,1,1</sup>, Christopher Soles<sup>2</sup> and Nicholas A. Kotov<sup>1,1,1</sup>; <sup>1</sup>University of Michigan—Ann Arbor, United States; <sup>2</sup>National Institute of Standards and Technology, United States

**11:45 AM SF07.01.04**

**Engineering Mechanical Properties via Control of Disorder—A Unified Mathematical Framework for Metamaterials Design** [Kate M. Ainger](#) and Lorenzo Valdevit; University of California, Irvine, United States

SESSION SF07.02: Particle Networks

Session Chairs: Tianli Feng and Yee Kan Koh

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 346

**1:30 PM +SF07.02.01**

**Single and Multi-Component Self-Associating Gel Networks** [Emanuela Del Gado](#); Georgetown University, United States

**2:00 PM \*SF07.02.02**

**3D Macroscale Metal Chalcogenide Architectures from the Assembly of Nanoscale Objects—The Intersection of Form and Function** Vinicius Alevato<sup>1</sup>, Himanshu Yadav<sup>1</sup>, Alexandru Niculescu<sup>1</sup>, Chansong Kim<sup>2</sup>, Sindy Liu<sup>2</sup>, Kody G. Whisnant<sup>3</sup>, Nicholas A. Kotov<sup>3</sup>, Qian Chen<sup>2</sup> and [Stephanie L. Brock](#)<sup>1</sup>; <sup>1</sup>Wayne State University, United States; <sup>2</sup>University of Illinois at Urbana-Champaign, United States; <sup>3</sup>University of Michigan—Ann Arbor, United States

**2:30 PM SF07.02.03**

**CdS Quantum Dot Pt Nanoparticle Aerogel Composites for Photocatalytic Hydrogen Evolution—Consequences of Composite Preparation Method on Photocatalytic Activity** [Vinicius Alevato](#)<sup>1</sup>, Alexandru Niculescu<sup>1</sup>, Chansong Kim<sup>2</sup>, Kody G. Whisnant<sup>3</sup>, Shahrzad Radpour<sup>4</sup>, Jier Huang<sup>4</sup>, Nicholas A. Kotov<sup>3</sup>, Qian Chen<sup>2</sup> and Stephanie L. Brock<sup>1</sup>; <sup>1</sup>Wayne State University, United States; <sup>2</sup>University of Illinois at Urbana-Champaign, United States; <sup>3</sup>University of Michigan, United States; <sup>4</sup>Boston College, United States

**2:45 PM BREAK**

**3:15 PM SF07.02.04**

**Layer-by-Layer Assembled Nanowire Networks Enable Graph-Theoretical Design of Multifunctional Coatings** [Wenbing Wu](#); University of Michigan, United States

**3:30 PM +SF07.02.05**

**Structuring the Complexity of Tissue Engineering Scaffolds for Rapid Prototyping and Efficient Tissue Regeneration** Lakshmi Y. Sujeeun<sup>1</sup>, Itisha Chummun Phul<sup>1</sup>, Nicholas A. Kotov<sup>2</sup> and [Archana Bhaw-Luximon](#)<sup>1</sup>; <sup>1</sup>University of Mauritius, Mauritius; <sup>2</sup>University of Michigan—Ann Arbor, United States



**4:00 PM \*SF07.02.06**

**Coating of Surfaces with Polymer Particles and Fabrication of Nanofiber Membranes by Electrohydrodynamic Material Fabrication Techniques**

Samuel Chigome; Botswana Institute for Technology Research and Innovation, Botswana

**4:30 PM SF07.02.07**

**Graph Theory Guided Template-Free Printing of Nanoparticle Films** John R. Crockett<sup>1</sup>, Kyung Sun Park<sup>1</sup>, Yen-Chi Chen<sup>1</sup>, Yung Man Yu<sup>1</sup>, Dajie Xie<sup>1</sup>, Dickson Owuor<sup>2,3</sup>, Paul V. Braun<sup>1</sup>, Qing Cao<sup>1</sup>, Nicholas A. Kotov<sup>2</sup>, Ying Diao<sup>1</sup> and Qian Chen<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States;

<sup>2</sup>University of Michigan–Ann Arbor, United States; <sup>3</sup>Strathmore, Kenya

**4:45 PM SF07.02.08**

**Disordered Spinodal Metamaterials—Curvature-Guided Properties and Scalable Self-Architecture** Somayajulu I. Dhulipala, Michael Espinal and Carlos Portela; Massachusetts Institute of Technology, United States

SESSION SF07.03/SF08.05: Joint Session: System Design and Assembly—Interfaces, Biomimetics and Nanostructures

Session Chairs: Brandi Cossairt and Nicholas Kotov

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 346

**8:00 AM \*SF07.03/SF08.05.01**

**Modelling Resilin-Like Peptides on 2D-Material Surfaces to Control Elastomer Cross-Linking and Composites** Tiffany Walsh; Deakin University, Australia

**8:30 AM \*SF07.03/SF08.05.02**

**Peptidic Luminescent Gold Nanoclusters for *In Situ* Biosensing in Living Organism** Valerie Marchi-Artzner; CNRS Rennes University, France

**9:00 AM SF07.03/SF08.05.03**

**Heterogeneous Functional Core-Shell Capsules Enabled by Nanoscale Spatial Assembly** Wenle Li<sup>1</sup>, Manrui Mu<sup>1</sup>, Bo Jiang<sup>1</sup>, Xiangyu Jiang<sup>1</sup>, Hongju Jung<sup>2</sup> and Nicholas A. Kotov<sup>2</sup>; <sup>1</sup>China University of Petroleum (East China), China; <sup>2</sup>University of Michigan–Ann Arbor, United States

**9:15 AM SF07.03/SF08.05.04**

**Bioinspired Nanocomposites for Energy Storage Applications** Ahmet Emre<sup>1,2,3</sup>, Emine Turali-Emre<sup>1,2</sup> and Nicholas A. Kotov<sup>1</sup>; <sup>1</sup>University of Michigan, United States; <sup>2</sup>Bogazici University, Turkey; <sup>3</sup>Valerion Energy, United States

**9:30 AM \*SF07.03/SF08.05.05**

**Statistical Mechanics of Frustrated Assemblies and Incompatible Graphs** Xiaoming Mao, José M. Ortiz-Tavárez, Zhen Yang and Nicholas A. Kotov; University of Michigan, United States

**10:00 AM BREAK**

**10:30 AM SF07.03/SF08.05.06**

**Designing Tunable Self-Assembly Process of Microparticles at Fluidic Interfaces** Sungwan Park, Justin Choi and Albert T. Liu; University of Michigan–Ann Arbor, United States

**10:45 AM SF07.03/SF08.05.07**

**Impact of the Chemical Intercalant on the Structural Properties and Aqueous Stability of V<sub>2</sub>CT<sub>x</sub> MXene** Reagan A. Beers and Jessica Ray; University of Washington, United States

**11:00 AM SF07.03/SF08.05.08**

**Influence of Repeated Solvent Processing on Morphology, Chemical Stability and Conductivity of Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene Flakes** Ken Aldren S. Usman, Jizhen Zhang and Joselito Razal; Deakin University, Australia

**11:15 AM SF07.03/SF08.05.09**

**Biomimetic Synthesis and Morphogenesis of Synthetic Brochosomes** Jinsol Choi and Tak-Sing Wong; The Pennsylvania State University, United States

**11:30 AM SF07.03/SF08.05.10**

**Hierarchical Epoxy Thermosets—Tuning Properties at Multiple Length Scales Through Phase Separation and Additive Manufacturing** Kylie E. Van Meter<sup>1</sup>, Lina Ghanbari<sup>2</sup>, Michael Ford<sup>2</sup>, Sangwoo Lee<sup>3</sup>, Francesca C'deBaca<sup>1</sup> and Brad H. Jones<sup>1</sup>; <sup>1</sup>Sandia National Laboratories, United States; <sup>2</sup>Lawrence Livermore National Laboratory, United States; <sup>3</sup>Rensselaer Polytechnic Institute, United States

**11:45 AM SF07.03/SF08.05.11**

**Length-Dependent Discrete Oligomers and Their Assembly Pathways** Janice M. Baek, Rui Zhang, Jeffrey Moore and Ying Diao; University of Illinois at Urbana-Champaign, United States

SESSION SF07.05/SF08.06: Joint Poster Session

Session Chair: Nicholas Kotov

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF07.05/SF08.06.01**

**Sonication-Driven Colloidal Structure and Rheological Behavior of MWCNT-Based Nanofluids** Jongsuk Lee<sup>1</sup>, Sejin Lee<sup>1</sup>, Chungyeon Cho<sup>2</sup> and Sunghan Kim<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Wonkwang University, Korea (the Republic of)

**SF07.05/SF08.06.02**

**A Study of Chiral Assembly in Quinoid Molecules—Exploring the Mechanism and Material Properties** Younghyo Kim, Jeongwoo Beak and Dong-Yu Kim; Gwangju Institute of Science and Technology, Korea (the Republic of)

**SF07.05/SF08.06.03**

**Advancing Friction Modeling—Integrating Surface Asperities and Complex Geometries with Nonlinear Mechanics** Matthew Nakamura, Corrisa Heyes and Joseph Brown; University of Hawaii at Manoa, United States

**SF07.05/SF08.06.04**

**Analysis of Multi Length Scale Ordering in Compositionally Complex Rare Earth Titanate Pyrochlores Through Microscopy and Scattering Techniques** Joshua Safin, Sean Drewry and Katharine Page; University of Tennessee, Knoxville, United States

**SF07.05/SF08.06.05**

**Synthesis and Surface Coatings of Anisotropic Au Nanoparticles** Joshua Marquardt, Yan Cui, Junming Yue, Zinnia Mallick and Shan Zhou; South Dakota School of Mines & Technology, United States

**SF07.05/SF08.06.06**

**Extracting Thermoelectric Properties from Hierarchically Designed Thinner Peltier Sheets** Norifusa Satoh<sup>1</sup>, Jin Kawakita<sup>1</sup> and Junnosuke Murakami<sup>2</sup>; <sup>1</sup>National Institute for Materials Science, Japan; <sup>2</sup>Sekisui Chemical Company, Limited, Japan

**SF07.05/SF08.06.07**

**Optical Characteristics of Dy<sup>3+</sup>-Doped High Entropy Oxides Studied by Raman and Photoluminescence Spectroscopy** Hanseul Cho<sup>1</sup>, Joohee Park<sup>1</sup>, Sojeong Ko<sup>1</sup>, Seokhyun Yoon<sup>1</sup>, Seungyeon Lee<sup>1</sup>, Suyeon Cho<sup>1</sup>, David Berardan<sup>2</sup> and Claudia Decorse<sup>2</sup>; <sup>1</sup>Ewha Womans University, Korea (the Republic of); <sup>2</sup>Paris-Saclay University, France

**SF07.05/SF08.06.08**

**Self-Assembled Hierarchical Nanostructures for Above 100k DPI Resolution and Wide-Gamut Structural Coloration on Both Rigid and Flexible Substrates** Fei Xiang, Ning Li, Maxim Elizarov, Arturo Burguete-Lopez and Andrea Fratolocchi; King Abdullah University of Science and Technology, Saudi Arabia

SESSION SF07.06: Complex Composites

Session Chairs: Tianli Feng and Yee Kan Koh

Thursday Morning, April 10, 2025

Summit, Level 3, Room 346

**8:30 AM \*SF07.06.01**

**Disordered Hyperuniformity in Materials and Its Influence on Properties** Lawrence F. Drummy; Air Force Research Laboratory, United States

**9:00 AM SF07.06.02**

**Molecular Design of a Filler-Polymer Interface to Control Elastomer Reinforcement** Tad Koga<sup>1</sup>, Xiaoran Wang<sup>1</sup>, Zhixing Huang<sup>1</sup>, Yashasvi Bajaj<sup>1</sup>, Maya Endoh<sup>1</sup>, Jan-Michael Carrillo<sup>2</sup> and Michihiro Nagao<sup>3</sup>; <sup>1</sup>Stony Brook University, United States; <sup>2</sup>Oak Ridge National Laboratory, United States; <sup>3</sup>National Institute of Standards and Technology, United States

**9:15 AM BREAK**

**9:45 AM SF07.06.03**

**Graph Models of Biomimetic Composites from Nanofibers** Nicholas A. Kotov; University of Michigan, United States

**10:00 AM SF07.06.04**

**Multi-Scale Defects Activation of Metallic Glasses Revealed by Nanoindentation** Wei Li; Southeast University, China

**10:15 AM SF07.06.05**

**Chiral Vanadium Oxide Nanoclusters with Predictive Docking and Biomimetic Actin Polymerization** Yanan Wang, Jessica Ma, Michal Sawczyk, Emine Turali-Emre and Nicholas A. Kotov; University of Michigan, United States

**10:30 AM SF07.06.06**

**3D Printing in Embedding Media to Fabricate Hierarchical Structures** Michinao Hashimoto; Singapore University of Technology and Design, Singapore

SESSION SF07.07: Complex Particles and Self-Assembly

Session Chairs: Tianli Feng, Yee Kan Koh and Zhiting Tian

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 346

**1:30 PM \*SF07.07.01**

**Resolving the Entropy Catastrophe Through Complex Core-Shell Particles** Martin Thuo<sup>1,1</sup>, Andrew Martin<sup>1,1</sup> and Jason Green<sup>2,2</sup>; <sup>1</sup>North Carolina State University, United States; <sup>2</sup>University of Massachusetts Boston, United States

**2:00 PM SF07.07.03**

**From Ion Ordering to Microphase Separation—How Charge Frustration Organizes Ions at Surfaces** Mingyi Zhang<sup>1</sup>, Benjamin A. Helfrecht<sup>1</sup>, Yuanzhong Zhang<sup>2</sup>, Shuai Tan<sup>1</sup>, Ying Xia<sup>3</sup>, Venkateshkumar Prabhakaran<sup>1</sup>, Younjin Min<sup>2</sup>, Chris Mundy<sup>1,3</sup>, Benjamin A. Legg<sup>1</sup> and James J. De Yoreo<sup>1,3</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of California, Riverside, United States; <sup>3</sup>University of Washington, United States

**2:15 PM SF07.07.04**

**The Effects of Crystallizing Amphiphiles on the Self-Assembly of Block Copolymer Supramolecules** Nayanathara Hendeniya, Shaghayegh Abtahi, Gabriel O. Mogbojuri, Chizoba Itheme, Sharif Tasnim Mahmud, Caden Chittick and Boyce Chang; Iowa State University, United States

**2:30 PM BREAK**

**3:00 PM SF07.07.05**

**Navigating Equilibrium and Non-Equilibrium Pathways in Self-Assembly Using Liquid-Phase Transmission Electron Microscopy** Sindy Liu, Zuo Chen Wang, Chang Qian, Chang Liu and Qian Chen; University of Illinois at Urbana-Champaign, United States

**3:15 PM SF07.07.06**

**Understanding Correlations Between Microstructure and Magnetic Properties in Novel Ni-Zn Ferrite-Ni Ceramic Matrix Soft Magnetic Nanocomposites** Suraj V. Mullurkara, Chris Bracken, Susheng Tan, Dipika Mandal and Paul Ohodnicki; University of Pittsburgh, United States

**3:30 PM SF07.07.07**

**Design of High-Entropy Alloys for Enhanced Corrosion Resistance Using Surface Passivation Directed by Machine Learning and Self-Organising Maps** [Shahin Mehraban](#)<sup>1</sup>, Nicholas Lavery<sup>1</sup> and Joseph Plumber<sup>2</sup>; <sup>1</sup>Swansea University, United Kingdom; <sup>2</sup>Defence Science and Technology Laboratory, United Kingdom

**3:45 PM \*SF07.07.08**

**From Colloidal Nanocrystals to (Aero-)Gels and Their Applications** [Alexander Eychmueller](#); Technische Universität Dresden, Germany

## SYMPOSIUM SF08

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Achieving and Exploiting Complexity Through the Synthesis and Application of Hybrid Hierarchical Materials  
April 7 - April 8, 2025

### Symposium Organizers

Brandi Cossairt, University of Washington  
Oleg Gang, Columbia University/Brookhaven National Laboratory  
Chris Mundy, Pacific Northwest National Laboratory  
Faik Tezcan, University of California, San Diego

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF08.01: Synthesis Across Scales: Hierarchical and Biomimetic Approaches I

Session Chairs: Oleg Gang and Faik Tezcan

Monday Morning, April 7, 2025

Summit, Level 3, Room 322

**10:30 AM \*SF08.01.01**

**Leading the Charge in the Science of Synthesis Across Scales** [Francois Baneyx](#); University of Washington, United States

**11:00 AM \*SF08.01.02**

**Enabling Hierarchical Material Structures by Integrating DNA-Programmed Nanoscale Assembly with Macroscopic Processing Methods** [Robert J. Macfarlane](#); Massachusetts Institute of Technology, United States

**11:30 AM \*SF08.01.03**

**Reconfigurable Multi-Component Nanostructures Built from DNA Origami Voxels** [Shelley Wickham](#); University of Sydney, Australia

SESSION SF08.02: Designing Responsive and Functional Materials—Hierarchical Structures and Applications

Session Chairs: Oleg Gang and Faik Tezcan

Monday Afternoon, April 7, 2025

Summit, Level 3, Room 322

**1:30 PM \*SF08.02.01**

**Universal Synthesis and Self-Assembly of Patchy Nanoparticles** [Qian Chen](#); University of Illinois at Urbana-Champaign, United States

**2:00 PM SF08.02.02**

**Magnetic Particle Assembly During 3D Printing for Computationally Optimized Actuation and Reinforcement** [Drew Melchert](#), Peter Miller, Jorge-Luis Barrera Cruz, Caitlyn C. Krikorian (Cook) and Jeremy Lenhardt; Lawrence Livermore National Laboratory, United States

**2:15 PM SF08.02.03**

**3D Printed Hierarchical and Functional Monoliths from Porous Nanomaterials for Environmental Applications** [Thomas Gaillard](#)<sup>1</sup>, Nadia Batool<sup>1</sup>, Arianna Bertero<sup>2</sup>, Bartolomeo Coppola<sup>2</sup>, Julien Schmitt<sup>1</sup>, Nicolas Brun<sup>1</sup>, Anne Galarneau<sup>1</sup> and Tangi Aubert<sup>1</sup>; <sup>1</sup>Institut Charles Gerhardt Montpellier, France; <sup>2</sup>Politecnico di Torino, Italy

**2:30 PM \*SF08.02.04**

**Life-Like Materials with Anisotropy, Autonomy and Polarity** [Yasuhiro Ishida](#); RIKEN Center for Emergent Matter Science, Japan

**3:00 PM BREAK**

**3:30 PM SF08.02.05**

**BlueMat—Water-Driven Materials** [Patrick Huber](#)<sup>1,2</sup>; <sup>1</sup>Hamburg University of Technology, Germany; <sup>2</sup>Deutsches Elektronen-Synchrotron DESY, Germany

**3:45 PM SF08.02.06**

**Structured Organic-Inorganic Hybrids Prepared Through Block Copolymer-Metal Complexation** [Shaghayegh Abtahi](#); Iowa State University of Science and Technology, United States

**4:00 PM \*SF08.02.07**

**Tunable Self-Assembly at Bio-Nanointerfaces—Engineering Hierarchical Structures for Enhanced Sensing and Drug Delivery Applications** [Sunita Srivastava](#); Indian Institute of Technology Bombay, India

**4:30 PM SF08.02.08**

**High-Strength High-Conductivity Materials with Hierarchical Structure** [Ke Han](#), Vince Toplosky and Rongmei Niu; Florida State University, United States

SESSION SF08.03: Synthesis Across Scales: Hierarchical and Biomimetic Approaches II

Session Chairs: Francois Baneyx and Brandi Cossairt

Tuesday Afternoon, April 8, 2025

Summit, Level 3, Room 322

**3:30 PM SF08.03.01**

**Enthalpic and Entropic Controls on 2D Self-Assembly of Proteins on Substrates** [Ying Xia](#)<sup>1,2</sup>, Zhiyin Zhang<sup>3</sup>, Shiqi Zhao<sup>4</sup>, Mingyi Zhang<sup>2</sup>, Timothy Moore<sup>4</sup>, Shuai Zhang<sup>2</sup>, Sharon C. Glotzer<sup>4</sup>, Faik A. Tezcan<sup>3</sup> and James J. De Yoreo<sup>2,1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States; <sup>3</sup>University of California, San Diego, United States; <sup>4</sup>University of Michigan-Ann Arbor, United States

**3:45 PM \*SF08.03.02**

**Hierarchically Ordered Hybrid and Quantum Materials from Additive Manufacturing and Block Copolymer Self-Assembly** [Ulrich Wiesner](#); Cornell University, United States

**4:15 PM SF08.03.03**

**Induced Chirality and Reversible Assembly of QDs Using Thermoresponsive Elastin-Like Polypeptides** [Chris Lowe](#), Helen Larson, Yifeng Cai, Huat Thart Chiang, Lilo D. Pozzo, Francois Baneyx and Brandi Cossairt; University of Washington, United States

**4:30 PM SF08.03.04**

**Tunable Light-Matter Interactions in Complex Perovskite Particles Templated by Nanostructured Assemblies with Multiscale Chirality** [Michael P. Veksler](#), Jeffery Raymond, Tao Ma and Nicholas A. Kotov; University of Michigan-Ann Arbor, United States

SESSION SF08.04: Poster Session

Session Chairs: Francois Baneyx and Brandi Cossairt

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SF08.04.01**

**Synergistic Effects of Bio-Waste-Derived Zero-Dimensional (0D) Carbon Quantum Dots Doped Zinc Manganese Oxide Hybrid in Achieving High Energy Density and Exceptional Stability in Supercapacitors** Om Priya Nanda and Sushmee Badhulika; Indian Institute of Technology, Hyderabad, India

**SF08.04.02**

**Highly Efficient Hybrid Sorbent for Simultaneous Removal of Radioactive Cesium and Iodine** Jueun Kim and Wooyong Um; Pohang University of Science and Technology, Korea (the Republic of)

**SF08.04.03**

**Synthesis Process Research in Microwave of UiO-66-NH<sub>2</sub> and Its Correlation Between CWAs Simulant Decontamination Performance and Its Further Application** Jonghyeok Bang; Chung-Ang University, Korea (the Republic of)

**SF08.04.04**

***In Situ* Hydrogen Detection in (Bio)Chemical Reactors** Niclas Alkazaz; Hamburg University of Technology, Germany

**SF08.04.05**

**An Exploration of Short Peptoid Oligomers for the Assembly of Supramolecular Structures** Zeqian Zhang<sup>1,2</sup>, Renyu Zheng<sup>1,2</sup>, Tengyue Jian<sup>2</sup> and Chun-Long Chen<sup>2</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

**SF08.04.06**

**A Lignin-Derived Carbon Dots Upgraded Bacterial Cellulose Membrane as an All-in-One Interfacial Evaporator for Solar-Driven Water Purification** Nirmiti Mate and Mobin M. Shaikh; Indian Institute of Technology Indore, India

**SF08.04.07**

**Scalable Fabrication of 2D Ternary Nanoarchitectures for Enhanced Water Splitting Applications** Minseong Ju and Hyeonseok Yoon; Chonnam National University, Korea (the Republic of)

**SF08.04.08**

**Durable and Anti-Icing Superhydrophobic Coatings with a Rock-Like Hierarchical Structure via Polydopamine-Epoxy Integration** Jaemin Kwon; Soongsil University, Korea (the Republic of)

# SYMPOSIUM SF09

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Aerospace Materials in Extreme Environments

April 9 - April 10, 2025

Symposium Organizers

Carol Glover, Boeing

Lisa Rueschhoff, Air Force Research Laboratory

Tsuyoshi Saotome, Toray Composite Materials America, Inc.

Jesse Tice, NG NEXT, Northrop Grumman

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SF09.01: Novel Materials and Structures for Evolving Space Environments

Session Chairs: Carol Glover and Max Lien

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 320

**8:00 AM \*SF09.01.01**

**Variable Emissivity Metamaterials** Michelle Povinelli; University of Southern California, United States

**8:30 AM SF09.01.02**

**Flexible Polyimide-Based Materials for Radiation Shielding Applications in Space Missions** Elisa Toto, Alessandra Volpe, Gianluca Ciarleglio, Susanna Laurenzi and Maria Gabriella Santonicola; Sapienza University of Rome, Italy

**8:45 AM SF09.01.03**

**Rare Earth Compounds for Extreme Aerospace and Space Environments** Jonathan Kaufman<sup>1,2</sup>, Connor Wyckoff<sup>1,2</sup>, Sarah Hall<sup>2</sup>, Katherine Acord<sup>2</sup>, Valerie L. Wiesner<sup>3</sup>, Cheol Park<sup>3</sup> and Lisa M. Rueschhoff<sup>2</sup>; <sup>1</sup>BlueHalo, United States; <sup>2</sup>Air Force Research Laboratory, United States; <sup>3</sup>NASA Langley Research Center, United States

**9:00 AM SF09.01.04**

**Experimental Determination of the Elastic Tensor of Trigonal B4C Using Resonance Ultrasound Spectroscopy** Henry Anderson, Juejing Liu, Arezoo Zare and Xiaofeng Guo; Washington State University, United States

SESSION SF09.02: Advances in Aerospace Coating Technologies

Session Chairs: Carol Glover and Max Lien

Wednesday Morning, April 9, 2025

Summit, Level 3, Room 320

**9:15 AM SF09.02.01**

**Advanced Multifunctional Metamaterial Coatings for Corrosion Protection and Color Coding** Fernando Chacón-Sánchez and Rosalía Serna; CSIC, Spain

**9:30 AM SF09.02.02**

**Performance of Multilayer Coated Carbon-Carbon Composites** Mark Olima, Mosiur Rahaman, Hema Ramsurn and Michael Keller; The University of Tulsa, United States

**9:45 AM SF09.02.03**

**Thermal and Optical Characterization of Rare Earth Compounds for Protective Barrier Coatings** Saman Zare<sup>1</sup>, William T. Riffe<sup>1</sup>, Haydn Wadley<sup>1</sup>, Prasanna Balachandran<sup>1</sup>, David Clarke<sup>2</sup>, Elizabeth Opila<sup>1</sup> and Patrick E. Hopkins<sup>1</sup>; <sup>1</sup>University of Virginia, United States; <sup>2</sup>Harvard University, United States

**10:00 AM BREAK**

SESSION SF09.03: Sustainable Materials for Aerospace Applications

Session Chairs: Carol Glover and Kara L. Martin

Wednesday Morning, April 9, 2025  
Summit, Level 3, Room 320

**10:30 AM \*SF09.03.01**

**INDUSTRY TRACK: Materials and Processes for Sustainable Aviation—Opportunities Across the Product Life Cycle** Jill Seebergh; Boeing Research & Technology, United States

**11:00 AM \*SF09.03.02**

**INDUSTRY TRACK: Development of Sustainable Composites and Manufacturing Technology for Future Air Mobility** Sang-Hyon Chu<sup>1</sup>, Christopher J. Wohl<sup>1</sup>, Cheol Park<sup>1</sup>, Valerie L. Wiesner<sup>1</sup>, Glen C. King<sup>1</sup>, Matthew R. Webster<sup>1</sup>, Devin E. Burns<sup>1</sup>, Samantha A. Johnson<sup>1</sup>, Erik Frankforter<sup>1</sup>, Sandi G. Miller<sup>2</sup>, Meelad Ranaiefar<sup>2</sup>, Stephanie Vivod<sup>2</sup>, Sadeq Malakooti<sup>2</sup>, David A. Rinehart<sup>2</sup>, Lauren J. Abbott<sup>3</sup> and Andrew P. Santos<sup>3</sup>; <sup>1</sup>NASA Langley Research Center, United States; <sup>2</sup>NASA Glenn Research Center, United States; <sup>3</sup>NASA Ames Research Center, United States

**11:30 AM \*SF09.03.03**

**Materials Development in Tri-Service Biotechnology for a Resilient Supply Chain Program** Nancy Kelley-Loughnane<sup>1</sup>, Benjamin Wolfson<sup>2</sup>, Steven Knott<sup>2</sup>, Chia Hung<sup>3</sup>, Hollie Pietsch<sup>2</sup>, Anthony Malanoski<sup>4</sup>, Sarah Glaven<sup>4</sup> and Henry Gibbons<sup>5</sup>; <sup>1</sup>Office of Undersecretary of Defense (Research and Engineering), United States; <sup>2</sup>U.S. Army Combat Capabilities Development, United States; <sup>3</sup>Air Force Research Laboratory, United States; <sup>4</sup>U.S. Naval Research Laboratory, United States; <sup>5</sup>U.S. Department of the Army, United States

SESSION SF09.04: Funding Trends in Aerospace Materials

Session Chairs: Scott McCormack and Lisa Rueschhoff

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 320

**1:30 PM \*SF09.04.01**

**Outlook on Research Priorities of AFOSR's Aerospace Composite Materials Basic Science Research Program** Derek B. Barbee; AFOSR, United States

**1:45 PM \*SF09.04.02**

**Aerospace Materials for Extreme Environments** Ali Sayir; Air Force Office of Scientific Research, United States

**2:00 PM**

**Panel Discussion** Derek B. Barbee<sup>1</sup> and Ali Sayir<sup>2</sup>; <sup>1</sup>AFOSR, United States; <sup>2</sup>Air Force Office of Scientific Research, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SF09.05: Multifunctional Aerospace Structures

Session Chairs: Max Lien and Ly Tran

Wednesday Afternoon, April 9, 2025

Summit, Level 3, Room 320

**4:00 PM \*SF09.05.01**

**Advanced Materials for Thermal Control of Spacecraft** Michael Barako; Northrop Grumman, United States

**4:30 PM SF09.05.02**

**Design and Fabrication of Conformal TPMS-Based Metal Foams Embedded with Phase Change Materials for Space-Based Thermal Storage** Sriharsha Sundarram, Eric Dillner, Patrick Russo, Justin Foun, Thanh Dat Nguyen and Richard Hodge; Fairfield University, United States

**4:45 PM SF09.05.03**

**Shielding Effectiveness of Boron Nitride Nanotube Composites for Space Radiation** Anna Wu<sup>1</sup>, Maria Santiago<sup>2</sup>, Sara Rengifo<sup>3</sup>, William Scott<sup>3</sup>, Thang



Quoc Huynh<sup>4</sup>, Minsung Kang<sup>4</sup>, Md. Monir Hossain<sup>4</sup>, Se Gyu Jang<sup>4</sup>, Seokhoon Ahn<sup>4</sup>, Sang-Hyon Chu<sup>5</sup> and Cheol Park<sup>5</sup>; <sup>1</sup>University of Oxford, United Kingdom; <sup>2</sup>University of Puerto Rico at Mayagüez, Puerto Rico; <sup>3</sup>NASA Marshall Space Flight Center, United States; <sup>4</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>5</sup>NASA Langley Research Center, United States

SESSION SF09.06: Poster Session: Aerospace Materials in Extreme Environments

Session Chairs: Carol Glover and Max Lien

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

#### **SF09.06.01**

**UV-Assisted Additive Manufacturing of SiOC Ceramic Structures for Extreme Environments** Victoria Bishop and Wei Wei; Michigan Technological University, United States

#### **SF09.06.02**

**Design Optimization Workflow for Reusable Compliant Attachment Mechanisms for Rapid Construction and Assembly in Extreme Environments** Kirsten Peterson, Matthew Nakamura, Ethan J. Rocheville and Joseph Brown; University of Hawaii at Manoa, United States

#### **SF09.06.03**

**Combating Creep with Compliant Mechanisms in Additive-Manufactured Interlocking Structures** Ethan J. Rocheville, Kirsten Peterson, Matthew Nakamura and Joseph Brown; University of Hawaii at Manoa, United States

#### **SF09.06.04**

**Microstructure and Impact Properties of Hot Isostatic Pressed- and Sintered-Cu Fabricated by FDM-Based Additive Manufacturing** Mingi Hong, JuEun Bae, MinHyeok Lim, Ji-Woon Lee, Soon-Jik Hong, Gian Song and Jongeon Mun; Kongju National University, Korea (the Republic of)

#### **SF09.06.05**

**Optimization of Process and Microstructural Characteristics of Inconel 625 Alloy Manufactured by Directed Energy Deposition** MinHyeok Lim, SungJae Jo, HyunJoong Kim, Mingi Hong, Ji-Woon Lee and Soon-Jik Hong; Kongju National University, Korea (the Republic of)

#### **SF09.06.06**

**Doping Zirconium Diboride with Rare-Earth Compounds for Extreme Environments** Connor Wyckoff<sup>1,2</sup>, Jonathan Kaufman<sup>1,2</sup>, Sarah Hall<sup>3,2</sup> and Lisa M. Rueschhoff<sup>2</sup>; <sup>1</sup>BlueHalo, United States; <sup>2</sup>Air Force Research Laboratory, United States; <sup>3</sup>Strategic Ohio Council for Higher Education, United States

#### **SF09.06.07**

**Paralinear Oxidation Kinetics and Passivation Mechanisms of SPS-Sintered ZrC Ultra-High Temperature Ceramic (UHTC)** Yunching Lin, Hans Brouwer, Vera Popovich and Yinglu Tang; TU Delft, Netherlands

#### **SF09.06.08**

**Carbon Fiber-Based Resistive Heating Composite for High Performance Electromagnetic Interference Shielding** Hyung Wook Park; Ulsan National Institute of Science and Technology, Korea (the Republic of)

#### **SF09.06.09**

**Nanostructures in the Direct Energy Deposited Metastable  $\beta$  Ti-5Al-5Mo-5V-3Cr Alloy for Aerospace Applications** Sydney Fields<sup>1</sup>, Deepak V. Pillai<sup>1</sup>, Dian Li<sup>1</sup>, Tirthesh Ingale<sup>1</sup>, Vishal Soni<sup>1</sup>, Mohammad M. Haque<sup>2</sup>, Yao Li<sup>1</sup>, Yiliang Liao<sup>2</sup>, Rajarshi Banerjee<sup>1</sup> and Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas, United States; <sup>2</sup>Iowa State University, United States

#### **SF09.06.10**

**Examining the Possibility of rGO@PANI with Co-Doped Mn<sub>2</sub>O<sub>3</sub> and CoFe<sub>2</sub>O<sub>4</sub> Composites as a Radar-Absorbing Material for the Whole X and Ku Bands** Parveen Kumar and Ashavani Kumar; National Institute of Technology Kurukshetra, India

#### **SF09.06.11**

**Laser Diagnostics of CMAS Infiltration into Environmental Barrier Coatings Through Spectroscopic Ellipsometry** Elizabeth S. Golightly<sup>1</sup>, Milena Milich<sup>1</sup>, Emma Tiernan<sup>1</sup>, Robert Golden<sup>2</sup>, Greg Harrington<sup>2</sup>, Adam Chambelain<sup>2</sup> and Patrick E. Hopkins<sup>1</sup>; <sup>1</sup>University of Virginia, United States; <sup>2</sup>Rolls

Royce, United States

SESSION SF09.07: Multi-Scale Modeling of Material Structures and Environments

Session Chairs: Max Lien and Scott McCormack

Thursday Morning, April 10, 2025

Summit, Level 3, Room 320

**8:30 AM \*SF09.07.01**

**High-Fidelity 3D Microstructural Characterization of ZrB<sub>2</sub> During Hot-Pressing** Randi Swanson<sup>1</sup>, Darko Kosanovic<sup>2</sup>, Michael Chapman<sup>3</sup>, Ashley Hilmas<sup>3</sup>, Michael Uchic<sup>3</sup>, Wei Xiong<sup>4</sup>, Hessam Babae<sup>4</sup>, William Fahrenholtz<sup>2</sup> and Scott J. McCormack<sup>1</sup>; <sup>1</sup>University of California, Davis, United States; <sup>2</sup>Missouri University of Science and Technology, United States; <sup>3</sup>Air Force Research Laboratory, United States; <sup>4</sup>University of Pittsburgh, United States

**9:00 AM \*SF09.07.02**

**Rapid Carbon-Carbon Composite Processing Characterization and Optimization Through Physics-Informed Machine Learning** Navid Zobeiry and Paulina Portales; University of Washington, United States

**9:30 AM BREAK**

SESSION SF09.08: Processing Considerations for Materials in Extreme Environments—Non-Metals

Session Chairs: Lisa Rueschhoff and Navid Zobeiry

Thursday Morning, April 10, 2025

Summit, Level 3, Room 320

**10:00 AM \*SF09.08.01**

**Recent Efforts in Understanding Filamentous Carbonaceous Coke Production by Investigating the Hydrocarbon-Material Interface Chemistry** Kara L. Martin; Air Force Research Laboratory, United States

**10:30 AM SF09.08.02**

**Synthesis of Zr-, HfC Whiskers for Use as Secondary Reinforcements in High Temperature Composites** Patricia Loughney<sup>1,2</sup> and Lisa M. Rueschhoff<sup>2</sup>; <sup>1</sup>National Research Council, United States; <sup>2</sup>Air Force Research Laboratory, United States

**10:45 AM \*SF09.08.03**

**Process Friendly and Sustainable Resin Systems for an Innovative Composite Production System for Aerospace Application** Hirofumi Nishida, Nobuyuki Odagiri and Kiyoshi Uzawa; Kanazawa Institute of Technology, Japan

**11:15 AM SF09.08.04**

**Polymer Derived Ultra-High Temperature Ceramic Matrix Composites** Abigail A. Advincula<sup>1,2</sup>, Sophia D. Angelopoulos<sup>1,2</sup>, William Meador<sup>1,2</sup>, James Ponder<sup>1,2</sup>, Joshua Cragette<sup>1,2</sup>, Jared Delcamp<sup>1</sup>, Matthew B. Dickerson<sup>1</sup> and Timothy L. Prun<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory, United States; <sup>2</sup>UES, A Blue Halo Company, United States

**11:30 AM SF09.08.05**

**The Role of Ultra-High Temperature vs High Entropy Phases in Polymer Derived Ceramics** James Ponder<sup>1,2</sup>, Stephanie L. Chua<sup>3</sup>, Sophia D. Angelopoulos<sup>1,2</sup>, Nicholas Bedford<sup>3</sup>, Matthew B. Dickerson<sup>1</sup> and Timothy L. Prun<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory, United States; <sup>2</sup>BlueHalo, United States; <sup>3</sup>University of New South Wales, Australia

**11:45 AM SF09.08.06**

**A Parametric Study Optimizing the Fabrication Parameters of Chemically Oxidized Porous Silicon for Microthruster Applications** Nathan D. Heavner, Elijah Covak, Jade Martinez, Natalia Lambos and Jeff Jessing; Fort Lewis College, United States

SESSION SF09.09: Processing Considerations for Materials in Extreme Environments–Metals

Session Chairs: Carol Glover and Saman Zare

Thursday Afternoon, April 10, 2025

Summit, Level 3, Room 320

**1:30 PM SF09.09.01**

**Tuning the Al/Ti Ratio in  $Al_xTi_{18-x}(CrFeNi)_{82}$  High-Entropy Alloy for Improved Resistances to Wear, Corrosion and Corrosive Wear** [Kaifan Lin](#) and Dongyang Li; University of Alberta, Canada

**1:45 PM SF09.09.02**

**Multi-Material Structures of Ti6Al4V and Ti6Al4V-B4C Through Directed Energy Deposition-Based Additive Manufacturing** [Nathaniel Zuckschwerdt](#) and Amit Bandyopadhyay; Washington State University, United States

**2:00 PM SF09.09.03**

**Laser Powder-Bed Fusion of a Refractory High-Entropy Alloy for Extreme Environments** [Xipeng Tan](#); National University of Singapore, Singapore

**2:15 PM SF09.09.04**

**Characterization of Thermal Conductivity for Niobium at Cryogenic Temperatures Using the Cut Bar Method** Sadiyah Anderson, [Kirsten A. Lovelace](#), Ayanna Jones and Sonya Smith; Howard University, United States

**2:30 PM BREAK**

**3:00 PM SF09.09.05**

**Development of Co-Based Nanocrystalline Soft Magnetic Alloys for Extreme Environments for Aerospace Applications** [Lauren Wewer](#)<sup>1</sup>, Yuankang Wang<sup>1</sup>, Alex Leary<sup>2</sup>, Ronald Noebe<sup>2</sup>, Vladimir Keylin<sup>2</sup> and Paul Ohodnicki<sup>1</sup>; <sup>1</sup>University of Pittsburgh, United States; <sup>2</sup>NASA Glenn Research Center, United States

**3:15 PM SF09.09.06**

**17-4 PH and SS316L Bimetallic Structures Using Powder-Based Laser-Directed Energy Deposition** [Aruntapan Dash](#) and Amit Bandyopadhyay; Washington State University, United States

**3:30 PM SF09.09.07**

**Novel Densification Method Using an Internal Chemical Vapor Infiltration (CVI) Method Through Vascular Channels in a Carbon/Carbon Composite** [Mohammed Ammar Abdul Latheef](#), Mark Olima, Michael Keller and Hema Ramsurn; The University of Tulsa, United States

**3:45 PM SF09.09.08**

**Development of Extruded Al-Ce and Al-Ce-Mg Alloys for Aerospace Applications** Humphrey Odhiambo<sup>1</sup>, [Gaoyuan Ouyang](#)<sup>2</sup>, Gaurav Singh<sup>3</sup>, Mohamad Tasneem<sup>3</sup>, Jun Cui<sup>1,2</sup>, Ralph Napolitano<sup>1</sup>, Monica Soare<sup>4</sup> and Catalin Picu<sup>3</sup>; <sup>1</sup>Iowa State University, United States; <sup>2</sup>Ames National Laboratory, United States; <sup>3</sup>Rensselaer Polytechnic Institute, United States; <sup>4</sup>GE Global Research, United States

**4:00 PM SF09.09.09**

**Guided Self-Assembly of Refractory Metal Helices in Ultra-High Vacuum** [A K M Sharoar Jahan Choyon](#)<sup>1,2</sup>, Divya J. Prakash<sup>1</sup>, Darryl Shima<sup>1</sup>, Ruhin Chowdhury<sup>1,2</sup> and Francesca Cavallo<sup>1,2</sup>; <sup>1</sup>Center for High Technology Materials, University of New Mexico, United States; <sup>2</sup>The University of New Mexico, United States

**4:15 PM SF09.09.10**

**Hybrid Wire Arc-Directed Energy Deposition of Commercially Pure Titanium in Monolithic and Bimetallic Configurations** [Aruntapan Dash](#) and Amit Bandyopadhyay; Washington State University, United States

# SYMPOSIUM SU01

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Solid Materials for Sustainable Cooling—Caloric Effects and Devices

April 8 - April 10, 2025

Symposium Organizers

Pol Lloveras, Universitat Politècnica de Catalunya

Anthony Phillips, Queen Mary University of London

Karl Sandeman, Brooklyn College

Helen Walker, Science and Technology Facilities Council

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU01.01: Caloric Materials—Applications and Devices I

Session Chairs: Anthony Phillips and Julie Slaughter

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 445

**10:30 AM \*SU01.01.01**

**Survival Strategy for Magnetic Refrigeration Technology** Asaya Fujita; AIST, Japan

**11:00 AM +SU01.01.02**

**Modifying MLCs of PST for Improved Performance** Mengfan Guo<sup>1</sup>, Vladimir Farenkov<sup>1</sup>, Jiaqi Zhang<sup>1</sup>, Xavier Moya<sup>1</sup>, Sakyō Hirose<sup>2</sup> and Neil D. Mathur<sup>1</sup>; <sup>1</sup>University of Cambridge, United Kingdom; <sup>2</sup>Murata Manufacturing Co., Ltd., Japan

**11:30 AM \*SU01.01.03**

**Materials, Devices and Systems for Compression-Based Elastocaloric Cooling** Ichiro Takeuchi; University of Maryland, United States

SESSION SU01.02: Caloric Materials—Applications and Devices II

Session Chairs: Anthony Phillips and Julie Slaughter

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 445

**1:30 PM +SU01.02.01**

**Magnetocaloric/Barocaloric Effect—Materials and Application** Feng-Xia Hu and Bao-Gen Shen; Institute of Physics, Chinese Academy of Sciences, China

SESSION SU01.03: Elastocaloric Materials

Session Chairs: Lluís Manosa and Helen Walker

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 445

**2:00 PM SU01.03.01**

**Liquid Crystal-Based Caloric Materials for New Heat-Management Technologies** Devid Cresnar<sup>1</sup>, Matic Morgan<sup>1</sup>, Bostjan Zalar<sup>1</sup>, Samo Kralj<sup>2</sup>,

Zdravko Kutnjak<sup>1</sup>, Gregor Skacej<sup>3</sup> and Brigita Rozic<sup>1</sup>; <sup>1</sup>Jozef Stefan Institute, Slovenia; <sup>2</sup>University of Maribor, Slovenia; <sup>3</sup>University of Ljubljana, Slovenia

**2:15 PM SU01.03.02**

**Elastins as Solid-State Refrigerants** Dharshika Malwane<sup>1,2</sup>, Nour Jamhawi<sup>3</sup>, Shibani Bhattacharya<sup>4</sup>, Damon Turney<sup>1,5</sup>, Gregory Hura<sup>6,7</sup>, Richard Wittebort<sup>3</sup>, Karl Sandeman<sup>2,1</sup> and Ronald Koder<sup>5,1</sup>; <sup>1</sup>The City University of New York, United States; <sup>2</sup>Brooklyn College, United States; <sup>3</sup>University of Louisville, United States; <sup>4</sup>New York Structural Biology Center, United States; <sup>5</sup>The City College of New York, United States; <sup>6</sup>Lawrence Berkeley National Laboratory, United States; <sup>7</sup>University of California, Santa Cruz, United States

**2:30 PM SU01.03.03**

**Irreversible Thermodynamic Modeling of Shape Memory Alloys for Elastocaloric Refrigeration** Derian R. Morphew, Roberto Orrostita, Elijah Meakins, Ibrahim Karaman and Patrick Shamberger; Texas A&M University, United States

**2:45 PM SU01.03.04**

**Machine Learning Modeling for Predicting Austenite Transformation Temperature and the Latent Heat in CuAl-Based Shape Memory Alloys** Boyang Liu<sup>1</sup>, Kotaro Tomioka<sup>2</sup>, Takuro Dazai<sup>2</sup>, Megumi Takayama<sup>2</sup>, Ayaka Ibato<sup>2</sup>, Haotong Liang<sup>1</sup>, Jun Cui<sup>3</sup>, Kenjiro Fujimoto<sup>2</sup> and Ichiro Takeuchi<sup>1</sup>; <sup>1</sup>University of Maryland, United States; <sup>2</sup>Tokyo University of Science, Japan; <sup>3</sup>Iowa State University of Science and Technology, United States

**3:00 PM BREAK**

SESSION SU01.04: Magnetocaloric Materials

Session Chairs: Feng-Xia Hu and Karl Sandeman

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 445

**3:30 PM \*SU01.04.01**

**Microstructure Design in Transition Metal-Based Magnetocaloric Materials** Luana Caron<sup>1,2</sup> and Xuefei Miao<sup>3</sup>; <sup>1</sup>Bielefeld University, Germany; <sup>2</sup>Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; <sup>3</sup>Nanjing University of Science and Technology, China

**4:00 PM \*SU01.04.02**

**Searching for New Magnetocaloric Materials—A High-Throughput Approach** Heike C. Herper<sup>1</sup>, Torbjörn Björkman<sup>2</sup>, Anders Bergman<sup>1</sup>, Olle R. Eriksson<sup>1</sup> and Rafael Vieira<sup>2</sup>; <sup>1</sup>Uppsala University, Sweden; <sup>2</sup>Åbo Akademi, Finland

**4:30 PM SU01.04.03**

**Investigation of the Emerging Magnetic Behavior in a Breathing Spinel Material** Rupali Mangotra and Madalynn Marshall; Kennesaw State University, United States

**4:45 PM SU01.04.04**

**Fabrication of Gadolinium Wire by Cold Drawing and the Development of Magnetocaloric Anisotropy** Woo Seok Yang, Min Jik Kim and Da Seul Shin; Korea Institute of Materials Science, Korea (the Republic of)

SESSION SU01.05: Electrocaloric Materials

Session Chairs: Xavier Moya and Helen Walker

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 445

**8:45 AM SU01.05.01**

**Enhancing Electrocaloric Effects in “Freestanding” Epitaxial Thin Films of Ferroelectric Relaxors** Jiyeob Kim<sup>1</sup>, Abel Fernandez<sup>1</sup>, Djamila Lou<sup>1</sup>, Hao Zheng<sup>2</sup>, Megha Acharya<sup>1</sup>, Deokyoung Kang<sup>1</sup>, Eric Parsonnet<sup>1</sup> and Lane W. Martin<sup>3,4</sup>; <sup>1</sup>University of California, Berkeley, United States; <sup>2</sup>Argonne National Laboratory, United States; <sup>3</sup>Rice University, United States; <sup>4</sup>Lawrence Berkeley National Laboratory, United States

**9:00 AM SU01.05.02**

**Large Low-Field-Driven Electrocaloric Effect in Organic-Inorganic Hybrids** Yuan Lin<sup>1,2</sup>, Jing Wang<sup>1,2</sup>, Shifeng Jin<sup>1,2</sup>, Yurong Yang<sup>3</sup>, Victorino Franco<sup>4</sup>, Feng-Xia Hu<sup>1,2,5</sup> and Bao-Gen Shen<sup>1,2,6</sup>; <sup>1</sup>Institute of Physics, Chinese Academy of Sciences, China; <sup>2</sup>University of Chinese Academy of Sciences, China; <sup>3</sup>Nanjing University, China; <sup>4</sup>Universidad de Sevilla, Spain; <sup>5</sup>Songshan Lake Materials Laboratory, China; <sup>6</sup>Ganjiang Innovation Academy, Chinese Academy of Sciences, China

**9:15 AM \*SU01.05.03**

**Aerosol Deposition of Thick Films for Caloric Applications** Hana Ursic; Jozef Stefan Institute, Slovenia

**9:45 AM SU01.05.04**

**Direct Local Measurements of the Electrocaloric Effect by Scanning Thermal Microscopy** Olivia Baxter<sup>1,2</sup>, Amit Kumar<sup>1</sup>, Sakyo Hirose<sup>3</sup>, Marty Gregg<sup>1</sup> and Raymond McQuaid<sup>1</sup>; <sup>1</sup>Queen's University Belfast, United Kingdom; <sup>2</sup>University of St. Andrews, United Kingdom; <sup>3</sup>Murata Manufacturing Co., Ltd., Japan

**10:00 AM BREAK**

SESSION SU01.06: Barocaloric Materials I

Session Chairs: Heike Herper and Anthony Phillips

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 445

**10:30 AM SU01.06.01**

**Isolation of Geometric Contributions to Plastic Crystal Transformations Through Selective Deuteration of Neopentyl Glycol** Patrick Shamberger, Chase B. Somodi, Satheesh Vanaparthi, Tzu-Hsuan Chao, Daniel Tabor and Emily Pentzer; Texas A&M University, United States

**10:45 AM \*SU01.06.02**

**Barocaloric Plastic Crystals for Sustainable Cooling** Xavier Moya; University of Cambridge, United Kingdom

**11:15 AM SU01.06.03**

**Organic Molecules in a Box—Barocaloric Cooling from Confined Order-Disorder Transitions** Daniel Laorenza, Yukyung Moon and Jarad A. Mason; Harvard University, United States

**11:30 AM SU01.06.04**

**Barocaloric Design Principles in Asymmetric Dialkylammonium Salts** Faith E. Chen<sup>1</sup>, Jason Braun<sup>1</sup>, Jinyoung Seo<sup>1</sup>, Malia Wenny<sup>2</sup> and Jarad A. Mason<sup>1</sup>; <sup>1</sup>Harvard University, United States; <sup>2</sup>Wellesley College, United States

SESSION SU01.07: Barocaloric Materials II

Session Chairs: Heike Herper and Anthony Phillips

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 445

**2:00 PM SU01.07.01**

**The Role of Hydrogen Bond Competition in the Colossal Barocaloric Response of Choline-Based Plastic Crystals** Joshua Levinsky<sup>1</sup>, Shivani Grover<sup>1</sup>, Phillippa Partridge<sup>1</sup>, Eliza Dempsey<sup>1</sup>, Charles McMonagle<sup>2</sup>, Emmanouil Charkiolakis<sup>3</sup>, David Gracia<sup>3</sup>, Gloria Subias<sup>3</sup>, Marco Evangelisti<sup>3</sup> and Claire L. Hobday<sup>1</sup>; <sup>1</sup>University of Edinburgh, United Kingdom; <sup>2</sup>European Synchrotron Radiation Facility, France; <sup>3</sup>Instituto de Ciencia de Materiales de Aragón, Spain

**2:15 PM SU01.07.02**

**Unraveling Thermal Hysteresis in Plastic Crystals—A Pathway to Efficient Solid-State Refrigerants** Chase B. Somodi, Enock Irumva, Lindsey Ford, Tzu-Hsuan Chao, Emily Pentzer, Daniel Tabor and Patrick Shamberger; Texas A&M University, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SU01.08: Multicaloric Materials

Session Chairs: Oliver Gutfleisch and Pol Lloveras

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 445

**3:30 PM \*SU01.08.01**

**Caloric Properties of Spin Crossover Complexes** Lluís Manosa; Universitat de Barcelona, Spain

**4:00 PM \*SU01.08.02**

**Multicaloric Effects on Ferroelectric Ceramics Under the Simultaneous Application of Pressure and Electric Field** Hana Ursic<sup>1</sup>, Carlos Escorihuela<sup>2</sup>, Claudio Cazorla<sup>2</sup>, Alvar Torello Massana<sup>2</sup> and Josep Lluís Tamarit<sup>2</sup>; <sup>1</sup>TotalEnergies OneTech, France; <sup>2</sup>Universitat Politècnica de Catalunya, Spain

**4:30 PM SU01.08.03**

**Multicaloric Effects in P(VDF-TrFe-CTFE) Terpolymers** Aleix H. Abadia<sup>1</sup>, Eduard Vives<sup>1</sup>, Jean-Fabien Capsal<sup>2</sup>, Gael Sebald<sup>2</sup>, Enric Stern Taulats<sup>1</sup> and Lluís Manosa<sup>1</sup>; <sup>1</sup>Universitat de Barcelona, Spain; <sup>2</sup>Institut National des Sciences Appliquées, France

SESSION SU01.09: Caloric Devices

Session Chairs: Karl Sandeman and Ichiro Takeuchi

Thursday Morning, April 10, 2025

Summit, Level 4, Room 445

**8:00 AM \*SU01.09.01**

**INDUSTRY TRACK: Solid-State Compact Cooling Devices Based on Electrocaloric Polymers** Qibing Pei; University of California, Los Angeles, United States

**8:30 AM \*SU01.09.02**

**INDUSTRY TRACK: Applications for Elastocaloric and Magnetocaloric Heat Pumps** Julie Slaughter, Agata M. Czernuszewicz and Lucas Griffith; Ames Laboratory, United States

**9:00 AM \*SU01.09.03**

**INDUSTRY TRACK: Multi-Caloric Cooling for Room Temperature and Cryo-Applications** Oliver Gutfleisch; TU Darmstadt, Germany

**9:30 AM SU01.09.04**

**Experimental Demonstration of a Barocaloric Heat Pump** Naveen D. Weerasekera and Bikram Bhatia; University of Louisville, United States

**9:45 AM SU01.09.05**

**TwistER—Prototype of Twistocaloric Cooling Device with Energy Recovery Based on Natural Rubber** Enric Stern Taulats, Antoni Vives-Cabaleiro, Lluís Manosa and Eduard Vives; Universitat de Barcelona, Spain

**10:00 AM BREAK**

**10:30 AM \*SU01.09.06**

**The Clean and Efficient Cooling EIC Portfolio—Example of the FROSBIT Project on Barocaloric Refrigeration** Patrick Rosa; ICMCB, CNRS-Université de Bordeaux-Bordeaux INP, France

**11:00 AM SU01.09.07**

**A Thin Film-based Capacitive Thermoelectric Device with a High Conversion Rate for Harvesting Low-Grade Waste Heat** Mohammad Al Thehaiban<sup>1</sup>, Zelong Yan<sup>1</sup>, Chukwudike Ukeje<sup>1</sup>, Vladimir Getov<sup>2</sup> and Peter K. Petrov<sup>1</sup>; <sup>1</sup>Imperial College London, United Kingdom; <sup>2</sup>University of Westminster, United Kingdom

**11:15 AM ^SU01.09.08**

**Elastocaloric Cooling System with Bending Actuation** [Agata M. Czernuszewicz](#)<sup>1</sup>, Lucas Griffith<sup>1</sup>, Alan Pelton<sup>2</sup>, Matthew Carl<sup>3</sup> and Julie Slaughter<sup>1</sup>;

<sup>1</sup>Ames National Laboratory, United States; <sup>2</sup>G.RAU, Inc., United States; <sup>3</sup>ATI Specialty Metals, United States

**11:30 AM SU01.09.09**

**Scalable Barocaloric Systems** [Jinyoung Seo](#) and Adam Slavney; Pascal Technologies, Inc., United States

SESSION SU01.10: Beyond Traditional Calorics

Session Chairs: Pol Lloveras and Helen Walker

Thursday Morning, April 10, 2025

Summit, Level 4, Room 445

**11:45 AM SU01.10.01**

**Ionocaloric Effect (ICE) in H<sub>2</sub>O** [Jaehan Bae](#)<sup>1</sup>, Songhee Han<sup>2</sup> and Beongki Cho<sup>1</sup>; <sup>1</sup>Gwangju Institute of Science and Technology, Korea (the Republic of);

<sup>2</sup>Mokpo National Maritime University, Korea (the Republic of)

SESSION SU01.11: Modelling Calorics

Session Chairs: Anthony Phillips and Alvar Torello Massana

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 445

**2:15 PM \*SU01.11.01**

**Theory and Modelling of Electro- and Baro-Caloric Materials** [Gian G. Guzman-Verri](#); University of Costa Rica, Costa Rica

**2:45 PM SU01.11.02**

**Understanding the Colossal Barocaloric Response in Choline Based Plastic Crystals from Ab Initio Molecular Dynamics** [Shivani Grover](#), Joshua

Levinsky and Claire L. Hobday; University of Edinburgh, United Kingdom

**3:00 PM BREAK**

SESSION SU01.12: Barocaloric Materials III

Session Chairs: Luana Caron and Anthony Phillips

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 445

**3:30 PM SU01.12.01**

**Exploring Vibrational Dynamics in Barocaloric Quinuclidinium Salts Using Inelastic Neutron Scattering** [Peter Nguyen Minh](#)<sup>1,2</sup>, Shiqi Gan<sup>1</sup>, Jeff Armstrong<sup>2</sup>, Helen C. Walker<sup>2</sup> and Anthony E. Phillips<sup>1</sup>; <sup>1</sup>Queen Mary University of London, United Kingdom; <sup>2</sup>ISIS Pulsed Neutron and Muon Source, United Kingdom

**3:45 PM SU01.12.02**

**Probing Dynamics of Quinuclidinium Hexafluorophosphate by Quasi-Elastic Neutron Scattering** [Shiqi Gan](#)<sup>1</sup>, Bernet E. Meijer<sup>1</sup>, Richard J. Dixey<sup>1</sup>, Peter Nguyen Minh<sup>1</sup>, Franz Demmel<sup>2</sup>, Naresh C. Osti<sup>3</sup>, Anthony E. Phillips<sup>1</sup> and Helen C. Walker<sup>2</sup>; <sup>1</sup>Queen Mary University of London, United Kingdom; <sup>2</sup>ISIS Pulsed Neutron and Muon Source, United Kingdom; <sup>3</sup>Oak Ridge National Laboratory, United States

**4:00 PM \*SU01.12.03**

**Manipulating Barocaloric Effects Derived from Hydrocarbon Order–Disorder Phase Transitions** [Jarad A. Mason](#); Harvard University, United States



**4:30 PM SU01.12.04**

**Understanding the Complex Phase Space of  $[N_{111}CN][PF_6]$  for Solid State Refrigeration** [Phillippa Partridge](#)<sup>1</sup>, Joshua Levinsky<sup>1</sup>, Nicholas P. Funnell<sup>2</sup>, Christopher J. Ridley<sup>2</sup>, Dominik Daisenberger<sup>3</sup>, Richard J. Dixey<sup>4</sup>, Anthony E. Phillips<sup>4</sup>, Jenny Pringle<sup>5</sup>, Eliza Dempsey<sup>1</sup> and Claire L. Hobday<sup>1</sup>; <sup>1</sup>University of Edinburgh, United Kingdom; <sup>2</sup>ISIS Neutron and Muon Source, United Kingdom; <sup>3</sup>Diamond Light Source Ltd, United Kingdom; <sup>4</sup>Queen Mary University of London, United Kingdom; <sup>5</sup>Deakin University, Australia

**4:45 PM SU01.12.05**

**Frustrated Under Pressure—Multi-Component Manganese Nitride Antiperovskites for Future Solid-State Refrigeration** [Connor S. Inglis](#) and David Boldrin; University of Glasgow, United Kingdom

## SYMPOSIUM SU02

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Enabling Sustainable Polymers—A Holistic View from Feedstock and Synthesis to Application and End-of-Life  
April 8 - April 10, 2025

Symposium Organizers

Kevin De France, Queen's University  
Erlantz Lizundia, University of the Basque Country  
Eleftheria Roumeli, University of Washington  
Josh Worch, Virginia Tech

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU02.01: Synthetic Polymers and Recycling I

Session Chairs: Kevin De France and Josh Worch

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 446

**10:30 AM \*SU02.01.01**

**INDUSTRY TRACK: The Global Plastic Treaty and Plastic Research, Sustainability and Waste Management** [Amy E. Landis](#); Colorado School of Mines, United States

**11:00 AM ^SU02.01.02**

**Dynamic and Degradable Vinyl Polymers—Towards a Sustainable Future for Commodity Plastics** [Elisabeth Prince](#); University of Waterloo, Canada

**11:30 AM SU02.01.03**

**Clean Polymerization Strategy for Recyclable Polydiene-Derivatives** [Pengfei Wu](#), Qixuan Hu and Letian Dou; Purdue University, United States

**11:45 AM SU02.01.04**

**Transforming Existing Waste Streams—Innovative Recycling Solutions for Poly(Dicyclopentadiene)** Keldy Mason<sup>1</sup>, Meghan Kiker<sup>2</sup>, Zachariah Page<sup>1</sup> and [Samuel C. Leguizamón](#)<sup>2</sup>; <sup>1</sup>The University of Texas at Austin, United States; <sup>2</sup>Sandia National Laboratories, United States

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SESSION SU02.02: Synthetic Polymers and Recycling II

Session Chairs: R. Konane Bay and Kevin De France

Tuesday Afternoon, April 8, 2025  
Summit, Level 4, Room 446

**1:30 PM ^SU02.02.01**

**Orthogonal Dual-Cure Neat Polymerizations for Fiber Reinforced Composite Materials Applications** [Chen Wang](#) and Grant Musgrave; University of Utah, United States

**2:00 PM SU02.02.02**

**Employing Ru- and Sn/Pt-Based Catalysts for the Deconstruction of Polyolefins Using Liquid Organic Hydrogen Carriers** [Julia Hancock](#) and Julie Rorrer; University of Washington, United States

**2:15 PM SU02.02.03**

**Recyclable Vitrimer-Based Carbon Fiber Reinforced Composites for Sustainable Automotive Applications** [Wenbin Kuang](#)<sup>1</sup>, Junpeng Wang<sup>2</sup>, James Eagan<sup>2</sup> and Wenping Zhao<sup>3</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>The University of Akron, United States; <sup>3</sup>Raytheon Technology Research Center, United States

**2:30 PM SU02.02.04**

**Enhancing Recycling of Poly(Lactide) to Methyl Lactate** [Suer Kurklu Kocaoglu](#)<sup>1</sup>, Carson Womack<sup>1</sup>, Sabah Najjar<sup>1</sup>, Louise Kuehster<sup>1</sup>, Hamidreza Mahdavi<sup>2</sup>, Laila Halim<sup>2</sup>, Michael Batten<sup>3</sup>, Leonie van't Hag<sup>2</sup>, Zongli Xie<sup>3</sup>, Nathaniel A. Lynd<sup>1</sup>, Matthew R. Hill<sup>2</sup> and Benny D. Freeman<sup>1</sup>; <sup>1</sup>The University of Texas at Austin, United States; <sup>2</sup>Monash University, Australia; <sup>3</sup>Commonwealth Scientific and Industrial Research Organisation, Australia

**2:45 PM SU02.02.05**

**Preparation, Characterization and Rheological Properties of Sustainable PC/ABS Blend With Zinc Borate** [Zeynep Iyigundogdu](#); Adana Alparslan Turkes Science and Technology University, Turkey

**3:00 PM BREAK**

**3:30 PM \*SU02.02.06**

**Exploring Polymer Deconstruction Through the Lens of X-Ray Scattering** [Sarah A. Hesse](#)<sup>1,2</sup>, Natasha Murphy<sup>2,3</sup>, Christopher Takacs<sup>1,2</sup>, SriBala Gorugant<sup>4</sup>, Mathew Mate<sup>1</sup>, Erika Erickson<sup>2,3</sup>, Tyler Quill<sup>1</sup>, Chloe Zimovets<sup>1</sup>, Nicholas Rorrer<sup>2,3</sup>, Linda Broadbelt<sup>2,4</sup>, Robert Allen<sup>2,3</sup>, Gregg Beckham<sup>2,3</sup> and Christopher Tassone<sup>1,2</sup>; <sup>1</sup>SLAC National Accelerator Laboratory, United States; <sup>2</sup>BOTTLE, United States; <sup>3</sup>National Renewable Energy Laboratory, United States; <sup>4</sup>Northwestern University, United States

**4:00 PM SU02.02.07**

**Biobased, Catalyst-Free, Non-Isocyanate Polyurethane Network Foams with Enhanced Circularity Through Extrusion and Foam-to-Foam Recycling** [Nathan S. Purwanto](#), Yixuan Chen, Boran Chen, Tong Wang, Yen-Wen Huang, Subeen Kim, William R. Dichtel and John M. Torkelson; Northwestern University, United States

**4:15 PM SU02.02.08**

**Sulfur-Copolymer Based Infrared Optics** [Cory Stephenson](#); NSWC Crane, United States

**4:30 PM SU02.02.09**

**Sustainable Adhesives—Exploring Boronic Ester Vitrimer Composites Containing Lignin Microparticles** [Martina Nardi](#)<sup>1</sup>, Luca Ceseracciu<sup>1</sup>, Marco Contardi<sup>2,1</sup>, Vincenzo Scribano<sup>2,1</sup>, Arkadiusz Zych<sup>1</sup> and Athanassia Athanassiou<sup>1</sup>; <sup>1</sup>Italian Institute of Technology, Italy; <sup>2</sup>Università degli Studi di Milano-Bicocca, Italy

SESSION SU02.03: Poster Session: Enabling Sustainable Polymers

Session Chairs: Kevin De France and Josh Worch

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SU02.03.01**

**Lignin-Chitosan-Vanillin Hydrogels for the Treatment of Wastewater** [Moses Ayitey-Adjin](#)<sup>1,2</sup>; <sup>1</sup>University of Dayton, United States; <sup>2</sup>Hanley Sustainability Institute, United States

**SU02.03.02**

**Thermomechanical Analysis of Cholesteric Liquid Crystal Mesophases from Chitosan Upon Solvent Evaporation** [Emma Sellin](#), Eleanor C. Grosvenor and Cecile Chazot; Northwestern University, United States

**SU02.03.03**

**Magnetic Cellulose Nanocomposite Hydrogels for Water Purification** [Corbon Moss](#); University of Dayton, United States

**SU02.03.04**

**Restoring Cellulose-Like Characteristics to Iron Oxide-Labelled Pulp Fibers Through Surface Crystallization of Cello-Oligosaccharides** [Anderson Thiago Vasconcelos Veiga](#)<sup>1,1</sup>, Megan G. Roberts<sup>2</sup>, D. Mark Martinez<sup>1,1</sup> and Emily D. Cranston<sup>1,1,1</sup>; <sup>1</sup>The University of British Columbia, Canada; <sup>2</sup>Western University, Canada

**SU02.03.05**

**Development of Biodegradable Electrospun Fibrous Films for Active Food Packaging Applications** [Bharath Perumal Pillai](#) and Ankit Tyagi; Indian Institute of Technology Jammu, India

**SU02.03.06**

**BUILD'EM—Properties of a Lignin-Based, Carbon-Negative Alternative to Traditional Concrete** [Swapnil Vaidya](#)<sup>1</sup>, Hudson Neyer<sup>2,1</sup>, Elise Harrison<sup>2,1</sup>, Gustavo Felicio Perruci<sup>3,1</sup>, Karli Gaffrey<sup>1</sup>, Rebecca Erwin<sup>4,1</sup>, Micah Duffield<sup>5,1</sup>, Ulysses Alfaro<sup>1</sup>, Tyler Bailey<sup>6,1</sup>, Bernadette Magalindan<sup>3,1</sup>, Thomas Spradley<sup>1</sup>, Jingying Hu<sup>1</sup>, Jasmine Liu<sup>6,1</sup>, Heather Goetsch<sup>1</sup>, Robert Allen<sup>1</sup>, Julia Sullivan<sup>1</sup>, Paulo Tabares<sup>7</sup>, Lori Tunstall<sup>7</sup>, Kevin Rens<sup>2</sup>, Kyle Foster<sup>1</sup>, Maryam Alahmar<sup>1,7</sup> and Paul Meyer<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>University of Colorado Denver, United States; <sup>3</sup>The University of Texas at Dallas, United States; <sup>4</sup>U.S. Department of Energy—Basic Energy Sciences, United States; <sup>5</sup>University of Colorado Boulder, United States; <sup>6</sup>The University of Texas at Austin, United States; <sup>7</sup>Colorado School of Mines, United States

**SU02.03.07**

**Using Advanced Macromolecular Composites as Physical Models for Algal Bioplastics** [Ian R. Campbell](#)<sup>1</sup>, Ziyue Dong<sup>2</sup>, Ella Lee<sup>1</sup>, Etta Shack<sup>1</sup>, Thea Zabala<sup>1</sup>, Kayla Sprenger<sup>2</sup> and Eleftheria Roumeli<sup>1</sup>; <sup>1</sup>The University of Washington, United States; <sup>2</sup>University of Colorado Boulder, United States

**SU02.03.08**

**Seaweed Bioadhesives for Engineered Wood Materials** Paul Grandgeorge, Ian R. Campbell, Mallory Parker, [Kwon-Teen Chen](#) and Eleftheria Roumeli; University of Washington, United States

**SU02.03.09**

**ML-Assisted Autonomous Assistant Robot for High-Throughput Algal Bioplastics Fabrication** [Kuotian Liao](#)<sup>1</sup>, Danli Luo<sup>1</sup>, Yiyang Sun<sup>2</sup>, Ian R. Campbell<sup>1</sup>, Hareesh Iyer<sup>1</sup>, Catherine Brinson<sup>2</sup>, Cynthia Rudin<sup>2</sup>, Kayla Sprenger<sup>3</sup>, Linda S. Schadler<sup>4</sup>, Nadya Peek<sup>1</sup> and Eleftheria Roumeli<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Duke University, United States; <sup>3</sup>University of Colorado Boulder, United States; <sup>4</sup>The University of Vermont, United States

**SU02.03.10**

**Upcycling Used Polymer Foam by Conversion to Free Standing Porous Carbon for Ion Removal from Water** [Jyotiraman De](#), Sumit Saxena and Shobha Shukla; Indian Institute of Technology Bombay, India

**SU02.03.11**

**Understanding Mesoscale Structural Features of Bacterial Cellulose for Biomedical Applications** [Julia Didier Amorim](#), Kuotian Liao and Eleftheria Roumeli; University of Washington, United States

**SU02.03.12**

**Exploring the Role of Natural Clinoptilolite Zeolite in Cementitious Systems—Accelerated Carbonation and 3D Printing Applications** [Brandon T. Lou](#), Eleftheria Roumeli and Dwayne Arola; University of Washington, United States

**SU02.03.13**

**Sustainable Mineral Wool Binder Using Algal Biomatter and Nanocellulose** Meng-Yen Lin<sup>1</sup>, Devin Hou<sup>1</sup>, [Thomas Hjelmgaard](#)<sup>2</sup> and Eleftheria Roumeli<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>ROCKWOOL A/S, Denmark

**SU02.03.14**

**Accelerating Bioinspired Cellulose Nanocomposite Design Through a Coarse-Grained Molecular Dynamics Approach** Sharmi Mazumder and [Ning](#)

Zhang; Baylor University, United States

#### **SU02.03.15**

**Analysis of Greenhouse Gas Emissions Produced by the Plastic Polymer's Life Cycle to Identify Targeted Mitigation Measures** Sally Han<sup>1</sup> and Clarise Han<sup>2</sup>; <sup>1</sup>High School, United States; <sup>2</sup>Massachusetts Institute of Technology, United States

#### **SU02.03.16**

**Fundamental Study of Algae-Inspired Biomatter Analogues Using Reactive Simulations for Sustainable Plastics Development** Ana Flavia M. Costa<sup>1</sup>, Ziyue Dong<sup>1</sup>, Ian R. Campbell<sup>2</sup>, Eleftheria Roumeli<sup>2</sup> and Kayla Sprenger<sup>1</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>University of Washington, United States

SESSION SU02.04: Polymers from Biomass I

Session Chairs: Eleftheria Roumeli and Josh Worch

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 446

#### **8:45 AM SU02.04.01**

**Self-Healable Epoxy Vitrimers Composites for Enhancing Wind Turbine Blade Sustainability** Amin Kuhzadmohammadi and Ning Zhang; Baylor University, United States

#### **9:00 AM \*SU02.04.02**

**INDUSTRY TRACK: Sustainable Adhesive Design Using Biomimicry and Targeting Market Impacts** Jonathan Wilker, Bradley McGill, Clayton Westerman and Gudrun Schmidt; Purdue University, United States

#### **9:30 AM \*SU02.04.03**

**Convergent Research from Synthetic Biology to Materials Chemistry Enabling Plastics Circularity** Brett A. Helms; Lawrence Berkeley National Laboratory, United States

#### **10:00 AM BREAK**

SESSION SU02.05: Biomass Polymers and Additive Manufacturing

Session Chairs: Eleftheria Roumeli and Josh Worch

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 446

#### **10:30 AM \*SU02.05.01**

**Preserving and Building on Natural Structures to Make Biobased Performance Materials** Jeremy Luterbacher; EPFL, Switzerland

#### **11:00 AM SU02.05.02**

**From Microalgae to Sustainable Plastics—Preparing Protein-Based Materials from Algal Biomass** Kevin De France and Yidan Wen; Queen's University, Canada

#### **11:15 AM SU02.05.03**

**Lignocellulosic and Polysaccharide Valorization—High-Performance 3D/4D Printable Materials and Coatings** Rigoberto C. Advincula; The University of Tennessee/Oak Ridge National Laboratory, United States

#### **11:30 AM SU02.05.04**

**OleoPlast—A Versatile Biodegradable Bioplastic for Green Transition and Additive Manufacturing** Leonardo Lamanna, Marco Friuli, Stefania Villani, Athira Narayanan, Luca Cafuero, Christian Demitri and Alessandro Sannino; Università del Salento, Italy

#### **11:45 AM SU02.05.05**

**Creep Suppression and Fatigue in Bio-Based Composites Manufactured via Large Format Additive Manufacturing** Amber M. Hubbard, Katie Copenhaver, Caitlyn Clarkson, Andres Rossy, Mitchell Rencheck, Meghan Lamm and Soydan Ozcan; Oak Ridge National Laboratory, United States

SESSION SU02.06: Sustainable Structural Materials

Session Chairs: Kevin De France and Eleftheria Roumeli

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 446

**1:30 PM \*SU02.06.01**

**Mechanics of Biomineralized Mycelium Materials** R. Konane Bay; University of Colorado Boulder, United States

**2:00 PM SU02.06.02**

**BUILD'EM: A Lignin-Based, Carbon-Negative, Cost-Competitive and Scalable Alternative to Concrete** Paul W. Meyer<sup>1</sup>, Karli Gaffrey<sup>1,2</sup>, Rebecca Erwin<sup>1</sup>, Elise Harrison<sup>1,3</sup>, Tyler Bailey<sup>1</sup>, Bernadette Magalindan<sup>1</sup>, Thomas Spradley<sup>1</sup>, Ulysses Alfaro<sup>1</sup>, Jasmine Liu<sup>1</sup>, Micah Duffield<sup>1</sup>, Maryam Alahmar<sup>1</sup>, Gustavo Felicio Perruci<sup>1</sup>, Swapnil Vaidya<sup>1</sup>, Hudson Neyer<sup>1</sup>, Kyle Foster<sup>1</sup>, Julia Sullivan<sup>1</sup>, Paulo Tabares<sup>2,1</sup>, Lori Tunstall<sup>2</sup>, Heather Goetsch<sup>1</sup>, Jingying Hu<sup>1</sup>, Kevin Rens<sup>3</sup> and Robert Allen<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory, United States; <sup>2</sup>Colorado School of Mines, United States; <sup>3</sup>University of Colorado Denver, United States

**2:15 PM SU02.06.03**

**Machine Learning-Driven Closed-Loop Optimization for the Accelerated Design of Sustainable Cements Utilizing Algal Biomatter** Meng-Yen Lin<sup>1</sup>, Kristen Severson<sup>2</sup>, Paul Grandgeorge<sup>1</sup> and Eleftheria Roumeli<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Microsoft Research, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

SESSION SU02.07: Nanocellulose I

Session Chairs: Kevin De France and Eleftheria Roumeli

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 446

**3:30 PM \*SU02.07.01**

**Functional Wood Materials for Energy-Efficient Smart Building Applications** Yong Ding<sup>1,2</sup> and Ingo Burgert<sup>1,2</sup>; <sup>1</sup>ETH Zurich, Switzerland; <sup>2</sup>Empa–Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**4:00 PM +SU02.07.02**

**Making Sustainable Energy Storage and Harvesting Technologies from Nanocellulose** Stephen Eichhorn; University of Bristol, United Kingdom

**4:30 PM SU02.07.03**

**The Effect of Ionic Liquid Treatment on the Morphology and Mechanical Properties of Cellulose Fibers** Lukas Pachernegg-Mair<sup>1</sup>, Jana Schaubeder<sup>1</sup>, Kristie J. Koski<sup>2</sup>, Ulrich Hirn<sup>1</sup>, Stefan Spirk<sup>1</sup> and Caterina Czibula<sup>1</sup>; <sup>1</sup>TU Graz, Austria; <sup>2</sup>University of California, Davis, United States

**4:45 PM SU02.07.04**

**Investigating the Effect of Highly Charged Cellulose Nanocrystals Alignment on their Piezoelectric Performance** Amirhossein Farahani and Zoubeida Ounaies; The Pennsylvania State University, United States

SESSION SU02.08: Nanocellulose II

Session Chairs: Kevin De France and Eleftheria Roumeli

Thursday Morning, April 10, 2025

Summit, Level 4, Room 446

**8:45 AM SU02.08.01**

**Surface Functionalization of Bacterial Cellulose Nanoparticles for Sustainable Nanomedicine** Gabrielle Balistreri, Elizabeth Nance and Eleftheria Roumeli; University of Washington, United States

**9:00 AM SU02.08.02**

**Optimized Labeling of Pulp Fibers with Iron Oxide Nanoparticles for Enhanced X-Ray Visualization** Anderson Thiago Vasconcelos Veiga<sup>1,1</sup>, James Drummond<sup>1,1</sup>, André B. Phillion<sup>2</sup>, D. Mark Martinez<sup>1,1</sup> and Emily D. Cranston<sup>1,1,1</sup>; <sup>1</sup>The University of British Columbia, Canada; <sup>2</sup>McMaster University, Canada

**9:15 AM SU02.08.03**

**Tuning Cholesteric Order, Optical Properties and Colorimetric Responses in Ethyl Cellulose-Poly(Acrylic Acid) Composites** Simona G. Fine, Charmaine Guo and Cecile Chazot; Northwestern University, United States

**9:30 AM SU02.08.04**

**Enhanced Growth in Nanocellulose Modified Flax Fibers** Louise Batta, Xhulja Biraku, Erik Nielsen, Mihela Banu and Alan Taub; University of Michigan, United States

**9:45 AM BREAK**

SESSION SU02.09: Polymers from Biomass II

Session Chairs: Kevin De France and Eleftheria Roumeli

Thursday Morning, April 10, 2025

Summit, Level 4, Room 446

**10:15 AM SU02.09.01**

**Mechanochemical Synthesis of Hybrid Biomass Composites** Josh Worch; Virginia Tech, United States

**10:30 AM SU02.09.02**

**Algal Biomatter Metamaterials for Acoustic Insulation Applications** Hareesh Iyer, Mohammad T. Manesh, Ryan Kim, Meghan Dillon, Hyunseo Kim, Tomas M. Echenagucia and Eleftheria Roumeli; University of Washington, United States

**10:45 AM SU02.09.03**

**Understanding Biopolymer Interactions in Multicomponent Systems Toward Imparting Multifunctionality.** Aban Mandal, Kuotian Liao, Hareesh Iyer, Taylor Hilton, Danli Luo, Nadya Peek and Eleftheria Roumeli; University of Washington, United States

**11:00 AM SU02.09.04**

**Biodegradable Hulls Materials for Buoys—Towards Sustainable Oceanography** Mallory Parker, Kuotian Liao, Michael Steele, Anuscheh Nawaz and Eleftheria Roumeli; University of Washington, United States

**11:15 AM SU02.09.05**

**Advancing Elastane Separation from Blended Textiles with Roll-to-Roll Chitosan Coating** Cecile Chazot<sup>1</sup>, Eleanor C. Grosvenor<sup>1</sup>, Malachi R. Cohen<sup>1</sup>, Emma M. Sellin<sup>1</sup> and Gabrielle N. Wood<sup>1,2</sup>; <sup>1</sup>Northwestern University, United States; <sup>2</sup>Howard University, United States

## SYMPOSIUM SU03

Symposium Organizers

Zheng Chen, University of California, San Diego  
Chiara Ferrara, University Milano Bicocca  
Minah Lee, Pohang University of Science and Technology  
Ge Li, University of Alberta

Symposium Support

**Bronze**

NEWARE TECHNOLOGY LIMITED

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU03.01: Earth-Abundant Materials for Batteries I

Session Chairs: Zheng Chen and Minah Lee

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 447

**10:30 AM \*SU03.01.01**

**Organic Batteries for a More Sustainable Future** Jodie Lutkenhaus; Texas A&M University, United States

**11:00 AM SU03.01.02**

**Designing Electrolytes for Solid-State Batteries for Sustainable Circularity** Brett A. Helms; Lawrence Berkeley National Laboratory, United States

**11:15 AM SU03.01.03**

**From Redox-Active Materials to a Sustainable All-Organic Polymer-Based Battery** Xhesilda Fataj<sup>1,2</sup>, Andreas J. Achazi<sup>3,4</sup>, Simon Münch<sup>1,2</sup>, Christian Stolze<sup>1,2</sup>, Doreen Mollenhauer<sup>3,4</sup>, Martin D. Hager<sup>1,2,5</sup> and Ulrich S. Schubert<sup>1,2,5</sup>; <sup>1</sup>Laboratory of Organic and Macromolecular Chemistry (IOMC, Lehrstuhl II/Schubert) Friedrich-Schiller-Universität Jena, Germany; <sup>2</sup>Center for Energy and Environmental Chemistry Jena (CEEC Jena), Friedrich Schiller University Jena, Germany; <sup>3</sup>Center for Materials Research Justus-Liebig University, Giessen, Germany; <sup>4</sup>Institute of Physical Chemistry, Justus-Liebig University Giessen, Germany; <sup>5</sup>Helmholtz Institute for Polymers in Energy Applications Jena (HIPOLE Jena), Germany

**11:30 AM SU03.01.04**

**2D Crystalline Polymer-Based Artificial Interphase for Sustainable Batteries** Minghao Yu; Technische Universität Dresden, Germany

SESSION SU03.02: Earth-Abundant Materials for Batteries I

Session Chairs: Chiara Ferrara and Ge Li

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 447

**1:30 PM \*SU03.02.01**

**Optimizing Organic Electrode Microstructures for All-Solid-State Batteries Through Hardness Manipulation** Yan Yao; University of Houston, United States

**2:00 PM \*SU03.02.02**

**Pressurized Organic Electrodes Enable Practical/Extreme Batteries** Xiaolei Wang; University of Alberta, Canada

**2:30 PM SU03.02.03**

**Polymeric Redox-Active Disulfide Particles as Organic Cathode Electrodes** Hongyi Zhang, Stuart Rowan and Shrayesh Patel; The University of Chicago, United States

**2:45 PM SU03.02.04**

**Surface/Interface Engineering for Sustainable Batteries** Yuqi Li; Stanford University, United States

**3:00 PM BREAK**

**3:30 PM SU03.02.05**

**Earth-Abundant Magnesium Metal Anode with Chemically Activated for Reversible Cycling in Simple Salt Electrolytes** A-Re Jeon<sup>1</sup>, Seungyun Jeon<sup>2,3</sup>, Gukhyun Lim<sup>1</sup>, Juyoung Jang<sup>2</sup>, Woo Joo No<sup>2,3</sup>, Si Hyoung Oh<sup>2</sup>, Jihyun Hong<sup>1</sup>, Seung-Ho Yu<sup>3</sup> and Minah Lee<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>3</sup>Korea University, Korea (the Republic of)

**3:45 PM SU03.02.06**

**Facilitating Dense Zn Deposition via Spontaneous Cu-Zn Alloying for High-Energy Aqueous Batteries** Minhyung Kwon<sup>1</sup>, Jina Lee<sup>1</sup>, Gukhyun Lim<sup>1</sup>, Seung-Ho Yu<sup>2</sup>, Jihyun Hong<sup>1</sup> and Minah Lee<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of)

**4:00 PM SU03.02.07**

**Enhancing F-CapMix Performance—Novel Multilayer Graphene-Protected Metal Current Collectors** Insung Hwang, Joonhyeok Park, Jiwoon Kim, Jaeik Kim, Myeungwoo Ryu, Gangyu Lee, Sumin Hong, Taeseup Song and Ungyu Paik; Hanyang University, Korea (the Republic of)

**4:15 PM SU03.02.08**

**Biobased Membranes for Redox Flow Batteries** Lukas Pachernegg-Mair<sup>1</sup>, Scheer Alexa<sup>1</sup>, Janis Zoder<sup>1</sup>, Dominik Wickenhauser<sup>1</sup>, Julian Selinger<sup>1,2</sup>, Jonas Lins<sup>3</sup>, Torsten Gutmann<sup>3</sup>, Ulrich Hirn<sup>1</sup> and Stefan Spirk<sup>1</sup>; <sup>1</sup>Graz University of Technology, Austria; <sup>2</sup>Aalto University, Finland; <sup>3</sup>Technical University of Darmstadt, Germany

**4:30 PM SU03.02.09**

**Unlocking the Potential of Carbonized Lignin for Sustainable Battery Anodes—Coupling Life Cycle and Economic Assessments with Technical Advancements** Talia A. Thomas, Quyen Tran, Valerie Thomas, Sankar Nair and Matthew McDowell; Georgia Institute of Technology, United States

SESSION SU03.03: Poster Session: Sustainable Batteries—Recycling and Utilizing Earth-Abundant Materials

Session Chairs: Hyungsub Kim and Minah Lee

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SU03.03.01**

**Advanced Absolute Chemical Precipitation for High-Purity Metal Recovery in All-Types of Lithium-Ion Battery Recycling** Hsin-Fang Chang, Jing-Yin Lin, Zheng-Yu Cheng and Chih-Huang Lai; National Tsing Hua University, Taiwan

**SU03.03.02**

**Chloride-Based Electrolytes for Long-Lifespan Tin Metal Batteries** Songyang Chang; University of Puerto Rico at Río Piedras, United States

**SU03.03.03**

**Direct Recovery of Ternary Cathode Materials from All Types Spent Lithium-Ion Batteries** Jing-Yin Lin, Tzu-Ming Cheng, Yung-Ling Chang and Chih-Huang Lai; National Tsing Hua University, Taiwan

**SU03.03.04**

**Zinc Oxide Nanowires on Copper Foam for Sustainable Urea Electrosynthesis via Co-reduction of Nitrate and Carbon Dioxide—A Step Towards Energy-Efficient Agriculture** Johanna Bacayo<sup>1</sup>, Daniel Amusah<sup>2,2</sup>, Victor Ramos-Sanchez<sup>1</sup> and Joaquin Rodriguez-Lopez<sup>3,3</sup>; <sup>1</sup>Northern Arizona University, United States; <sup>2</sup>University of Ghana, Ghana; <sup>3</sup>University of Illinois at Urbana-Champaign, United States

**SU03.03.05**

**Laser-Induced Regeneration of Spent LiMn<sub>2</sub>O<sub>4</sub> Cathode into High-Performance Ni-Doped LiMn<sub>2</sub>O<sub>4</sub> Cathode** Xucun Ye and Lawrence Yoon Suk Lee; The Hong Kong Polytechnic University, Hong Kong



**SU03.03.06**

**Direct Upcycling of NMC Mixtures in Molten Salts** Xin Wang<sup>1</sup>, Tao Wang<sup>1</sup>, Huimin Luo<sup>1</sup> and Sheng Dai<sup>1,2</sup>; <sup>1</sup>Oak Ridge National Laboratory, United States; <sup>2</sup>The University of Tennessee, Knoxville, United States

**SU03.03.07**

**Electrochemical Approaches for Resource Recovery and Circulation for the Sustainability of Lithium-Ion Batteries** Inhoi Kim, Jinwook Jung and Jin Soo Kang; Seoul National University, Korea (the Republic of)

**SU03.03.08**

**Supra-3-Volt Nonaqueous Redox Flow Batteries with High Stability Based on Simple Terephthalonitrile Anolytes** Nicolas Daub<sup>1</sup>, Xiaotong Zhang<sup>2</sup>, Nico J. van Rijswijk<sup>1</sup>, Piotr de Silva<sup>2</sup> and Rene A. Janssen<sup>1</sup>; <sup>1</sup>Eindhoven University of Technology, Netherlands; <sup>2</sup>Technical University of Denmark, Denmark

SESSION SU03.04: Advanced Battery Recycling I

Session Chairs: Zheng Chen and Chiara Ferrara

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 447

**8:30 AM \*SU03.04.01**

**Materials Challenge in Recycling Lithium-Ion Batteries** Ilias Belharouak, Yaocai Bai and Lu Yu; Oak Ridge National Laboratory, United States

**9:00 AM \*SU03.04.02**

**ReCell—Working to Advance Battery Recycling** Khagesh Kumar, Bintang Nuraeni, Jessica Macholz, Albert Lipson and Jeffrey Spangenberg; Argonne National Laboratory, United States

**9:30 AM SU03.04.03**

**Direct Recycling and Upcycling of Spent LiNi<sub>x</sub>Mn<sub>y</sub>Co<sub>z</sub>O<sub>2</sub> (NMC) Cathodes in Molten Salts** Tao Wang, Huimin Luo and Sheng Dai; Oak Ridge National Laboratory, United States

**9:45 AM SU03.04.04**

**From NMC to NMC—Towards Circular Economy** Magdalena Winkowska-Struzik<sup>1</sup>, Dominika Buchberger<sup>1</sup>, Witold Uhrynowski<sup>1</sup>, Michal Struzik<sup>2,2</sup>, Maciej Boczar<sup>1</sup>, Zbigniew Rogulski<sup>1</sup> and Andrej Czerwinski<sup>1</sup>; <sup>1</sup>University of Warsaw, Poland; <sup>2</sup>Warsaw University of Technology, Poland

**10:00 AM BREAK**

**10:30 AM \*SU03.04.05**

**INDUSTRY TRACK: Repairing and Upcycling of Electrode Materials from Spent Lithium Ion Batteries** Guangmin Zhou; Tsinghua Shenzhen International Graduate School, China

**11:00 AM SU03.04.06**

**Thermodynamically Controlled Chemical Charge Transfer for Regenerating Spent Battery Cathodes Under Ambient Conditions** Minah Lee; Pohang University of Science and Technology, Korea (the Republic of)

**11:15 AM \*SU03.04.07**

**Efficient Direct Recycling of Spent Lithium-Ion Batteries Materials** Panpan Xu; Suzhou Institute of Nano-Tech and Nano-Bionics, China

**11:45 AM SU03.04.08**

**Battery Direct Recycling—Atmospheric-Pressure Relithiation by Aqueous Media Followed by Low-Temperature Calcination of NMC-Based Materials Containing Conductive Carbon** Flora Chelouah<sup>1,2</sup>, Christine Surcin<sup>1,2</sup>, Nadir Recham<sup>1,2</sup> and Claude Guery<sup>1,2</sup>; <sup>1</sup>Laboratoire de Réactivité et de Chimie des Solides (LRCS), UMR CNRS 7314, Université de Picardie Jules Verne, France; <sup>2</sup>Réseau sur le Stockage Electrochimique de l'Energie (RS2E), France

SESSION SU03.05: Advanced Battery Recycling II

Session Chairs: Minah Lee and Ge Li

Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 447

**1:30 PM \*SU03.05.01**

**INDUSTRY TRACK: Scalable Direct Recycling Techniques for Battery Materials— Bridging Laboratory Research and Commercial Applications**

Weikang Li; ExPost Technology, United States

**2:00 PM \*SU03.05.02**

**Direct Recycling of Spent Li-Ion Batteries via Spontaneous Redox Reactions** Jung-Je Woo, Hayong Song, Jinju Song, Jiyoung Ma, Joonkyo Seo, Seok Hyun Song, Jeong-Sun Park and Il-Chan Jang; Korea Institute of Energy Research, Korea (the Republic of)

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SU03.05.03**

**Quinone-Driven Redox Mediator-Assisted Relithiation for Direct Li-Ion Battery Recycling** Won-Hee Ryu; Sookmyung Women's University, Korea (the Republic of)

**4:00 PM SU03.05.04**

**Unlocking Ultrafast Diagnosis of Retired Batteries via Interpretable Machine Learning and Optical Fiber Sensors** Taolue Zhang, Ruifeng Tan, Pinxi Zhu, Tongyi Zhang and Jiaqiang Huang; The Hongkong University of Science and Technology (Guangzhou), China

**4:15 PM \*SU03.05.05**

**Study on Automatic Solvent Extraction Process for Recycling Electric Vehicle Batteries** Hong In Kim; Korea Institute of Geoscience and Mineral Resources, Korea (the Republic of)

**4:45 PM SU03.05.06**

**Magnetophoretic Separation and Recovery of Metal Ions for Electronic Waste Recycling** Isabella Hoyer<sup>1</sup>, Ayca Ersoy<sup>1</sup>, Andrew Ritchhart<sup>2</sup>, Jaehun Chun<sup>2</sup>, Elias Nakouzi<sup>2</sup> and Zachary Sherman<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

SESSION SU03.06: Advances in Sustainable Energy Technology

Session Chairs: Zheng Chen and Won-Hee Ryu

Thursday Morning, April 10, 2025

Summit, Level 4, Room 447

**8:30 AM \*SU03.06.01**

**A Novel Gas-Solid Reaction Approach for Selective Lithium Recovery from Spent Cathode Materials** Hyungsub Kim<sup>1,2</sup>; <sup>1</sup>Korea Atomic Energy Research Institute, Korea (the Republic of); <sup>2</sup>Chungbuk National University, Korea (the Republic of)

**9:00 AM SU03.06.02**

**Enhancing Performance Efficiency in Mn-Fe Redox Flow Batteries Through Electrolyte Optimization** Nitika Devi and Yong-Song Chen; National Chung Cheng University, Taiwan

**9:15 AM SU03.06.03**

**Revealing Water and Ion Transport Under Extreme Confinement for Sustainable Batteries** Xintong Xu; Stanford University, United States

**9:30 AM BREAK**

**10:00 AM SU03.06.04**

**Thermochemical Salt Hydrates—Structural Dynamics and Kinetic Insights for High-Density and Sustainable Energy Storage** Sumanjeet Kaur; Lawrence Berkeley National Laboratory, United States

**10:15 AM SU03.06.05**

**Upcycling Polycrystalline LiNiMnCoO<sub>2</sub> Cathode to Single-Crystal Cathode via Efficient Polyol-Metallurgical Recycling** Lu Yu, Yaocai Bai and Ilias

Belharouak; Oak Ridge National Laboratory, United States

**10:30 AM SU03.06.06**

**Reducing Environmental Impact in LIB Recycling Through Electrochemical Systems** [Seoni Kim](#); Ewha Womans University, Korea (the Republic of)

**10:45 AM SU03.06.07**

**Transforming E-Waste into High-Performance Catalysts for Renewable Energy and Environmental Sustainability** [Nageh K. Allam](#); American University in Cairo, Egypt

## SYMPOSIUM SU04

Protons in Solids, Fluids and Molecules

April 9 - April 11, 2025

### Symposium Organizers

Artur Braun, EMPA-Swiss Federal Laboratories for Materials Science and Technology

Qianli Chen, Shanghai Jiao Tong University

Elena Rozhkova, Argonne National Laboratory

WonHyoungh Ryu, Yonsei University

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU04.01: Protons in Bio-Inspired Materials

Session Chairs: Elena Rozhkova and WonHyoungh Ryu

Wednesday Afternoon, April 9, 2025

Summit, Level 4, Room 448

**1:30 PM SU04.01.01**

**Bio-Inspired Photon-to-Chemical Energy Conversion Through Hybrid Organic-Inorganic Nanoarchitectures** Jinhyeong Jang and [Elena A. Rozhkova](#); Argonne National Laboratory, United States

**1:45 PM \*SU04.01.02**

**Engineered Green Algae Photovoltaic Power Stations for Green Hydrogen Production in Fresh and Sea Waters** [Hyun S. Ahn](#); Yonsei University, Korea (the Republic of)

**2:15 PM SU04.01.03**

**Hydrogen Production Based on Thylakoids Composite Hydrogel Beads with Improved Stability by ROS Scavenging Using Ceria Nanoparticles** [JaeHyoungh Yun](#)<sup>1</sup>, Sharipov Mirkomil<sup>1</sup>, Suji Choi<sup>2</sup>, SeungWoo Choi<sup>2</sup> and WonHyoungh Ryu<sup>1</sup>; <sup>1</sup>Yonsei University, Korea (the Republic of); <sup>2</sup>Seoul National University Hospital, Korea (the Republic of)

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM SU04.01.04**

**Aqueous Redox Active Molecular Materials Mediating Proton-Coupled-Electron-Transfer for Sustainable Energy Applications** [Dawei Xi](#), Junlin Li, Yuheng Wu, Abdulrahman Alfaraidi, Taobo Wang and Michael J. Aziz; Harvard University, United States

**3:45 PM \*SU04.01.05**

**Advancements, Applications and Challenges of Miniature Microbial Fuel Cells** Seokheun Choj; Binghamton University, The State University of New York, United States

**4:15 PM SU04.01.06**

**Maximizing Direct Electron Transfer in Thylakoid Membranes Using Synergistic Nanomaterials Through Bayesian Optimization** JongHyun Kim, JaeHyoun Yun, Sharipov Mirkomil and WonHyoun Ryu; Yonsei University, Korea (the Republic of)

SESSION SU04.02: Proton Conducting Ceramics

Session Chairs: Qianli Chen and Alexey Rulev

Thursday Morning, April 10, 2025

Summit, Level 4, Room 448

**8:00 AM \*SU04.02.01**

**Advancing the Science of Solid Acid Superprotonic Conductors** Sossina M. Haile; Northwestern University, United States

**8:30 AM SU04.02.02**

**Investigation of Hydroxyl Proton Diffusion in Ceramic Proton Conductors Revealed by *In Situ* Raman Spectroscopy** Zihan Zhao<sup>1</sup>, Lulu Jiang<sup>2</sup>, Ruibin Wang<sup>1</sup>, Donglin Han<sup>2</sup> and Qianli Chen<sup>1</sup>; <sup>1</sup>Shanghai Jiao Tong University, China; <sup>2</sup>Soochow University, China

**8:45 AM \*SU04.02.03**

**Developing Protonic Ceramic Cells on Porous Metal Supports** Noriko Sata, Haoyu Zheng, Feng Han, Matthias Riegraf and Rémi Costa; DLR, Germany

**9:15 AM SU04.02.04**

**Infrared Excited Proton Conductivity in BaZr<sub>0.8</sub>Y<sub>0.2</sub>O<sub>3-δ</sub>** Haobo Li, Wenjie Wan and Qianli Chen; Shanghai Jiao Tong University, China

**9:30 AM BREAK**

**10:00 AM \*SU04.02.05**

**Uncovering Fast Proton Conductors Based on Lattice Dynamics** Bilge Yildiz; Massachusetts Institute of Technology, United States

**10:30 AM SU04.02.06**

**Boosting Air-Electrode Surface Kinetics in Protonic Ceramic Electrochemical Cells** Youdong Kim, Jayoon Yang, Neal Sullivan and Ryan O'Hayre; Colorado School of Mines, United States

**10:45 AM \*SU04.02.07**

**Atomic-Scale Oxide Overcoat for Enhanced Electrode Activity and Durability of Solid Oxide Cells** Min Hwan Lee; University of California, Merced, United States

**11:15 AM SU04.02.08**

**Proton-Conducting Nanosheet Membrane for Low-Temperature Fuel Cells** Kazuto Hatakeyama, Tatsuki Tsugawa, Haruki Watanabe, Kanako Oka, Sho Kinoshita and Shintaro Ida; Kumamoto University, Japan

**11:30 AM \*SU04.02.09**

**Effect of Hydration on Electrical and Electromechanical Properties of Lanthanum-Cerium Oxides** Or Ben-Zion<sup>1</sup>, Tahel Malka<sup>1</sup>, David Ehre<sup>1</sup>, Isaac Abrahams<sup>2</sup> and Igor Lubomirsky<sup>1</sup>; <sup>1</sup>Weizmann Institute of Science, Israel; <sup>2</sup>Queen Mary University of London, United Kingdom

SESSION SU04.03: Proton Flux in Electrochemical Systems

Session Chairs: Artur Braun and Qianli Chen

Thursday Afternoon, April 10, 2025

Summit, Level 4, Room 448

**1:30 PM \*SU04.03.01**

**Probing Dynamic Proton Flux in Nanoscale Electrochemical Cells** Shu Hu; Yale University, United States

**2:00 PM SU04.03.02**

**Interface Engineering of Graphene Oxide Proton Exchange Membranes for Fuel Cells** Tatsuki Tsugawa, Kazuto Hatakeyama, Michio Koinuma and Shintaro Ida; Kumamoto University, Japan

**2:15 PM SU04.03.03**

**H<sub>2</sub>/O<sub>2</sub> Fuel Cell Using Hydrogen-Bonded Metal-Organic Framework Nanosheet as a Proton-Exchange Membrane** Shintaro Ida, Agamoni Pathak and Kazuto Hatakeyama; Kumamoto University, Japan

SESSION SU04.04: Poster Session: Protons in Solids, Fluids and Molecules

Session Chairs: Elena Rozhkova and Alexey Rulev

Thursday Afternoon, April 10, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SU04.04.01**

**An *In Situ* Formed Composite High Entropy Perovskite Oxide Air Electrode for Protonic Ceramic Electrochemical Cells** Jayoon Yang, Youdong Kim, Neal Sullivan and Ryan O'Hayre; Colorado School of Mines, United States

SESSION SU04.05: Neuromorphic Ion-Transfer Materials

Session Chairs: Igor Lubomirsky and Subramanian Sankaranarayanan

Friday Morning, April 11, 2025

Summit, Level 4, Room 448

**8:00 AM \*SU04.05.01**

**Computational Modeling of Protonation Effects in Strongly Correlated Quantum Materials** Subramanian Sankaranarayanan<sup>1,2</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>University of Illinois at Chicago, United States

**8:30 AM SU04.05.02**

**Multiscale Modeling of Proton Conduction in Nafion Membranes—Integrating Coarse-Grained Molecular Dynamics and Continuum Calculations** Xingyu Zhang<sup>1,2</sup>, Alejandro A. Franco<sup>1,2</sup> and Robert Pöschl<sup>3</sup>; <sup>1</sup>Laboratoire de Réactivité et Chimie des Solides, France; <sup>2</sup>Université de Picardie Jules Verne, France; <sup>3</sup>AVL List GmbH, Austria

**8:45 AM \*SU04.05.03**

**Graph Theory Ideas Reveal Long Range Proton Conduction Pathways** Maria A. Gomez; Mount Holyoke College, United States

**9:15 AM SU04.05.04**

**Atomistic Simulation of Activation Reactions and Proton Hopping in Zr-MOFs** Adam R. Hinkle<sup>1,2</sup>, Ivan Iordanov<sup>2</sup> and Matthew Browe<sup>2</sup>; <sup>1</sup>DCS Corporation, United States; <sup>2</sup>U.S. Army CCDC CBC, United States

**9:30 AM \*SU04.05.05**

**INDUSTRY TRACK: Materials Discovery Through Interpretation—Decoding Proton Conductivity with Small Experimental Datasets** Yoshihiro Yamazaki<sup>1</sup>, Kota Tsujikawa<sup>1</sup>, Junji Hyodo<sup>1</sup>, Shusuke Kasamatsu<sup>2</sup> and Susumu Fujii<sup>1</sup>; <sup>1</sup>Kyushu University, Japan; <sup>2</sup>Yamagata University, Japan

**10:00 AM BREAK**

**10:30 AM \*SU04.05.06**

**Protonic Modulation of Electronic Conductivity of Ultrathin Layers for Electrochemical Synaptic Devices** Mantao Huang, Longlong Xu, Ju Li and Bilge Yildiz; Massachusetts Institute of Technology, United States

**11:00 AM \*SU04.05.07**

**Influence of Lattice Vibrations on Ionic Conduction—A New Model for Enhanced Ionic Conductivity** Alexey Rulev and Artur Braun; Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland

**11:30 AM SU04.05.08**

**Percolation Based Proton Transport in 2D Layered Materials** Anjan Das; Indian institute of Technology Madras, India

SESSION SU04.06: Protons in Energy Conversion and Storage

Session Chairs: Artur Braun and Huyen Dinh

Friday Afternoon, April 11, 2025

Summit, Level 4, Room 448

**1:30 PM \*SU04.06.01**

**Measuring and Leveraging Local Structures in Materials for Hydrogen Storage and Reactions** Paul S. Weiss; University of California, Los Angeles, United States

**2:00 PM \*SU04.06.02**

**INDUSTRY TRACK: HydroGEN Consortium—Advancements in Renewable Hydrogen Production** Huyen Dinh; National Renewable Energy Laboratory, United States

**2:30 PM BREAK**

**3:00 PM SU04.06.03**

**Enhanced Charge Transfer in Bi<sub>2</sub>S<sub>3</sub> and Protonated g-C<sub>3</sub>N<sub>4</sub> Composites for Sustainable Photoelectrochemical Hydrogen Generation** Kanchan J. Pawar and Oshnik Maurya; Institute of Chemical Technology Mumbai, India

**3:15 PM \*SU04.06.04**

**Proton-Conducting Oxides for Power Generation, Hydrogen Production and Chemicals Synthesis** Chuancheng Duan; University of Utah, United States

**3:45 PM SU04.06.05**

**Protons in Room-Temperature, Post-Synthesis Doping and Defect Engineering of Oxides for Energy Applications** Ian L. Suni<sup>1</sup>, Heonjae Jeong<sup>2</sup>, Raylin Chen<sup>1</sup>, Grace McKnight<sup>1</sup>, Elif Ertekin<sup>1</sup>, Xiao Su<sup>1</sup> and Edmund Seebauer<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign, United States; <sup>2</sup>Gachon University, Korea (the Republic of)

**4:00 PM \*SU04.06.06**

**Room-Temperature Defect Chemistry in Functional Oxides** Qiyang Lu; Westlake University, China

## SYMPOSIUM SU05

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Materials Innovation for Sustainability and Energy Applications of Critical Elements

April 8 - April 10, 2025

Symposium Organizers

Ying Li, University of Wisconsin--Madison

Chong Liu, The University of Chicago

Karen Mulfort, Argonne National Laboratory

Sui Zhang, National University of Singapore

\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU05.01: Water and Sustainability

Session Chairs: Ying Li and Chong Liu

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 420

**10:30 AM SU05.01.01**

**H<sub>2</sub>O<sub>2</sub>-Catalyzed Defluorination of Perfluorooctanesulfonate (PFOS) by Oxidized Vanadium Carbide MXene Nanosheets** [Yuemei Ye](#)<sup>1</sup> and Jessica Ray<sup>2</sup>; <sup>1</sup>Lehman College, United States; <sup>2</sup>University of Washington, United States

**10:45 AM SU05.01.02**

**PFAS-Free Waterborne Amphiphobic Coatings with Excellent Substrate Independent Adhesion** [Priya Mandal](#), Vikaramjeet Singh and Manish K. Tiwari; University College London, United Kingdom

**11:00 AM SU05.01.03**

**Metal Nanohybrids-Based Solar Evaporator with Controllable Aligned Channels for Efficient Solar-Driven Desalination** [Jinhyeok Kang](#) and Changwoo Nam; Jeonbuk National University, Korea (the Republic of)

**11:15 AM SU05.01.04**

**Few Cycles Atomic Layer Deposition Modification Towards Superior Anti-Fouling Membranes** [Bratin Sengupta](#)<sup>1,2</sup>, Yining Liu<sup>1,3</sup>, Seth B. Darling<sup>1</sup> and Jeffrey W. Elam<sup>1</sup>; <sup>1</sup>Argonne National Laboratory, United States; <sup>2</sup>Northwestern University, United States; <sup>3</sup>The University of Chicago, United States

**11:30 AM SU05.01.05**

**Environmentally Friendly Synthesis and Aerosol Jet Printing of hBN Films for Thermal Packaging Applications** [Laura C. Davidson](#)<sup>1</sup>, Nicholas Sepelak<sup>1</sup>, Joshua Piel<sup>2</sup>, Judit Beagle<sup>1</sup>, Fahima Ouchen<sup>1</sup>, Carrie Bartsch<sup>2</sup> and Andrew Green<sup>2</sup>; <sup>1</sup>KBR, United States; <sup>2</sup>Air Force Research Laboratory, United States

SESSION SU05.02: Lithium

Session Chairs: Ying Li and Chong Liu

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 420

**1:30 PM \*SU05.02.01**

**Electrochemical Lithium Extraction from Brines and Electrochemical Production of Lithiated Transition Metal Oxides** [Paul V. Braun](#); University of Illinois at Urbana Champaign, United States

**2:00 PM SU05.02.02**

**Advancing a Circular Lithium Economy—Optimizing Electrodialysis for Efficient Lithium Recovery and Upcycling from Spent Batteries** [Zi Hao Foo](#)<sup>1,2</sup>, Trent Lee<sup>1</sup> and John Lienhard<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology, United States; <sup>2</sup>University of California, Berkeley, United States

**2:15 PM SU05.02.03**

**Recovery of Lithium and Heavy Non-Ferrous Metals from Spent Lithium-Ion Batteries** Valery Kaplan, Ellen Wachtel and [Igor Lubomirsky](#); Weizmann Institute of Science, Israel

**2:30 PM BREAK**

**3:00 PM \*SU05.02.04**

**Biaxial Nematic Flow Electrode for Active Lithium Separation** [Michael Whittaker](#), Dimitrius Khaladj and Wenming Dong; Lawrence Berkeley National Laboratory, United States

**3:30 PM SU05.02.05**

**From Brine to Battery—Exploring High-Efficiency Lithium Recovery with a Novel LDH Material** [Mohammed A. Abujayyab](#), Fawzi Banat, Hassan Arafat and Shadi W. Hasan; Khalifa University of Science and Technology, United Arab Emirates

**3:45 PM SU05.02.06**

**Hybrid Solvothermal-Molten Synthesis of M-N-H Systems—A Novel Approach Towards Lithium Nanostructurisation** [Fatima Abi Ghaida](#) and Joshua W. Makepeace; University of Birmingham, United Kingdom

**4:00 PM SU05.02.07**

**High-Entropy Polymer Blend Based Electrolytes for Structural Energy Storage Applications** [Md Shovon Hossain](#)<sup>1</sup>, Jesse Estrada<sup>2</sup> and Caiwei Shen<sup>1</sup>; <sup>1</sup>University of Massachusetts Dartmouth, United States; <sup>2</sup>California State Polytechnic University-Pomona, United States

**4:15 PM SU05.02.08**

**Capacitive Deionization Using Organic Mixed Ion Electron Conductors** [Sepideh Saghafifar](#) and Loren G. Kaake; Simon Fraser University, Canada

SESSION SU05.03: Rare Earth Elements

Session Chairs: Chong Liu and Yayuan Liu

Wednesday Morning, April 9, 2025

Summit, Level 4, Room 420

**9:00 AM \*SU05.03.01**

**Separation of Rare-earth Elements—From Data to Machine Learning and Back** [De-en Jiang](#); Vanderbilt University, United States

**9:30 AM SU05.03.02**

**Achieve a High-Selective Rare-Earth Elements Separation in Neutral-pH All-Aqueous System** [Yu Han](#) and Chong Liu; University of Chicago, United States

**9:45 AM SU05.03.03**

**Innovative Electrochemical Recycling of Rare Earth Elements from NdFeB Permanent Magnets for Critical Materials Recovery and Sustainable Energy Transition** [Shao-Chi Lo](#), Ting-Huan Chiu, Tzu-Ming Cheng and Chih-Huang Lai; National Tsing Hua University, Taiwan

**10:00 AM BREAK**

**10:30 AM \*SU05.03.04**

**Collaboration Accelerates Progress in Critical Materials Recycling** [Yoshiko Fujita](#)<sup>1</sup> and Santa Jansone-Popova<sup>2</sup>; <sup>1</sup>Idaho National Laboratory, United States; <sup>2</sup>Oak Ridge National Laboratory, United States

**11:00 AM SU05.03.05**

**Modulating Ionic Transport Through Nanoporous Graphene Membranes for Rare-Earth Recovery** [Simar Mattewal](#) and Rohit N. Karnik; Massachusetts Institute of Technology, United States

**11:15 AM SU05.03.06**

**Understanding Reverse-Size-Selective Extraction of Lanthanides Using a Conformationally Adaptive Ligand** [Debmalya Ray](#), Md. Faizul Islam, Benjamin L. Dougherty, Nikki Thiele and Vyacheslav Bryantsev; Oak Ridge National Laboratory, United States

SESSION SU05.04: Metal

Session Chairs: Chong Liu, Bratin Sengupta and Sui Zhang



Wednesday Afternoon, April 9, 2025  
Summit, Level 4, Room 420

**1:30 PM \*SU05.04.01**

**Nickel and Cobalt Recovery Through Carbonation and Sulfidation** Young-Shin Jun, Ying Wang and Xueyi Liu; Washington University in St. Louis, United States

**2:00 PM SU05.04.02**

**Photo-Controlled Recovery of Nickel Cobalt Manganese for Sustainable Recycling of Batteries** Ting-Wei Hsu and Zhengcheng Zhang; Argonne National Laboratory, United States

**2:15 PM SU05.04.03**

**Investigation of Carrier Transport and Leaching Mechanisms in Chalcopyrite Mineral** Julian R. Battaglia, Johnna J. Zarndt Buettner and Zafer Mutlu; The University of Arizona, United States

**2:30 PM SPECIAL BREAK - EXHIBIT HALL EVENT**

**3:30 PM \*SU05.04.04**

**Molecules, Materials and Processes for Electrifying Carbon Capture** Yayuan Liu; Johns Hopkins University, United States

**4:00 PM SU05.04.05**

**Influence of Individual and Synergistic Addition of In and Ni on Nanoindentation Creep Response of Lead-Free Sn-0.7Cu Solder** Ayushi Thakur, Jayant Jain and Sangeeta Santra; Indian Institute of Technology Delhi, India

**4:15 PM SU05.04.06**

**Synergistic Integration of Waste Oil-Derived Carbon Dots with NiCo MOF Nanosheets for Sustainable and Efficient Supercapacitors** Chhaya Ravi Kant, Rita Kumari and Megha Prajapati; Indira Gandhi Delhi Technical University for Women, India

**4:30 PM SU05.04.07**

**Phase-Engineered MoS<sub>2</sub> Nanostructures for Multifunctional Water Treatment and Disinfection Applications** Rupal Kaushik and Amar Nath Gupta; Indian Institute of Technology Kharagpur, India

SESSION SU05.05: Poster Session: Materials Innovation for Sustainability and Energy Applications of Critical Elements

Session Chairs: Ying Li and Chong Liu

Wednesday Afternoon, April 9, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SU05.05.01**

**Recycling of Rare Metals by Accumulation in Rose Mushroom** Daniel Kolacyak, Likitha Thumma and Oliver Dominick; Ravensburg-Weingarten University of Applied Sciences, Germany

**SU05.05.02**

**Tunable Nanoporous Copper Films from Zn-Rich Cu-Zn Alloys for Sustainable Microelectronics Packaging** Fatin Battal<sup>1</sup>, Paulina Chyzy<sup>1</sup>, Zhiyu Zhu<sup>1</sup>, Peter Mulder<sup>1</sup>, Paul Tinnemans<sup>1</sup>, René H. Poelma<sup>2</sup>, Elias Vlieg<sup>1</sup>, Evan W. Zhao<sup>1</sup> and John J. Schermer<sup>1</sup>; <sup>1</sup>Radboud University, Netherlands; <sup>2</sup>Nexperia BV, Netherlands

**SU05.05.03**

**New Hybrid MOF/Polymer Materials for Carbon Capture** Zhengkai Chen, Peixin Zhang and Liang Feng; Duke University, United States

**SU05.05.04**

**Enhance Visible-Light-Driven Photoelectrochemical Nitrate Reduction by Utilizing TiO<sub>2-x</sub>/Si Integration** Shu-Yin Wang, Lu Yang-Sheng and Shao-Sian Li; National Taipei University of Technology, Taiwan

**SU05.05.05**

**Electrodeposition of Copper(I) Oxide on Graphene/Silicon Photoelectrode for Photoelectrochemical Nitrate Reduction Reaction** [Chen-Ting Liu](#), Lu Yang-Sheng and Shao-Sian Li; National Taipei University of Technology, Taiwan

**SU05.05.06**

**Fluorine-Free Synthesis and Optimization of Graft Polymer Proton Exchange Membranes for Enhanced Water Electrolysis Performance** [Dong Un Lim](#) and Tae-Ho Kim; Korea Research Institute of Chemical Technology, Korea (the Republic of)

**SU05.05.07**

**Synthesis and Fabrication of Metal Cation Intercalation in Multilayered  $Ti_3C_2T_x$  Composite CNF Electrode for Asymmetric Coin Cell Supercapacitors** Arumugam Sonachalam<sup>1</sup> and [Jagadeesh Ramados](#)<sup>2</sup>; <sup>1</sup>Tamilnadu Open University, India; <sup>2</sup>Bharathidasan University, India

**SU05.05.08**

**Hydrous Fe-Al-Zr Oxide Nanocomposite Filled Dialysis Membrane Tubes for Phosphate Desorption Study from Acidic Soils** [Yibrehu B. Dibabe](#); Academia Sinica, Taiwan

**SU05.05.09**

**Highly Flexible Silver Selenide Films for Skin-Conformal and Stretchable Thermoelectric Generator** [Yeongjun Mun](#) and Kwang-Suk Jang; Hanyang University, Korea (the Republic of)

**SU05.05.10**

**Enhanced Photocatalytic Activities of  $NaBH_4$  Calcined  $MnFe_2O_4$  NPs** Hyun Sung Kim<sup>1</sup> and [Hangil Lee](#)<sup>2</sup>; <sup>1</sup>Pukyong National University, Korea (the Republic of); <sup>2</sup>Sookmyung Women's University, Korea (the Republic of)

**SU05.05.11**

**Highly Efficient Nitrogen-Fixing Microbial Hydrogel Device for Sustainable Solar Hydrogen Production** [Hyunseo Park](#)<sup>1,2</sup> and Dae-Hyeong Kim<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**SU05.05.12**

**Closed-Loop Photo- and Electrocatalysis Using Floatable Hierarchical Hydrogel Device for Efficient Waste-Derived Fuel Production** [Haeseong Kim](#)<sup>1,2</sup>; <sup>1</sup>Seoul National University, Korea (the Republic of); <sup>2</sup>Institute for Basic Science, Korea (the Republic of)

**SU05.05.13**

**Hydrovoltaic Cell Using Non-Woven Fabric** [Seong Hyun Kim](#); ETRI, Korea (the Republic of)

**SU05.05.14**

**Rare Earth Ion Transport and Selectivity in One-Dimensional Carbon Nanotube Porins** [Jobaer Abdullah](#)<sup>1,2</sup>; <sup>1</sup>University of California, Merced, United States; <sup>2</sup>Lawrence Livermore National Laboratory, United States

**SU05.05.15**

**Application of Microcracked Metallic Surfaces as Reservoir for Lubricants** Hector Espejo<sup>1</sup>, Cody Shank<sup>1,2</sup> and [Pratt Williams](#)<sup>1</sup>; <sup>1</sup>Western Colorado University, United States; <sup>2</sup>University of Colorado Boulder, United States

**SU05.05.16**

**Improving the Cycle Performances of Si Anode Using Water-Soluble Polyimide Binders for Lithium-Ion Batteries** [Minji Choi](#), Byeongjin Kim and Youngjae Yoo; Chung-Ang University, Korea (the Republic of)

**SU05.05.17**

**Preparation of Titanium Oxynitride-Based Platinum-Free Cathode Catalyst for Polymer Electrolyte Fuel Cells by Ammonia Nitridation of Titanium Complexes** [Yushi Tamaki](#)<sup>1</sup>, Satoshi Seino<sup>1</sup>, Yuta Uetake<sup>1</sup>, Takaaki Nagai<sup>2</sup>, Ryuji Monden<sup>2</sup>, Akimitsu Ishihara<sup>2</sup> and Takashi Nakagawa<sup>1</sup>; <sup>1</sup>Osaka University, Japan; <sup>2</sup>Yokohama National University, Japan

**SU05.05.18**

**Perovskite Oxides as Catalysts for the Oxygen Evolution Reaction** [Brenda L. Vargas Pérez](#), Abigail L. Bernard Garcia and Lisandro Cunci Perez; University of Puerto Rico at Río Piedras, Puerto Rico

**SU05.05.19**

**Effect of Interstitial Alkyl Chain Engineering of Anion Exchange Membrane for Improved CO<sub>2</sub> Electrolyzer** [Haeryang Lim](#) and Taiho Park; Pohang University of Science and Technology, Korea (the Republic of)

**SU05.05.20**

**Lifecycle Carbon and Cost Analysis of Material Recovery from PV Water Splitting Systems** [Jules Freeman](#), Achyuth Ravilla and Ilke Celik; Portland State University, United States

**SU05.05.21**

**Controlled Reaction-Diffusion Coupling for Critical Elements Separations** [Joelle V. Scott](#)<sup>1</sup>, Zachery R. Wylie<sup>1</sup>, Abdul Moez<sup>1</sup>, Lilo D. Pozzo<sup>1</sup>, Elias Nakouzi<sup>2</sup> and David S. Bergsman<sup>1</sup>; <sup>1</sup>University of Washington, United States; <sup>2</sup>Pacific Northwest National Laboratory, United States

**SU05.05.22**

**Enhancement of Oxygen Reduction Reaction Performance by Iridium-Cluster-Decorated Ni@Pd Nanocatalysts** [Pochun Chen](#)<sup>1</sup>, Wei-Tze Sun<sup>1</sup> and Tsan-Yao Chen<sup>2</sup>; <sup>1</sup>National Taipei University of Technology, Taiwan; <sup>2</sup>National Tsing Hua University, Taiwan

**SU05.05.23**

**Flexible Organic Electronics Reinforced with Metallic Glass Electrodes with Prolonged Chemical and Mechanical Stability** [Jae Sang Cho](#)<sup>1</sup>, Woongsik Jang<sup>1</sup>, Keum Hwan Park<sup>2</sup> and Dong Hwan Wang<sup>1</sup>; <sup>1</sup>Chung-Ang University, Korea (the Republic of); <sup>2</sup>Korea Electronics Technology Institute, Korea (the Republic of)

**SU05.05.24**

**P-Doped Onion-Like Carbon as a Support for Oxygen Reduction Reaction Electrocatalysts** [Angelica Del Valle-Perez](#) and Lisandro Cunci Perez; University of Puerto Rico at Río Piedras, Puerto Rico

**SU05.05.25**

**High Entropy Alloying Strategy for Efficient Seawater Splitting and Dual Ion Battery Applications** [Gokul Raj](#) and K. K. Nanda; Indian Institute of Science, India

**SU05.05.26**

**Efficient and Selective Magneto-Electrochemical Separation of Critical Materials** [Ivani S. Javalath](#)<sup>1,2</sup>, Giovanna Ricchiuti<sup>1</sup>, Yang Huang<sup>1,3</sup>, Vignesh Sundaresan<sup>2</sup> and Venkateshkumar Prabhakaran<sup>1,3</sup>; <sup>1</sup>Pacific Northwest National Laboratory, United States; <sup>2</sup>University of Mississippi, United States; <sup>3</sup>Washington State University, United States

**SU05.05.27**

**Efficient Lithium-Ion Separation Using Al<sub>2</sub>O<sub>3</sub>-Based Lithium Aluminium Titanium Phosphate (LATP) Composite Membranes via Electrodialysis Process** Jilong Han<sup>1</sup>, Kuihu Wang<sup>1</sup>, [Siyu Chen](#)<sup>2</sup>, Huanzhang Lu<sup>1</sup>, Yongsheng Du<sup>3</sup>, Qingfeng Meng<sup>4</sup> and Yi Huang<sup>2</sup>; <sup>1</sup>Hebei University of Science and Technology, China; <sup>2</sup>University of Edinburgh, United Kingdom; <sup>3</sup>Chinese Academy of Sciences, China; <sup>4</sup>Qinghai Chaidam Xinghua Lithium Salt Co., Ltd., China

**SU05.05.28**

**Development of a High-Performance Pt/SiC-Graphene Catalyst for Proton Exchange Membrane Fuel Cells** [Joon Heo](#), Hyukjun Youn, Kyeongho Lee and Soon-Mok Choi; Korea University of Technology and Education, Korea (the Republic of)

SESSION SU05.06: Electrochemical Processes I

Session Chairs: Chong Liu and Bratin Sengupta

Thursday Morning, April 10, 2025

Summit, Level 4, Room 420

**9:00 AM \*SU05.06.01**

**Novel Strategies for Recycling and Regeneration of Materials for Energy and Sustainability** [Pietro Papa Lopes](#), Caroline Williams, Igor Messias and Peter Zapol; Argonne National Laboratory, United States

**9:30 AM SU05.06.02**

**Investigation on the Mechanisms of Oxygen Evolution Reaction with the Consideration of Spin** [Xiaoning Li](#); RMIT University, Australia

**9:45 AM SU05.06.03**

**Enhancing Electrocatalytic Performance of Iridium Nanosheets in Hydrogen Evolution Reaction Through Morphological Optimization** Chaoyu Ting, Lu Yang-Sheng, Pochun Chen and Shao-Sian Li; National Taipei University of Technology, Taiwan

**10:00 AM BREAK**

**10:30 AM SU05.06.04**

**Sustainable Recovery of Iridium Oxide Waste to Electrospun IrOx Nanofibers with Tunable Electrochemical Sensing Properties** Hsuan-Chi Wu<sup>1</sup>, Pochun Chen<sup>1</sup>, Kuang-Chih Tso<sup>2</sup> and Puwei Wu<sup>3</sup>; <sup>1</sup>National Taipei University of Technology, Taiwan; <sup>2</sup>Nara Institute of Science and Technology, Japan; <sup>3</sup>National Yang Ming Chiao Tung University, Taiwan

**10:45 AM SU05.06.05**

**Structural Characterization of Quantum-Crystalline Pt on SiO<sub>2</sub> Aerogels Used for In-a-Chip Catalytic Combustion of Hydrogen** Oliver Thueringer<sup>1</sup>, Ana Luiza S. Fiates<sup>1,2</sup>, Andreas Schander<sup>1,2</sup>, Raphael Moreira<sup>3</sup>, Marco Schowalter<sup>4</sup>, Wilke Dononelli<sup>1,5</sup>, Konrad Krämer<sup>1</sup>, Andreas Rosenauer<sup>4,5</sup>, Michael J. Vellekoop<sup>1,2,5</sup> and Thorsten M. Gesing<sup>1,5</sup>; <sup>1</sup>University of Bremen, Germany; <sup>2</sup>Microsystems Center Bremen (MCB), University of Bremen, Germany; <sup>3</sup>Institute of Applied and Physical Chemistry IAPC, University of Bremen, Germany; <sup>4</sup>Institute for Solid State Physics, University of Bremen, Germany; <sup>5</sup>MAPEX Center for Materials and Processes, University of Bremen, Germany

**11:00 AM SU05.06.06**

**Smart Paper Transformer—New Insight for Enhanced Catalytic Efficiency and Reusability of Noble Metal Nanocatalysts** Xiujuan J. Li; The University of Texas at El Paso, United States

SESSION SU05.07: Electrochemical Processes II  
Session Chairs: Ying Li, Chong Liu and Sui Zhang  
Thursday Afternoon, April 10, 2025  
Summit, Level 4, Room 420

**1:30 PM \*SU05.07.01**

**Structure and Nature of Liquid Systems for Critical Electrochemical Deposition** Brian J. Ingram; Argonne National Laboratory, United States

**2:00 PM SU05.07.02**

**The Role of Green Hydrogen in Rapid Decarbonization** Javeed Mahmood, Seok-Jin Kim and Cafer T. Yavuz; King Abdullah University of Science and Technology, Saudi Arabia

**2:15 PM SU05.07.03**

**Exploring Crystal Growth within Liquid Metal in Their Natural States** Moonika S. Widjajana<sup>1,2</sup>, Kourosh Kalantar-Zadeh<sup>1,2</sup>, Minkyung Kang<sup>1</sup> and Jianbo Tang<sup>2</sup>; <sup>1</sup>The University of Sydney, Australia; <sup>2</sup>University of New South Wales, Australia

**2:30 PM SU05.07.04**

**Effect of Concentration on Solution State Redox Activity—A Bridge Between Polymer Physics and Electrochemistry** Khiraabdi Mohanty<sup>1</sup>, Sheila Keating<sup>2</sup>, Riccardo Alessandri<sup>2</sup>, Cheng-Han Li<sup>1</sup>, Daniel Tabor<sup>1</sup>, Stuart Rowan<sup>2</sup>, Juan de Pablo<sup>2</sup> and Jodie Lutkenhaus<sup>1</sup>; <sup>1</sup>Texas A&M University, United States; <sup>2</sup>The University of Chicago, United States

**2:45 PM SU05.07.05**

**Dry-Spinnable Core-Sheath Carbon Nanotube Yarn(CSCNY) Electrode for Dye-Sensitized Solar Cell** Yeonggwon Kim, Chae Young Woo, Yeongsu Jo, Jiseong Park, Minsu Jang, Tae-Young Jeong, Sung-Jo Kim, Jin-Woo Oh and Hyung Woo Lee; Pusan National University, Korea (the Republic of)

**3:00 PM SU05.07.06**

**Magnetic Hardening in Fe-Based Carbide** J. Ping Liu; The University of Texas at Arlington, United States

# SYMPOSIUM SU06

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Degradable Materials and Devices

April 7 - April 9, 2025

Symposium Organizers

Giuseppe Barillaro, University of Pisa

Clementine Boutry, TU Delft

Alex Chortos, Purdue University

Helen Tran, University of Toronto

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\* Invited Paper

+ JMR Distinguished Invited Speaker

^ MRS Communications Early Career Distinguished Presenter

SESSION SU06.01: Materials Synthesis and Processing

Session Chairs: Giuseppe Barillaro and Alex Chortos

Monday Morning, April 7, 2025

Summit, Level 4, Room 448

**8:30 AM \*SU06.01.01**

**Soft, Resorbable Materials for Bioelectronics** Suk-Won Hwang; Korea University, Korea (the Republic of)

**9:00 AM ^SU06.01.02**

**Biodegradable Piezoelectric Nanofibers for Medical Applications** Thanh D. Nguyen; University of Connecticut, United States

**9:30 AM BREAK**

**10:00 AM SU06.01.03**

**Green Laser-Induced Graphene from Biodegradable Almond Shell Composite for Sensors Application** Iuliia Steksova<sup>1,1</sup>, Anna Chiara Bressi<sup>1,1</sup>, Marina Galliani<sup>1,1</sup>, Hilda Gomez Bernal<sup>1,1</sup> and Francesco Greco<sup>1,1,2</sup>; <sup>1</sup>Scuola Superiore Sant'Anna, Italy; <sup>2</sup>Graz University of Technology, Austria

**10:15 AM SU06.01.04**

**From Corn Starch to Magnetic Laser-Induced Graphene Nanocomposite** Anna Chiara Bressi<sup>1</sup>, Sreenadh Thaikkattu<sup>1</sup>, Alexander Dallinger<sup>2</sup>, Attilio Marino<sup>3</sup>, Gianni Ciofani<sup>3</sup>, Aleksandra Szkudlarek<sup>4</sup>, Vitaliy Bilovol<sup>4</sup>, Krystian Sokolowski<sup>4</sup>, Birgit Kunert<sup>2</sup>, Hana Kristin Hampel<sup>2</sup>, Hilda Gomez Bernal<sup>1</sup> and Francesco Greco<sup>1,2,1</sup>; <sup>1</sup>Scuola Superiore Sant'Anna, Italy; <sup>2</sup>Graz University of Technology, Austria; <sup>3</sup>Istituto Italiano di Tecnologia, Italy; <sup>4</sup>AGH University of Krakow, Poland

**10:30 AM \*SU06.01.05**

**Leveraging Bio-Inspired and Dynamic Chemistry to Develop Soft and Degradable Thin-Film Transistors** Angela Awada, Piumi Kulatunga, Madison Mooney and Simon Rondeau-Gagne; University of Windsor, Canada

**11:00 AM SU06.01.06**

**Recyclable Vitrimers for Electronic Applications—From Circuit Boards to Charging Cables** Agni Kumar K. Biswal and Aniruddh Vashisth; University of Washington, United States

**11:15 AM SU06.01.07**

**Comprehensive Study of Substrate van der Waals Force Effect on the Stability of Violet Phosphorus** Sarabpreet Singh<sup>1</sup>, Mahdi Ghafariasl<sup>1,2</sup>, Hsin-Yu Ko<sup>3</sup>, Sampath Gamage<sup>1</sup>, Michael Snure<sup>4</sup>, Robert DiStasio Jr<sup>3</sup> and Yohannes Abate<sup>1</sup>; <sup>1</sup>University of Georgia, United States; <sup>2</sup>University of Maryland, United States; <sup>3</sup>Cornell University, United States; <sup>4</sup>Air Force Research Laboratory, United States

SESSION SU06.02: Materials Processing and Functionalization

Session Chairs: Suk-Won Hwang and Thanh Nguyen

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 448

**1:30 PM \*SU06.02.01**

**Liquid Metals as Tools for Creating Degradable Devices** Michael Dickey; North Carolina State University, United States

**2:00 PM \*SU06.02.02**

**Electronic-Free Wireless Sensors for Subsoil Moisture and Microbial Activity Monitoring** Rahim Rahimi; Purdue University, United States

**2:30 PM BREAK**

**3:00 PM SU06.02.03**

**Forest-Based Biodegradable Foam for Thermal Insulation** Monica G. Simoes, Filipe Matos, Fausto Queda, Diana Gaspar and Luís Pereira; AlmaScience Colab, Portugal

**3:15 PM SU06.02.04**

**Degradable Conductive Plastics with Liquid Metal-Vitrimer Composites** Josh Worch and Michael D. Bartlett; Virginia Tech, United States

**3:30 PM SU06.02.05**

**Characterizing the Environment Degradation of Thermoplastic Materials for a Novel Semi-Transparent Bifacial Solar Panel via Gaussian Process Regression** Duncan McGraw<sup>1</sup>, Gowtham Mohan<sup>2,3</sup>, Peter Vorobieff<sup>3</sup>, Manel Martinez-Ramon<sup>1</sup> and Tito Busani<sup>1</sup>; <sup>1</sup>The University of New Mexico, United States; <sup>2</sup>University of Houston, United States; <sup>3</sup>University of New Mexico, United States

SESSION SU06.03: Devices for Medical Applications I

Session Chairs: Michael Dickey and Rahim Rahimi

Monday Afternoon, April 7, 2025

Summit, Level 4, Room 448

**4:15 PM SU06.03.01**

**How to Establish if a Device is Bioresorbable and Biocompatible *In Vivo*** Eleonora Vandini<sup>1</sup>, Eleonora Daini<sup>1</sup>, Antonietta Vilella<sup>1</sup>, Alessandra Ottani<sup>1</sup>, Salvatore Surdo<sup>2</sup>, Martina Corsi<sup>2</sup>, Thierry Djenizian<sup>3</sup>, Daniela Giuliani<sup>1</sup> and Giuseppe Barillaro<sup>2</sup>; <sup>1</sup>University of Modena and Reggio Emilia, Italy; <sup>2</sup>University of Pisa, Italy; <sup>3</sup>École des Mines de Saint-Étienne, France

**4:30 PM SU06.03.02**

**Magnesium-Sputtered Collagen Nerve Conduits Regulate Magnesium Ion Release to Promote Peripheral Nerve Regeneration** Hyewon Kim<sup>1,2</sup>, Jieun Kwon<sup>1</sup>, Hyeok Kim<sup>1</sup>, Seongchan Kim<sup>3</sup>, Ji-Young Lee<sup>1,4</sup>, Khandoker Asiqur Rahaman<sup>1</sup>, Taeyeon Kim<sup>1,2</sup>, Hyojin Lee<sup>1,5</sup>, Myoung-Ryul Ok<sup>1,4</sup>, Seok Chung<sup>1,2</sup>, Hyung-Seop Han<sup>1,4</sup> and Yu-Chan Kim<sup>1,4</sup>; <sup>1</sup>Korea Institute of Science and Technology, Korea (the Republic of); <sup>2</sup>Korea University, Korea (the Republic of); <sup>3</sup>Gyeongsang National University, Korea (the Republic of); <sup>4</sup>University of Science and Technology, Korea (the Republic of); <sup>5</sup>Sungkyunkwan University, Korea (the Republic of)

**4:45 PM SU06.03.03**

**Degradation Kinetics, Mechanisms and Antioxidant Activity of PCL-Based Scaffolds with *In Situ* Grown Nanohydroxyapatite on Graphene Oxide Nanoscrolls** Lillian T. Mambiri and Dilip Depan; University of Louisiana Lafayette, United States

**5:00 PM SU06.03.04**

**Implantable and Biodegradable Chemical Sensors for Real Time Monitoring of Clinical/Diagnostic Markers with High Spatial and Temporal Accuracy** Martina Corsi<sup>1</sup>, Elena Maurina<sup>1</sup>, Salvatore Surdo<sup>1</sup>, Eleonora Vandini<sup>2</sup>, Eleonora Daini<sup>2</sup>, Antonietta Vilella<sup>2</sup>, Giuseppina Leo<sup>2</sup>, Moein Farshchian<sup>3</sup>, Giulia Grisendi<sup>3</sup>, Giulia Golinelli<sup>3</sup>, Aline Debrassi<sup>4</sup>, Gabriella Egri<sup>4</sup>, Stefano Mariani<sup>1</sup>, Alessandro Paghi<sup>1</sup>, Lars Dahne<sup>4</sup>, Massimo Dominici<sup>3</sup>, Guido Bocci<sup>1</sup>, Daniela Giuliani<sup>2</sup> and Giuseppe Barillaro<sup>1</sup>; <sup>1</sup>University of Pisa, Italy; <sup>2</sup>Università degli Studi di Modena e Reggio Emilia, Italy; <sup>3</sup>University Hospital of Modena and Reggio Emilia, Italy; <sup>4</sup>Surflay Nanotech, Germany

**5:15 PM SU06.03.05**

**The Design and Development of Degradable Biomaterials of Different Sizes and Formulations for Biomedical Applications from Natural Polymer Polygalacturonic Acid** Betul Ari<sup>1</sup> and Nurettin Sahiner<sup>1,2</sup>; <sup>1</sup>Canakkale Onsekiz Mart University, Turkey; <sup>2</sup>Florida Gulf Coast University, United States

**5:30 PM SU06.03.06**

**Dry-Phase Photodegradation of Benzene, Toluene and Xylene (BTX) Using Cu-Doped TiO<sub>2</sub> Under LED Light Irradiation** Plassidius J. Chengula, Hazina M. Charles, Jiyeon Seo and Caroline Sunyong S. Lee; Hanyang University - ERICA, Korea (the Republic of)

SESSION SU06.04: Devices for Medical Applications II

Session Chairs: Giuseppe Barillaro and Alex Chortos

Tuesday Morning, April 8, 2025

Summit, Level 4, Room 448

**10:30 AM \*SU06.04.01**

**Chemistry of Porous Silicon to Enable Degradable Drug Delivery Systems** Michael J. Sailor; University of California, San Diego, United States

**11:00 AM ^SU06.04.02**

**Biodegradable Materials for Peripheral Neural Interfaces** Lan Yin; Tsinghua University, China

**11:30 AM SU06.04.03**

**Multifunctional, Physically Transient Devices—Supercapacitors, Triboelectric Nanogenerators and Capacitive Sensors** Husnu E. Unalan, Mete B. Durukan, Melih O. Cicek, Doga Doganay, Mustafa C. Gorur and Simge Cinar; Middle East Technical University, Turkey

SESSION SU06.05: Biodegradable Devices and Sensors

Session Chairs: Michael Sailor and Lan Yin

Tuesday Afternoon, April 8, 2025

Summit, Level 4, Room 448

**1:30 PM \*SU06.05.01**

**Degradable, Wireless Optoelectronics for Electrotherapy** John A. Rogers; Northwestern University, United States

**2:00 PM \*SU06.05.02**

**Biodegradable and Self-Deployable Electronics for Minimally Invasive Brain Interfaces** Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

**2:30 PM BREAK**

**3:00 PM SU06.05.03**

**Biodegradable and Printed Impedance-Based pH Sensors for Agricultural Monitoring** Joseph Cameron<sup>1</sup>, Andrew Rollo<sup>1</sup>, Diego Fernandes-Diaz<sup>2</sup>, Radoslaw Cichocki<sup>3</sup>, Beata Synkiewicz-Musialska<sup>3</sup>, Jia Ren<sup>4</sup>, Shoushou Zhang<sup>4,1</sup> and Jeff Kettle<sup>1</sup>; <sup>1</sup>University of Glasgow, United Kingdom; <sup>2</sup>São Paulo State University (UNESP), Brazil; <sup>3</sup>Lukasiewicz Research Network, Poland; <sup>4</sup>Central South University of Forestry and Technology, China

**3:15 PM SU06.05.04**

**Development of Leaf-Based Hydrovoltaic Device** Neha Viradia and Ramesh Adhikari; Colgate University, United States

**3:30 PM \*SU06.05.05**

**Biodegradable Printed Sensors for *In Situ* Evaluation of Soil Microbial Decomposition Activity** Gregory L. Whiting<sup>1</sup>, Taylor Sharpe<sup>1</sup>, Madhur Atreya<sup>1</sup>, Shangshi Liu<sup>2</sup>, Mengyi Gong<sup>3</sup>, Noah Smock<sup>1</sup>, Jessica Davies<sup>3</sup>, John Quinton<sup>3</sup>, Richard Bardgett<sup>2</sup>, Jason Neff<sup>1</sup> and Rebecca Killick<sup>3</sup>; <sup>1</sup>University of Colorado Boulder, United States; <sup>2</sup>The University of Manchester, United Kingdom; <sup>3</sup>Lancaster University, United Kingdom

**4:00 PM SU06.05.06**

**Towards Edible Gas Sensors to Reduce Food Waste** [Pierluigi Mondelli](#) and Mario Caironi; Istituto Italiano di Tecnologia, Italy

**4:15 PM SU06.05.07**

**Photopatternable, Degradable and Performant Polyimide Network Substrates for E-Waste Mitigation** [Chen Wang](#); University of Utah, United States

SESSION SU06.06: Poster Session: Degradable Materials and Devices

Session Chairs: Seung-Kyun Kang and Gregory Whiting

Tuesday Afternoon, April 8, 2025

5:00 PM - 7:00 PM

Summit, Level 2, Flex Hall C

**SU06.06.01**

**Laser Direct Writing of Conductive Structures on Marine-Biodegradable Polymer Composite Sheets** [Mari Kato](#)<sup>1</sup>, Yuma Hattori<sup>1</sup> and Mitsuhiro Terakawa<sup>2,1</sup>; <sup>1</sup>Keio University, Japan; <sup>2</sup>Keio Univ., Japan

**SU06.06.02**

**Adhesion-Assisted Laser Ablation for the Fabrication of Bioresorbable Electronics** [Hyungho Seo](#) and Yeonsik Choi; Yonsei University, Korea (the Republic of)

**SU06.06.03**

**Soft and Rapidly Biodegradable 3D-Printable Electronics** [Joo-Hyeon Park](#), Ju-Yong Lee and Seung-Kyun Kang; Seoul National University, Korea (the Republic of)

**SU06.06.04**

**Mullite-Type O8 EMBO<sub>4</sub> Phases ( $E = \text{Pb, Sn}$ ;  $M = \text{Al, Ga, V, Cr, Fe, Mn}$ ) as Exciton Source for Photo-Catalytic Processes on Activated Carbon** [Thorsten M. Gesing](#), Sarah Wittmann, M. Mangir Murshed and Raphaell Moreira; University of Bremen, Germany

**SU06.06.05**

**Novel SERS DNA Biosensor Using Nanostructured GaN Template and Thin Metal Film for Mutation Detection in Clinical Samples** [Aleksandra Michalowska](#) and Andrzej Kudelski; University of Warsaw, Poland

**SU06.06.06**

**Chemo-Thermo-Mechanical Characterization of Cellulose Acetate Microfibers** [Eric Wilkinson](#) and George Youssef; San Diego State University, United States

**SU06.06.07**

**Biodegradable Temperature Soil Sensors via Stimuli-Responsive Polymers** [Elsa C. Micklin](#), Ana Aranzola, Dominique Porcincula, Widiyanto P. Moestopo and Abhinav Parakh; Lawrence Livermore National Laboratory, United States

**SU06.06.08**

**Biodegradable Neuromorphic Memristor Arrays with Enhanced Linearity and Synaptic Plasticity for Implantable Bioelectronics** [Kyungmoon Kwak](#), Jae Seong Han, Ju Hyun Lee, Kyungho Park and Hyun Jae Kim; Yonsei University, Korea (the Republic of)

**SU06.06.09**

**High Temperature Melt Electrowriting** [Simon Luposchinsky](#)<sup>1,2</sup>, Tong Sun<sup>1</sup>, Clemens Koerver<sup>1</sup>, Paul Dalton<sup>2</sup> and Huaizhong Xu<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology, Japan; <sup>2</sup>University of Oregon, United States

**SU06.06.10**

**High-Temperature Corrosion Behavior of Ferritic Stainless Steels Under Ammonia-Fueled SOFC Conditions Environments** [Dong Woo Joh](#), Tae-Hun Kim, Ji-Weon Shin, Jong-Eun Hong, Tak-Hyoung Lim and Rak-Hyun Song; Korea Institute of Energy Research, Korea (the Republic of)

SESSION SU06.07: Emerging Developments

Session Chairs: Giuseppe Barillaro and Alex Chortos



Wednesday Morning, April 9, 2025  
Summit, Level 4, Room 448

**9:00 AM \*SU06.07.01**

**Self-Immolative Polymers—Chemical Designs and Applications** [Elizabeth Gillies](#); University of Western Ontario, Canada

**9:30 AM \*SU06.07.02**

**Biodegradable Porous Silicon Materials for Therapeutic Applications** [Ji Ho Park](#); KAIST, Korea (the Republic of)

**10:00 AM BREAK**

**10:30 AM SU06.07.03**

**Mechanically Tunable and Cellularly Adhesive Highly Entangled Hydrogels with Degradable Crosslinks** [Alex Sunday](#) and Benjamin Freedman; Harvard University, United States

**10:45 AM SU06.07.04**

**Influence of Water on Printed Nanocellulose Dielectric Performance** [Brittany N. Smith](#), Xuancheng Pei, Nicolas Chen and Aaron D. Franklin; Duke University, United States

**11:00 AM \*SU06.07.05**

**Biohybrid and Biodegradable Soft Robots Capable of Multi Degree-of-Freedom Motion** [Ritu Raman](#); Massachusetts Institute of Technology, United States

**11:30 AM +SU06.07.06**

**Bioresorbable Na-ion Battery for Temporary Medical Devices** [Thierry Djenizian](#); Ecole des Mines Saint-Etienne, France