2021 MRS® FALL MEETING & EXHIBIT

A Hybrid Event

#F21MRS

November 29–December 2, 2021 | **Boston, Massachusetts**
December 6–8, 2021 | **Virtual**

mrs.org/fall2021

MEETING & EXHIBIT GUIDE

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2021 MRS FALL MEETING & EXHIBIT

A Hybrid Event

November 29–December 2, 2021 | Boston, Massachusetts
December 6–8, 2021 | Virtual

The Materials Research Society is committed to providing a safe and healthy environment for all 2021 MRS Fall Meeting participants. We have been working with the Hynes Convention Center and Sheraton Boston Hotel on implementing preventive measures to reduce the potential spread of the COVID-19 virus. Our decisions and preventive measures have been guided by the requirements and recommendations of the U.S. Centers for Disease Control (CDC) and federal, state and local health authorities. These measures include:

Masks required

Contactless badge printing

Session Rooms allow for social distancing

All food will be individually packaged

Hand sanitizing stations around the venue

Increased cleaning, with emphasis on key touchpoints

Stickers for badges to indicate your contact comfort level

Your cooperation is essential to the safety of attendees and staff. Please reference the **MRS COVID Statement and Duty of Care** at mrs.org/fall-2021-covid for detailed information.

Please remember:

- Stay home if unwell.
- Wash hands regularly.
- Keep your distance–stay 6 feet apart when possible.
- Avoid physical contact.

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FOCUS ON Sustainability

Continuing our efforts toward greener, more sustainable practices

in both our Society and our Meetings, MRS offers Meeting content in a variety of formats.

Over the last few years, **MRS has streamlined its Meeting & Exhibit Guide,** representative of our commitment to a reduced carbon footprint. Since 2019, this effort has reduced our paper consumption by approximately 400 pages per Guide—a total of 2.5 million pages—saving an estimated 306 trees!

A fully searchable, digital version of the entire Meeting program is available on the **MRS website (mrs.org/fall2021)** and the **MRS Meeting App.** The Meeting App provides all the information you need to have a successful and organized Meeting—full session descriptions, abstracts, event details, networking, social feeds and exhibitor profiles are available right at your fingertips.

Get your MRS Meeting App on the app store today!

All of this means a more engaging Meeting experience for you and your peers. **We encourage you to use our sustainable platforms** to build your personalized schedule, meet new friends and exhibitors and navigate the Meeting in a fresh new way!

MRS MATERIALS RESEARCH SOCIETY®
Advancing materials. Improving the quality of life.

The 2021 MRS Fall Meeting & Exhibit Guide was printed by Knepper Press.

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MESSAGE FROM THE PRESIDENT

WELCOME

to the 2021 MRS FALL MEETING AND EXHIBIT!

Welcome to the 2021 MRS Fall Meeting and Exhibit! This year, MRS is pleased to offer a hybrid event. Presenters and attendees can choose to join the Meeting in person in Boston, attend virtually from home or office, or both!

On behalf of the Board of Directors, I would like to extend a special thank you for the hard work and dedication of the Meeting Chairs—**Markus J. Buehler, Craig Fennie, Marina Leite, Laura Na Liu and Cengiz S. Ozkan.** They, along with their Symposium Organizers, MRS staff and numerous volunteers, have assembled a technically strong in-person Meeting which offers opportunities to network with colleagues and connect with exhibitors. In addition, the virtual experience will deliver exceptional Meeting content to attendees worldwide including live streaming, pre-recorded and on-demand scientific sessions. In-person Meeting attendees will also enjoy access to the virtual experience.

Please take advantage of featured events that include a session on getting your work published, special award talks and panel discussions. U.S. citizens, please visit Materials Voice to contact your legislators in support of the physical sciences. Consult the Meeting app for times and locations.

I also invite you to join us for a very special two-part event scheduled for Monday evening—***the MRS Diversifying Materials Event, featuring a panel discussion and the launch of Special Interest Groups (SIG).*** During this event, we'll share ideas for growing our community of women in materials science and engineering, as well as expanding our outreach into such diverse communities as academics and researchers of color, LGBTQ+ academics and researchers, and students of any group historically underrepresented in the materials science field. We're looking forward to rich and engaging discussions and hope you'll join the conversation!

Your meeting registration includes a FREE one-year membership in the Society beginning January 1, 2022. With membership, you are eligible for a discounted registration fee to both the 2022 Spring and 2022 Fall MRS Meetings, discounted registration fee for MRS virtual workshops, free access to MRS journals, and more. Your engagement with the Society also offers you opportunities to shape the Society's future as a Symposium Organizer, or as a volunteer for committee service. Thanks to your continued engagement, our membership grows, and so too does our voice to advocate for predictable and sustained funding for research.

We definitely have a busy and exciting two weeks ahead. Thanks for joining us!

Cherie R. Kagan
2021 MRS President

2021 MRS BOARD OF DIRECTORS

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Seoul National University

Linda S. Schadler
The University of Vermont

Ting Xu
University of California, Berkeley

Yusheng Zhao
Southern University of Science and Technology

MEETING SYMPOSIA

BROADER IMPACT

BI01 Developing an Open Source Introductory Textbook for the Materials Community
BI02 Women in Materials Science—Pioneers and a Vision for a More Inclusive Future

CHARACTERIZATION

CH01 *In Situ* and *Operando* Techniques Applied to Electrochemical Systems—A Key Toolkit for Deep Understanding
CH02 Solid-State Chemistry of New Materials
CH03 Frontiers in Scanning Probe Microscopy—Beyond Imaging of Soft Materials
CH04 Accelerating Materials Characterization, Modeling and Discovery by Physics-Informed Machine Learning

MATERIALS COMPUTING AND DATA SCIENCE

DS01 Accelerating Experimental Materials Research with Machine Learning
DS02 Advanced Atomistic Algorithms in Materials Science
DS03 Combining Machine Learning with Simulations for Materials Modeling

ELECTRONICS, OPTICS AND QUANTUM

EQ01 Quantum Optical Materials and Devices Based on Impurity Systems
EQ02 Heterostructures of Various Dimensional Materials
EQ03 Spin-Based Sensing at the Nanoscale and Hyperpolarization with NV-Diamond and Beyond
EQ04 Machine Learning on Experimental Data for Emergent Quantum Materials
EQ05 Plasmonics, Nanophotonics and Metaphotonics—Design, Materials and Applications
EQ06 Innovative Fabrication and Processing Methods for Organic and Hybrid Electronics
EQ07 Defects and Strain Potential Enabled Emergent Behavior in Two-Dimensional Materials
EQ08 New Frontiers in the Design, Fabrication and Applications of Metamaterials and Metasurfaces
EQ09 Cutting-Edge Plasma Processes for Next-Generation Materials Science Applications
EQ10 Multiferroics and Magnetoelectrics
EQ11 Materials, Processes and Device Structures Enabling Next-Generation High-Frequency Flexible Electronics
EQ12 Optical Probes of Nanostructured, Organic and Hybrid Materials
EQ13 Nitride Materials—Synthesis, Characterization and Modeling
EQ14 Materials and Devices for Controlling Quantum-Coherent Spin Dynamics
EQ15 Soft Matter Materials and Mechanics for Haptic Interfaces
EQ16 Infrared and Thermal Photonic Materials and Their Applications
EQ17 Emerging Materials for Contacts and Interfaces in Optoelectronics
EQ18 Emerging Materials for Quantum Information
EQ19 Diamond and Diamond Heterojunctions—From Growth to Applications
EQ20 Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications

ENERGY AND SUSTAINABILITY

EN01 Materials for Sustainable Electronics
EN02 Solid-State Batteries—Electrodes, Electrolytes and Interphases
EN03 Thermal Materials, Modeling and Technoeconomic Impacts for Thermal Management and Energy Application
EN04 Silicon for Photovoltaics
EN05 Emerging Energy and Materials Sciences in Halide Perovskites
EN06 Sustainable Electronics—Green Chemistry, Circular Materials, End-of-Life and Eco-Design
EN07 Mechano-Thermo and Electrical Coupling in Emerging Energy Materials
EN08 Low-Dimensional Halide Perovskites—From Fundamentals to Applications
EN09 Metal Sulfides for High Performance Electrochemical Batteries
EN10 Advanced Materials for Thermal Energy Management and Harvesting
EN11 Electrocatalytic Materials to Sustainably Convert Atmospheric C, H, O and N into Fuels and Chemicals
EN12 Advanced Materials and Chemistries for Low-Cost and Sustainable Batteries
EN13 Climate Change Mitigation Technologies
EN14 Advanced Materials for Hydrogen and Fuel Cell Technologies
EN15 Materials Research Opportunities for Energy Efficient Computing

BIOMATERIALS AND SOFT MATERIALS

SB01 Engineered Functional Multicellular Circuits, Devices and Systems
SB02 From Hydrogel Fundamentals to Novel Applications via Additive Manufacturing
SB03 Transformative Nanostructures with Therapeutic and Diagnostic Modalities
SB04 Materials and Algorithms for Neuromorphic Computing and Adaptive Bio-Interfacing, Sensing and Actuation
SB05 Antimicrobial Materials Against Coronaviruses and Other Nosocomial Pathogens
SB06 Graphene and Related 2D Materials for Bioelectronics and Healthcare
SB07 Soft, Healable Materials and Devices for Biological Interfaces and Wearables
SB08 Bioelectronics—Materials and Interfaces
SB09 Biological and Bioinspired Functional Materials—From Nature to Applications
SB10 Micro- and Nanoengineering of Biomaterials—From Precision Medicine to Precision Agriculture and Enhanced Food Security
SB11 Photo/Electrical Phenomena at the Interface with Living Cells and Bacteria
SB12 Biomaterials for Regenerative Engineering

STRUCTURAL AND FUNCTIONAL MATERIALS

SF01 Advanced Atomic Layer Deposition and Chemical Vapor Deposition Techniques and Applications
SF02 Additive Manufacturing—From Material Design to Emerging Applications
SF03 3D Printing of Functional Materials and Devices
SF04 New Types of Polymers, Composites and Hybrid Materials for Additive Manufacturing

2021 MRS FALL MEETING CHAIRS

Markus J. Buehler
Massachusetts Institute of Technology

Craig Fennie
Cornell University

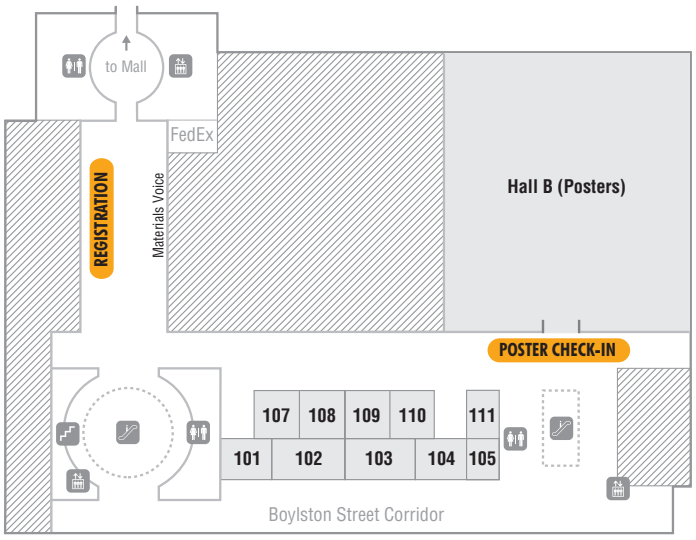
Marina Leite
University of California, Davis

Laura Na Liu
Universität Stuttgart

Cengiz S. Ozkan
University of California, Riverside

HYNES CONVENTION CENTER

LEVEL 1



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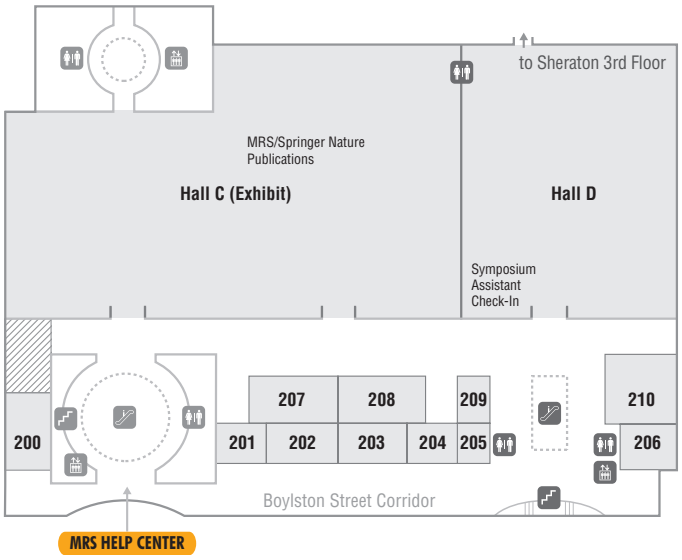

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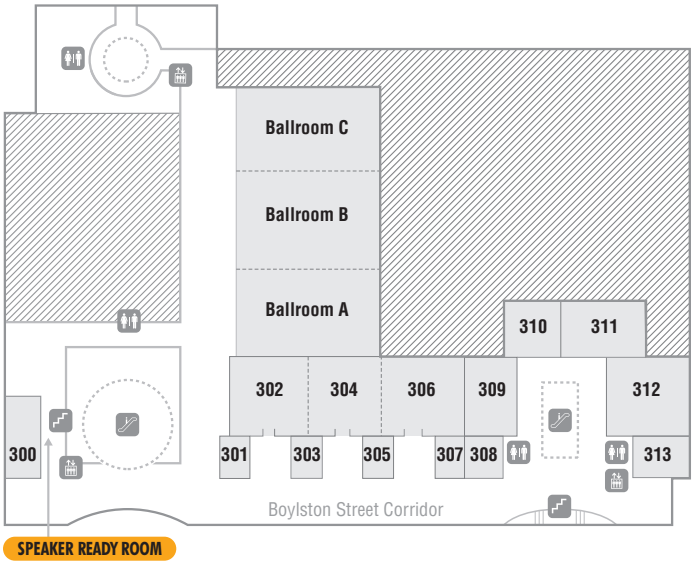
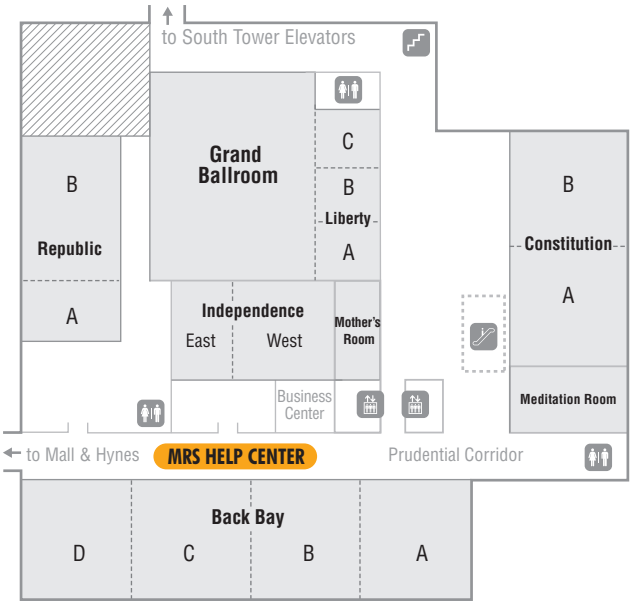
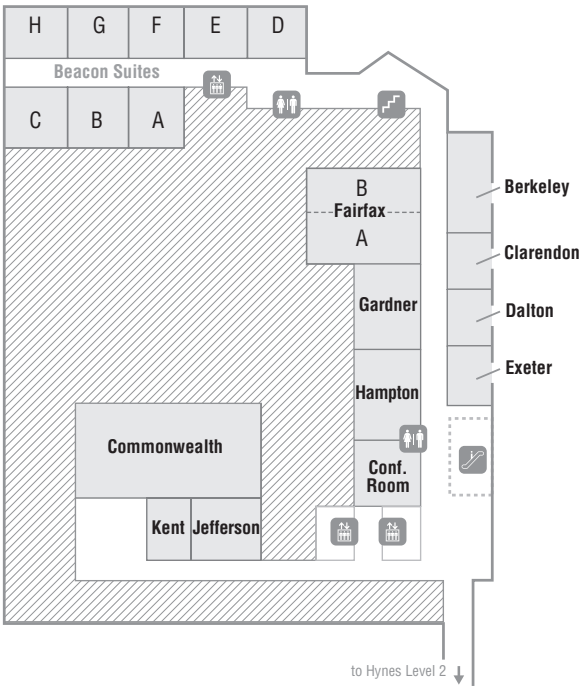


SHERATON BOSTON HOTEL

2nd FLOOR



3rd FLOOR



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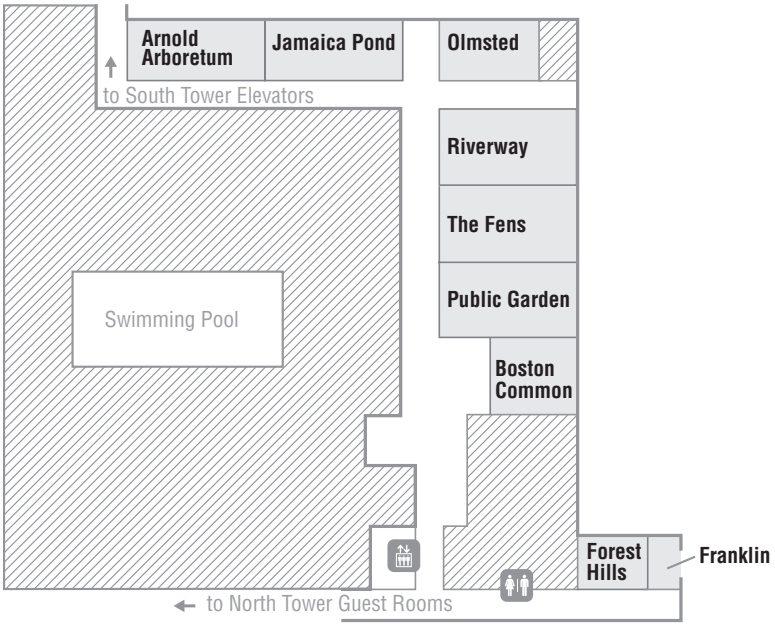


BOSTON TRAVEL RESOURCES

MRS does not endorse or sponsor any of the listings below. Information is provided as a courtesy to our attendees.

MRS HELP CENTERS

MRS Help Centers are your one-stop source for information about all things MRS. Help Centers are located on the 2nd Floor of both the Hynes Convention Center and the Sheraton Hotel.

ACCESSIBILITY

The Materials Research Society (MRS), its meeting partners and event venues are responsible for complying with the Americans with Disabilities Act (ADA) including the "readily achievable" removal of physical barriers to access meeting rooms, sleeping rooms and common areas. MRS will make every attempt to ensure that disabled individuals are accommodated so that they can receive the full benefit of participation in our events; on-site needs will be met to the extent possible.

PARKING/TRANSPORTATION

Costs for parking in the Back Bay area range from $40–$60 per day. Parking is available in the garage between the Boston Marriott and the Westin hotels at Copley Place and at the Prudential Center Complex.

For information on train, subway and bus schedule, visit mbta.com.

Airport and ground transportation information is available at massport.com.

SOCIAL MEDIA

Connect with other Meeting attendees via MRS Social Media.

Discuss talks and events, get the scoop on local dining and entertainment options, post pictures, and more.

mrs.org/social-media | #F21MRS

COMPLIMENTARY MORNING COFFEE

Monday – Thursday, 6:00 am – 9:00 am

The Sheraton Boston Hotel, the Boston Marriott Copley Place, the Boston Park Plaza, the Hilton Boston Back Bay and the Westin Copley Place will provide complimentary coffee for MRS attendees who are registered guests of their respective hotels. MRS attendees must be wearing their Meeting badges.

For specific information, ask at the hotel front desk.

WI-FI

Complimentary wireless Internet is available at both the Hynes Convention Center (no password required) and the Sheraton Boston Hotel (password: f21hotel).

BUSINESS CENTER

A FedEx Office® Print & Ship Center is located in the Prudential Corridor of the Sheraton Boston Hotel.

Call 617-587-5444 for more details.

ATM

ATMs are available in the Prudential Center Complex and in the Sheraton, 1st Floor, Lobby.

MOTHER'S ROOM

Stop at the MRS Help Center, Sheraton, 2nd Floor, for the sign-up sheet and key access.

MEDITATION ROOM

The meditation room is located at the Sheraton, 2nd Floor.

LOST AND FOUND

Lost and Found items may be brought to the MRS Help Center at either the Hynes Convention Center or the Sheraton Boston Hotel. Found items will be returned to Security at the end of the week.

*For Lost and Found information at the Hynes Convention Center, visit signatureboston.com/attend/lost-and-found.

*For Lost and Found information at the Sheraton Boston Hotel, call 617-236-6123

Outtakes QUICK CUISINE

Take advantage of the Outtakes Quick Cuisine food and beverage cart during the busy Meeting week. It's a quick and easy place to grab a bite before, after or even between sessions. And if you have the time, there's plenty of space in the hall to sit, relax and/or network with fellow attendees. Located in **Hall D.**

BREAKFAST ITEMS
SANDWICHES
SALADS
FRUIT/SNACKS

COFFEE/TEA
BOTTLED BEVERAGES
AND MORE!

- Monday – Thursday
  9:00 am – 4:00 pm

Download the MRS Meeting App
mrs.org/meetingapp

5 THINGS TO KNOW ABOUT THE MRS MEETING

1

BADGE POLICY

All persons wishing to present their research and/or attend MRS Meeting sessions or evening events are required to register and must wear their Meeting badges at all times while within the Meeting venues. Security will be in place to ensure that all participants are wearing badges. Anyone not wearing a badge will be asked to leave the MRS functions immediately.

Access to the Exhibit Hall is complimentary and does not require payment of a registration fee; however, an Exhibit Only badge is required. You may pick up an Exhibit Only badge at the Exhibit Support counter, Hynes, Level 1. Lost badges can be verified and replaced by reporting to the Registration area during posted registration hours. A photo ID will be required in order to receive a replacement badge, and a **$10 fee will be assessed for reprinting a lost or damaged badge.**

2

THE MRS MEETING APP

All of the information you need to have a successful and organized MRS Meeting can be found on our Meeting App. Visit **mrs.org/meetingapp,** or search and download "Eventsential" on the app store. Then enter MRS in the search bar and select Materials Research Society. Once you're logged in, you can search, create and organize your daily Meeting schedule, view abstracts for all technical talks and learn about special Meeting events.

NOTE: Complimentary wireless Internet is available at both the Hynes Convention Center (no password required) and the Sheraton Boston Hotel (password: f21hotel).

3

YOU'RE AN MRS MEMBER!

Registration for the 2021 MRS Fall Meeting includes MRS Membership from January 1, 2022, through December 31, 2022. As a member, you'll enjoy many benefits, including free electronic access to the entire MRS Journal Portfolio. Online access to the journals requires login with your MRS Member ID and password. Visit **mrs.org/member-benefits** for a complete list of MRS Membership benefits.

4

MRS CODE OF CONDUCT, COMPLIANCE REMINDER AND OTHER POLICIES

All MRS Meeting participants are expected to adhere to all MRS policies, including the MRS Code of Conduct and Compliance Reminder, COVID Statement and Duty of Care, and MRS Transaction Policy, all of which can be found at **mrs.org/attendee-guidelines.**

5

RECORDING/PHOTO POLICY

Recording of Presentations is Strictly Prohibited

No individual or entity—including a presenting author—may electronically record or broadcast any portion of the MRS Meeting without prior written consent of MRS. **Unauthorized recording (audio, video, still photography, etc.) of presentations during sessions, posters, workshops, tutorials, etc., without the express written consent of MRS and individual authors is strictly prohibited.** MRS reserves the rights to any approved audio and video production of presentations at all MRS events.

Press representatives must receive a Press Pass and photo/recording permission from MRS.

Photo Policy

Attendees or exhibitors are encouraged to network and enjoy the Meeting experience. As such, capturing memories of casual Meeting activities and networking is permitted with the permission of those being prominently photographed. **Photographing formal Meeting presentations, posters or displays is forbidden without permission of MRS and the presenter.**

Videos and Photos for MRS Use

MRS Meeting attendance implies your consent to be photographed, filmed and/or otherwise recorded for use on the MRS website or in news publications. **Please note that no technical presentations will be recorded without prior consent of MRS and the authors.**

NOTE: Those who do not comply with the MRS Recording/Photo Policy may be asked to leave the premises.

WELCOME TO THE 2021 MRS FALL EXHIBIT

Hynes Convention Center, Level 2

TUESDAY.....11:00 am – 5:30 pm
WEDNESDAY .....11:00 am – 5:30 pm
THURSDAY ..... 10:00 am – 1:30 pm

Visit the MRS Fall Exhibit and talk directly to manufacturers, suppliers and developers about the latest techniques and advances in the swiftly evolving world of materials research.

MRS Publications

Don't miss the joint MRS/Springer Nature Booth, 617. Meet with our editors to discuss your latest research and see where it fits within the MRS portfolio, learn more about our new publishing alliance, and enjoy discounts on books.

Snack Break

Combat mid-day munchies with a tasty snack at the Tuesday Snack Break at 3:00 pm.

Satisfy Your Sweet Tooth!

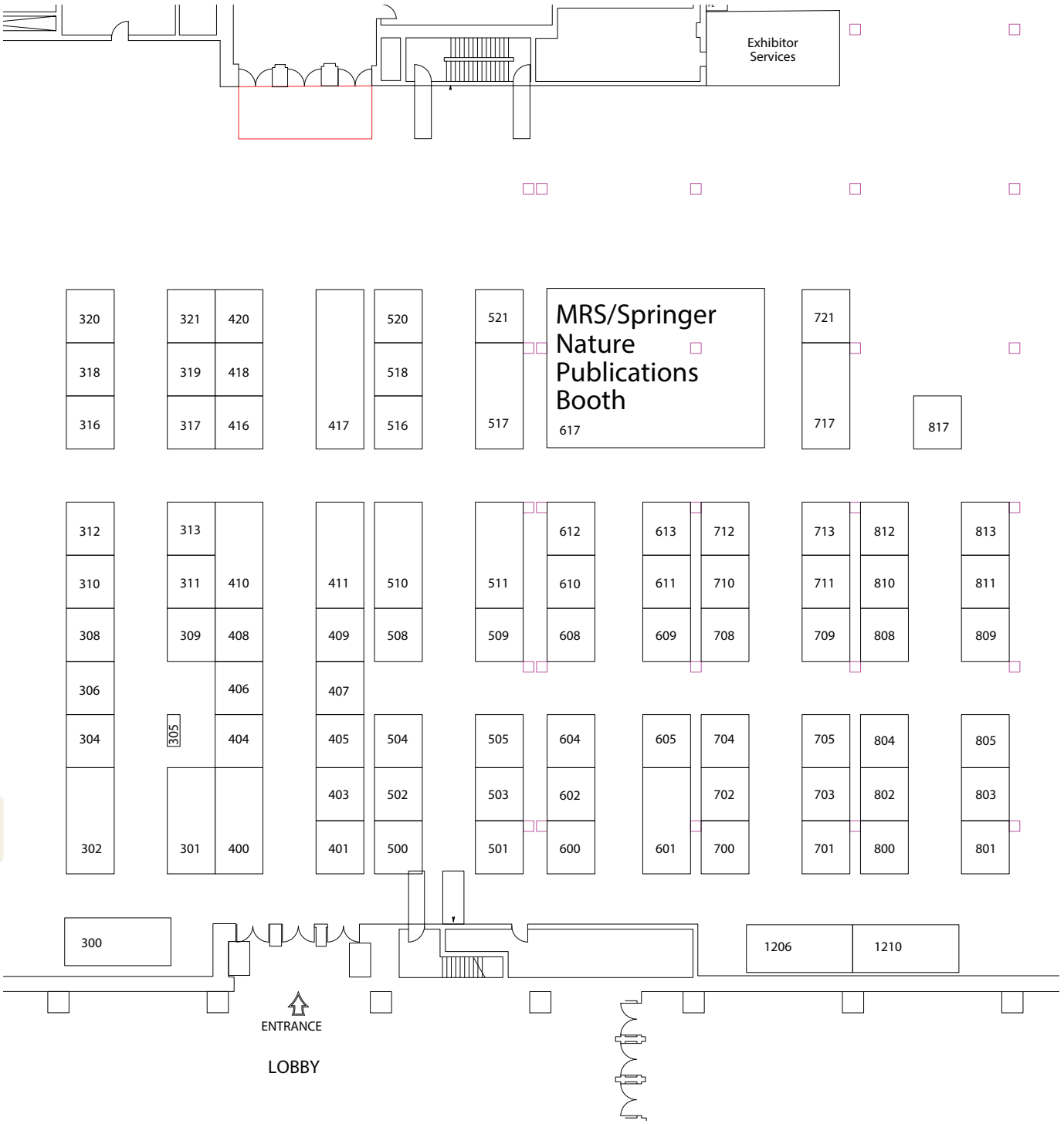
From old fashioned and retro to today's favorites, stop by the Candy Buffet on Wednesday at 3:00 pm. You're never too old for a childhood memory!

Digital Fun with Caricature Sketches

Stop by Tuesday through Thursday and have your caricature drawn by author and award-winning cartoon artist Angie Jordan.

EXHIBIT FLOOR PLAN

Hynes Convention Center, Level 2



ALPHABETICAL CHECKLIST

MRS EXHIBITS Take a moment to read through the exhibitor profiles and check the companies you wish to visit.

- ☐ 521 Across International LLC
- ☐ 800 Advanced Material Development Limited
- ☐ 813 Advanced Research Systems, Inc.
- ☐ 611 AIP Publishing
- ☐ 600 ANCORP
- ☐ 517 attocube systems Inc.
- ☐ 516 Barnett Technical Services
- ☐ 300 Bruker
- ☐ 301 Carl Zeiss Microscopy
- ☐ 518 CELLINK
- ☐ 709 CrystalMaker Software Ltd.
- ☐ 612 DE GRUYTER
- ☐ 504 Delong Instruments
- ☐ 1206 Digital Surf
- ☐ 710 Dotmatics, Inc.
- ☐ 401 Duniway Stockroom Corporation
- ☐ 407 ECS—The Electrochemical Society
- ☐ 502 EDAX
- ☐ 501 Edinburgh Instruments Ltd.
- ☐ 700 Electron Microscopy Sciences
- ☐ 608 FemtoTools AG
- ☐ 319 Gamry Instruments
- ☐ 500 Gatan
- ☐ 509 Heidelberg Instruments Inc.
- ☐ 808 ICSPI
- ☐ 805 Integrated Dynamics Engineering
- ☐ 418 International Centre for Diffraction Data (ICDD)
- ☐ 313 J.A. Woollam
- ☐ 809 JASCO
- ☐ 604 JEOL US, Inc.
- ☐ 317 KEMSTREAM
- ☐ 703 Kleindiek Nanotechnik
- ☐ 409 KP Technology USA Inc.
- ☐ 405 Kurt J. Lesker Company
- ☐ 417 Lake Shore Cryotronics, Inc.
- ☐ 308 Linkam Scientific Instruments
- ☐ 1210 M. Braun Inc.
- ☐ 404 MPF Products, Inc
- ☐ 617 MRS Publishing
- ☐ 311 MTI Corporation
- ☐ 609 NanoAndMore USA Corporation
- ☐ 420 Nanoscience Instruments
- ☐ 411 Nanosurf, Inc.
- ☐ 406 Nextron Corporation
- ☐ 708 Nor-Cal Products, Inc.
- ☐ 510 NT-MDT America, Inc.
- ☐ 320 Optics11 Life
- ☐ 605 Oxford University Press
- ☐ 613 Park Systems Inc.
- ☐ 312 PerkinElmer, Inc.
- ☐ 811 PicoQuant Photonics North America Inc.
- ☐ 817 Pine Research Instrumentation
- ☐ 508 PITTCON
- ☐ 701 Plasmaterials, Inc,
- ☐ 812 Prochem, Inc.
- ☐ 704 Protochips
- ☐ 602 Qnami GmbH
- ☐ 601 Quantum Design Inc.
- ☐ 711 QZabre LLC
- ☐ 400 R.D. Mathis Company
- ☐ 801 Raith America, Inc.
- ☐ 403 Renishaw Inc.
- ☐ 305 Science/AAAS
- ☐ 713 SEMILAB
- ☐ 408 Sigray, Inc.
- ☐ 416 SmarAct Inc.
- ☐ 702 Solar Light Company, LLC
- ☐ 309 SPECS-TII, Inc.
- ☐ 717 Springer Nature
- ☐ 316 SPS-America
- ☐ 804 STAIB Instruments, Inc.
- ☐ 705 Strem Chemicals, Inc.
- ☐ 712 Super Conductor Materials, Inc.
- ☐ 310 SurgePower Materials, Inc
- ☐ 511 Ted Pella, Inc.
- ☐ 410 TESCAN
- ☐ 321 Thermo Fisher Scientific
- ☐ 520 UC Components Inc.
- ☐ 810 United Mineral and Chemical Corporation
- ☐ 503 Virtual Lab Inc
- ☐ 505 Xenocs Inc.
- ☐ 304 Zurich Instruments USA, Inc.

As of October 15, 2021

EXHIBITOR PROFILES

Across International LLC — Booth 521
acrossinternational.com

Key Products: Vacuum Systems and Components

Headquartered in New Jersey, Across International supplies laboratory equipment including the leading technology in vacuum ovens, pumps, rotary evaporation systems, jacketed glass reactors and high quality material processing laboratory equipment in the areas of heat treatment and sample preparation for universities, research facilities and labs worldwide, from NASA, Tesla, 3M, GM, Government and Natural Resources Canada, the US Department of Energy, all the major national labs and branches of the military and more. Across International has additional locations in Sparks, Nevada, USA and VIC, Australia.

Advanced Material Development Limited — Booth 800
amdnano.com

Key Products: Nanomaterials, Nanotechnology, Nanoscience

Advanced Material Development (AMD) is a leader in the field of cutting-edge Materials Science. It specialises in funding research into 2D nanotechnologies and materials in collaboration with university partners to develop and commercialise unique solutions for industrial applications. In partnership with customers, it builds deep and lasting relationships that seek to bring solutions to market through various licensing initiatives.

Advanced Research Systems, Inc. — Booth 813
arscryo.com

Key Products: Cryogenic Systems

ARS manufactures cryogenic equipment for your applications and experiments, from quantum optics, to optical spectroscopy, to neutron scattering. ARS specializes in Helium-Free Cryostats, Flow Cryostats, and Probe Stations. Our Closed Cycle Cryocoolers have a temperature range of 1.5 K to 350 K, and low vibrations between 3 to 5 nm at the sample, which makes ARS Cryocoolers the equipment of choice for laboratory cryogenic applications. Our Probe Station range includes closed cycle and flow cryostats, both featuring magnet options, with nanometer vibration levels, and temperature range of 1.5 K to 800 K.

AIP Publishing — Booth 611
publishing.aip.org

Key Products: Publishers, Books, Journals

AIP Publishing is a wholly owned not-for-profit subsidiary of the American Institute of Physics (AIP). AIP Publishing's mission is to support the charitable, scientific and educational purposes of AIP through scholarly publishing activities in the fields of the physical and related sciences on its own behalf, on behalf of Member Societies of AIP, and on behalf of other publishing partners to help them proactively advance their missions. AIP Publishing's portfolio comprises 20 highly regarded, peer-reviewed journals, including the flagship journals Applied Physics Letters, Journal of Applied Physics, and The Journal of Chemical Physics, in addition to the AIP Conference Proceedings.

ANCORP — Booth 600
ancorp.com

Key Products: Manufacturing; Vacuum Systems and Components

Manufacturer of high and ultra-high vacuum components since 1965, ANCORP offers an extensive line of vacuum flanges, fittings, feedthroughs, traps, viewports, valves, chambers, and custom fabrications to researchers, OEMs, and industrial users around the world. ANCORP products are designed to meet or exceed the standards required by our customers, such as those involved with thin film deposition, surface analysis, laser devices, cryogenics, and the aerospace industry.

attocube systems Inc. — Booth 517
attocube.com

Key Products: Cryogenic Systems; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Scanning Probe Techniques and Instruments

attocube's 'Cryogenic Instruments' business unit offers customers nanopositioners, cryostats and microscopes for research in extreme environments, while 'Nanoscale Analytics' (formerly neaspec GmbH) offers optical imaging and spectroscopy microscopes using ground-breaking and patented optical background-filtering techniques. A highly skilled team guarantees highest levels of technical consulting competence and excellent after-sales support.

Barnett Technical Services — Booth 516
barnett-technical.com

Barnett Technical Services started in 2010 to provide consulting and training services for the analytical instrumentation industry, especially those techniques that involve the use of light for chemical and material analysis. Over time, we have added capabilities to act as manufacturer's representatives and distributor. In combination with our consulting and training capabilities, this allows us to act as a "one stop shop" for many of our partners who need to provide support, applications development, and training to support their product sales.

Bruker — Booth 300
bruker.com/afm

Key Products: Microscopes, Electron Microscopy; Spectroscopy – Analysis, Instrumentation

Celebrating 10 years with PeakForce Tapping®, the most significant scientific breakthrough in atomic force microscope (AFM) since the introduction of tapping mode. It provides unprecedented high-resolution imaging, extending AFM measurements into a range of samples not previously accessed, and uniquely enables simultaneous nanoscale property mapping. Bruker also offers a variety of laboratory FTIR spectrometers for your research applications. The new INVENIO, with innovative technology and smart design, sets standards for next-generation intelligent R&D FTIR spectrometers.

Carl Zeiss Microscopy — Booth 301
zeiss.com/microscopy/us

Key Products: Additive Manufacturing Equipment; Microscopes, Electron Microscopy; Research Instrumentation and Equipment; Software; Spectroscopy-Analysis, Instrumentation

Carl Zeiss Microscopy is the world's only one-stop manufacturer of light, electron, X-ray and ion microscope systems and offers solutions for correlative microscopy. The portfolio comprises of products and services for life sciences, materials and industrial research, as well as education and clinical practice.

SILVER SPONSOR

CELLINK
A BICO COMPANY

cellink.com — Booth 518

Key Products: 3D Printers and Inks; Biological, Biomedical, Bio-related; Laboratory Services; Materials, Chemicals, Synthesis; Universities

CELLINK is creating the future of health as part of BICO, the world's leading bioconvergence company. When CELLINK released the first universal bioink in 2016, it played a major role in turning the field of 3D bioprinting into a thriving $1 billion industry. Today, the company's best-in-class bioinks, bioprinters, software and services have been cited in over 700 publications and are trusted by more than 1,000 academic, pharmaceutical and industrial labs.

EXHIBITOR PROFILES

CrystalMaker Software Ltd. — Booth 709
crystalmaker.com

Key Products: Software

CrystalMaker Software Ltd is an award-winning British company, based at the Oxford University Begbroke Science Park, developing innovative computer software for empowering scientists in key areas of chemistry, physics and materials science - with a worldwide market. We develop software for modelling the nano-scale arrangements of atoms and chemical bonds (crystal/molecular structures) and for predicting their diffraction properties. Our software is unique in its combination of advanced crystallographic features, spectacular 3D graphics and elegant user interfaces.

DE GRUYTER — Booth 612
cloud.newsletter.degruyter.com/physical_sciences

Key Products: Databases; Publishers, Books, Journals

The expanding field of materials sciences is a fast-growing subject area in the De Gruyter portfolio that is distinguished by fresh topics and new authors. The contemporary nature of this science is evidenced by its focus on cross-sectional technologies and their application in commerce and the business sector, with content provided by outstanding, internationally renowned scientists. Our portfolio contains graduate-level textbooks, a special STEM series for career beginners, traditional monographs, and a collection of journals, including our open access journals: Nanophotonics and Nanotechnology Reviews.

Delong Instruments — Booth 504
lv-em.com

Key Products: Microscopes, Electron Microscopy

Delong is proud to be a world leader in benchtop and compact Low Voltage Electron Microscopes (LVEM) and the only company offering Transmission Electron Microscopes (TEM) in a benchtop format. Delong continues to explore the benefits of low voltage-high contrast imaging in both material science and life science applications. This, combined with the small size and ease of our instruments is certainly the reason that benchtop electron microscopes from Delong are poised to move research to new limits.

Digital Surf — Booth 1206
digitalsurf.com

Key Products: Software

Digital Surf provides software solutions for analyzing data from a wide range of instruments including Atomic Force Microscopes (AFM), other Scanning Probe Microscopes (SPM), Scanning Electron Microscopes (SEM), 3D confocal and interferometric microscopes/profilers, and spectrometers. Mountains® software is offered by the majority of profilometer and microscope manufacturers worldwide, embedded in their equipment or available as an option. A major new version, Mountains® 8, was released summer 2019. Image Metrology, creator of SPIP™ software for SPM image processing, is also part of the Digital Surf group.

Dotmatics, Inc — Booth 710
dotmatics.com

Key Products: Software

Dotmatics is a scientific informatics software and services company that is driving the automation of laboratory workflows for discovery and innovation research - accelerating the journey towards full digitalization and the Lab of the Future.

Duniway Stockroom Corporation — Booth 401
duniway.com

Key Products: Manufacturing; Vacuum Systems and Components

For 45 years, Duniway Stockroom has supplied new and used vacuum equipment to Universities, government laboratories, OEM's, Fortune 500 corporations and smaller end-users around the world. We are a manufacturer of new ion pumps and ion pump controllers (Terranova®) as well as new vacuum gauge controllers (Terranova®). For more information, go to www.duniway.com.

ECS—The Electrochemical Society — Booth 407
electrochem.org

Key Products: Publishers, Books, Journals

ECS, a nonprofit professional society established in 1902, advances theory and practice at the forefront of electrochemistry and solid state science and technology, and allied subjects. Our more than 8,000 members in over 85 countries research innovative solutions to major global challenges. ECS hosts prestigious meetings, publishes research, fosters education, and collaborates with other organizations.

EDAX — Booth 502
edax.com

Key Products: Materials, Chemicals, Synthesis; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Spectroscopy-Analysis, Instrumentation

EDAX is a leading provider of innovative materials characterization systems encompassing Energy Dispersive Spectroscopy (EDS), Wavelength Dispersive Spectrometry (WDS), Electron Backscatter Diffraction (EBSD) and X-ray Fluorescence (XRF). The company designs, manufactures, distributes and services hardware and software solutions for a broad range of industries, educational institutions and research organizations.

Edinburgh Instruments Ltd. — Booth 501
edinst.com

Key Products: Lasers and Related Equipment; Spectroscopy – Analysis, Instrumentation

Edinburgh Instruments are global providers of Molecular Spectroscopy solutions covering techniques such as Photoluminescence, Raman, UV-Vis, Transient Absorption, and pulsed lasers and LEDs. We are world leaders in cutting-edge fluorescence spectroscopic instrumentation. Over the years we have developed new and innovative products, winning many international designs, technology and export achievement awards. We excel in providing one-to-one comprehensive customer service and continue to meet the needs of our customers worldwide.

Electron Microscopy Sciences — Booth 700
emsdiasum.com

Key Products: Microscopes, Electron Microscopy

Electron Microscopy Sciences (EMS) will have on display their comprehensive line of chemicals (material embedding kits), supplies and equipment (polishers, grinders, manipulators, disc punches, tripods, and lapping machines) for microscopy and all of the related material research fields. As well, Diatome will be exhibiting their Diamond Knives for materials microtomy, including the unique UltraSonic Oscillating Diamond knife for compression free sections.

FemtoTools — Booth 608
femtotools.com

Key Products: Macro-, Micro-, and Nano-scale Mechanical Testing

FemtoTools is a manufacturer of micro- and nano-mechanical testing instruments for applications in metallurgy, soft materials, bio-materials and microsystems. The FemtoTools instruments cover a wide range of material characterization techniques such as nanoindentation, micro-tensile testing, micro-compression testing, micro-rheology, dynamic mechanical analysis and fatigue testing.

Gamry Instruments — Booth 319
gamry.com

Key Products: Deposition Equipment; Research Instrumentation and Equipment; Surface Analysis Equipment; Thin Films Processing and Characterization

Gamry Instruments designs, manufactures, and sells a variety of electrochemical instrumentation and accessories designed to fit your needs and budget. We have a variety of instruments from single and multichannel potentiostats, QCMs, and rotating electrode setup. Come see why Gamry is the worldwide leader in electrochemical instrumentation.

Gatan Booth 500
gatan.com

Key Products: Ion Beam Systems; Research Instrumentation and Equipment; Software; Specimen Preparation Equipment; Spectroscopy-Analysis, Instrumentation

Gatan designs and manufactures instruments and products for applications in electron microscopy. Gatan specializes in materials research and development and its products are used in a broad range of advanced material science applications, including: nano-materials, semiconductors (micro- and nano-electronics), and photovoltaics. Gatan is a part of AMETEK's Electronic Instruments Group.

Heidelberg Instruments Inc. Booth 509
himt.de

Key Products: Lasers and Related Equipment; Nanomaterials, Nanotechnology, Nanoscience

Heidelberg Instruments is a world leader in the development and production of high precision photolithography systems, maskless aligners and nanofabrication tools. Our systems are installed in industrial and academic facilities all over the world. These are used for direct writing and photomask production in various areas of MEMS/NEMS - for Semiconductors, Quantum Computing, Flat Panel Displays, Photonics, 2D Materials, IOT and many other related applications.

ICSPI Booth 808
icspicorp.com

Key Products: Scanning Probe Techniques and Instruments

ICSPI develops and produces easy-to-use and affordable benchtop AFM instruments designed for the individual scientist and individual lab to capture 3D images at the nanoscale.

Integrated Dynamics Engineering Booth 805
ideworld.com

Key Products: Biological, Biomedical, Bio-related; Ion Beam Systems; Macro-, Micro- and Nano-scale Mechanical Testing; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience

Integrated Dynamics Engineering (IDE) provides active/passive vibration isolation, EMI cancellation, acoustic isolation and interior environmental controls for universities, laboratories, corporations, engineers, researchers, and microscopists, worldwide. Through IDE Germany, IDE United States, IDE Asia, IDE Japan, IDE China, IDE Israel. Global sales/services for over 25 years in the Aalberts Advanced Mechatronics Group.

International Centre for Diffraction Data (ICDD) Booth 418
icdd.com

Key Products: Databases; Software

ICDD and MDI focus on the needs of the materials characterization scientific community by providing the Powder Diffraction File™ (PDF®) and JADE® analysis software. JADE Pro is an All-Inclusive, Phase ID, Whole Pattern Fitting (WPF) and Rietveld refinement tool that makes quantifying and identifying even minor phases routine. JADE Pro and the PDF-4+ powder diffraction database are a powerful combination for all of your materials analyses needs.

J.A. Woollam Booth 313
jawoollam.com

Key Products: Characterization Services; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Spectroscopy-Analysis, Instrumentation; Thin Films Processing and Characterization

J.A. Woollam has over 35 years of experience in spectroscopic ellipsometry. We offer a wide range of spectroscopic ellipsometers for nondestructive materials characterization including, thin film thickness (single and multi-layer), optical constants, composition, growth/etch rates, and more. We have instruments available for research and manufacturing metrology covering spectral ranges from vacuum ultra-violet to far infrared. We pride ourselves in creating the most advanced, high quality and reliable ellipsometers. We are your Elliposometry Experts.

JASCO Booth 809
jascoinc.com

Key Products: Software; Spectroscopy – Analysis, Instrumentation

JASCO Spectra Manager™ is a single, integrated software for measurement and analysis used with a range of spectroscopy instruments. Raman: Compact and research confocal Raman microscopes, with fast imaging. Probe Raman can be used for in situ measurement. FTIR: Spectrometers for the visible to THz regions, step-scan. Microscopes with linear array detectors for high-speed imaging. Other: Film Thickness, NSOM, UV-Visible/NIR, Fluorescence, circular dichroism. Application support for academic research and teaching to pharmaceutical, biotechnology, materials analysis and nanotechnology.

JEOL US, Inc. Booth 604
jeolUS.com

Key Products: Additive Manufacturing Equipment; Ion Beam Systems; Microscopes, Electron Microscopy; Semiconductor Equipment; Specimen Preparation Equipment

JEOL is the global leader in electron microscopy, offering benchtop to Field Emission SEMs, multipurpose analytical S/TEM to Cs corrected atomic resolution TEM, ion beam milling, EPMA, spot beam lithography tools, and now EB metal additive manufacturing. JEOL ARMs continue to offer the highest performance of any commercially available instrument.

KEMSTREAM Booth 317
kemstream.com

KEMSTREAM manufactures Direct Liquid Injection vaporizers for CVD, MOCVD, ALD, ALE and all gas phase processes. KEMSTREAM Vapbox DLI vaporizers can vaporize a very wide range of organic and organometallic precursors at atmospheric pressure or under vacuum. They are especially efficient for vaporizing low vapor pressure and thermally unstable molecules including solid precursors. Vapbox DLI vaporizers can also be used to inject nanoparticles suspensions in vacuum or atmospheric pressure process.

Kleindiek Nanotechnik Booth 703
kleindiek.com

Founded in 1997, Kleindiek Nanotechnik is proudly looking back at over 20 years in the market, providing micro- and nano-positioning capability to our customers around the world. In 1991, during his PhD work at the University of Tuebingen, the company founder Stephan Kleindiek invented the Nanomotor®. This motor and subsequent inventions of rotational motors based on the same principle are the foundation of Kleindiek Nanotechnik's products.

KP Technology USA Inc. Booth 409
kelvinprobe.com

Key Products: Spectroscopy – Analysis, Instrumentation

Leading Kelvin Probe and Photoemission Yield Spectroscopy Specialists. Strengthen your materials characterisation capabilities with a dedicated KP Technology Kelvin Probe or Kelvin Probe Photoemission Yield Spectroscopy system. Our systems measure work function, volta potential, Valence Band (HOMO) and Conduction Band (LUMO) energy bands quickly and easily in ambient, controlled atmosphere and UHV environments. Visit our booth to find out how these essential investigative tools can support and further your research.

Kurt J. Lesker Booth 405
lesker.com

Key Products: Thin Films Processing and Characterizations; Vacuum Systems and Components

A world leader in plasma and thin film deposition technology and vacuum coating for materials discovery and molecular engineering. We deliver complete solutions with expertise in magnetron sputtering, electron beam deposition and thermal evaporation, organic electronics, and atomic layer deposition (ALD) for your materials research challenges. Extensive global inventory of sputtering targets and evaporation materials available for same-day shipment. Visit www.lesker.com for all your vacuum needs.

EXHIBITOR PROFILES

Lake Shore Cryotronics, Inc. — Booth 417
lakeshore.com

Key Products: Cryogenic Systems; Electronic Properties Instruments; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Thermal Analysis Systems; Thin Films Processing and Characterization

A leading innovator in measurement and control solutions for low temperature and magnetic field conditions, Lake Shore Cryotronics offers cryogenic probe stations for on-wafer DC, RF, and microwave measurements at temperatures as low as 1.6 K and in fields to 5 T; highly sensitive VSMs; complete Hall measurement solutions for fast, highly precise analysis; and a new modular synchronous source measure system for sourcing DC and/or AC to 100 kHz signals for low-level measurements of materials or devices. Also available: liquid nitrogen, liquid helium, and closed-cycle refrigerator (cryogen-free) cryostats, LHe and cryogen-free superconducting magnet systems, and various other lab cooling systems optimized for material researchers.

Linkam Scientific Instruments — Booth 308
linkam.co.uk

Linkam develops and manufactures a broad range of temperature and environmental control stages for both OEMs and end users. From high to cryo temperatures as well as humidity, electrical connections, gas purging, vacuum and pressure, for enhanced sample analysis. Linkam stages are used with light microscopes and a wide range of analytical techniques including Raman, FTIR, WAX/SAX and many more to visualise and characterise the properties of materials. Linkam stages are found in thousands of laboratories worldwide with the most successful microscope heating stage, the THMS600, selling over 6,000 units alone. Linkam is the market leader in temperature-controlled microscopy.

M. Braun Inc. — Booth 1210
mbraun.com

Key Products: Biological, Biomedical, Bio-related; Deposition Equipment; Nanomaterials, Nanotechnology, Nanoscience; Semiconductor Equipment; Thermal Processing Equipment

MBRAUN is a worldwide leading manufacturer of high-end technology solutions including inert gas gloveboxes and gas purification systems, high-end vacuum deposition systems and a complete line of integrated process tools. In combination with over 40 years of experience and world class engineering team, MBRAUN becomes your partner for complete, turnkey solutions. For more information please email info@mbraunusa.com.

MPF Products, Inc — Booth 404
mpfpi.com

Manufactured Precision Feedthrough Products, Inc (MPF Products, Inc.) specializes in the design and manufacture of electrical feedthroughs and viewports, utilizing the latest in ceramic-to-metal seal technologies.

MRS Publishing — Booth 617
mrs.org/journals

Key Products: Non-profit/Association; Publishers, Books, Journals

Don't miss the joint MRS/Springer Nature Publications booth. Enjoy discounts on books, meet with journal and book editors, and learn more about our new publishing alliance!

MTI Corporation — Booth 311
mtixtl.com

Key Products: Research Instrumentation and Equipment

MTI Corporation has been providing a total solution for materials research labs since 1995. MTI supplies ceramic, crystal, metallic substrates from A-Z and nano-powder. We also provide laboratory R&D equipment including mixing, cutting, polishing machines, high temperature muffle and tube furnaces, pressing machines, film coaters, glove boxes, high vacuum systems, high-pressure furnaces, RTP furnaces, CSS and PECVD furnace systems, high pressure and hydrogen furnaces, melting and casting systems, crystal growth systems as well as compact XRD/X-Ray orientation unit and equipment for battery and energy materials research.

NanoAndMore USA Corporation — Booth 609
nanoandmore.com

Key Products: Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience

We support and distribute the most popular AFM probe brands in North and South America and Canada! As we distribute numerous AFM Probe Brands covering all the price points and applications in the market – you decide which Brand to use for your specific goals. For exploring samples and training new AFM users BudgetSensors and MikroMasch are extremely popular as the price is the lowest in the market. If you require the highest resolution and most consistent cantilever and tip geometries from probe-to-probe then NanoWorld, OPUS and NANOSENSORS are recommended. The most widely used and most published brands in the world are NanoWorld and NANOSENSORS.

Nanoscience Instruments — Booth 420
nanoscience.com

Key Products: Analytical Services; Microscopes, Electron Microscopy; Research Instrumentation and Equipment; Specimen Preparation Equipment; Surface Analysis Equipment

Nanoscience Instruments combines expertise in microscopy and surface science instrumentation with real-world solutions. We partner with innovative instrument manufacturers around the world to help scientists and engineers solve complex problems leading to break-through innovations. Our team of scientists and engineers are passionate about solutions and connecting our customers with the right products and services to accomplish these goals.

Nanosurf, Inc. — Booth 411
nanosurf.com

Key Products: Microscopes, Electron Microscopy

Nanosurf was founded in 1997 in Liestal, Switzerland, and has since become one of the most trusted and established AFM brands in the market today. While we continue to develop and manufacture our AFMs from our headquarters in Switzerland, we have grown to be a global company with direct sales, service and support operations in China, Germany, India, Singapore, UK and the US. Since its inception, Nanosurf has focused on designing and manufacturing modular, high-quality and easy-to-use AFMs with excellent price to value ratio.

Nextron Corporation — Booth 406
microprobesystem.com

Key Products: Electronic Properties Instruments; Research Instrumentation and Equipment; Semiconductor Equipment; Thin Films Processing and Characterization; Vacuum Systems and Components

NEXTRON Micro Probe System is suitable to measure and analyze the electrical and optical properties of the materials under various environmental conditions; temperature, vacuum, humidity, gas flow, and light irradiation. Our unique manual-type probes make electrical contacts on the sample while holding it on the stage at the same time.

Nor-Cal Products, Inc. Booth 708
n-c.com

Key Products: Vacuum Systems and Components

Nor-Cal Products is a manufacturer of high and ultra-high vacuum components for industry and research specializing in custom chambers and components. We understand that even the smallest component can be critical to the integrity of your process. Therefore, our responsibility is to ensure that every component is exceptionally engineered, fabricated and inspected before shipping. Standard products include flanges, fittings, adapters, viewports, feedthroughs, hose, monitors, isolation valves, pressure control valves, heater jackets, foreline traps, and manipulators.

NT-MDT America, Inc. Booth 510
ntmdt.com

Key Products: Spectroscopy-Analysis, Instrumentation

From cutting edge scientific research to routine surface investigations, NT-MDT has a unique and unrivalled portfolio of scanning probe microscopes. Our application-focused instruments provide you with a full range of capabilities in AFM-Raman, high resolution, multi-frequency measurements, and AFM-based nanomechanics. As an innovator in SPM for over 20 years, NT-MDT has a specialized high performance solution for your research needs.

Optics11 Life Booth 320
optics11life.com

Key Products: Nanomaterials, Nanotechnology, Nanoscience

Optics11 Life offers powerful table-top nanoindenters that are remarkably user-friendly, versatile, and robust. The nanoindentation instruments can measure complex, irregular biomaterials such as single cells, tissues, hydrogels, and coatings.

Oxford University Press Booth 605
global.oup.com

Key Products: Publishers, Books, Journals

Oxford University Press is a publisher of some of the most respected and prestigious books and journals in the world. Visit our stand to browse books and to pick up sample copies of our journals, or visit online at www.global.oup.com for more information.

Park Systems Inc. Booth 613
parksystems.com

Key Products: Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; National Laboratories; Scanning Probe Techniques and Instruments; Surface Analysis Equipment

Park Systems is introducing the Automatic Atomic Force Microscope Park FX40, with robotics and artificial intelligence and many added features for the most automated nanoscale imaging, watch the video at: https://www.youtube.com/watch?v=uYdQ4hWZ92I. Park Systems is one of the fastest growing and a world-leading manufacturer of atomic force microscopy (AFM) systems, with a complete range of products for researchers and engineers in the chemistry, materials, physics, life sciences, semiconductor and data storage industries. Our mission is to enable nanoscale advances for scientists and engineers solving the world's most pressing problems and pushing the boundaries of scientific discoveries and engineering innovations.

PerkinElmer, Inc. Booth 312
perkinelmer.com

Key Products: Electronic Properties Instruments; Microscopes, Electron Microscopy; Research Instrumentation and Equipment; Spectroscopy-Analysis, Instrumentation; Thermal Analysis Systems

PerkinElmer enables scientists, researchers, and clinicians to address their most critical challenges across science and healthcare. With a mission focused on innovating for a healthier world, we deliver solutions to serve the diagnostics, life sciences, food and applied markets. We're passionate about helping customers sustain the well-being and longevity of people.

PicoQuant Photonics North America Inc. Booth 811
picoquant-US.com

Key Products: Lasers and Related Equipment

Product lines include Pulsed Diode Lasers, Time-Correlated Single Photon Counting (TCSPC) electronics and detectors, fluorescence lifetime spectrometers, time-resolved fluorescence microscopes and upgrade kits for Laser Scanning Microscopes. Applications include Single Molecule Spectroscopy, Fluorescence Lifetime Imaging (FLIM), Fluorescence Resonance Energy Transfer (FRET), Fluorescence Correlation Spectroscopy (FCS), Optical tomography and Quantum Key Distribution. Also offered in the booth are the Q-switch nanosecond laser products from Innolas and ultrafast pico- and femto-second lasers from Amphos up to 1000W.

Pine Research Instrumentation Booth 817
pineresearch.com

Key Products: Biological, Biomedical, Bio-related; Electronic Properties Instruments; Energy Services and Instruments; Research Instrumentation and Equipment; Software

Pine Research Instrumentation is the world leader in electrode rotators, for popular applications like electrocatalysis using rotating disk (RDE) and rotating ring-disk (RRDE). Our features potentiostats include the WaveDriver with EIS to 1 MHz and the recently released WaveNow Wireless system, the easiest option for electrochemistry in the glovebox.

PITTCON Booth 508
pittcon.org

Key Products: Non-profit/Association

Pittcon is a dynamic, transnational exposition and comprehensive technical conference, a venue for presenting the latest advances in research and scientific instrumentation, and a platform for continuing education and career-enhancing opportunity. Our objective is to advance scientific endeavor through collaboration, bringing together a world of knowledge to impact, enrich, and inspire the future of science. Pittcon is a catalyst for the exchange of information, a showcase of the latest advances in laboratory science, and a venue for international connectivity.

Plasmaterials, Inc. Booth 701
plasmaterials.com

Key Products: Magnets and Magnetic Materials; Manufacturing; Materials, Chemicals, Synthesis; Vacuum Systems and Components

Plasmaterials, Inc., since 1987, has been supplying the Thin Film Industry with high quality sputtering targets and evaporation materials for use in PVD equipment and related applications. These materials are well suited for industrial applications, laboratory processing, research and development applications, pilot production applications as well as full scale production. In addition, we offer backing plates, e-beam starter sources, crucible liners and bonding services.

EXHIBITOR PROFILES

Prochem, Inc. — Booth 812
prochemonline.com

Key Products: Materials, Chemicals, Synthesis

ProChem, Inc. was founded in 1986 by Reno Novak, president, as a high purity inorganic chemical manufacturing company. For the past 30 years, ProChem has been supplying many industries with high purity metal oxides, rare earth oxides, and other inorganic compounds. With over 60 years of experience in synthesizing new products, and a philosophy which centers on flexibility and service, we strive to meet and exceed our customers' needs.

Protochips — Booth 704
protochips.com

Key Products: Biological, Biomedical, Bio-related; Electronic Properties Instruments; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment

We empower scientists, engineers, and researchers to discover and analyze new phenomenon by visualizing biological, chemical and physical processes in completely new ways. Our field-proven products offer an unparalleled view into sample behavior by combining in situ experiment control with the analysis and resolution capabilities of the modern electron microscope. Through continual innovation, we create solutions that improve productivity and generate actionable data to accelerate discovery.

Qnami GmbH — Booth 602
qnami.ch

Qnami is a spin-off from the University of Basel in Switzerland, which develops new sensors based on diamond quantum technologies. We allow researchers and R&D engineers to perform non-invasive magnetic imaging at the nanoscale in all types of environment. Qnami's products address the demand across different applications from fundamental material science to failure analysis of new storage solutions.

Quantum Design Inc. — Booth 601
qdusa.com

Key Products: Cryogenic Systems; Electronic Properties Instruments; Magnets and Magnetic Materials; Microscopes, Electron Microscopy; Research Instrumentation and Equipment

Quantum Design manufactures automated material characterization systems providing temperatures from 0.05 to 1000 K and magnetic fields up to 16 tesla. Instruments include the PPMS®, MPMS®3, VersaLab, and DynaCool. Quantum Design manufactures helium liquefiers (ATL80, ATL160) and recovery systems, and recently introduced an innovative 7 tesla magneto-optical cryostat (OptiCool™). They also distribute direct-write and nano-lithography systems, single crystal furnaces and an AFM solution for integration into SEM/FIB, adding topographic, magnetic, and electric characterization at nanometer scales.

QZabre LLC — Booth 711
qzabre.com

Key Products: Scanning Probe Techniques and Instruments

QZabre makes magnetic fields visible at the nanometer scale. Our key technologies are single nitrogen vacancy centers in high quality diamond, atomic sized quantum sensors for magnetic fields, currents and much more. We offer two products: NV scanning tips made from single crystal diamond, shaped to provide maximum brightness. And the QSM, a scanning diamond microscope combining high performance optics with a state-of-the-art AFM, covering your needs in NV scanning in one simple to use package.

R.D. Mathis Company — Booth 400
rdmathis.com

Key Products: Deposition Equipment; Manufacturing; Materials, Chemicals, Synthesis; Thermal Processing Equipment; Vacuum Systems and Components

We fabricate the highest quality Evaporation Sources and Materials in the industry. A wide selection of sources and Materials are available in our catalog and on our website. We also offer E-Beam liners, filaments, Sputtering Targets and feedthroughs. Our Low Voltage High current power supplies and our Inert gas purifier will also be on display.

Raith America, Inc. — Booth 801
raith.com

Key Products: Microscopes, Electron Microscopy

Raith manufactures focused ion beam (FIB-SEM) scanning electron microscopy (SEM), and electron beam lithography (EBL) instrumentation. With sub-5 nm performance, Raith instruments are enabling continuous advancement in nanoscale research development and production.

Renishaw Inc. — Booth 403
renishaw.com

Key Products: Spectroscopy-Analysis, Instrumentation

Renishaw is a recognized leader in Raman spectroscopy, producing high performance Raman systems for a range of applications. The Virsa Raman Analyser, our latest high-performance Raman spectroscopy system, takes your spectroscopic analysis away from the confines of the laboratory microscope to new samples and environments. This versatile system has a modest footprint; use it on a bench or mounted in an industry-standard 19" rack. It's ideal for researchers wanting to expand the application of Raman beyond traditional laboratory-based microscope systems.

Science/AAAS — Booth 305
science.org

Key Products: Non-profit/Association; Publishers, Books, Journals

The very best in scientific research, commentary, and news.

SEMILAB — Booth 713
semilab.com

Semilab is a leading metrology equipment supplier for characterization of semiconductor materials. The company offers advanced electrical and optical systems, for both R&D and production control in the semiconductor, photovoltaic, and display technology markets. Technologies include world-leading sensitivity for contamination, dopant concentration measurement and profiling, ellipsometry and IR reflectometry, photoluminescence, CV/IV measurement of dielectrics, atomic force microscopy, and nanoindentation. Electrical techniques include both contact and non-contact solutions, and all are offered in a range of platforms from smaller manual type tools to fully automated production control systems and high-resolution imaging.

Sigray, Inc. — Booth 408
sigray.com

Key Products: Microscopes, Electron Microscopy; Spectroscopy-Analysis, Instrumentation

Sigray, Inc. is a San Francisco Bay Area company founded with the aim to accelerate scientific progress by providing powerful, synchrotron-grade research capabilities in its laboratory x-ray systems. These systems represent a major step-change from existing laboratory x-ray systems and their breakthrough performance are uniquely enabled by Sigray's patented innovations in x-ray source, optics, and detector technologies. Since its founding in 2013, Sigray's products have already been adopted by prominent scientific leaders in Asia, America, and Europe.

SmarAct Inc. Booth 416
smaract.com

Key Products: Macro-, Micro-, and Nano-scale Mechanical Testing; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; Optical Components; Semiconductor Equipment

SmarAct develops and produces piezo-based, high-accuracy positioning and measuring systems for industrial and research applications in the micro- and nanometer scale. Comprehensive positioner systems with numerous degrees of freedom and parallel kinematics, microscopy stages and laser interferometers can be assembled to custom-built, complete robotic systems, and work under extreme conditions, e.g., ultrahigh vacuum, cryogenic temperatures, and non-magnetic materials.

Solar Light Company, LLC Booth 702
solarlight.com

Key Products: Light Sources

Solar Light Company, LLC designs and manufactures precision solar simulators, meteorological instruments, sources, standards and calibration services to assess the impact of sunlight on human health and the environment. Areas of focus include SPF measurement of sun protection products, monitoring UV disinfection systems, atmospheric monitoring and solar cell testing.

SPECS-TII, Inc. Booth 309
specs.com

Key Products: Biological, Biomedical, Bio-related; Deposition Equipment; Materials, Chemicals, Synthesis; Microscopes, Electron Microscopy; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Scanning Probe Techniques and Instruments; Spectroscopy-Analysis, Instrumentation; Surface Analysis Equipment; Vacuum Systems and Components

SPECS leads the way in state-of-the-art technology, cutting-edge components, and individually designed systems for surface analysis. Our newest solution for environmental XPS is the award-winning EnviroESCA, which features quick sample throughput at Near Ambient Pressure. And for ARPUS, the KREIOS 150, which combines a hemispherical analyzer with a new PEEM lens approach.

Springer Nature Booth 717
springernature.com

Key Products: Publishers, Books, Journals

Springer Nature one of the world's leading global research, educational and professional publishers, home to respected brands providing quality content through innovative products and services. Springer Nature is the world's largest academic book publisher, publisher of the world's most influential journals, a pioneer in the field of open research.

SPS-America Booth 316
sps-america.com

Key Products: Semiconductor Equipment

SPS offers a wide range of semiconductor equipment products and customized solutions for all your major process steps.

STAIB Instruments, Inc. Booth 804
staibinstruments.com

Key Products: Deposition Equipment; Electronic Properties Instruments; Ion Beam Systems; Materials, Chemicals, Synthesis; Microscopes, Electron Microscopy

STAIB designs and manufactures high performance, reliable instruments for in situ material analysis and Multi-technique Surface Analysis Chambers: RHEED systems to study structure and film quality in UHV and high pressure; Auger Probe for studying elemental composition in situ during growth; CMA energy spectrometers (Auger, SAM, XPS, and UPS) for analytical surface studies; Electron Guns for analytical surface studies-flood, microfocus, general purpose, low energy, nanofocus; SEM using Staib microfocus guns; PEEM; X-ray Sources.

Strem Chemicals, Inc. Booth 705
strem.com

Key Products: Biological, Biomedical, Bio-related; Deposition Equipment; Magnets and Magnetic Materials; Materials, Chemicals, Synthesis; Nanomaterials, Nanotechnology, Nanoscience

Strem Chemicals, an ISO 9001 certified company, manufactures and markets a wide variety of metals, inorganics and organometallics for research and commercial scale production, including metal organic frameworks, MOCVD, CVD and ALD precursors and bubblers. We also offer a wide variety of nano products, such as metal-based Nanomaterials, surfactants for nano synthesis, quantum dots (graphene, CdSe, PbS), and carbon nanomaterials (nanotubes, fibers, cones, CNT arrays, graphene). We also provide custom synthesis services and offer catalysts and ligands for organic synthesis and electronic grade chemicals for ultra high purity needs. Visit our website for a complete list of over 5,000 products.

Super Conductor Materials, Inc. Booth 712
scm-inc.com

Key Products: Magnets and Magnetic Materials; Manufacturing; Materials, Chemicals, Synthesis; Nanomaterials, Nanotechnology, Nanoscience

Thin Film Materials manufactures, Sputtering Targets, Evaporation Materials, Crucible Liners e-beam spare parts.

SurgePower Materials, Inc Booth 310
surgepowermaterials.com

Key Products: 3D Printers and Inks; Characterization Services; Manufacturing; Materials, Chemicals, Synthesis; Nanomaterials, Nanotechnology, Nanoscience

SurgePower Materials Inc., is a producer of high-quality plant-based graphene, SP2ybridTM, for application in energy storage, polymer composites, nanofluid and inks, lubricants, reinforced concrete and cement, and other advanced technology applications. The company's cost-effective and eco-friendly patented process meets 8 out of 12 principles of green chemistry. SurgePower Materials, Inc. is located in Southwest Texas.

Ted Pella, Inc. Booth 511
tedpella.com

Key Products: Specimen Preparation Equipment

Ted Pella, Inc. is a premier supplier of quality consumables and specimen preparation tools for SEM, TEM, FIB, AFM/SPM, light microscopy and nanotechnology. We offer a full range of bench top coaters for thin film research and electron microscopy applications that can be equipped for optimal coating. We manufacture TEM / SEM sample thinning instruments and accessories, SEM specimen mounts and holders, TEM support films, microscopy calibration tools, sample storage solutions, vacuum components and supplies.

TESCAN Booth 410
tescan.com

Key Products: Microscopes, Electron Microscopy

TESCAN's SEM, FIB-SEM, and micro-CT instruments are capable of providing valuable insights into a broad range of scientific disciplines. From materials science to cellular biology, semiconductors, and geology, our instruments help unlock the secrets of "How" and "Why." TESCAN has developed state-of-the-art SEM's, FIB-SEM's, and micro-CT's that are capable of imaging with both high resolution and high contrast – some solutions will even enable observation of dynamic events in real-time. Furthermore, these systems have been designed to be extremely versatile, allowing customization of a system by adding imaging and microanalytical detection capabilities. This culmination of performance and versatility produces intricate experimental capabilities that result in the most comprehensive analyses.

EXHIBITOR PROFILES

Thermo Fisher Scientific — Booth 321
thermofisher.com

Key Products: Microscopes, Electron Microscopy; Spectroscopy - Analysis, Instrumentation; Surface Analysis Equipment

Visit the Thermo Fisher Scientific booth to learn more about imaging and analysis solutions that help material scientists advance their sample characterization, their analysis, and advance everyday materials. Our team of experts can help you gain deeper insight into your material samples using the latest advances in analytical instruments.

UC Components Inc. — Booth 520
uccomponents.com

Key Products: Vacuum Systems and Components

High and Ultra High Vacuum environments, UC Components "RediVac®" vented screws provide a path for trapped air to be pumped away from blind-tapped holes resulting in faster and cleaner pump-down of vacuum systems. Combined with UC's proprietary cleaning procedure removes potential contaminates from voids resulting in higher throughput and yields. The "RediVac®" process insures that components are inspected, cleaned and packaged in a Class 100 cleanroom environment. UC Components has provided consistency for over 46 years.

United Mineral and Chemical Corporation — Booth 810
umccorp.com

Key Products: Deposition Equipment; Materials, Chemicals, Synthesis

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Virtual Lab Inc. — Booth 503
virtuallab.co.kr

Key Products: Laboratory Services

Virtual Lab provide a barrier-less materials/chemical simulation environment as a SaaS. The researchers can design their materials with the cutting-edge simulation techniques without own high-performance computer and annually licensed fee.

Xenocs Inc. — Booth 505
xenocs.com

Key Products: Biological, Biomedical, Bio-related; Characterization Services; Nanomaterials, Nanotechnology, Nanoscience; Research Instrumentation and Equipment; Thin Films Processing and Characterization

Xenocs is the world leader in laboratory Small Angle X-ray Scattering (SAXS) for Nanoscale Metrology. Our innovative portfolio includes USAXS/SAXS/WAXS instruments with capabilities ranging from specific measurements to state-of-the-art research tools. All our products are backed by the most experienced worldwide team of specialist scientists and engineers.

Zurich Instruments USA, Inc. — Booth 304
zhinst.com

Key Products: Electronic Properties Instruments; Research Instrumentation and Equipment; Scanning Probe Techniques and Instruments; Spectroscopy-Analysis, Instrumentation; Surface Analysis Equipment

Zurich Instruments builds lock-in amplifiers, quantum computing control systems, impedance analyzers, arbitrary waveform generators, phase-locked loops and boxcar averagers for scientists and technologists in advanced research laboratories. In combination with LabOne®, the Zurich Instruments control software, these products exemplify the company's mission to simplify laboratory setups, support high-quality data acquisition, and unlock new measurement approaches for cutting-edge research.

For more information on future MRS Exhibit Opportunities – stop by the Exhibit Sales Office at the back of Hall C to review floor plans and reserve your booth today!

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BI02: Women in Materials Science—Pioneers and a Vision for a More Inclusive Future
- *Science Advances* | AAAS
- *APL Materials* | AIP Publishing

CHARACTERIZATION

CH02: Solid-State Chemistry of New Materials
- *Chemistry of Materials* | ACS Publications
- Hiden Analytical, Inc
- *Inorganic Chemistry* | ACS Publications

CH03: Frontiers in Scanning Probe Microscopy—Beyond Imaging of Soft Materials
- Bruker
- Oxford Instruments, Asylum Research
- Nanosurf

MATERIALS COMPUTING AND DATA SCIENCE

DS01: Accelerating Experimental Materials Research with Machine Learning
- *Matter* | Cell Press

ENERGY AND SUSTAINABILITY

EN02: Solid-State Batteries—Electrodes, Electrolytes and Interphases
- *Energy Material Advances, a Science Partner Journal* | AAAS

EN05: Emerging Energy and Materials Sciences in Halide Perovskites
- *Matter* | Cell Press

EN13: Climate Change Mitigation Technologies
- IBM Research
- *Joule* | Cell Press
- *Chem Catalysis* | Cell Press

ELECTRONICS, OPTICS AND QUANTUM

EQ03: Spin-Based Sensing at the Nanoscale and Hyperpolarization with NV-Diamond and Beyond
- Qnami

EQ07: Defects and Strain Potential Enabled Emergent Behavior in Two-Dimensional Materials
- National Science Foundation

EQ08: New Frontiers in the Design, Fabrication and Applications of Metamaterials and Metasurfaces
- Nano Convergence (Korea Nanotechnology Research Society)
- Nanophotonics

EQ11: Materials, Processes and Device Structures Enabling Next-Generation High-Frequency Flexible Electronics
- Novaled GmbH

EQ13: Nitride Materials—Synthesis, Characterization and Modeling
- Taiyo Nippon Sanso

EQ15: Soft Matter Materials and Mechanics for Haptic Interfaces
- Facebook Reality Labs Research

EQ18: Emerging Materials for Quantum Information
- Lawrence Livermore National Laboratory (Lawrence Livermore National Security, LLC)

EQ20: Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications
- Penn State 2DCC-MIP

BIOMATERIALS AND SOFT MATERIALS

SB01: Engineered Functional Multicellular Circuits, Devices and Systems
- *Science Robotics* | AAAS

SB04: Materials and Algorithms for Neuromorphic Computing and Adaptive Bio-Interfacing, Sensing and Actuation
- *Neuromorphic Computing and Engineering (NCE)* | IOP Publishing

SB09: Biological and Bioinspired Functional Materials—From Nature to Applications
- Samsung Semiconductor Inc
- ZEISS

SB11: Photo/Electrical Phenomena at the Interface with Living Cells and Bacteria
- BBSRC

SB12: Biomaterials for Regenerative Engineering
- KeAi Communications Co., Ltd.,

STRUCTURAL AND FUNCTIONAL MATERIALS

SF01: Advanced Atomic Layer Deposition and Chemical Vapor Deposition Techniques and Applications
- Waterloo Institute for Nanotechnology

SF04: New Types of Polymers, Composites and Hybrid Materials for Additive Manufacturing
- Eastman Chemical Company

We also thank those symposium supporters who donated after the Meeting & Exhibit Guide print deadline of October 8, 2021.

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BI01: Developing an Open Source Introductory Textbook for the Materials Community
Steven Yalisove, University of Michigan
Marc De Graef, Carnegie Mellon University
Kevin Jones, University of Florida
Amy Moll, Boise State University

BI02: Women in Materials Science—Pioneers and a Vision for a More Inclusive Future
Fang Liu, Stanford University
Raffaella Buonsanti, École Polytechnique Fédérale de Lausanne
Betar M. Gallant, Massachusetts Institute of Technology
Jennifer A. Hollingsworth, Los Alamos National Laboratory

CHARACTERIZATION

CH01: In Situ and Operando Techniques Applied to Electrochemical Systems—A Key Toolkit for Deep Understanding
Claire Villevieille, Laboratoire d'Electrochimie et Physico-chimie des Matériaux et des Interfaces
Kristina Edström, Uppsala University
Christian Masquelier, Université de Picardie Jules Verne
Shirley Meng, University of California, San Diego

CH02: Solid-State Chemistry of New Materials
Brent Melot, University of Southern California
Craig Brown, National Institute of Standards and Technology
Amparo Fuertes, Institut de Ciència de Materials de Barcelona
Hiroshi Kageyama, Kyoto University

CH03: Frontiers in Scanning Probe Microscopy—Beyond Imaging of Soft Materials
Philippe Leclere, Université de Mons
Zoya Leonenko, University of Waterloo
Ken Nakajima, Tokyo Institute of Technology
Igor Sokolov, Tufts University

CH04: Accelerating Materials Characterization, Modeling, and Discovery by Physics-Informed Machine Learning
Sebastian Schmitt, Helmholtz-Zentrum Berlin für Materialien und Energie
Maria Chan, Argonne National Laboratory
Kamal Choudhary, National Institute of Standards and Technology
Rama Vasudevan, Oak Ridge National Laboratory

MATERIALS COMPUTING AND DATA SCIENCE

DS01: Accelerating Experimental Materials Research with Machine Learning
Keith Brown, Boston University
Kristen Brosnan, Collins Aerospace
A. Gilad Kusne, National Institute of Standards and Technology
Alfred Ludwig, Ruhr-Universität Bochum

DS02: Advanced Atomistic Algorithms in Materials Science
Enrique Martinez, Clemson University
David Aristoff, Colorado State University
Jutta Rogal, Ruhr-Universität Bochum
Gideon Simpson, Drexel University

DS03: Combining Machine Learning with Simulations for Materials Modeling
N M Anoop Krishnan, Indian Institute of Technology Delhi
Mathieu Bauchy, University of California, Los Angeles
Sumanta Das, University of Rhode Island
Christian Hoover, Arizona State University

ENERGY AND SUSTAINABILITY

EN01: Materials for Sustainable Electronics
Anke Weidenkaff, Fraunhofer Research Institution for Materials Recycling and Resource Strategies IWKS
David Cahen, Weizmann Institute of Science
David Ginley, National Renewable Energy Laboratory
Alp Sehirlioglu, Case Western Reserve University

EN02: Solid-State Batteries—Electrodes, Electrolytes and Interphases
Fudong Han, Rensselaer Polytechnic Institute
Montse Casas Cabanas, CIC energiGUNE
Huilin Pan, Zhejiang University
Yuyan Shao, Pacific Northwest National Laboratory

EN03: Thermal Materials, Modeling and Technoeconomic Impacts for Thermal Management and Energy Application
Yee Kan Koh, National University of Singapore
Xiulin Ruan, Purdue University
Bo Sun, Tsinghua University
Yanfei Xu, University of Massachusetts Amherst

EN04: Silicon for Photovoltaics
James Bullock, University of Melbourne
Kaining Ding, Forschungszentrum Jülich GmbH
Ivan Gordon, Interuniversity Microelectronics Centre
Emily Warren, National Renewable Energy Laboratory

EN05: Emerging Energy and Materials Sciences in Halide Perovskites
Yuanyuan Zhou, Hong Kong Baptist University
Maria Antonietta Loi, University of Groningen
Michael Saliba, University of Stuttgart
Feng Yan, Hong Kong Polytechnic University

EN06: Sustainable Electronics—Green Chemistry, Circular Materials, End-of-Life and Eco-Design
Clara Santato, Polytechnique Montréal
Francesca Iacopi, University of Technology Sydney
Christine Luscombe, University of Washington
Federico Rosei, Institut National de la Recherche Scientifique

EN07: Mechano-Thermal and Electrical Coupling in Emerging Energy Materials
Shangchao Lin, Shanghai Jiao Tong University
Shengjie Ling, ShanghaiTech University
Seunghwa Ryu, Korea Advanced Institute of Science and Technology
Jingjie Yeo, Cornell University

EN08: Low-Dimensional Halide Perovskites—From Fundamentals to Applications
Giulia Grancini, Università degli Studi di Pavia
Aditya D. Mohite, Rice University
Yana Vaynzof, Technische Universität Dresden
Elizabeth von Hauff, Vrije Universiteit Amsterdam

EN09: Metal Sulfides for High Performance Electrochemical Batteries
Hui Wang, University of Louisville
Yoon Seok Jung, Yonsei University
Wolfgang Zeier, University of Münster
Hongli Zhu, Northeastern University

EN10: Advanced Materials for Thermal Energy Management and Harvesting
Yangying Zhu, University of California, Santa Barbara
Youngsuk Nam, Korea Advanced Institute of Science and Technology
Yuan Yang, Columbia University
Mona Zebarjadi, University of Virginia

EN11: Electrocatalytic Materials to Sustainably Convert Atmospheric C, H, O and N into Fuels and Chemicals
Haotian Wang, Rice University
Chong Liu, University of California, Los Angeles
Samira Siahrostami, University of Calgary
Wilson Smith, National Renewable Energy Laboratory

EN12: Advanced Materials and Chemistries for Low-Cost and Sustainable Batteries
Weiyang Li, Dartmouth College
Dominic Bresser, Karlsruhe Institute of Technology
Seok Woo Lee, Nanyang Technological University
Xiaolin Li, Pacific Northwest National Laboratory

EN13: Climate Change Mitigation Technologies
Mihri Ozkan, University of California, Riverside
Radu Custelcean, Oak Ridge National Laboratory
Klaus Lackner, Arizona State University
Susan Rempe, Sandia National Laboratories

EN14: Advanced Materials for Hydrogen and Fuel Cell Technologies
T. A. Venkatesh, Stony Brook University, The State University of New York
Ming Dao, Massachusetts Institute of Technology
Huyen Dinh, National Renewable Energy Laboratory
Chris San Marchi, Sandia National Laboratories

EN15: Materials Research Opportunities for Energy Efficient Computing
Subhash L. Shinde, University of Notre Dame
Asif Khan, Georgia Institute of Technology
Iuliana Radu, imec
Hui Jae Yoo, Intel Corporation

ELECTRONICS, OPTICS AND QUANTUM

EQ01: Quantum Optical Materials and Devices Based on Impurity Systems
Shengxi Huang, The Pennsylvania State University
Igor Aharonovich, University of Technology Sydney
Abram Falk, IBM T. J. Watson Research Center
Xuedan Ma, Argonne National Laboratory

EQ02: Heterostructures of Various Dimensional Materials
Jeehwan Kim, Massachusetts Institute of Technology
Kyusang Lee, University of Virginia
Xiuling Li, University of Illinois at Urbana-Champaign
Feng Miao, Nanjing University

EQ03: Spin-Based Sensing at the Nanoscale and Hyperpolarization with NV-Diamond and Beyond
Peter Knittel, Fraunhofer Institute for Applied Solid State Physics
Carlo Bradac, Trent University
Norikazu Mizuochi, Kyoto University
Elke Neu-Ruffing, Technische Universität Kaiserslautern

EQ04: Machine Learning on Experimental Data for Emergent Quantum Materials
Mingda Li, Massachusetts Institute of Technology
Maciej Haranczyk, IMDEA Materials Institute
Chris Rychroft, Harvard University
Tess Smidt, Massachusetts Institute of Technology

EQ05: Plasmonics, Nanophotonics and Metaphotonics—Design, Materials and Applications
Yu-Jung Lu, Academia Sinica
Viktoriia Babicheva, The University of New Mexico
Howard (Ho Wai) Lee, University of California, Irvine
Giulia Tagliabue, École Polytechnique Fédérale de Lausanne

EQ06: Innovative Fabrication and Processing Methods for Organic and Hybrid Electronics
Ioannis Kymissis, Columbia University
Paddy Chan, The University of Hong Kong
Oana Jurchescu, Wake Forest University
Brendan O'Connor, North Carolina State University

EQ07: Defects and Strain Potential Enabled Emergent Behavior in Two-Dimensional Materials
Feng He, Harbin Institute of Technology, Shenzhen
SungWoo Nam, University of California, Irvine
Michael T. Pettes, Los Alamos National Laboratory
Qing Tu, Texas A&M University

EQ08: New Frontiers in the Design, Fabrication and Applications of Metamaterials and Metasurfaces
Junsuk Rho, Pohang University of Science and Technology
Whensan Cai, Georgia Institute of Technology
Joel Yang, Singapore University of Technology and Design
Thomas Zentgraf, Universität Paderborn

The Materials Research Society acknowledges and thanks the **2021 MRS Fall Meeting Symposium Organizers.** Without their continued enthusiasm, creativity and commitment, this incredible Meeting would not have been possible.

EQ09: Cutting-Edge Plasma Processes for Next-Generation Materials Science Applications
Davide Mariotti, Ulster University
Rebecca Anthony, Michigan State University
Wei-Hung Chiang, National Taiwan University of Science and Technology
Chi-Chin Wu, U.S. Army Research Laboratory

EQ10: Multiferroics and Magnetoelectrics
Tianxiang Nan, Tsinghua Univeristy
Jiamian Hu, University of Wisconsin–Madison
Eckhard Quandt, Kiel University
Nian X. Sun, Northeastern University

EQ11: Materials, Processes and Device Structures Enabling Next-Generation High-Frequency Flexible Electronics
Hans Kleemann, Technische Universität Dresden, IAPP
Mario Caironi, Istituto Italiano di Tecnologia
Antonio Facchetti, Flexterra Inc.
Jun Takeya, The University of Tokyo

EQ12: Optical Probes of Nanostructured, Organic and Hybrid Materials
Natalie Banerji, University of Bern
Ilaria Bargigia, Wake Forest University
Carlos Silva, Georgia Institute of Technology
Mark W.B. Wilson, University of Toronto

EQ13: Nitride Materials—Synthesis, Characterization and Modeling
Andriy Zakutayev, National Renewable Energy Laboratory
Björn Alling, Linköping University
Rachel Oliver, University of Cambridge
Minghui Yang, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences

EQ14: Materials and Devices for Controlling Quantum-Coherent Spin Dynamics
Lee Bassett, University of Pennsylvania
Marcus Doherty, The Australian National University
Danna Freedman, Northwestern University
Bernhard Urbaszek, Institut National des Sciences Appliquées

EQ15: Soft Matter Materials and Mechanics for Haptic Interfaces
Charles Dhong, University of Delaware
Matteo Bianchi, University of Pisa
Marcia O'Malley, Rice University
Tristan Trutna, Facebook Reality Labs

EQ16: Infrared and Thermal Photonic Materials and Their Applications
Artur Davoyan, University of California, Los Angeles
Svetlana Boriskina, Massachusetts Institute of Technology
Zhe Fei, Iowa State University of Science and Technology
Georgia Papadakis, ICFO–Institute of Photonic Sciences

EQ17: Emerging Materials for Contacts and Interfaces in Optoelectronics
Philip Schulz, Centre National de la Recherche Scientifique
Stefaan De Wolf, King Abdullah University of Science and Technology
Alex Martinson, Argonne National Laboratory
Monica Morales, University of Twente

EQ18: Emerging Materials for Quantum Information
Shashank Misra, Sandia National Laboratories
Susan Coppersmith, University of New South Wales
Vincenzo Lordi, Lawrence Livermore National Laboratories
Giordano Scappucci, Delft University of Technology

EQ19: Diamond and Diamond Heterojunctions—From Growth to Applications
Anke Krueger, Julius-Maximilians-Universität Würzburg
Emmanuel Scorsone, Commissariat à l'énergie atomique et aux énergies alternatives
Mariko Suzuki, University of Cádiz
Oliver Williams, Cardiff University School of Physics and Astronomy

EQ20: Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications
Zakaria Al Balushi, University of California, Berkeley
Cinzia Casiraghi, The University of Manchester
Joshua Robinson, The Pennsylvania State University
Hyeon-Jin Shin, Samsung Advanced Institute of Technology

BIOMATERIALS AND SOFT MATERIALS

SB01: Engineered Functional Multicellular Circuits, Devices and Systems
Liang Guo, The Ohio State University
Kate Adamala, University of Minnesota
Seokheun Choi, Binghamton University, The State University of New York
Pinar Zorlutuna, University of Notre Dame

SB02: From Hydrogel Fundamentals to Novel Applications via Additive Manufacturing
Ferenc Horkay, National Institutes of Health
Marc H. in het Panhuis, University of Wollongong
David Londono, DuPont de Nemours
Evgenia Vaganova, The Hebrew University of Jerusalem

SB03: Transformative Nanostructures with Therapeutic and Diagnostic Modalities
Sanjay Mathur, University of Cologne
Jennifer Dionne, Stanford University
Isabel Gessner, Harvard Medical School-Massachusetts General Hospital
Gerardo Goya, Universidad Zaragoza

SB04: Materials and Algorithms for Neuromorphic Computing and Adaptive Bio-Interfacing, Sensing and Actuation
Paschalis Gkoupidenis, Max Planck Institute for Polymer Research
Priyadarshini Panda, Yale University
Francesca Santoro, Istituto Italiano di Tecnologia
Yoeri van de Burgt, Technische Universiteit Eindhoven

SB05: Antimicrobial Materials Against Coronaviruses and Other Nosocomial Pathogens
Reza Ghiladi, North Carolina State University
Vijay Mhetar, Kraton Corporation
Frank Scholle, PhotoCide Protection, Inc.
Qingqing Wang, Jiangnan University

SB06: Graphene and Related 2D Materials for Bioelectronics and Healthcare
Deji Akinwande, The University of Texas at Austin
Matthew Cole, University of Bath
Andreas Offenhaeusser, Forschungszentrum Jülich GmbH
Litao Sun, Southeast University

SB07: Soft, Healable Materials and Devices for Biological Interfaces and Wearables
Derya Baran, King Abdullah University of Science and Technology
Fabio Cicoira, Polytechnique Montréal
Wei Lin Leong, Nanyang Technological University
Shiming Zhang, The University of Hong Kong

SB08: Bioelectronics—Materials and Interfaces
Tzahi Cohen-Karni, Carnegie Mellon University
Sahika Inal, King Abdullah University of Science and Technology
Jonathan Rivnay, Northwestern University
Flavia Vitale, University of Pennsylvania

SB09: Biological and Bioinspired Functional Materials—From Nature to Applications
Radwanul Hasan Siddique, Samsung Semiconductor, Inc.
Guillaume Gomard, Carl Zeiss AG
Mathias Kolle, Massachusetts Institute of Technology
Silvia Vignolini, University of Cambridge

SB10: Micro- and Nanoengineering of Biomaterials—From Precision Medicine to Precision Agriculture and Enhanced Food Security
Benedetto Marelli, Massachusetts Institute of Technology
Chiara Ghezzi, University of Massachusetts Lowell
Julie Goddard, Cornell University
Amir Sheikhi, The Pennsylvania State University

SB11: Photo/Electrical Phenomena at the Interface with Living Cells and Bacteria
Giuseppe Maria Paternò, Istituto Italiano di Tecnologia
Herdeline Ann Ardoña, University of California, Irvine
Munehiro Asally, University of Warwick
Daniela Comelli, Politecnico di Milano

SB12: Biomaterials for Regenerative Engineering
Gulden Camci-Unal, University of Massachusetts Lowell
Richard Benninger, University of Colorado Denver
Natesh Parashurama, University at Buffalo, The State University of New York
Donghui Zhu, Stony Brook University, The State University of New York

STRUCTURAL AND FUNCTIONAL MATERIALS

SF01: Advanced Atomic Layer Deposition and Chemical Vapor Deposition Techniques and Applications
Noa Lachman, Tel Aviv University
Graziella Malandrino, Università degli Studi di Catania
Kevin Musselman, University of Waterloo
Wyatt Tenhaeff, University of Rochester

SF02: Additive Manufacturing—From Material Design to Emerging Applications
Kun (Kelvin) Fu, University of Delaware
Sung Hoon Kang, Johns Hopkins University
Yayue Pan, University of Illinois at Chicago
Jordan Raney, University of Pennsylvania

SF03: 3D Printing of Functional Materials and Devices
Yanliang Zhang, University of Notre Dame
J. William Boley, Boston University
Sohini Kar-Narayan, University of Cambridge
Ethan Secor, Iowa State University of Science and Technology

SF04: New Types of Polymers, Composites and Hybrid Materials for Additive Manufacturing
Roger Narayan, North Carolina State University
Susmita Bose, Washington State University
Richard Hague, The University of Nottingham
Jayme Keist, The Pennsylvania State University

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November 27–December 2, 2022 | Boston, Massachusetts

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BROADER IMPACT

Early Career Development—Insights from Academia and Industry

CHARACTERIZATION

Understanding Dynamic Processes of Materials Synthesis, Self-Assembly and Processing via *In Situ* Techniques

Frontiers of Imaging and Spectroscopy in Transmission Electron Microscopy

Advanced Characterizations of Heterogeneities in Electrochemical Energy Storage Materials

ELECTRONICS, OPTICS AND QUANTUM

Progress in Thermoelectrics from Traditional to Novel Materials

New Paths for Light-Based Quasiparticles in Layered Crystals

Plasmonics, Nanophotonics and Metamaterials—From Design to Applications

Emerging Chalcogenide Electronic Materials—Theory to Applications

Contacts and Interfaces in Optoelectronic Devices

Two-Dimensional (2D) van der Waals Materials—Quantum Properties and Electronic and Photonic Devices

Diamond Electronics, Devices and Sensors—From Synthesis to Applications

Higher-Order Topological Structures in Real Space—From Charge to Spin

Emergent Materials for Low Power Electronics

ENERGY AND SUSTAINABILITY

Redox Flow Batteries—Materials, Methods and Devices

Halide Perovskite Materials and Devices

Beyond Li-Ion Batteries—Low Cost Alternatives Based on Other Chemistries

Advances in the Fundamental Understanding of Halide Perovskites

Practical Challenges Facing Solid-State Batteries—Performance, Safety and Manufacturing

Silicon for Photovoltaics

Materials, Modeling and Technoeconomic Impacts for Emergent Applications of Large-Scale Hydrogen

Scientific Basis for Nuclear Waste Management

NANOMATERIALS

Moire Superlattice of 2D Materials

Nanotubes, Graphene and Related Nanostructures

Colloidal Quantum Dots for Emerging Technologies

2D MXenes—Synthesis, Properties and Applications

Challenges and Opportunities in Solution Synthesis of Functional Nanomaterials

2D Layered Materials and Heterostructures for Ubiquitous Electronics, Sensors and Beyond

SOFT MATERIALS AND BIOMATERIALS

Responsive Nanomaterials for Theranostics and Tissue Engineering

Lignocellulose Materials and Beyond—From Fundamental Explorations to Advanced Applications

Materials and Designs for 3D Bioelectronic Interfaces

Bioelectricity in Microbial-Based Living Materials

Emergent Order and Mesoscale Structure Formation in Soft Condensed Matter

Structure–Function Relationships and Optoelectronic Processes in Organic and Organic/Inorganic Hybrid Materials for Flexible Electronics and Photovoltaics

Magnetic Materials for Soft Robotics and Nanorobotics

Bioinspired and Biological Polymers—From Living Organisms to Sustainable Functional Materials in Photonics, Electronics and Biology

Hydrogel Technologies for Humans and Machines

New E-Textile Materials and Devices for Wearable Electronics

Engineering Biomaterials with Synthetic Biology

Novel Soft Materials and Systems for Artificial Skin and Soft Robotics and Haptics

STRUCTURAL AND FUNCTIONAL MATERIALS

Smart Functions of Stimuli-Responsive Materials

Materials for Extreme Conditions

Plasma Technologies for Emerging Materials Science and Applications

Integrated Experimental and Modeling Approaches for Understanding Interfacial Effects at Different Physical Scales in Crystalline Materials

Harnessing Functional Defects for Energy and Electronic Frontiers

Defect and Disorder-Driven Material Transport Properties and Functionalities

Frontiers of Intermetallics Science for Structural and Functional Materials Design

Advanced Ceramics and Glasses—From Advanced Manufacturing to Data-Driven Methods for Synthesis and Mechanical Characterization

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Will Dichtel
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California Institute of Technology

Laura Herz
University of Oxford

Lane W. Martin
University of California, Berkeley

Haimei Zheng
Lawrence Berkeley National Laboratory

2023 MRS® SPRING MEETING & EXHIBIT

April 10–14, 2023 | San Francisco, California

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Intel Corporation

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Seoul National University

Sierin Lim
Nanyang Technological University

Katharine Page
The University of Tennessee, Knoxville

Ashley White
Lawrence Berkeley National Laboratory

LATE NEWS–HOT TOPIC ABSTRACTS

ACCEPTED DECEMBER 16, 2021–JANUARY 5, 2022

CHARACTERIZATION

- CH01 Frontiers of *In Situ* Materials Characterization—From New Instrumentation and Method to Imaging Aided Materials Design
- CH02 Ultrafast Probes in Emerging Materials
- CH03 Advances in *In Situ* and *Operando* TEM Methods for the Study of Dynamic Processes in Materials

MATERIALS THEORY, COMPUTATION AND DATA

- DS01 Integrating Machine Learning and Simulations for Materials Modeling, Design and Manufacturing
- DS02 Advanced Manufactured Materials—Innovative Experiments, Computational Modeling and Applications
- DS03 Phonon Properties of Complex Materials—Challenges in Data Generation, Data Availability and Machine Learning Approaches
- DS04 Recent Advances in Data-Driven Discovery of Materials for Energy Conversion and Storage

ENERGY AND SUSTAINABILITY

- EN01 Silicon for Photovoltaics
- EN02 III-V Semiconductors for Energy Conversion Technologies
- EN03 Emerging Inorganic Semiconductors for Solar Energy and Fuels
- EN04 Next-Generation Organic Photovoltaics—Fundamentals and Applications for Flexible, Stretchable and Wearable Devices
- EN05 Emerging Materials for Electrochemical Energy Storage Devices—Degradation and Failure Characterization— From Composition, Structure and Interfaces to Deployed Systems
- EN06 Solid-State Batteries—From Electro-Chemo Mechanics to Devices
- EN07 Sustainable Polymeric Materials by Green Chemistry—Degradability and Resilience

ELECTRONICS, OPTICS AND PHOTONICS

- EQ01 Ultra-Wide Bandgap Materials and Devices
- EQ02 Harnessing Functional Defects in Energy and Electronic Materials
- EQ03 Next-Generation Organic Semiconductors—Materials, Fundamentals and Applications
- EQ04 Advanced Soft Materials and Processing Approaches for Flexible and Printed Optoelectronic Devices
- EQ05 Semiconductor Physics of Halide Perovskites—From Fundamentals to Devices
- EQ06 Surfaces and Interfaces in Electronics and Photonics
- EQ07 Emerging Opto-Magnetic Materials—Advances, Trends and Challenges at the Interface Between Optics and Magnetism
- EQ08 Quantum Dot Optoelectronics and Low-Dimensional Semiconductor Electronics
- EQ09 Emerging Light Emitters for Photonics and Optoelectronics—Hybrid Perovskites and Other Low-Dimensional Emitters
- EQ10 Advances in Metasurfaces, Metamaterials and Plasmonics—Materials Design, Manufacturing, Applications and Industrial Aspects
- EQ11 Neuromorphic Computing and Biohybrid Systems—Materials and Devices for Brain-Inspired Computing, Adaptive Biointerfacing and Smart Sensing

MANUFACTURING

- MF01 Cutting-Edge Plasma Processes Contributing to Sustainable Development Goals
- MF02 3D Printing of Passive and Active Medical Devices
- MF03 Materials and Methods for Fabricating Flexible and Large-Area Electronics

NANOMATERIALS

- NM01 Beyond Graphene 2D Materials—Synthesis, Properties and Device Applications
- NM02 Reconfiguring the Properties of 2D Materials by Post-Synthesis Design
- NM03 2D MXenes—Synthesis, Properties and Applications
- NM04 Nanotubes and Related Low-Dimensional Nanostructures
- NM05 Advances in Nanodiamonds for Sensing, Biomedical and Other Novel Applications
- NM06 Nanoscale Mass Transport Through 2D and 1D Nanomaterials

QUANTUM

- QT01 Applications and Characterization of Nonequilibrium Electron, Phonon and Polariton Dynamics
- QT02 Quantum and Topological Phenomena in Two-Dimensional Systems
- QT03 Higher-Order Topological Structures—From Charge to Spin
- QT04 Topology and Exotic Quantum Phases in 3D Materials
- QT05 2D Topological Materials—Growth, Theoretical Models and Applications
- QT06 Recent Developments on the Properties of Emergent Layered 2D Quantum Magnetic Materials and Heterostructures
- QT07 Atomic and Molecular Quantum Systems and Defect Engineering for Quantum Technologies
- QT08 Group IV Quantum Engineering
- QT09 Light-Matter Strong Coupling in the Infrared and THz—Materials, Methods and New Phenomena
- QT10 Emerging Phenomena in Moiré Materials
- QT11 Superconducting Materials and Applications

BIOMATERIALS AND SOFT MATERIALS

- SB01 Organic Electronics—Multimodal Characterization and Computation-Driven Material Design and Performance
- SB02 Materials, Power Sources, Sensors, Actuators and Mechanics for Untethered Soft Robots
- SB03 Robotic Materials for Advanced Machine Intelligence
- SB04 Advanced Soft Materials for Bioelectronic Interfaces
- SB05 Tissue-Like Bioelectronics and Living Bioelectronic Interfaces
- SB06 Bioelectronic Materials and Devices for *In Vitro* Systems
- SB07 Bioresponsive Nanotheranostics
- SB08 Soft Embodiments of Electronics and Devices for Healthcare Applications
- SB09 Genetically-Encoded and Bioinspired Materials Science
- SB10 Complex States in the Observation, Control and Utilization of Biomimetic Functionalities—From Fundamentals to Applications

STRUCTURAL AND FUNCTIONAL MATERIALS

- SF01 Materials Research Needs to Advance Nuclear Fuels, Structural Materials and Wasteforms
- SF02 Actinide Materials—From Basic Science to Applications
- SF03 Paper-Based Packaging—21st Century Perspectives on an Ancient Material
- SF04 Progress in Materials Genomics, Synthesis and Characterization of Functional Polymers and Polymer Nanocomposites
- SF05 Autonomous Materials for the Next-Generation of Smart Systems
- SF06 Recent Advances in Structural Materials from Bulk to Nanoscale
- SF07 *In Situ* Material Performance and Dynamic Structure Characterization Under Coupled Extremes
- SF08 Far from Equilibrium Microstructure Evolution in Metals
- SF09 High Entropy Materials II—From Fundamentals to Potential Applications
- SF10 Emerging Functional Oxides and Interfaces
- SF11 Advances in Design, Synthesis and Characterization of Functional Heteroanionic Materials
- SF12 Bioinspired Structural Composites—Advances in Experiments, Simulations and AI-Based Design
- SF13 From Actuators and Energy Harvesting Storage Systems to Living Machines
- SF14 Novel Frontiers in 3D and 4D Multi-Photon Micro-Fabrication—Materials, Methods and Applications
- SF15 Thermal Processes and Management Under Unconventional Conditions
- SF16 Advanced Materials for Antibacterial, Antiviral and Antifungal Applications—From Micro to Nano

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Meeting Chairs

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