Revolutionary Science
Continually breaking boundaries in electron microscopy

Gatan proudly showcases the K3™ IS direct detection camera, the GIF Continuum™ systems, and the Monarc™ cathodoluminescence (CL) detector. With these best-in-class detectors Gatan continues to set new benchmarks in high-performance electron microscopy.

**K3 IS**
- Count: 1500 full fps – 3.7x the frame rate of K2
  - K3 IS model (1027) – 24 megapixels (5,760 x 4,092)
  - K3 Base IS model (1026) – 14 megapixels (3,456 x 4,092)
- Store 75 fps at full sensor resolution to 1200 fps with sub area, no binning required

**Continuum**
- The next generation of advanced systems for EELS & EFTEM
  - >8000 spectra per second at >95% duty cycle
  - >10x faster system tuning
  - Streamlined, workflow-based user interface

**Monarc**
- Acquire CL data with unmatched spatial (<10 nm), angular (1°), and wavelength (0.1 nm) resolutions
- Simultaneously capture angle- and wavelength-resolved CL data
- Collect hyperspectral data up to 30 times faster than other CL detectors

www.gatan.com
Continuing our efforts toward greener, more sustainable practices in both our Society and our Meetings, MRS offers Meeting content in a variety of formats.

- New this year, MRS is introducing a more streamlined version of the Meeting & Exhibit Guide. This printed Guide is complimentary for all registered attendees and represents our further commitment to a reduced carbon footprint. The effort reduces our paper consumption by approximately 250 pages per Guide—a total of 11 million pages for the Meeting—saving an estimated 66 trees!

- A fully searchable digital version of the Guide, including Technical Program, is available on the MRS website (mrs.org/spring2019) or via Program Kiosks located throughout the Meeting venue. For Kiosk locations, look for this symbol on the venue maps, pages 4–5. Need to print? Our self-serve Cyber Café is located at PCC North, 300 Level, Foyer.

- For a totally paper-free Meeting experience, we encourage you to use our FREE 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. Once you log in with your MRS username and password, you can access the Meeting App from your laptop, tablet or smartphone.

- Get your MRS Meeting App at 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!
Welcome to the 2019 MRS Spring Meeting! I anticipate an exciting conference filled with reports of outstanding research and opportunities to vet new ideas, to renew established relationships and to make new ones. I’m confident you’ll find the conference both enriching and intellectually stimulating.

On behalf of the Board of Directors, I would like to thank the Meeting Chairs—Yuping Bao, Bruce Dunn, Subodh Mhaisalkar, Ruth Schwaiger and Subhash L. Shinde—for their hard work and dedication in coordinating a meeting of this magnitude. Thanks also to the numerous symposium organizers, MRS staff, and other volunteers including the Meetings Committee and its subcommittees who have contributed their time and talent to make this another successful conference with new and high-quality content.

I invite you to join us for the MRS Frontiers Reception: Building Communities, scheduled for Thursday from 5:30 pm to 7:00 pm. During this time, we’ll share drinks, hors d’oeuvres and ideas for forging new communities on topics at the frontier of materials research—artificial intelligence, bio, quantum and sustainability to name a few—and emerging areas of particular interest to you. We’re looking forward to rich and forward-looking discussions and hope you’ll join the conversation!

In addition to the technical program, there are many interesting ancillary sessions and activities offered throughout the Meeting week. These include professional development opportunities such as Career Paths in Materials Science and Engineering, Communicating Science to Public Audiences: Science Communication Workshop, programs on entrepreneurship, publishing, resume writing and more. Featured events include Materials Needs for Energy Sustainability by 2050: Incentivizing a Zero-Waste Future, special award talks and government agency funding presentations. Please consult the Daily Schedule of Events for times and places.

Your Meeting registration includes a FREE one-year membership in the Society beginning July 1, 2019. With membership you are eligible for a discounted registration fee to both the 2019 MRS Fall Meeting and the 2020 MRS Spring Meeting, free access to MRS journals and MRS Internet content. Your engagement with the Society offers you opportunities to shape the Society’s future by being a symposium organizer, or a voice as a volunteer for committee service. As our membership grows, thanks to your continued engagement, so too does the strength of our voice in advocating for predictable and sustained funding for research, and transparency and timeliness in granting visas for visiting scientists.

Thank you for joining us!

Michael R. Fitzsimmons
MRS President
MEETING SYMPOSIA

GENERAL INTEREST
G101 Advancing Materials Discovery with Data-Driven Science

BROADER IMPACT
B101 High Impact Practice—Increasing Ethnic and Gender Diversification in Engineering Education

CHARACTERIZATION, PROCESSING AND THEORY
CP01 Advances in In Situ Experimentation Techniques Enabling Novel and Extreme Materials/ Nanocomposite Design
CP02 Design and In Situ TEM Characterization of Self-Assembling Colloidal Nanosystems
CP03 Advances in In Situ Techniques for Diagnostics and Synthetic Design of Energy Materials
CP04 Interfacial Science and Engineering—Mechanics, Thermodynamics, Kinetics and Chemistry
CP05 Materials Evolution in Dry Friction—Microstructural, Chemical and Environmental Effects
CP06 Smart Materials for Multifunctional Devices and Interfaces
CP07 From Mechanical Metamaterials to Programmable Materials
CP08 Additive Manufacturing of Metals
CP09 Mathematical Aspects of Materials Science—Modeling, Analysis and Computations

ELECTRONICS AND PHOTONICS
Soft Organic and Biomolecular Electronics
EP01 Liquid Crystalline Properties, Self-Assembly and Molecular Order in Organic Semiconductors
EP02 Photonic Materials and Devices for Biointerfaces
EP03 Materials Strategies and Device Fabrication for Biodegradable and Biocompatible Materials
EP04 Soft and Stretchable Electronics—From Fundamentals to Applications
EP05 Engineered Functional Multicellular Circuits, Devices and Systems
EP06 Organic Electronics—Materials and Devices
EP07 Next-Generation Interconnects—Materials, Processes and Integration
EP08 Phase-Change Materials for Memories, Photonics, Neuromorphic and Emerging Application
EP09 Devices and Materials to Extend the CMOS Roadmap for Logic and Memory Applications
EP10 Heterovalent Integration of Semiconductors and Assemblies to Optical Devices
EP11 Hybrid Materials and Devices for Enhanced Light-Matter Interactions
EP12 Emerging Materials for Plasmonics, Metamaterials and Metasurfaces
EP13 Thermoelectrics—Materials, Methods and Devices

ENERGY AND SUSTAINABILITY
Energy Storage
ES01 Organic Materials in Electrochemical Energy Storage
ES02 Next-Generation Intercalation Batteries
ES03 Electrochemical Energy Materials Under Extreme Conditions
ES04 Solid-State Electrochemical Energy Storage

2019 MRS SPRING MEETING CHAIRS

Yuping Bao
The University of Alabama

Bruce Dunn
University of California, Los Angeles

Subodh Mhaisalkar
Nanyang Technological University

Ruth Schweiger
Karlsruhe Institute of Technology—Institute for Applied Materials

Subhash L. Shinde
University of Notre Dame
**Program Kiosk**
A fully searchable digital version of the Guide, including Technical Program, is available at these locations.

**Need to print?**
Visit our self-serve Cyber Café located in Phoenix North, 300 Level.
MRS, the Phoenix Convention Center and Visit Phoenix have joined together to make quick and fun lunch options available for purchase during the Meeting week. Monday, Tuesday & Thursday—from noon to 1:30 pm—a variety of local Food Trucks will park on Third Street, between the North and West Buildings.

On Wednesday, take a minute to thank an exhibitor and join us in the Exhibit Hall for lunch. Use the $5 coupon you received when you registered—redeemable Wednesday only, from 11:00 am to 2:00 pm in PCC North, 300 Level, Halls C–E.

Lunch Options: Food Trucks & $5 Coupon for Concession Stands in the Exhibit Hall!
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 Registration counter, PCC North, 300 Level, Foyer.

   Lost badges can be verified and replaced by reporting to the Registration area during posted registration hours. A photo ID will be required for verification.

2. **The Free MRS Meeting App**
   All the information you need to have a successful and organized MRS Meeting can be found using our free Meeting App. Visit mrs.org/meetingapp to access the unique website on your laptop or desktop, or download the mobile app on your smartphone or tablet by searching “MRS Meetings” at the app store. Just log in with your MRS username and password, then 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 the Phoenix Convention Center (no password required).

3. **You’re an MRS Member!**
   Registration for the 2019 MRS Spring Meeting includes MRS Membership from July 1, 2019 through June 30, 2020. 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**
   All MRS Meeting participants are expected to adhere to the MRS Code of Conduct and Compliance Reminder, which can be found at mrs.org/spring-2019-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) 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.
DON’T MISS THESE LATE NEWS—HOT TOPIC SYMPOSIA
Full program details available on the MRS Meeting App

GI01—Advancing Materials Discovery with Data-Driven Science
PCC West, 100 Level, Room 102 C
For more on this topic, check out:
- the Spring 2019 MRS Communications Special Issue on Machine Learning for Materials Development issue posted when available at mrs.org/mrc
- the archived MRS OnDemand® Webinar, Machine Learning, AI- and Data-Driven Materials Development and Design, mrs.org/ai-webinar

QN06—Emerging Materials for Quantum Information
PCC North, 100 Level, Room 127 B
QN07—Emergent Phenomena in Oxide Quantum Materials
PCC North, 100 Level, Room 127 C
For more on these topics, check out:
- “Artificial neuron made from VO₂” from the new MRS Bulletin Materials News Podcast mrsbulletin.buzzsprout.com
- a list of quantum materials-related articles in the MRS Publications Portfolio mrs.org/quantum

SM03—Growing Next-Generation Materials with Synthetic Biology
PCC North, 200 Level, Room 227 B
For more on these topics, check out:
- the Spring 2019 MRS Communications Special Issue on Frontiers in Synthetic Biology and its Applications Issue posted when available at mrs.org/mrc
- “3D-printed implant designed to repair spinal injuries” from the new MRS Bulletin Materials News Podcast mrsbulletin.buzzsprout.com

LATE NEWS—HOT TOPIC Symposia in these areas will also be featured at the 2019 MRS Fall Meeting. Abstract Submission opens May 13, 2019. See page 45 for details.

Let’s Continue the Conversation!

Join us Thursday evening for a very special event....

MRS Frontiers Reception: Building Communities

PCC North, 100 Level, Ballroom 120 D, 5:30 pm – 7:00 pm

Grab a drink. Enjoy a few hors d’oeuvres. And be a part of this interactive brainstorming session.

- Artificial Intelligence
- Bio
- Quantum
- Sustainability
- “Your” Emerging Areas of Interest

Help us chart a course to build new materials communities!
PROFESSIONAL DEVELOPMENT

Designing Sustainability into Materials Research Workshop
Monday, 10:00 am – 12:30 pm
PCC North, 100 Level, Room 122 A
(Space is limited; advanced sign-up is required.)

Julie M. Schoenung
University of California, Irvine

Alan Rae
IncubatorWorks

Many sustainability initiatives focus on technologies that minimize carbon footprint and energy use. This workshop expands upon sustainability to include limiting sustainable materials development, as opposed to sustainable technology development.

Sponsored in part by: Focus on Sustainability and NSF

Communicating Science to Public Audiences—Science Communication Workshop
Monday, 1:00 pm – 6:00 pm
PCC North, 100 Level, Room 128 A
(Space is limited; advance sign-up is required)

Daniel Steinberg
Princeton University

Sara Rodriguez Martinez
Princeton University

This session is designed to increase confidence in scientists as they communicate their work and become part of a community of researchers who share an interest in science outreach and engagement.

Sponsored in part by: NSF-MRSEC, PCCM, and Portal to the Public

Networking for Nerds—Become a Networking Rock Star
Monday, 1:00 pm – 4:00 pm
PCC North, 200 Level, Room 224 B

Alaina G. Levine
Quantum Success Solutions

Learn the secrets of being a master networker—how to cultivate strategic, mutually beneficial relationships, find people to add to your networks, “work a room,” start conversations with people you have never met before, and obtain information that can set you on a path to career victory.

National Laboratory User Facilities—How to Get Access for Your Research
Monday, 2:00 pm – 5:00 pm
PCC North, 100 Level, Room 122 B
(Limited to first 50 registrations. Advance registration was required.)

Silke Christiansen
Helmholtz-Zentrum Berlin

Sean J. Hearne
Oak Ridge National Laboratory

Saw Wai Hla
Argonne National Laboratory

Ashley White
Lawrence Berkeley National Laboratory

This workshop will bring you in direct contact with cutting-edge characterization facilities in the United States and Germany, and will support you with planning your research visit. Networking reception to follow.

Essentials of Getting Your Work Published
Monday, 3:30 pm – 5:00 pm
PCC North, 100 Level, Room 121 A

PANELISTS
Rigoberto C. Advincula, Editor-in-Chief, MRS Communications
Susmita Bose, Associate Editor, Journal of Materials Research
Gary L. Messing, Editor-in-Chief, Journal of Materials Research

Learn the fundamentals of successful scientific publishing from MRS journal Editors-in-Chief. Not only are they leading researchers in their field, but they share a dedication to high-quality content, editorial integrity and scientific scholarship.

Career Planning and Job Searching in Entrepreneurship
Monday, 4:00 pm – 5:00 pm
PCC North, 100 Level, Room 121 B

Alaina G. Levine
Quantum Success Solutions

Learn about the basics of entrepreneurship, developing your brand, and finding and solidifying customers. The basic elements of marketing, and understanding and selling your services and products will also be addressed.

Plenary Session Featuring The Fred Kavli Distinguished Lectureship in Materials Science
Tuesday, 8:15 am – 9:30 am | PCC North, 100 Level, Ballroom 120 D

Synchrotron Light to Investigate Materials In Operando

Helena Van Swygenhoven-Moens
Paul Scherrer Institute and École Polytechnique Fédérale de Lausanne

The Kavli Foundation is dedicated to advancing science for the benefit of humanity, promoting public understanding of scientific research and supporting scientists and their work.
BROADER IMPACT

PROFESSIONAL DEVELOPMENT

MRS University Chapter Representatives Meeting
Monday, 5:15 pm – 6:30 pm
Sheraton, Second Level, Deer Valley
This brief meeting will discuss the MRS University Chapters Program. Current Chapter officers, faculty advisors and students who wish to form a University Chapter should attend.

MRS Career Fair—Visit the Recruiters, Resume Critiques, Mock Interviews, Professional Photos
› Tuesday, 2:00 pm – 7:00 pm
PCC North, 300 Level, Halls C–E—Exhibit
› Wednesday, 11:00 am – 7:00 pm
PCC North, 300 Level, Halls C–E—Exhibit
Visit recruitment booths to discuss your qualifications directly with recruiters for a potential interview. Register online and upload your resume from your own laptop at jobs.mrs.org or stop by the Career Fair to access our registration stations. Don’t forget to bring extra copies of your resume!

Green Cards for Scientific Researchers: How to Win Your EB-1/NIW Case!
Tuesday, 2:45 pm – 3:45 pm
PCC North, 300 Level, Halls C–E—Exhibit Stage
Marco Pignone III
Getson & Schatz, P.C.
Learn about the U.S. immigration process and how to maximize your chances of immigration success during this presentation by the law firm of Getson & Schatz.

Preparing for Your Next Job Interview
Tuesday, 4:30 pm – 5:15 pm
PCC North, 300 Level, Halls C–E—Exhibit Stage
Bob Floreak
Acuity Human Resources
Attend this session to get tips on how to prepare in advance to make the most of your next opportunity to meet with a potential employer.

How to Prepare for Your ABET Accreditation
Tuesday, 7:15 pm – 9:30 pm
Sheraton, Second Level, Arcadia
(Advance registration by April 19 was required if you plan to attend by Internet.)
Bill Hammetter
Sandia National Laboratories (retired)
Ron Gibala
University of Michigan (Van Vlack Professor Emeritus)
If an ABET evaluation is in your future, this session will help you understand the accreditation process and any updates to the criteria so your materials department is prepared.

Women in Materials Science & Engineering Breakfast
Wednesday, 7:00 am – 9:00 am
PCC North, 200 Level, Room 231 ABC
(Space is limited; advance sign-up is required at the MRS Help Center, PCC North, 100 Level, Foyer, until 12:00 pm on Tuesday.)
Olivia A. Graeve
University of California, San Diego
Lati3no Engineering Faculty in the United States—A Personal Perspective and Journey
The MRS Women in Materials Science & Engineering Breakfast event is intended to promote interaction across various ethnic, cultural and gender boundaries and facilitate dialog among women (and men) working in or pursuing education toward a profession in materials science or engineering.
Sponsored in part by: The Kavli Foundation and MilliporeSigma | Booth 426
Career Paths in Materials Science and Engineering
Wednesday, 4:30 pm – 5:30 pm
PCC North, 300 Level, Halls C–E—Exhibit Stage
Join our panel of scientists who will share their insight about the role of materials science and engineering in their organizations and address existing career paths to explore.

Real-Life Challenges and Opportunities in Sustainable Product Design Seminar
Wednesday, 7:30 pm – 8:30 pm
Sheraton, Second Level, Camelback A
Alan Rae will discuss how to incorporate sustainability principles into your research in a more comprehensive way while considering the real-world application of these principles to product design and manufacture.
Sponsored in part by: Focus on Sustainability

EDUCATION & OUTREACH
Student Mixer
Monday, 7:00 pm – 8:00 pm
Sheraton, Second Level, The Oculus
Come and connect with other fellow students during the Student Mixer! Various interactive science activities provide an atmosphere for networking! Student ID required at the door!
Sponsored in part by: Arizona State University, Goodfellow Corporation, and Lake Shore Cryotronics, Inc.

Public Outreach Center
- Tuesday, 2:00 pm – 7:00 pm
  PCC North, 300 Level, Halls C–E—Exhibit
- Wednesday, 11:00 am – 7:00 pm
  PCC North, 300 Level, Halls C–E—Exhibit
Find out how you can participate as we partner to bring the science of materials to the general public, explore the topics of sustainable practices and the impact of society on materials science, education and outreach.

Materials Science Research Aboard the International Space Station
Wednesday, 2:00 pm – 2:30 pm
PCC North, 300 Level, Halls C–E—Exhibit Stage
Randy Giles
International Space Station U.S. National Laboratory
R&D onboard the International Space Station (ISS) U.S. National Laboratory offers an unparalleled opportunity to investigate how gravity and the extreme environment of space influence observations in materials science to advance human knowledge and commercial pursuits.
Sponsored in part by: International Space Station (ISS) U.S. National Laboratory

Open Data Challenge Awards Presentation
Wednesday, 3:00 pm – 3:30 pm
PCC North, 300 Level, Halls C–E—Exhibit Stage
Josh Tappan
Citrine Informatics
Malcolm Davidson
Citrine Informatics
Attend the Open Data Challenge Awards Presentation and celebrate with the winning teams—Learn how they built their materials data sets and approached their analysis through poster and visual presentations.
Sponsored in part by: Citrine Informatics

PowerPoint Karaoke
Wednesday, 7:30 pm – 9:00 pm
Sheraton, Second Level, Deer Valley
(Presenters and slide authors must preregister.)
What kind of slide is that? PowerPoint Karaoke asks the presenter to explain a slide without prior knowledge of its content or author. $300 prizes to the best presenter and slide author. Networking reception to follow.

Materials Needs for Energy Sustainability by 2050—Incentivizing a Zero-Waste Future
Tuesday, 7:15 pm – 8:30 pm
PCC North, 100 Level, Ballroom 120 D
MODERATOR
Elizabeth A. Kócs, University of Illinois at Chicago
PANELISTS
Diran Apelian, Worcester Polytechnic Institute
Karsten Schischke, Fraunhofer Institute for Reliability and Microintegration
Gabrielle Gaustad, Alfred University
Lucas Mariacher, Phoenix Public Works Department
This panel session will convene top experts to discuss the challenges and complexities associated with zero waste and the role of zero waste in enabling energy sustainability by 2050.
Sponsored in part by: Focus on Sustainability, MRS Energy and Sustainability, NSF and Symposium ES13

NEW!
MRS Bulletin Podcast
Presenting breakthrough news and insightful interviews on hot topics including quantum, AI, perovskites, biomaterials, and more!
mrs.org/bulletin-podcast
ADVOCACY

Research Funding Opportunities

Monday, 5:30 pm – 8:00 pm
PCC North, 100 Level, Room 121 C

Andrew R. Schwartz, Senior Technical Advisor
U.S. Department of Energy—Office of Science
Overview of Materials Research Priorities and Opportunities—DOE Office of Basic Energy Sciences

Linda S. Sapochak, Division Director
Division of Materials Research—National Science Foundation
Navigating Funding Opportunities in Materials Research at NSF

Matthew Bauer, Technology Development Manager
U.S. Department of Energy—Solar Energy Technologies Office
Material and Manufacturing Successes and Future Opportunities to Drive Inexpensive Solar Electricity

Mary Kavanagh, Minister-Counselor, Research and Innovation
European Union Delegation to the United States of America
Horizon 2020—Open to the World—Opportunities for Collaboration with European Teams and Funding for Career Development in Europe

The Research Funding Opportunities sessions provide interaction between government agency presenters and MRS Membership. Invited talks will be followed by roundtable Q&A sessions with the individual program managers.

Materials Voice

› Tuesday, 2:00 pm – 7:00 pm
PCC North, 300 Level, Halls C–E—Exhibit
› Wednesday, 11:00 am – 7:00 pm
PCC North, 300 Level, Halls C–E—Exhibit

At the Materials Voice Booth, attendees send convenient, personalized letters to their representatives on Capitol Hill.

Congressional Science and Engineering Fellowship Program Information Session

Tuesday, 4:15 pm – 5:15 pm
PCC North, 200 Level, Room 221 C

Ashley White
Lawrence Berkeley National Laboratory
Become a Congressional Science and Engineering Fellow!

Attendees will learn about the MRS/OSA and MRS/TMS Congressional Fellowships and hear from current and former Fellows about their experiences as scientists in the Senate and House of Representatives.

SYMPOSIUM X
FRONTIERS OF MATERIALS RESEARCH

All Symposium X will be located in
PCC North, 100 Level, Ballroom 120 D

Tuesday, 12:15 pm – 1:15 pm

Molly M. Stevens
Imperial College London
Designing Bio-Responsive Hybrid Materials

Wednesday, 12:15 pm – 1:15 pm

Sunita Satyapal
U.S. Department of Energy
Hydrogen and Fuel-Cell Technology Perspectives

Bart Biebuyck
The Fuel Cells and Hydrogen Joint Undertaking
Development of Fuel Cells and Hydrogen Technologies in Europe Toward Commercialization from 2020 Onward

Thursday, 12:15 pm – 1:15 pm

Jonathan Arenberg
Northrop Grumman Aerospace Systems
The James Webb Space Telescope—Its Mission, Design and Development

BROADER IMPACT

CONGRATULATIONS YOU’RE AN MRS MEMBER

2019 MRS Spring Meeting registrations include MRS Membership July 1, 2019 – June 30, 2020

That means FREE electronic access to all MRS journals!
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<td>ES10 Advanced Low Temperature Water-Splitting for Renewable Hydrogen Production via Electrochemical and Photoelectrochemical Processes</td>
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**NEW MRS MEMBER BENEFIT!**

The Materials Research Society has partnered with the PhD team at American Journal Experts to provide a **10% discount to MRS Members** on a comprehensive suite of author services that provide end-to-end publication and presentation support. Services include:

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Poster Session Information

**Poster Authors Check-In**
PCC North, 300 Level, Alcove

**TUESDAY**
- **Check-In ONLY**
  - 9:00 am – 10:00 am
- **Check-In and Post**
  - 10:00 am – 12:00 pm

All poster presenters must check in at the Poster Authors Check-In Desk the day of their presentation. The presenter must be an author of the poster and a registered attendee with a valid MRS Meeting badge. Any posters not verified at the Check-In Desk prior to posting will be removed from the session.

Poster Session
PCC North, 300 Level, Halls C–E—Exhibit

**TUESDAY**
- **Poster Session—Judges Only**
  - 12:00 pm – 2:00 pm
- **Poster Session—Attendee Viewing**
  - 2:00 pm – 7:00 pm
- **Poster Session—Presentations**
  - 5:00 pm – 7:00 pm
- **Best Poster Award Winners Announcement**
  - 5:30 pm

**WEDNESDAY**
- **Poster Session—Judges Only**
  - 9:30 am – 11:30 am
- **Poster Session—Attendee Viewing**
  - 11:00 am – 7:00 pm
- **Poster Session—Presentations**
  - 5:00 pm – 7:00 pm
- **Best Poster Award Winners Announcement**
  - 5:30 pm

Each Session’s winning posters will be displayed near the Exhibit Hall Stage and then will be moved to PCC North, 200 Level, Alcove across from Rooms 221 AB for the remainder of the Meeting and can be removed by the authors at their convenience. All other posters must be removed from the Exhibit Hall at the end of their Poster Session.

Posters left on the boards after 7:00 pm will be discarded.

**BEST POSTER AWARDS**
Poster Sessions are an important and integral part of MRS Meetings, allowing many more authors the opportunity to share their research and ideas with others.

The quality of the Poster Sessions is a major priority of the Society. The 2019 MRS Spring Meeting Chairs will recognize the best presentations from each of the Poster Sessions. One or more awards of up to $500 will be presented by the Chairs. The Meeting Chairs will select the winners on the basis of the poster’s technical content, appearance, graphic excellence and presentation quality (not necessarily equally weighted). Poster award winners must be present at the time of the Winners Announcement to be eligible for a Best Poster Award.

**MRS/Sociedad Mexicana de Materiales (SMM) Student Poster Award Exchange Program**

**TUESDAY ONLY!**
- 5:00 pm – 7:00 pm
- PCC North, 300 Level, Halls C–E—Exhibit

Best Poster awardees from the XXVII International Materials Research Congress (IMRC) 2018 present their posters at the 2019 MRS Spring Meeting as part of the MRS/SMM student exchange program.

Congratulations to the following authors whose outstanding posters, selected by the Sociedad Mexicana de Materiales, will be displayed at the April 23 Poster Session. Please stop by to meet the authors and view their prize-winning posters.

- **Manuel Ceballos**
  - Centro de Investigación en Materiales Avanzados S.C. Unidad Monterrey, Apodaca, Nuevo León
  - GROWTH OF SILVER DENDITRIC NANOSTRUCTURES DECORATED WITH GOLD NANOSPHERES AND THEIR APPLICATION AS SERS SUBSTRATE

- **Kevin Fitzwell**
  - Chemical Engineering Department, University of California, Los Angeles
  - DESIGN OF GALFENOL PERMALLOY NANOLAMINATES FOR INCORPORATION INTO A STRAIN-MEDIATED NANOSCALE ANTENNA

- **Arlet Ariadne Rodríguez**
  - Instituto Politécnico Nacional – IPN
  - EFFECT OF MODIFICATION OF THE SURFACE OF MESOPOROUS SILICA IN THE ADSORPTION-DESORPTION OF GRISEOFULVINE

The 2019 MRS Spring Meeting Chairs will select three Best Poster awardees from this Meeting to attend and display their posters at the International Materials Research Congress (IMRC) 2019, in August, in Cancun.

Congratulations to the Poster Award Winners!
## MONDAY DAILY SCHEDULE OF EVENTS

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<tr>
<td>Tutorial EP12—Plasmonics, Metamaterials and Metasurfaces for Manipulating Light at Nanoscale</td>
<td>PCC North, 100 Level, Room 127 A</td>
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<td>Tutorial ES06—Simulating Electrochemical Systems from First Principles with Quantum-Espresso</td>
<td>PCC North, 100 Level, Room 122 C</td>
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<td>Tutorial ES20—Young Scientist Tutorial on Characterization Techniques for Thin-Film Solar Cells</td>
<td>PCC North, 100 Level, Room 132 B</td>
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<tr>
<td>Tutorial ES21—Nanogenerators and Piezotronics—Principles, Materials, Devices and Nanosystems</td>
<td>PCC North, 100 Level, Room 132 C</td>
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<td>Tutorial GN04—Outstanding Challenges in Nanoscale Heat Transport</td>
<td>PCC North, 100 Level, Room 124 A</td>
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<td>Tutorial GN07—Quantum Phenomena in Oxide Materials</td>
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<td>Coffee Break</td>
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<td>PROFESSIONAL DEVELOPMENT Designing Sustainability into Materials Research Workshop</td>
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<td>TUTORIAL SESSION Soft Electronics for Noninvasive Health Care—From the Skin to Below the Skin Sheng Xu, University of California, San Diego</td>
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<tbody>
<tr>
<td>MRS Email Preferences Booth</td>
<td>PCC North, 300 Level, Alcove</td>
<td>7:30 am - 7:00 pm</td>
</tr>
<tr>
<td>MRS Help Center</td>
<td>PCC North, 100 Level</td>
<td>7:30 am - 6:30 pm</td>
</tr>
<tr>
<td>Registration</td>
<td>PCC North, 300 Level, Foyer</td>
<td>7:30 am - 5:00 pm</td>
</tr>
<tr>
<td>Science as Art—Check-In and Prep Area</td>
<td>PCC North, 300 Level, Alcove</td>
<td>7:30 am - 10:00 am</td>
</tr>
<tr>
<td>Speaker Ready Room</td>
<td>PCC North, 200 Level, Alcove</td>
<td>7:30 am - 5:00 pm</td>
</tr>
<tr>
<td>Plenary Session Featuring The Fred Kavli Distinguished Lectureship in Materials Science Synchrotron Light to Investigate Materials In Operando Helena Van Swygenhoven-Moens, Paul Scherrer Institute and Ecole Polytechnique Fédérale de Lausanne</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>8:15 am - 9:30 am</td>
</tr>
<tr>
<td>Poster Authors (Tuesday Only) Check-In Only</td>
<td>PCC North, 300 Level, Alcove</td>
<td>9:00 am - 10:00 am</td>
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<tr>
<td>Coffee Break</td>
<td>PCC North, 100 Level, Foyer</td>
<td>9:30 am - 10:30 am</td>
</tr>
<tr>
<td>Symposium Assistant Check-In</td>
<td>PCC North, 100 Level, Alcove</td>
<td>9:30 am - 5:30 am</td>
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<tr>
<td>Poster Authors (Tuesday Only) Check-In and Post</td>
<td>PCC North, 300 Level, Alcove</td>
<td>10:00 am - 12:00 pm</td>
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<tr>
<td>Symposium Sessions</td>
<td>PCC North, 100 Level</td>
<td>10:30 am - 5:00 pm</td>
</tr>
<tr>
<td>Poster Session—Judges Only</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>12:00 pm - 2:00 pm</td>
</tr>
<tr>
<td>Symposium X—Frontiers of Materials Research Designing Bio-Responsive Hybrid Materials Molly M. Stevens, Imperial College London</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>12:15 pm - 1:15 pm</td>
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<tr>
<td>ADVOCACY</td>
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<tr>
<td>Materials Voice</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>EDUCATION &amp; OUTREACH</td>
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<tr>
<td>Public Outreach Center</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
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<td>EXHIBIT</td>
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<tr>
<td>SELFIE STATION</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>MRS/Cambridge University Press Publications Booth 100</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit Booth 100</td>
<td>2:00 pm - 7:00 pm</td>
</tr>
<tr>
<td>Poster Session—Attendee Viewing</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>PROFESSIONAL DEVELOPMENT</td>
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<tr>
<td>MRS Career Fair—Resume Critiques, Mock Interviews, Professional Photos</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>PROFESSIONAL DEVELOPMENT</td>
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<tr>
<td>MRS Career Fair—Visit the Recruiters!</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:00 pm - 7:00 pm</td>
</tr>
<tr>
<td>Science as Art—Viewing and Voting</td>
<td>PCC North, 300 Level, Alcove</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>Tutorial Notes Prepaid Pickup/Sales</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit Booth 100</td>
<td>2:00 pm - 7:00 pm</td>
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<tr>
<td>Coffee Break</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>2:30 pm - 3:30 pm</td>
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<td>PROFESSIONAL DEVELOPMENT</td>
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<tr>
<td>Green Cards for Scientific Researchers: How to Win Your EB-1/NIW Case!</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit Stage</td>
<td>2:45 pm - 3:45 pm</td>
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<tr>
<td>ADVOCACY</td>
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<tr>
<td>Congressional Science and Engineering Fellowship Program Information Session Become a Congressional Science and Engineering Fellow!</td>
<td>PCC North, 200 Level, Room 221 C</td>
<td>4:15 pm - 5:15 pm</td>
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<tr>
<td>PROFESSIONAL DEVELOPMENT</td>
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<tr>
<td>Preparing for Your Next Job Interview</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit Stage</td>
<td>4:30 pm - 5:15 pm</td>
</tr>
<tr>
<td>MRS/Sociedad Mexicana de Materiales Student Poster Award Exchange Program</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>5:00 pm - 7:00 pm</td>
</tr>
<tr>
<td>Poster Session—Author Presentations</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>5:00 pm - 7:00 pm</td>
</tr>
<tr>
<td>Best Poster Award Winners Announcement</td>
<td>PCC North, 300 Level, Halls C–E—Exhibit Stage</td>
<td>5:30 pm</td>
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<tr>
<td>EDUCATION &amp; OUTREACH</td>
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<tr>
<td>Materials Needs for Energy Sustainability by 2050—Incentivizing a Zero-Waste Future</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>7:15 pm - 8:30 pm</td>
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<tr>
<td>PROFESSIONAL DEVELOPMENT</td>
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<tr>
<td>How to Prepare for Your ABET Accreditation (Advanced registration by April 19 was required if you plan to attend by Internet.)</td>
<td>Sheraton, Second Level, Arcadia</td>
<td>7:15 pm - 9:30 pm</td>
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## WEDNESDAY DAILY SCHEDULE OF EVENTS

<table>
<thead>
<tr>
<th>EVENT TITLE</th>
<th>LOCATION</th>
<th>EVENT TIME</th>
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<tbody>
<tr>
<td><strong>Poster Authors (Wednesday Only) Check-In and Post</strong></td>
<td>PCC North, 300 Level, Alcove</td>
<td>7:00 am - 9:30 am</td>
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<tr>
<td><strong>PROFESSIONAL DEVELOPMENT</strong></td>
<td>PCC North, 200 Level, Room 231 ABC</td>
<td>7:00 am - 9:00 am</td>
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<tr>
<td><strong>Women in Materials Science &amp; Engineering Breakfast</strong></td>
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<tr>
<td>Latino Engineering Faculty in the United States—A Personal Perspective and Journey</td>
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<tr>
<td>Olivia A. Graeve, University of California, San Diego</td>
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<tr>
<td>(Space is limited; advanced sign-up is required at the MRS Help Center, PCC North, 100 Level, Foyer, until 12:00 pm on Tuesday.)</td>
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<tr>
<td><strong>MRS Email Preferences Booth</strong></td>
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<tr>
<td><strong>MRS Help Center</strong></td>
<td>PCC North, 100 Level</td>
<td>7:30 am - 6:30 pm</td>
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<tr>
<td><strong>Registration</strong></td>
<td>PCC North, 300 Level, Foyer</td>
<td>7:30 am - 5:00 pm</td>
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<tr>
<td><strong>Speaker Ready Room</strong></td>
<td>PCC North, 200 Level, Alcove</td>
<td>7:30 am - 5:00 pm</td>
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<tr>
<td><strong>Symposium Assistant Check-In</strong></td>
<td>PCC North, 100 Level, Alcove</td>
<td>7:30 am - 5:30 pm</td>
</tr>
<tr>
<td><strong>Poster Session—Winners Row</strong></td>
<td>PCC North, 200 Level, Alcove</td>
<td>8:00 am - 6:00 pm</td>
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<tr>
<td><strong>Symposium Sessions</strong></td>
<td>PCC North, 100 Level</td>
<td>8:00 am - 5:00 pm</td>
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<tr>
<td><strong>MRS Awards Ceremony &amp; Innovation in Materials Characterization Award Talk</strong></td>
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<tr>
<td><strong>Electron Microscopy Advances in Catalysis</strong></td>
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<tr>
<td>Stig Helveg, Haldor Topsoe AS</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>9:00 am - 10:15 am</td>
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<tr>
<td><strong>Coffee Break</strong></td>
<td>PCC North, 100 Level, Foyer</td>
<td>9:30 am - 10:30 am</td>
</tr>
<tr>
<td><strong>Poster Session—Judges Only</strong></td>
<td>PCC North, 300 Level, Halls C–E—Exhibit</td>
<td>9:30 am - 11:30 am</td>
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<tr>
<td><strong>ADVOCACY</strong></td>
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<td><strong>Materials Voice</strong></td>
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<tr>
<td><strong>Public Outreach Center</strong></td>
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<tr>
<td><strong>EXHIBIT—LAST DAY</strong></td>
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<tr>
<td><strong>EXHIBIT HALL EVENT</strong></td>
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<tr>
<td><strong>Selfie Station</strong></td>
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<td><strong>MRS/Cambridge University Press Publications Booth 100</strong></td>
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<tr>
<td><strong>Poster Session—Attendee Viewing</strong></td>
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<tr>
<td><strong>Authors Available for Poster Discussions from 5:00 pm to 7:00 pm</strong></td>
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<tr>
<td><strong>PROFESSIONAL DEVELOPMENT</strong></td>
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<tr>
<td><strong>Tutorial Notes Prepaid Pickup/Sales</strong></td>
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<tr>
<td><strong>Symposium X—Frontiers of Materials Research</strong></td>
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<tr>
<td><strong>Hydrogen and Fuel-Cell Technology Perspectives</strong></td>
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<tr>
<td>Sunita Satyapal, U.S. Department of Energy</td>
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<tr>
<td>Development of Fuel Cells and Hydrogen Technologies in Europe Toward Commercialization from 2020 Onward</td>
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<tr>
<td>Bart Biebuyck, The Fuel Cells and Hydrogen Joint Undertaking</td>
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<tr>
<td><strong>EDUCATION &amp; OUTREACH</strong></td>
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<tr>
<td><strong>Materials Science Research Aboard the International Space Station</strong></td>
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<td><strong>Coffee Break</strong></td>
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<tr>
<td><strong>EDUCATION &amp; OUTREACH</strong></td>
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<tr>
<td><strong>Open Data Challenge Awards Presentation</strong></td>
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<tr>
<td><strong>PROFESSIONAL DEVELOPMENT</strong></td>
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<tr>
<td><strong>Career Paths in Materials Science and Engineering</strong></td>
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<tr>
<td><strong>Poster Session—Author Presentations</strong></td>
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<tr>
<td><strong>Best Poster Award Winners Announcement</strong></td>
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<tr>
<td><strong>Science as Art—Winners Announcement</strong></td>
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<tr>
<td><strong>EDUCATION &amp; OUTREACH</strong></td>
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<tr>
<td><strong>PowerPoint Karaoke</strong></td>
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<tr>
<td>(Presenters and slide authors must preregister.)</td>
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<tr>
<td><strong>PROFESSIONAL DEVELOPMENT</strong></td>
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<tr>
<td><strong>Real-Life Challenges and Opportunities in Sustainable Product Design Seminar</strong></td>
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THURSDAY

DAILY SCHEDULE OF EVENTS

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<thead>
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<th>EVENT TITLE</th>
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<th>EVENT TIME</th>
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<tbody>
<tr>
<td>MRS Help Center</td>
<td>PCC North, 100 Level</td>
<td>7:30 am - 5:30 pm</td>
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<tr>
<td>Registration</td>
<td>PCC West, 100 Level</td>
<td>7:30 am - 5:00 pm</td>
</tr>
<tr>
<td>Speaker Ready Room</td>
<td>PCC North, 300 Level, Foyer</td>
<td>7:30 am - 5:00 pm</td>
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<tr>
<td>Symposium Assistant Check-In</td>
<td>PCC North, 200 Level, Alcove</td>
<td>7:30 am - 5:00 pm</td>
</tr>
<tr>
<td>Poster Session—Winners Row</td>
<td>PCC North, 200 Level, Alcove</td>
<td>8:00 am - 6:00 pm</td>
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<tr>
<td>Symposium Sessions</td>
<td>PCC North, 100 Level</td>
<td>8:00 am - 5:00 pm</td>
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<td>PCC North, 200 Level</td>
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<tr>
<td></td>
<td>PCC West, 100 Level</td>
<td>8:00 am - 5:00 pm</td>
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<tr>
<td>AWARDs</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>9:00 am - 9:45 am</td>
</tr>
<tr>
<td>Mid-Career Researcher Award Talk</td>
<td>Self-Assembly of Functional Nanoscale Materials</td>
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<tr>
<td>Hongyou Fan, Sandia National Laboratories and The University of New Mexico</td>
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<td>Coffee Break</td>
<td>PCC North, 100 Level, Foyer</td>
<td>9:30 am - 10:30 am</td>
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<td>PCC West, 100 Level, Foyer</td>
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<tr>
<td>Symposium X—Frontiers of Materials Research</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>12:15 pm - 1:15 pm</td>
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<tr>
<td>The James Webb Space Telescope—Its Mission, Design and Development</td>
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<tr>
<td>Jonathan Arenberg, Northrop Grumman Aerospace Systems</td>
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<tr>
<td>Coffee Break</td>
<td>PCC North, 100 Level, Foyer</td>
<td>2:30 pm - 3:30 pm</td>
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<td>PCC North, 200 Level, Foyer</td>
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<td>PCC West, 100 Level, Foyer</td>
<td>2:30 pm - 3:30 pm</td>
</tr>
<tr>
<td>EDUCA TION &amp; OUTREACH</td>
<td>PCC North, 100 Level, Ballroom 120 D</td>
<td>5:30 pm - 7:00 pm</td>
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<tr>
<td>MRS Frontiers Reception: Building Communities</td>
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FRIDAY

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<td>MRS Help Center</td>
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<td>Symposium Assistant Check-In</td>
<td>PCC North, 100 Level, Alcove</td>
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<tr>
<td>Symposium Sessions</td>
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<td>PCC North, 200 Level, Foyer</td>
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<td>PCC West, 100 Level, Foyer</td>
<td>9:30 am - 10:30 am</td>
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<td>PCC North, 200 Level, Foyer</td>
<td>2:30 pm - 3:30 pm</td>
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THANKS!

2019 MRS CORPORATE PARTNERS who have supported the Materials Research Society Foundation and its mission.

PLATINUM
American Elements
Goodfellow Corporation | Booth 627
High Voltage Engineering
Lake Shore Cryotronics, Inc. | Booth 327
MilliporeSigma | Booth 426
Thermo Fisher Scientific

SILVER
Angstrom Engineering Inc.
Gatan, Inc. | Booth 401
J.A. Woollam Company, Inc. | Booth 600

TITANIUM
CAMECA Instruments, Inc.
Electron Microscopy Sciences | Booth 502
Janis Research Company, LLC | Booth 301
Thermo-Calc Software Inc.

GOLD
Rigaku | Booth 205

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Congratulations!

2019 MRS FELLOWS

Honoring MRS Members who are notable for their distinguished research accomplishments and outstanding contributions to the advancement of materials research worldwide.

The vitality, diversity and opportunity of materials research are all epitomized in this group of new Fellows, whose remarkable accomplishments are highlighted by their brief citations. We are confident that the examples of excellence, enterprise and dedication displayed by this steadily growing community of MRS Fellows will serve to encourage and inspire all materials researchers, at all levels, and will also support and enhance the prestige and recognition of materials research in serving the broader community worldwide.

Michael Chabinyc
University of California, Santa Barbara
For contributions to the fundamental science of the structure and electronic properties of organic semiconductors and the translation of these relationships to functional devices.

Sheng Dai
Oak Ridge National Laboratory and The University of Tennessee, Knoxville
For significant and sustained contributions in pioneering and developing novel synthetic methods for functional carbon materials for energy applications.

Jesús A. del Alamo
Massachusetts Institute of Technology
For extraordinary contributions to the physics, design, process technology and reliability of III–V compound semiconductor transistors, and for his sustained commitment to knowledge dissemination among students and researchers.

Mary E. Galvin
University of Notre Dame
For foundational research that clarifies the role of molecular architecture on the properties and performance of electroactive polymeric materials, and for her exceptional service to the materials science community.

Peter F. Green
National Renewable Energy Laboratory
For research leading to the understanding of the influence of polymer dynamics and confinement on thin-film structures and their corresponding properties, and for outstanding leadership in the materials science community.

Yue Kuo
Texas A&M University
For exceptional contributions to thin-film materials and fabrication processes for microelectronics as well as leadership in the materials science community.

Javier Llorca
IMDEA Materials Institute and Universidad Politécnica de Madrid
For contributions to the development and industrial implementation of multiscale modeling strategies in structural materials, and for his leadership as Founder and Director of the IMDEA Materials Institute.

Steven G. Louie
University of California, Berkeley
For seminal contributions to materials theory as well as to the discovery and understanding of fundamental phenomena in solids and nanostructures.

Sudipta Seal
University of Central Florida
For outstanding research on and the application and commercialization of multifunctional nanostructured defect-engineered oxides, as well as advancing graduate and undergraduate education in materials engineering and nanotechnology.

Natalie Stingelin-Stutzmann
Georgia Institute of Technology
For pivotal contributions to the application of classical polymer science tools for the efficient design and processing of organic electronic and photonic materials and devices.

Haiyan Wang
Purdue University
For innovative research on multifunctional ceramic nanocomposites, superconductors, solid oxide fuel cells and in situ TEM, and for inspired materials science education and leadership.

Paul S. Weiss
University of California, Los Angeles
For pioneering nanoscience advances, testing the ultimate limits of miniaturization of functional materials, developing ultrahigh resolution microscopes that simultaneously measure structure, spectra and function, and adding chemical dimensions to nanolithography.

Matthias Wuttig
RWTH Aachen University
For path-breaking contributions to the advancement of phase-change materials, including unraveling their unique bonding mechanism, unconventional transport properties and unusual kinetics.

Miguel José Yacaman
The University of Texas at San Antonio
For pioneering contributions to materials research in the fields of nanotechnology, catalysis, electron microscopy and physics of materials, and for his leadership in engaging the scientific community.

Xiao Cheng Zeng
University of Nebraska–Lincoln
For groundbreaking work on low-dimensional ice and clathrate gas hydrates, structures of ligand-covered gold clusters, catalysis with surface-supported gold and metal clusters and computational design of low-dimensional materials.

Yimei Zhu
Brookhaven National Laboratory
For distinguished contributions to the field of materials characterization by developing electron microscopy instrumentation and techniques to understand atomic, electronic and spin structures and the physical behavior of functional materials.

Yuntian Zhu
North Carolina State University
For seminal work on the fundamental physics, processing and properties of heterostructured and nanostructured materials.

Ji-Cheng (JC) Zhao
The Ohio State University
For pioneering research on high-throughput measurement in the field of structural materials through the invention and application of the diffusion-multiple approach and co-invention of ultrafast laser materials–property microscopy tools.

For more information please visit mrs.org/mrsfellows
**AWARDS**

**MRS Awards Ceremony & Innovation in Materials Characterization Award Talk**

**Wednesday, 9:00 am – 10:15 am**

PCC North, 100 Level, Ballroom 120 D

**Join us to honor our distinguished award recipients!**

Come and celebrate with us to honor our distinguished award recipients at the 2019 MRS Spring Meeting Awards Ceremony. Awards include the Innovation in Materials Characterization, Mid-Career Researcher, MRS Impact, Outstanding Young Investigator, MRS Postdoctoral, Graduate Student Gold and Silver, and the Arthur Nowick Graduate Student Award. Be sure to stay for the Innovation in Materials Characterization Award Talk directly following the Awards Ceremony.

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**Outstanding Young Investigator Award Talk**

Monday, 1:00 pm – 1:45 pm  
PCC North, 100 Level, Ballroom 120 D

The MRS Outstanding Young Investigator Award recognizes outstanding, interdisciplinary scientific work in materials research by a young scientist or engineer. The award recipient must also show exceptional promise as a developing leader in the materials area.

**Soft Electronics for Noninvasive Health Care—From the Skin to Below the Skin**

**Sheng Xu**  
University of California, San Diego

"for materials and device designs in biointegrated electronics and stretchable energy systems"

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**MRS Communications Lecture**

Monday, 5:15 pm – 6:30 pm  
PCC North, 100 Level, Room 124 A

**Dynamic Optical Properties of Gold Nanoparticles/ Cholesteric Liquid-Crystal Arrays**

**Timothy J. Bunning**  
Air Force Research Laboratory

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**MRS Impact Award**

The MRS Impact Award honors outstanding individuals who have displayed excellence in areas of science communication, education, advancing diversity, mentoring, or community engagement, which reflect the Society’s pursuit to advance materials science and technology to improve the quality of life.

**Meyya Meyyappan**  
NASA Ames Research Center

"for his lifelong dedication toward creating significant and outstanding impact to understanding nanotechnology through global outreach initiatives and for unwavering mentorship"

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**Innovation in Materials Characterization Award**

The Innovation in Materials Characterization Award honors an outstanding advance in materials characterization that notably increases knowledge of the structure, composition, in situ behavior under outside stimulus, electronic behavior, or other characterization feature, of materials. It is not limited to the method of characterization or the class of materials observed.

**Wednesday, 9:00 am – 10:15 am**

PCC North, 100 Level, Ballroom 120 D

**Electron Microscopy Advances in Catalysis**

**Stig Helveg**  
Haldor Topsoe A/S

"for pioneering atomic-scale transmission electron microscopy under reactive gas environments, leading to groundbreaking insights in catalysis, crystal growth and corrosion."

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**Mid-Career Researcher Award Talk**

Thursday, 9:00 am – 9:45 am  
PCC North, 100 Level, Ballroom 120 D

The Mid-Career Researcher Award recognizes exceptional achievements in materials research made by mid-career professionals.

**Self-Assembly of Functional Nanoscale Materials**

**Hongyou Fan**  
Sandia National Laboratories and The University of New Mexico

"for outstanding contributions in nanoparticle self-assembly of functional nanomaterials and for leadership within the materials community"

Endowed by MilliporeSigma | Booth 426

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mrs.org/spring2019
MRS Postdoctoral Awards
The MRS Postdoctoral Awards recognize postdoctoral scholars who show exceptional promise that may include, for example, excellence in scientific research, leadership, advocacy, outreach, or teaching during their postdoc assignment.

Kaifu Bian
Sandia National Laboratories
“For advancing the understanding of nanoparticle assemblies under stress”

Nicholas Jackson
Argonne National Laboratory
“For foundational theoretical and computational contributions to the study of structure and transport in charged polymers and organic semiconductors”

MRS acknowledges the Jiang Family Foundation and MTI Corporation for their generous contribution to support this award.

Graduate Student Award Finalists’ Special Talk Sessions
The MRS Graduate Student Awards are intended to honor and encourage graduate students whose academic achievements and current materials research display a high level of excellence and distinction. In addition to the MRS Graduate Student Gold and Silver Awards, the Arthur Nowick Graduate Student Award, which honors the late Dr. Arthur Nowick and his lifelong commitment to teaching and mentoring students in materials science, will be presented to a GSA finalist who shows particular promise as a future teacher and mentor.

Talk Session 1 | Monday, 12:00 pm – 2:45 pm | PCC North, 100 Level, Room 131 C

12:00 Aashutosh Mistry
Purdue University
“Interfacial Effects in Concentration-Driven Phase Change

12:15 Xiaoxing Xia
California Institute of Technology
“Electrochemically Reconfigurable Architected Materials Through Cooperative Beam Buckling and Defect Engineering

12:30 Hyunjoong Chung
University of Illinois at Urbana-Champaign
“Understanding the Molecular Origin of Polyomorph Transition via Nucleation and Cooperativity and Their Impact on Organic Semiconductors

12:45 Hyunwoo Yuk
Massachusetts Institute of Technology
“Preparation, Adhesion and 3D Printing of Highly Conductive PEDOT:PSS Hydrogels

1:00 Andrew Meng
Stanford University
“Control of Axial to Radial Growth of Ge/GeSn Nanowires with H2 Partial Pressure

1:15 Subhajit Roychowdhury
Jawaharlal Nehru Centre for Advanced Scientific Research
“N-Type Cubic GeSe Stabilized by Entropy-Driven Alloying of AgBiSe2 Leads to Ultralow Thermal Conductivity and Promising Thermoelectric Performance

1:15 BREAK

1:45 Joon Sang Kang
University of California, Los Angeles
“Experimental Observation of Ultrahigh Thermal Conductivity in Boron Arsenide

2:00 Xuezeng Lu
Northwestern University
“Novel Epitaxial Strain Effects on the Hybrid Improper Ferroelectrics from First-Principles

2:15 Zhaopianli Feng
Brandeis University
“Enzymatic Assemblies Disrupt Membrane and Target Endoplasmic Reticulum (ER) for Selective Cancer Cell Death

2:30 Jennifer Boothby
The University of Texas at Dallas
“Engineering Liquid Crystalline Polymers for Biological Applications

Talk Session 2 | Monday, 12:00 pm – 2:30 pm | PCC North, 100 Level, Room 131 A

12:00 Peter Attia
Stanford University
“Multi-Length-Scale Characterization and Optimization of Extreme Battery Fast Charging

12:15 Lichen Liu
Universitat Politècnica de València
“Generation of Subnanometric Metal Species in Zedolites and Their Catalytic Applications

12:30 Yixiu Wang
Purdue University
“Large-Area Solution-Grown Two-Dimensional Tellurene for Smart, Ubiquitous Electronics

12:45 Amitava Banerjee
Uppsala University
“Rashba-Dresselhaus Triggered Electronic and Optical Properties in De Novo Designed Mixed Halide Hybrid Perovskites—Implication of Composition Route and Stoichiometry

1:00 Rohit John
Nanyang Technological University
“Ionotronic Halide Perovskite Drift-Diffusive Synapses for Low-Power Neuromorphic Computation

1:15 Rainie Nelson
Iowa State University of Science and Technology
“Impact of Composition and Structure on Bismuth Halide Perovskites

1:15 BREAK

1:45 Arashdeep Thind
Washington University in St. Louis
“Atomic Structure and Electrical Activity of Planar Faults in Cesium Lead Bromide Perovskite

2:00 Aristide Gumusenge
Purdue University
“High Temperature Semiconducting Polymer Blends

2:15 Wen-Hui Cheng
California Institute of Technology
“Energy Band Alignment and Photonic Design to Enable Photoelectrochemical Water Splitting with >19% Efficiency

2018 JMR Paper of the Year Award
“Additive Manufacturing and size-dependent mechanical properties of three-dimensional microarchitected, high-temperature ceramic metamaterials”

Published February 14, 2018 | JMR Volume 33, Issue 3
This paper will be freely accessible to the materials science community in perpetuity.

Huachen Cui, Ryan Hensleigh, Hongshun Chen and Xiaoyu Zheng
Virginia Tech

The 2018 JMR Paper of the Year Award will be presented immediately preceding the MRS Communications Lecture, Monday, April 22, at 5:15 pm.
PCC North, 300 Level, Halls C–E

TUESDAY  ................................ 2:00 pm – 7:00 pm
WEDNESDAY  ........................ 11:00 am – 7:00 pm

Visit the MRS Spring Exhibit and talk directly to nearly 100 international manufacturers, suppliers and developers about the latest techniques and advances in the swiftly evolving world of materials research.

Poster Sessions
Authors will be available for in-depth discussions of their research Tuesday and Wednesday from 5:00 to 7:00 pm. Poster award winners will be announced daily at 5:30 pm.

Selfie Station
Grab a prop and strike a pose! Use the official Meeting Hashtag #S19MRS to share your stories and photos on Twitter and Instagram.

Coffee Breaks
Network with colleagues and enjoy all that the exhibit hall has to offer at the afternoon coffee breaks.

MRS Publications
Don’t miss the joint MRS/Cambridge University Press Publications Booth 100. Enjoy 20% off books, purchase Science as Art notecards and Tutorial Notes, and try your chances with the “PLINKO coin drop”... where everyone’s a winner!

MRS Public Outreach Center
Explore exciting hands-on activities, demonstrations and information areas used to engage future materials scientists and engineers.

Materials Voice
Help ensure that the commitment for sustained federal research funding by Congress and the Administration continues. Stop by and send personalized letters to your representatives on Capitol Hill.

Science as Art Exhibition
Vote for your favorite image at the ever-popular Science as Art competition, highlighting the interplay between art and science. Winners will be announced on Wednesday at 6:15 pm.

Career Fair
Meet your next employer! Whether you’re looking for a new job or planning the next step in your career path, the MRS Career Fair is a rich resource for exciting career opportunities.
PCC North, 300 Level, Halls C–E

EXHIBIT FLOOR PLAN

MRS Career Fair
Exhibit Hall Stage
Public Outreach

100 Cambridge University Press/Materials Research Society

Posters
Posters

Selfie Station
Networking Area

Arizona State University
430

Networking Area

Pedestrian Skybridge to West Building
Take a moment to read through the exhibitor profiles and check the companies you wish to visit.
Admiral Instruments  
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**Key Products:** Potentiostats/Galvanostats; EIS Measurements; Photo-Electrochemistry  
Admiral Instruments offers a growing selection of electrochemistry and photo-electrochemistry instruments including the low-cost, compact, easy-to-use collection of Squidstat™ potentiostats and high-performance workstations from Zahnier Scientific Instruments. Our products are uniquely suited to satisfy limited budgets or those seeking specialized capabilities including multi-sine EIS and equivalent circuit modeling. Visit our booth to see the Squidstat Plus potentiostat featuring a ±10V scan range, ±1A max current, and EIS up to 1 MHz priced at just $4,900!  

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**Key Products:** Physics Journals; Conference Proceedings; Digital Archive  
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.  

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American Physical Society  
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journals.aps.org  
**Key Products:** Journals  
The American Physical Society (APS) is a non-profit membership organization that publishes the *Physical Review* collection, the world’s most widely read physics research and review journals. Please stop by booth 705 in the exhibit hall to learn about *Physical Review Research*, an exciting new journal from APS that will begin accepting submissions in 2019.  

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Introducing the new Access™ atomic force microscopes from Angstrom Science. The small, ultra-thin, patented design enables Access™ AFMs to be easily integrated onto optical microscopes, without sacrificing performance. This novel approach creates a new paradigm in AFM and optical microscopes, enabling true correlative microscopy.  

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**Key Products:** Atomic Force Microscope; Gas Sorption; Pycnometers  
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Key Products: Potentiostats; Impedance Analyzers; Battery Cyclers

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Key Products: Nanoscale IR Spectroscopy; AFM/SPM Systems; AFM/SPM Probes; Nanomechanics; NanoElectronics; Nanochemical

Anasys, now Bruker, pioneered AFM-based nanoscale IR spectroscopy with our patented photothermal-based AFM-IR technique. The new nanoIR3 features advanced scattering SNOM capability, enabling high-performance measurements on 2D-materials, electrical and optical materials. Bruker continues developing technologies to advance AFM in nanomechanical, nanoelectrical and nanochrome research. New DataCube Mode capabilities within NanoElectrical Lab® provide full characterization in a single experiment. NanoMechanics Lab® offers quantifiable characterization extending from soft sticky hydrogels and composites to stiff metals and ceramics.

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Key Products: Journals; Periodicals

Cell Press is a leading publisher of cutting-edge papers and reviews that impact the future of research. Launching in 2019, Matter is the home for multi-disciplinary, transformative materials sciences research. Cell Press publishes chemistry studies that may help find potential solutions to the global challenges of tomorrow. Joule is the home for ground-breaking energy research that bridges scales and disciplines. Visit Cell Press Booth #800 to learn more and pick up the latest free journal copies!

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EXHIBITOR PROFILES

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Key Products: TEM Specimen Holders; TEM/SEM/X-Ray; In situ TEM  
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Key Products: GV10x; Mobile Cubic Asher; Chiaro High-Vacuum Mobile Plasma Asher  
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Key Products: Materials Characterization Databases; Education; Powder Diffraction Journal  
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Key Products: Stylus and Optical Profilers; Nanoindenters
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KP Technology USA Inc.  Booth 103
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