



MICROSCOPY & MICROANALYSIS

July 28-August 1 • Cleveland, OH

LOOK INSIDE FOR:

- Plenary Sessions & Program Highlights
- Registration Fees
- Special M&M Hotel Rates

MEETING UPDATE

2024





QUESTIONS?

TECHNICAL MEETING CONTENT:
2024 Program Chair
James LeBeau, Massachusetts
Institute of Technology
MM2024ProgramChair@microscopy.org

EXHIBITS & EXHIBITORS:
Exhibits Manager
doreen@corcexpo.com

SPONSORS & SPONSORSHIPS:
Sponsorship Manager
mary@corcexpo.com

REGISTRATION:
Registration Manager
mmregistration@microscopy.org

GENERAL:
Meeting Manager
meetingmanager@microscopy.org

ARE YOU A MEMBER?

Join Today and Save on M&M 2024 Registration Fees!



Visit <http://microscopy.org> to join the Microscopy Society of America online, or for more information about the benefits of MSA membership.



Visit <http://the-mas.org> to find out the benefits of MAS membership.



Visit <http://fieldemission.org> to learn more about the benefits of IFES membership.

On behalf of the Microscopy Society of America and the Microanalysis Society, we are pleased to invite you to join us, in-person, July 28-August 1, 2024, for Microscopy & Microanalysis 2024 in Cleveland, OH. Discover the vibrant heartbeat of the Midwest in Cleveland, a city that seamlessly blends rich history with a contemporary flair. Nestled along the shores of Lake Erie, Cleveland invites you to experience a one-of-a-kind journey through its diverse neighborhoods and dynamic cultural scene.

The Program Committee, led by James LeBeau, James Evans, Steven Spurgeon (MAS co-chair), and Francios Vurpillot (IFES co-chair) has developed an exciting group of symposia, spanning advances in instrumentation and techniques development, as well as applications in the analytical, biological, and physical sciences. We encourage you to browse the Call for Papers for complete symposium descriptions and to submit one or more scientific papers for platform or poster presentations.

Experience an unparalleled gathering of industry experts and microscopists at M&M 2024! Prior to the main meeting, immerse yourself in the renowned Sunday Short Courses and four Pre-Meeting Congresses. The MSA Student Council's Annual Pre-Meeting Congress, tailored for students and early-career professionals, highlights outstanding research, fostering collaboration and recognition.

Kickstart the meeting on Sunday evening at the Opening Welcome Reception, a perfect opportunity to reconnect with colleagues and forge new friends. The scientific program begins on Monday morning with the Plenary Session, featuring captivating talks in both Physical and Biological sciences, along with the presentation of prestigious awards from MSA and sponsoring societies.

Beyond the robust scientific program, the M&M meeting distinguishes itself with the world's largest annual microscopy exhibition in the Exhibit Hall, unveiling cutting-edge instrumentation and accessories. Explore the Exhibit Hall and participate in vendor tutorials, held Monday through Wednesday after hours. Don't miss other educational opportunities, including focused tutorials in biological and physical sciences, educational outreach programs, and special sessions like the Technologists' Forum and roundtable discussions.

M&M 2024 continues to be the premier meeting for microscopy and microanalysis where you'll stay abreast of the latest technologies, discover new applications across microscopy and microanalysis, and, most importantly, foster meaningful connections with colleagues. Elevate your professional journey with M&M 2024!

We look forward to being Together Again for M&M 2024!



Jay D. Potts
University of South Carolina, School of Medicine
President, Microscopy Society of America



Patrick Camus
Retired
President, Microanalysis Society

2024 Registration Information

If you are not a current member of MSA or MAS (i.e., expired member or non-member), your registration fee will also include a membership fee for the society/societies of your choice, unless otherwise noted.*

Your TOTAL Registration Fee for M&M 2024 will be:

Base Registration Fee \$ (CHART A)

+ Selected Membership Fee \$ (CHART B)

= Total Registration Fee

*This does not include or affect any additional purchases, such as Short Courses or PMCs.

- Online registration will be available beginning **March 5** at <https://mmconference.microscopy.org/registration-information>
- A valid credit card is required to register. Checks are not accepted.
- Questions? Please contact MMregistration@microscopy.org

CHART A - M&M 2024 Base Registration Rates (all rates in USD)

REGISTRATION TYPE	2024 REGISTRATION RATE		
<i>You must register on or before the following dates to receive these rates</i>	Early (May 9)	Regular (June 27)	Onsite (after June 27)
Full Meeting	\$692	\$865	\$933
Full Meeting – Student †	\$204	\$216	\$247
Full Meeting – Post-Doctoral Researcher	\$278	\$346	\$396
Full Meeting – Emeritus Member* <i>(requires Emeritus membership in MSA or MAS)**</i>	\$278	\$278	\$278
Partial Meeting – One Day Only <i>(Monday, Tuesday, Wednesday or Thursday)</i>	\$334	\$420	\$482
Pre-Meeting Congresses* <i>(separate registration required)</i>	\$199	\$249	\$299
Pre-Meeting Congresses – Student* † <i>(separate registration required)</i>	\$100	\$129	\$149
Sunday Short Course* <i>(separate registration required)</i>	\$339	\$389	\$399
Sunday Short Course – Student* † <i>(separate registration required)</i>	\$149	\$179	\$199

CHART B - 2024 Membership Dues Chart (all rates in USD)

MEMBERSHIP TYPE <i>Membership with either society is for the calendar year and is not pro-rated</i>	MSA	MAS	JOINT MEMBERSHIP WITH MSA & MAS
Regular Member	\$70	\$40	\$100
Student Member	\$20	\$10	\$20
Emeritus Member	Free	Free	Free
Honorary Member	Free	Free	Free

*This registration rate **will not** include a membership fee. Member rate applies to any member of MSA, MAS. Membership will be verified.

** Emeritus members are for MSA only. To inquire about becoming an MSA Emeritus Member, please contact associationmanagement@microscopy.org.

All **Full Meeting Registrations** (Regular, Student, Post-Doc, Emeritus) for M&M 2024 include:

- Digital access to meeting proceedings;
- Four full days' access to exhibits, plenary sessions, symposia, tutorials, poster presentations/happy hours, and all vendor tutorials. Vendor Tutorials are free and require registration onsite in Cleveland at the MSA MegaBooth.
- Admission ticket + one (1) drink ticket to the Sunday Welcome Reception on Sunday, July 28.

† Student rate is available to full-time undergraduate and graduate students only. Post-doctoral researchers are not considered students.

HOTEL INFORMATION

Book your hotel room in Cleveland at:




<https://book.passkey.com/event/50765254/owner/502/home>

Reservations will open **February 6, 2024**. Special rates are guaranteed until **June 21, 2024**.

Book your room through the M&M 2024 Housing Website and get an immediate reservation confirmation. A valid credit card is required to reserve a room. You must book through M&M Housing to get the special meeting rates.

Maps showing the location of the hotels and convention center are available on the M&M 2024 site.

Hotel rooms will sell fast. **Book early for the best availability!**

Hotel Name	M&M Rate	Distance from Huntington Convention Center of Cleveland	
Hilton Cleveland Downtown	\$229	Adjacent to Convention Center 5 Minute Walk	
Marriott Cleveland Downtown - Key Tower	\$229	Adjacent to Convention Center 4 Minute Walk	
Westin Cleveland Downtown	\$194	Adjacent to Convention Center 6 Minute Walk	

M&M 2024 sessions will begin on Monday, July 29 at 8:30 AM and end on Thursday, August 1 at 5:00 pm. Pre-meeting short courses and Congresses will be held on Sunday, July 28. Please plan your travel accordingly.

PROGRAM HIGHLIGHTS



Join your scientific colleagues at these and other symposia at M&M 2024, which will showcase the latest innovative applications and instrumental developments in the biological, physical, and analytical sciences.

Visit the M&M 2024 website below for a complete list of symposia, posters, tutorials, workshops, sessions, and pre-meeting educational events. A sample of the exciting line-up includes:

- P02** Memorial Symposium: Terence E. Mitchell
- P05** Advanced Imaging and Spectroscopy Beyond Room Temperature
- P07** Understanding Structure-Property Relationships in Quantum Materials with Emerging Electron Microscopy Methods
- A03** Expanding Capabilities of Atom Probe Tomography (IFES-Organized)
- A09** Automation in Microscopy from Image Acquisition to Image Analysis, Data Visualization and Management
- B01** 3D Structures: from Macromolecular Assemblies to Whole Cells
- B05** Hyperspectral Imaging: A New Window into the Cell
- C01** Emerging 4D STEM Techniques in Materials and Biological Sciences
- C04** Machine Learning-driven Automated Microscopy for Materials Discovery
- C07** Memorial Symposium: Lena Fitting Kourkoutis

M&M 2024 sessions will begin Monday, July 29 at 8:30 AM and will end on Thursday, August 1 at 5:00 PM. A complete list of symposia and their presentation days will be available in May 2024. **Presenters will receive their presentation day/ time information by the end of April.**

A full scientific program with all presentation days and times will be posted around July 1. Please plan your travel accordingly.



<https://mmconference.microscopy.org/full-symposium-descriptions>



PRE-MEETING CONGRESSES

- **Registration and additional fee required** (*register online along with your M&M registration*)
- **See below for details on which meals are included with each event.**

- Career workshops covering from interview skills to exploring various career paths
- Opportunities to share research in an engaging, non-intimidating, and interactive setting
- Expanded professional networking with people from different research backgrounds

Visit <https://msaconference.morwebcms.com/congress-x60> for details.

X60 Pre-Meeting Congress for Students, Postdocs, and Early-Career Professionals in Microscopy & Microanalysis

Organized by the Microscopy Society of America Student Council (StC)

Saturday, July 27, 2024 • 8:30 AM to 5:30 PM

Separate registration required — see registration form (Spring 2024)

INCLUDED IN REGISTRATION FEE:

Breakfast, AM Break, Lunch, PM Break, Evening Banquet

ORGANIZERS:

Yifan Wang, Arizona State University (*Program Chair*)

Huiming Guo, University of California, Irvine (*Physical Sciences Co-Chair*)

Abayomi Adegboyega, Purdue University (*Biological Sciences Co-Chair*)

Jake Garcia, Ph.D., National Institute of Standards and Technology (*Post-Doc Subcommittee Chair*)

This pre-meeting congress is organized by and for students, postdocs, and early-career professions, and provides:

- A forum for students to deliver presentations to peers ahead of the meeting
- The opportunity for students and post-docs to present posters and win awards determined by peer voting

X61 Synergy of Hardware Innovations and Computational Breakthroughs in TEM

Organized by the MSA Abberation-Corrected Electron Microscopy & Electron Microscopy Data Analysis and Management Focused Interest Groups

Sunday, July 28, 2024 • 8:30 AM - 5:00 PM

Separate registration required — see registration form (Spring 2024)

INCLUDED IN REGISTRATION FEE:

AM Break & Lunch

ORGANIZERS:

Debangshu Mukherjee, Oak Ridge National Laboratory

Wyeth Gibson, University of Illinois Chicago

Alexander Rakowski, Lawrence Berkeley National Laboratory

Andrew Lupini, Oak Ridge National Laboratory

David C. Bell, Harvard John A. Paulson School of Engineering and Applied Sciences

Shize Yang, Yale

The X61 symposium will focus on developments in both Hardware and Software Advancements in electron microscopy and will be jointly hosted by the Aberration Corrected EM (ACEM) and the DAM) Focused Interest Groups.



X62

Obtaining Reliable and Relevant Insights in Our In Situ Microscopy and Spectroscopy Studies of Reactions in Liquids and Gases: A Discussion on Re-reproducibility, Robustness and Rigor

Organized by the MSA Electron Microscopy in Liquids and Gases Focused Interest Groups

Sunday, July 28, 2024 • 8:30 AM - 5:00 PM

Separate registration is required - see registration form (Spring 2024)

INCLUDED IN THE REGISTRATION FEE:

Breakfast, AM Break, Lunch, PM Break

ORGANIZERS:

Grace Burke, Oak Ridge National Laboratory

See Wee Chee, Fritz Haber Institute of the Max Planck Society

Patricia Kooyman, University of Cape Town

Piyush Haluai, Arizona State University

Kinga Unocic, Oak Ridge National Laboratory

Yuanyuan Zhu, University of Connecticut

Stephen House, Sandia

David Yang, NIST

In this PMC, we hope to foster lively discussions regarding recent innovations propelling the quantitative analysis of materials phenomena during reactions in liquids and gases. With the growing availability and variety of commercial holders and microscopes, the use of in situ/operando liquid and gas-phase electron microscopy in our research has become more accessible. However, these experiments are still regarded as complex undertakings. Common challenges include attaining high spatial resolution while mitigating beam effects, ensuring data reproducibility in systematic studies, and extracting meaningful insights from multi-dimensional datasets. We will delve into these challenges that arise when conducting studies using liquid and gas-phase electron microscopy and explore

innovative strategies that tackle these challenges. These discussions will be guided through invited talks delivered by established leaders and emerging scientists in the relevant fields. Vendors will also present their latest developments that simplify the execution of these experiments or enhance their analytical capabilities.

Topics covered within this PMC will include:

- Quantitative in situ and operando studies of materials phenomena under reaction conditions
- Design of experiment for liquid and gas phase electron microscopy experiments
- Rationalizing beam-induced effects and their impact under different conditions
- Relevance of in situ and operando observations: balancing resolution versus statistics,
- Multi-modal and correlative studies for spatially resolved spectromicroscopy
- Data-driven approaches for handling multi-object or multi-scale in situ studies



SUNDAY SHORT COURSES

ORGANIZER:

Aubrey Penn, Massachusetts Institute of Technology

- These full-day courses run from 8:30 AM to 5:00 PM on Sunday, July 28, 2024
- A certificate of participation will be issued to each requesting participant, following the conclusion of the M&M 2024 meeting.
- Morning and afternoon coffee breaks and boxed lunches are included (breakfast is on your own).
- Separate registration with additional fees is required (see registration info on M&M website for more information).

X10 **Guidelines for Performing 4D-STEM Characterization from the Atomic to Micrometer Scales: Experimental Considerations, Data Analysis**

LEAD INSTRUCTORS:

Colin Ophus, Lawrence Berkeley National Laboratory

David Muller, Cornell University

X11 **Cryo-EM for Materials Sciences: Hardware, Applications and Data Acquisition**

LEAD INSTRUCTORS:

Ismail El Baggari, Harvard University

Myung-Geun Han, Brookhaven National Laboratory

Michael Zachman, Oak Ridge National Laboratory

X12 **Transmission Electron Microscopy and Spectroscopy from First Principles**

LEAD INSTRUCTOR:

Toma Susi, University of Vienna, Austria

Jacob Madsen, University of Vienna, Austria

Jan Ruzs or Paul Zeiger, Uppsala University, Sweden

Rebecca Nicholls, University of Oxford, UK

X13 **Automated Experiments in Electron Microscopy**

LEAD INSTRUCTORS:

Sergei Kalinin, University of Tennessee, Knoxville

Maxim Ziatdinov, Oak Ridge National Lab

Kevin Roccapriore, Oak Ridge National Lab

X14 **From Obscure to Clear: A Dive into Tissue Clearing and Expansion Microscopy**

LEAD INSTRUCTORS:

Yongxin (Leon) Zhao, Carnegie Mellon

Alan Watson, University of Pittsburgh

Adam Glaser, Allen Institute

Aleksandra Klimas, Carnegie Mellon

X15 **Focused Ion Beam Theory & Methods**

INSTRUCTORS:

Lucille Gianuzzi, EXpressLO, LLC

Joseph Michael, Sandia National Laboratory (ret.)

For a complete description of each course, please visit the M&M 2024 website:
<https://mmconference.microscopy.org/sunday-short-courses>

EXHIBITOR LIST AS OF FEBRUARY 9, 2024

- 3D-Micromac AG
- Advanced Microscopy Techniques Corp.
- Angstrom Scientific Inc.
- Applied Physics Technologies, Inc.
- Attocube Systems Inc.
- Barnett Technical Services
- Bruker Corporation
- Carl Zeiss Microscopy, LLC
- Clark-MXR Inc
- condenZero
- ConnectomX Ltd
- DECTRIS Ltd
- DENSsolutions
- Diatome US
- DigiM Solution LLC
- Direct Electron, LP
- Duniway Stockroom Corp.
- El-Mul Technologies
- Electron Microscopy Sciences
- EXpressLO LLC
- Ferrovac
- Fischione Instruments
- Gatan Inc. /Edax
- Herzan LLC
- HIROX-USA, Inc.
- Hitachi High-Tech America, Inc.
- HORIBA Scientific
- HREM Research Inc.
- Hummingbird Scientific
- ibss Group, Inc.
- Integrated Dynamics Engineering
- JASCO
- JEOL USA, Inc.
- JH Technologies
- Keyence Corporation
- Kitware Inc.
- Kleindiek Nanotechnik
- Ladd Research
- Leica Microsystems
- Linkam Scientific Instruments
- MAS: The Microanalysis Society
- Mel-Build Corporation
- Microscopy Innovations, LLC
- Midwest Center for Cryo-Electron Tomography
- MSA Mega Booth
- NanoMEGAS USA
- Nanomotion Inc
- Nanoscience Instruments
- NenoVision
- Nion Company
- Norcada, Inc.
- NT-MDT America, Inc.
- Oxford Instruments
- Pacific Northwest CryoEM Center
- Physical Electronics
- PIE Scientific LLC
- PNDetector GmbH
- Point Electronic GmbH
- Protochips, Inc.
- Quantum Design, Inc
- Quantum Detectors
- Raith America, Inc.
- Renishaw Inc.
- RMC Boeckeler
- Royal Microscopical Society
- Scientific Bridge
- Sigray, Inc
- SiriusXT Ltd
- SmarAct Inc
- Ted Pella Inc.
- TESCAN
- Theia Scientific
- Thermo Fisher Scientific
- TMC / Cameca
- Tousimis
- TVIPS GmbH
- United Mineral and Chemical Corp.
- Vibration Engineering Consultants
- XEI Scientific, Inc.





PLENARY SPEAKERS

MONDAY, JULY 29, 2024

Huntington Convention Center of Cleveland

Plenary session begins at 8:30 AM and will feature special awards presentations from the joining societies.



Dr. Ed Boyden

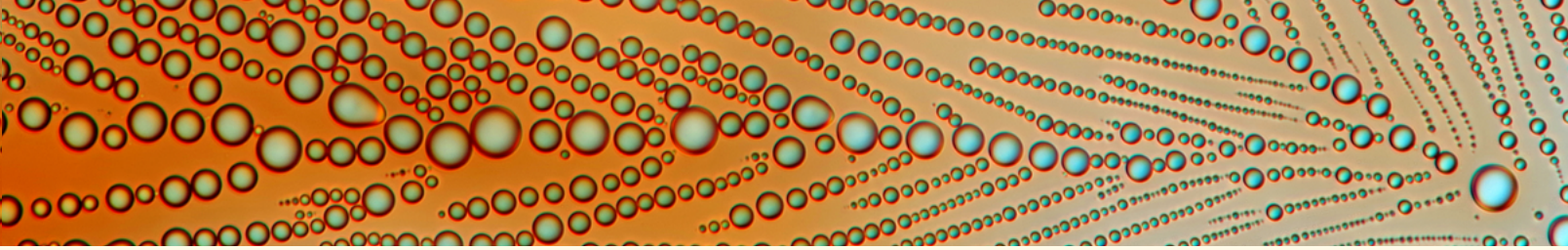
Professor, Departments of Brain and Cognitive Sciences, Media Arts and Sciences, and Biological Engineering, Y. Eva Tan Professor in Neurotechnology, McGovern Institute and HHMI

Ed Boyden is Y. Eva Tan Professor in Neurotechnology at MIT, an investigator of the Howard Hughes Medical Institute and the MIT McGovern Institute, and professor of Brain and Cognitive Sciences, Media Arts and Sciences, and Biological Engineering at MIT. He leads the Synthetic Neurobiology Group, which develops tools for analyzing and repairing complex biological systems, such as the brain, and applies them systematically to reveal ground truth principles of biological function and to repair these systems. These inventions include optogenetic tools, which enable control of neural activity with light; expansion microscopy, which enables ordinary microscopes to do nanoimaging; new tools for high-speed imaging of living biological signals and networks; noninvasive brain stimulation strategies that may help with conditions ranging from Alzheimer's to blindness; and new strategies for inexpensively creating 3-D nanotechnology. He co-directs the MIT Center for

Neurobiological Engineering, which aims to develop new tools to accelerate neuroscience progress, and is a faculty member of the MIT Center for Environmental Health Sciences, Computational & Systems Biology Initiative, and Koch Institute.

Amongst other recognitions, he has received the Wilhelm Exner Medal (2020), the Croonian Medal (2019), the Lennart Nilsson Award (2019), the Warren Alpert Foundation Prize (2019), the Rumford Prize (2019), the Canada Gairdner International Award (2018), the Breakthrough Prize in Life Sciences (2016), the BBVA Foundation Frontiers of Knowledge Award (2015), the Carnegie Prize in Mind and Brain Sciences (2015), the Jacob Heskell Gabbay Award (2013), the Grete Lundbeck Brain Prize (2013), the NIH Director's Pioneer Award (2013), and the Perl/UNC Neuroscience Prize (2011). He was named to the World Economic Forum Young Scientist list (2013) and the Technology Review World's "Top 35 Innovators under Age 35" list (2006), and is an elected member of the National Academy of Sciences (2019), the American Academy of Arts and Sciences (2017), the National Academy of Inventors (2017), and the American Institute for Medical and Biological Engineering (2018). His group has hosted hundreds of visitors to learn how to use new biotechnologies, and he also regularly teaches at summer courses and workshops in neuroscience, and delivers lectures to the broader public (e.g., TED (2011), TED Summit (2016), World Economic Forum (2012, 2013, 2016)).

Ed received his Ph.D. in neurosciences from Stanford University as a Hertz Fellow, working in the labs of Jennifer Raymond and Richard Tsien, where he discovered that the molecular mechanisms used to store a memory are determined by the content to be learned. In parallel to his PhD, as an independent side project, he co-invented optogenetic control of neurons, which is now used throughout neuroscience. Previously, he studied chemistry at the Texas Academy of Math and Science at the University of North Texas, starting college at age 14, where he worked in Paul Braterman's group on origins of life chemistry. He went on to earn three degrees in electrical engineering and computer science, and physics, from MIT, graduating at age 19, while working on quantum computing in Neil Gershenfeld's group. Long-term, he hopes that understanding how the brain generates the mind will help provide a deeper understanding of the human condition, and help humanity achieve a more enlightened state.



Dr. Christopher (Wren) Carr

Lawrence Livermore National Laboratory

Dr. Christopher (Wren) Carr is an experimental physicist with a specialty in ns laser-induced damage in optical materials. He earned his Ph.D. in a collaboration UC Davis and LLNL in 2003. After graduation Wren became a permanent member of the scientific staff at Lawrence Livermore National Laboratory (LLNL). Wren has studied laser-induced damage and growth in all the major components of the NIF laser including the final optics, amplifiers, and laser mirrors. He has published 120 manuscripts in the field of laser-induced damage and is one of the current chairs of the SPIE Laser Damage international conference on laser-induced damage.

Wren currently leads the OMST Damage and Mitigation Science and Technology group who focus on understanding laser-induced damage on laser systems in general, and NIF in particular, and developing and mitigating technologies.





THANK YOU TO OUR SUSTAINING MEMBERS

(As of February 9, 2024)

Advanced Microscopy Techniques

Applied Physics Technologies

Boeckeler Instruments, Inc.

Bruker Nano Analytics

Carl Zeiss Microscopy, LLC

CEOS GmbH

CryoElectron Microscopy Research Center

Dectris Ltd.

Diatome US

Direct Electron LP

Double Helix Optics

Duniway Stockroom Corp.

EDAX

Electron Microscopy Sciences

EMSIS GmbH

EXpressLO LLC

Gatan

Hitachi High-Tech America, Inc.

HREM Research Inc.

Hummingbird Scientific

ibss Group, Inc.

International Centre for Diffraction Data

JEOL USA, Inc.

Kleindiek Inc.

Ladd Research

Lehigh Microscopy School

Micron, Inc.

Microscopy Innovations LLC

NanoSpective

Nion Co.

Oxford Instruments

Protochips, Inc.

Quantum Design

Scientific Instrumentation Services, Inc.

SEMTECH Solutions, Inc.

Ted Pella Inc.

TESCAN

Thermo Fisher Scientific

Tousimis

XEI Scientific, Inc.