

MICROSCOPY & MICROANALYSIS

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Microscopy & Microanalysis 2018

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The Microscopy Society of America (MSA), the Microanalysis Society (MAS), and the Microscopical Society of Canada/Société de Microscopie du Canada (MSC/SMC) invite you to Microscopy & Microanalysis 2018 (M&M 2018), August 5–9, in Baltimore, Maryland. The conference will take place at the Baltimore Convention Center, conveniently located two blocks from the famed Inner Harbor. The Baltimore Inner Harbor is a wonderful, family-friendly locale with excellent restaurants, shopping, and activities, including the National Aquarium, the Maryland Science Center, and the *USS Constellation*, docked at the Inner Harbor for visitors to board and explore.

As always, M&M will feature the latest innovations, applications, and instrument developments from hundreds of global researchers employing microscopy and microanalysis across the biological and physical sciences. The M&M 2018 meeting will feature two plenary lectures, close to 40 symposia covering a broad range of topics, and numerous educational opportunities for attendees in the form of courses and tutorials. There will also be a full schedule of pre-meeting congresses and short courses taking place prior to the meeting. The annual microscopy exhibition will again be the largest in the world, with 120 companies from the USA and 12 other countries.

For our first plenary speaker, we are pleased to feature Manu Prakash, Assistant Professor of BioEngineering at Stanford University. Prof. Prakash will speak on the very real possibility of how and why “Every Child in the World Should Carry a Microscope in Their Pocket.” Prof. Prakash is the inventor of a 50-cent functional microscope, called the Foldscope, made mostly of paper and using origami principles to realize micro-optics, self-alignment, and sub-micron image resolution. Through his company, Foldscope



Manu Prakash

Instruments, Prof. Prakash has distributed tens of thousands of microscopes to 135 countries. Children around the globe are sharing their micrographs, experiences, and discoveries online through the “Microcosmos” program. Prof. Prakash is a current HHMI–Gates Faculty scholar, a 2016 MacArthur Fellow, one of the “Brilliant 10” featured by *Popular Science* in 2014, and a 2014 *MIT Technology Review* top 35 innovator under 35 years of age. He has presented two TED talks featuring the use of origami and paper to create cost-effective diagnostic tools.

Our second plenary speaker is Jon Larsen, a world-renowned jazz guitarist who is also a “citizen scientist” and the author of *In Search of Stardust*, the first comprehensive popular science book on micrometeorites. His book provides a photo atlas presenting hundreds of micrometeorites imaged by high-resolution color light microscopy and by scanning electron microscopy. While tens of thousands of tons of meteorites strike the Earth’s surface each year, the vast majority are dust-sized extraterrestrial specks only a few hundred micrometers in size. Historically, these micrometeorites, or stardust, were thought to be discoverable only in pristine areas like Antarctica or isolated deserts. Larsen became the first individual to demonstrate how to find micrometeorites in populated areas. Larsen travels extensively to work with scientists in collecting and isolating micrometeorites, as well as analyzing the dust particles’ structure and chemistry. Larsen will share his experiences and insights in a lecture titled “Using Microscopy to Find Stardust Anywhere,” showing how your nearest rain gutter could hold an array of tiny, extraterrestrial stones! Larsen has facilitated a community-based network of researchers through a program called “Project Stardust” so that anyone can conduct independent fieldwork and lab analysis to document their own micrometeorite discoveries.



Jon Larsen

This year we have three pre-meeting congresses taking place on the Saturday and Sunday preceding the M&M 2018 technical program. A pre-meeting congress on “Microanalytical Standards” is a one-day event, organized by the MSA Focused Interest Group on MicroAnalytical Standards, that will be a forum for discussion about the current status of available standards and reference materials, round robin analyses, and the cataloging of new standards and reference materials across a broad range of microanalytical techniques. These reference standards are currently used for electron probe microanalysis but could be applied to other analytical techniques, including secondary ion mass spectroscopy and inductively coupled plasma mass spectroscopy. A second pre-meeting congress will be organized by the MSA Focused Interest Group on Electron Microscopy in Liquids and Gases. This one-day event will be a forum for discussing developments related to *in situ* liquid/gas microscopy, including radiation damage control, nanoparticle synthesis, electrochemistry, catalysis, and corrosion. Finally, the MSA Student Council will host the second annual “Pre-Meeting Congress for Early Career Professionals in Microscopy and Microanalysis.” This congress is organized by and for students, postdocs, and early career professionals; however, all M&M registrants are welcome to attend. This congress will offer a highly interactive forum for participants to share research results, network, and engage with peers ahead of the main meeting. Invited presentations and contributed talks and posters will give attendees an opportunity to discuss their work with peers in a highly interactive setting. Further professional development opportunities will include a luncheon featuring a panel of recent graduates currently working in industry, academia, and government labs.

Other events of note for M&M 2018 include memorial symposia honoring the contributions of recently deceased scientists from our microscopy community. Professor Hatsujiro Hashimoto was a pioneer in imaging crystalline solids by transmission electron microscopy (TEM). A symposium will be held in his honor covering topics reflective of the scope of his work, including atomic-scale TEM imaging, dynamical diffraction theory, *in situ* high-temperature TEM, and atomic-scale spectrometry. Sterling Newberry, until his passing at the age of 101 this past January, was the last surviving founding member of MSA from 1942. A symposium in his honor will cover X-ray microscopy (including shadow imaging, the basis Newberry used for the first commercial X-ray microscope), X-ray computed tomography, focused probe imaging techniques, X-ray synchrotron methods including ptychography and holography, and advances in X-ray detectors. Elizabeth Ann Ellis was a charter member of the MSA Technologists’ Forum and a widely regarded expert in biological specimen preparation. A session within the 2018 Technologists’ Forum will be dedicated to her memory and include a series of invited speakers reflecting her many years of teaching and mentorship.

Education and training are important components of the M&M technical program each year, and 2018 is no exception.

A panel will be convened on the topic of “Entrepreneurship in the Microscopy Community” where several entrepreneurs will make remarks and hold a Q&A with attendees concerning instrumentation development, starting a microscopy-based business, and start-up best practices. Another panel will be held on the topic of “Procuring Government Funding for Microscopy Instrumentation and Research.” Government program managers from various funding agencies, including NIH, NSF, and DOD, will discuss various research funding opportunities available to the microscopy/microanalysis community for support of instrumentation and facilities. This panel is organized by the MSA Focused Interest Group on Facilities and Operation Management.

Additional educational opportunities include Sunday short courses as well as in-meeting tutorial symposia and Technologists’ Forum sessions. Invited experts will serve as Sunday short-course instructors on cryo-preparation for biological samples, focused ion beam methods, image-analysis software, open-source SerialEM for data acquisition, sample preparation for high-resolution electron microscopy, imaging and compositional analysis using SEM and EDS, and multivariate statistical methods for quantitative microscopy. In-meeting tutorials are planned on scanning nanobeam diffraction using STEM, transmission Kikuchi diffraction, CryoSPARC software tool for cryo-EM image analysis, and data integrity guidelines in the pharmaceutical sciences. Finally, the Technologists’ Forum will host specialized sessions on professional development, new advances in instrumentation and training, and round table discussions of best practices and strategies for sample preparation and microscopy.

Outreach is a major enterprise at M&M conferences, where we encourage young people to pursue careers in science through microscopy activities. Formerly called Family Affair, a special session entitled “Microscopic Explorations” lets the family and friends of conference attendees engage in fun microscopy projects. For 2018, both keynote speakers have a passion for encouraging youth engagement in microscopy, so we plan to feature Foldscopes and micrometeorites in this session. Attendees can visit the MSA Megabooth or attend the “Microscopy in the Classroom” session to discuss and share ideas regarding educational outreach activities.

The Executive Program Committee and the dozens of symposia organizers welcome you to Baltimore for what promises to be an exciting scientific meeting. Catch up with old friends and make new ones. Enjoy the local cuisine and be sure to try the blue crab! Plan to attend a Baltimore Orioles baseball game (Camden Yards is short walk from the conference site), or take a boat tour of the Inner Harbor and scenic Chesapeake Bay. We hope your attendance will include participation in the sponsoring societies, so please look for opportunities to attend society business meetings and socials during the week. On behalf of MSA, MAS, MSC/SMC, and the numerous volunteers that organize this event, I look forward to seeing you in Baltimore this August!

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