

M&M 2012

MICROSCOPY & MICROANALYSIS

July 29 – August 2 • Phoenix, AZ

Microscopy & Microanalysis 2012 in Phoenix, Arizona

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Microscopy & Microanalysis 2012 will celebrate our past achievements, present our current research, and inspire us about the future of our field. The meeting will be held in Phoenix, Arizona from July 29–August 2, 2012.

The M&M meeting will open with a plenary session on Monday morning, July 30, including two plenary speakers and the presentation of the major awards. This year is the seventieth anniversary of the Microscopy Society of America. To honor this important milestone, Professor Archibald Howie (Figure 1) of the University of Cambridge will give a lecture entitled “Learning from past epiphanies, successes, and disappointments to assess future progress in microscopy.”

In this talk, Professor Howie will highlight the key advances in microscopy over the past seventy years. In addition, he will provide insights into what the next seventy years in microscopy might hold. Professor Howie was elected to the Royal Society in 1978 and was awarded their Royal Medal in 1999. In 1991, he received the MSA Distinguished Scientist Award, and in 1992 he was awarded the Guthrie Medal and Prize by the Institute of Physics. He was head of the Cavendish Laboratory from 1989–1997. We are also honored and excited to have a plenary lecture by Professor Mildred Dresselhaus (Figure 2) of the Massachusetts Institute of Technology entitled “Probing the Nanostructures of Carbon.” Professor Dresselhaus has served as president of the American Association for the Advancement of Science, treasurer of the US National Academy of Sciences, and president of the American Physical Society. She is



Figure 1: Professor Archie Howie, University of Cambridge.



Figure 2: Professor Mildred Dresselhaus, MIT (Photo: Ed Quinn).

currently chair of the Governing Board of the American Institute of Physics. She has received numerous awards, including the US National Medal of Science and twenty-three honorary doctorates worldwide.

Our named symposium this year will honor the life and work of Robert (Bob) James Gray (1918–2010). As noted by long-time colleague S. Dekanich, Robert Gray was a “true pioneer” who helped to establish the metallographic techniques used for preparing nuclear materials specimens and for metallic alloys in general [1]. In 38 years of service at Oak Ridge National Laboratory (ORNL), Robert Gray was instrumental to the establishment of world-class metallography laboratories at ORNL and the Y-12 National Security Complex. He also served as IMS President from 1977 to 1979, received the Henry Sorby Award in 1981, and received the ASM President’s Award in 1983. The “R.J. Gray Symposium on Metallographic Preparation of Reactive and Radioactive Materials” will provide a forum for presenting and discussing the most recent work on the metallographic preparation of reactive and radioactive materials. Many technologically important metals and alloys, such as uranium and zircaloy, are extremely challenging to prepare because they react with the atmosphere and polishing media and because they require special procedures to prevent contamination and radiation hazards. This symposium will not be limited to metals but will also discuss challenging reactive materials, such as hydrides, battery materials, and explosives. The topics for discussion will also highlight technique development for metallography that will allow us to address challenging materials in general and reactive and radioactive materials in particular.

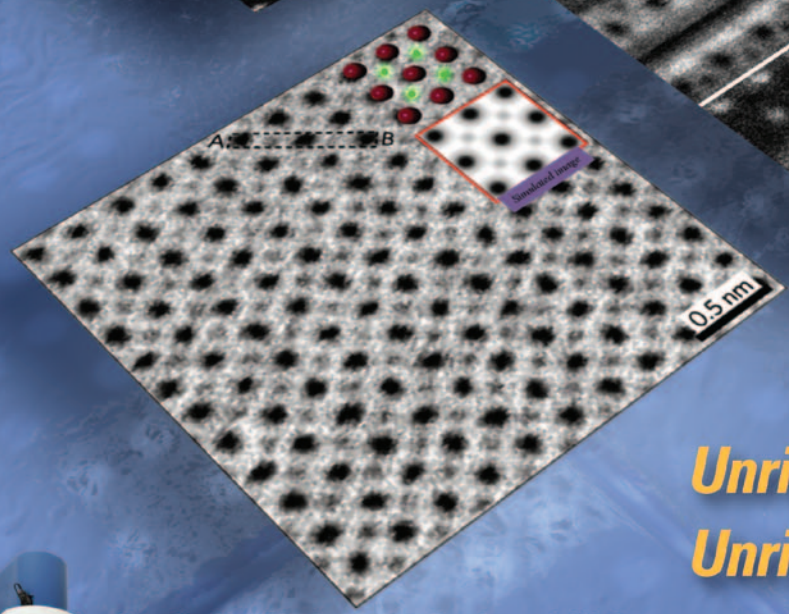
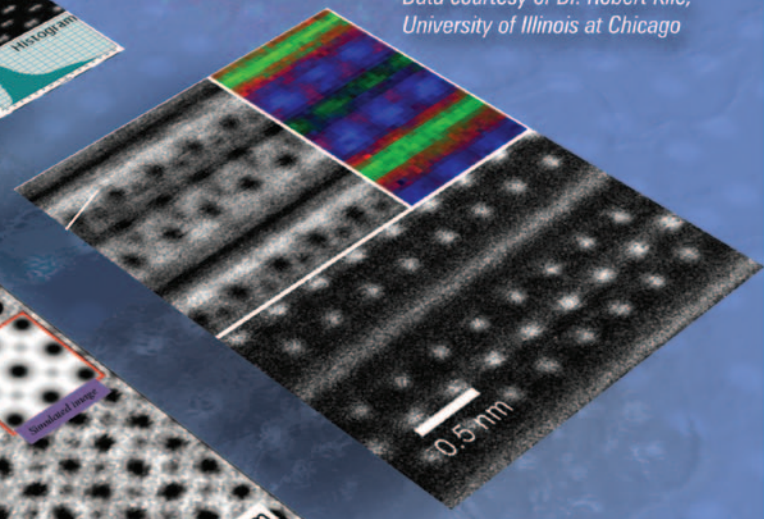
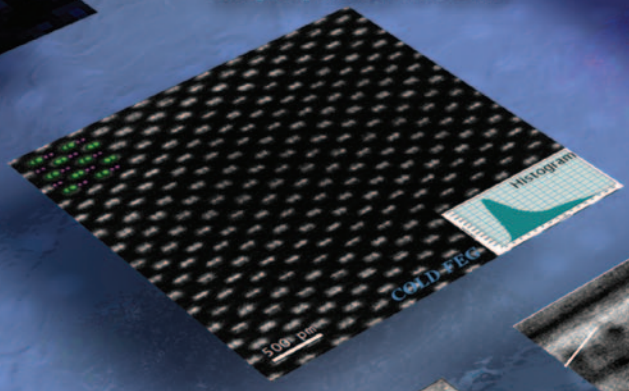
The technical programming this year will provide forums for sharing the latest results in key technical areas and applications to problems in the biological and physical sciences. Our biological symposia will include topics such as biofilms (Figure 3), cellular biology (Figure 4), disease diagnosis, and pharmaceuticals. Physical symposia will include topics such as carbon nanostructures, joining of materials, microscopy of quantum structures and devices, and failure analysis of structural materials. A special symposium, “Hybrid (soft-hard) Materials and Interfaces,” will provide an opportunity for the presentation of results about the application of microscopy and microanalysis at the junction between the biological and physical sciences. Microanalysis will be highlighted in a number of symposia, including “High resolution microscopy and microanalysis of

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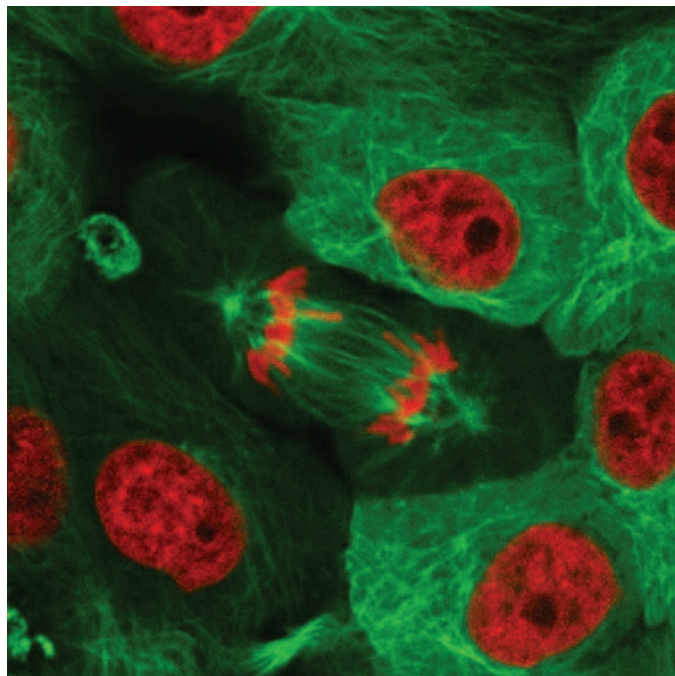


Figure 3: Biofilm formed by sulfate-reducing bacteria *Desulfovibrio desulfuricans* G20. Courtesy of Alice Dohnalkova, Pacific Northwest National Laboratory.



Figure 4: Cell division with red chromosomes labeled with mApple-histone H2B. Courtesy of Michael Davidson, Florida State University.

meteorites, minerals, and aerosols” and “Quantification from the micro- to sub-nano-scales: Pushing the Limits.”

Microscopy & Microanalysis 2012 will also showcase a number of emerging techniques. We will have a symposium on the most recent developments in helium ion microscopy. We will also hear the latest about the use of lasers in conjunction with electron beams for ultrafast dynamic electron microscopy. We will continue building on our emphasis on super-resolution techniques with a symposium entitled, “Imaging beyond the diffraction limit: super-resolution in biology.” In addition, the meeting will have a symposium on correlative microscopy and microanalysis, which is a burgeoning area in both the biological and physical sciences, allowing for a productive sharing of ideas from across the societies.

The Technologists’ Forum session topics will be “Microscopy techniques in hydrology,” “Confocal microscopy across the sciences,” and “EM biological specimen prep: protocols for success.” As in previous years, there also will be Sunday short courses, tutorials, and in-week intensive workshops.

Microscopy & Microanalysis 2012 will continue adding energy to the poster sessions. The technical posters at M&M provide an ideal forum for in-depth discussion about the latest technical results that mirror and reinforce the platform sessions. Following the success in 2011, we will have a poster session each day of the technical meeting, and we will announce student poster awards each day of the meeting. New for 2012, we will have invited poster presentations. These poster presentations will increase the technical excellence of our poster session by bringing some of the very best technical work at the meeting to these presentations.

The Executive Program Committee invites you to review the complete listing of symposia, contributed sessions, workshops, and short courses at <http://www.microscopy.org/MandM/2012/program.cfm>.

Finally, the M&M meeting will again include the largest annual exhibition of microscopy and microanalysis instrumentation in the world. Preliminary exhibit booth sales data indicate that the show will be larger than last year.

We welcome microscopists of all disciplines to an inclusive, dynamic, and interactive conference. We look forward to seeing you in Phoenix in 2012!

References

- [1] RK Ryan and S Dekanich, *Slip Lines* 38(4) (2010) 6.

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SPECTROSCOPY OF MICROSCOPIC SAMPLES

CRAIC Technologies UV-visible-NIR microscopes and microspectrophotometers are used for imaging and spectral analysis of sub-micron sized features with absorbance, reflectance, fluorescence, emission and polarized illumination. Capabilities include film thickness measurements, colorimetry and high resolution imaging in the UV, visible and NIR regions. **Rapid & accurate** spectra & images of microscopic samples: The Perfect Vision for Science™.

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TECHNOLOGIES

June 3 -15, 2012

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MAIN COURSES

SCANNING ELECTRON MICROSCOPY and X-RAY MICROANALYSIS June 4-8 *Flagship Course*

Provides a working knowledge of SEM and EDS X-ray microanalysis as well as an introduction to variable-pressure (environmental), low-voltage, and high-resolution SEM. Students are encouraged to bring their own specimens.

INTRODUCTION to SEM and EDS for the NEW OPERATOR June 3

A one-day course with lectures and labs related to the basic operation of the SEM. Enrollment limited to participants attending the main SEM course above.

**Win an
Apple iPad!**

iPads loaded with course notes and labs will be given away to FIVE Flagship Course registrants.

Drawing will be on June 4th, the first day of the SEM course above.

Registration guarantees eligibility!

SPECIALIZED COURSES

QUANTITATIVE X-RAY MICROANALYSIS: Problem Solving using EDS and WDS Techniques June 11-15

BRING A SPECIMEN – SOLVE A MICROANALYSIS PROBLEM! Learn how to perform EDS and WDS microanalysis on bulk specimens, layered materials, particles, and beam-sensitive materials. Master problem solving and quantitative microanalysis using $\Phi(\rho Z)$ corrections and software tools. Discover new technologies including silicon drift detectors. Become a better analyst with improved skills.

SCANNING TRANSMISSION ELECTRON MICROSCOPY: From Fundamentals to Advanced Applications June 11-15

This course provides an understanding of the concepts, instrumentation, and applications of STEM. The course explores basic and advanced levels of the following topics: STEM imaging, aberration correction, EDS, EELS, CBED, tomography, data manipulation, sample preparation, and a review of complementary techniques.

FOCUSED ION BEAM (FIB): Instrumentation and Applications June 11-14

Ion-solid interaction theory will be introduced and used in describing methods of specimen preparation for SEM, TEM, AFM, Auger, SIMS, and atom probe. Other topics include FIB/SEM analytical characterization and milling/deposition techniques for nanotechnology.

For more information, contact:
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