Minnesota Microscopy Society

Local affiliate of the **Microscopy Society of America**
and the **Microbeam Analysis Society**

Newsletter

April 2007

Date:
Friday, April 20, 2006

Location:
Science Museum of Minnesota
120 W. Kellogg Blvd., St. Paul
Discovery Hall
(www.sci.mus.mn.us)

FOCUS ON SCIENCE

Minnesota Microscopy Society Spring Symposium

Emerging Technologies in Microscopy

Schedule

7:00 - 8:00 AM	Registration, Continental Breakfast, and Vendor Displays
8:15 - 8:30 AM	Ev Osten, 3M Company *Introduction: Emerging Technologies*
8:30 - 9:10 AM	Mark Kelsey, Bruker AXS Microanalysis *The Confusion over Silicon Drift Detectors*
9:10 - 9:50 AM	Vern Robertson, JEOL USA, Inc. *Recent Advances in Low kV Microanalysis*
9:50 - 10:30 AM	Break and Vendor Displays
10:30 - 11:10 AM	Bill Roth, Hitachi High Technologies America, Inc. *STEM Imaging of Lattice Fringes and Beyond in a UHR In-Lens Field-Emission SEM*
11:10 – 11:50 AM	Richard Bormett, Renishaw Inc. *Raman Microanalysis Without an Optical Microscope: Bringing Raman Spectroscopy to the SEM Microscope*
11:50 - 1:15 PM	Lunch and Vendor Displays
1:15 - 1:30 PM	Business Meeting
1:30 - 2:20 PM	John Notte, ALIS Corporation *An Introduction to the Helium Ion Microscope*
2:20 - 2:55 PM	Break and Vendor Displays
2:55 – 3:45 PM	Eugene Paransky, Delong America *Practicality, Functionality and Economy Concepts in Micro and Nanotechnology Imaging* *(a benchtop combined transmission and scanning electron microscope)*
3:45-4:00 PM	Door Prizes, Closing Remarks

Registration

The cost of the meeting will be $75 for MMS members and $85 for nonmembers. This fee includes the meeting, buffet lunch, breakfast, coffee breaks, and **a free pass to the Museum exhibits** (a $7 value). Registrants can pay at the door, but reservations must be made in advance. For students and K-12 teachers the registration fee is $35.

Reservations MUST be made no later than **Monday, April 16th**. Register by e-mailing Bede Willenbring at mms-reservations@comcast.net. Include your name, company, phone number, and e-mail address.

Luncheon Buffet

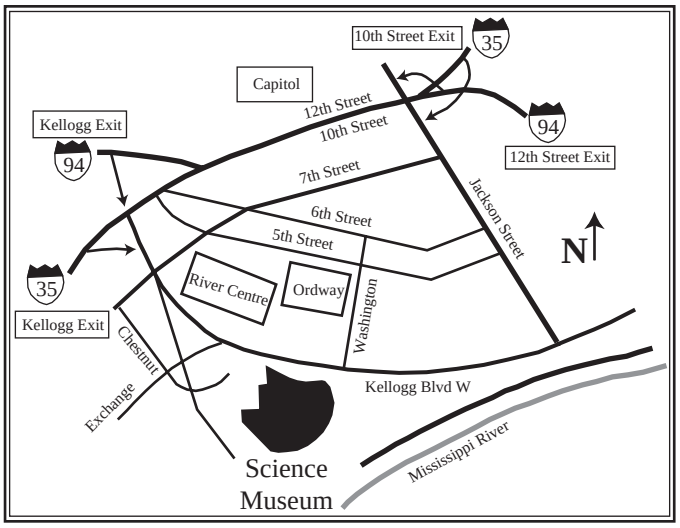
- Platters of cold roast beef, roast turkey, and smoked ham.
- Slices of swiss, cheddar, and pepper jack cheeses.
- Fresh lettuce, sliced tomatoes, onions, and pickles.
- Freshly baked bread, rolls and petite croissants.
- Country potato salad, penne pasta salad primavera, and kettle chips.
- Fresh sliced fruits of the season.
- Chocolate Torte.

Registration Includes a Free Pass to the Science Museum

The Science Museum of Minnesota always has an exciting array of exhibits. In addition, the Science Museum has the Omnitheater and the 3D Cinema showing great films. Tickets to these theaters are extra. For more information go to www.smm.org.

Location of the Science Museum and Meeting Room

The Science Museum is located at 120 W. Kellogg Blvd., St. Paul. The meeting will be held in Discovery Hall. If entering the Museum from Kellogg Boulevard, go through the Lobby, angle left just after the Box Office, and continue to the stairs/elevators. Discovery Hall is one floor down.



Parking

The Science Museum's parking ramp can be accessed from either Kellogg Boulevard or Chestnut Street. Enter the museum by taking the parking ramp elevator to the Lobby level. The River Centre ramp is an alternative to the Science Museum's ramp.

Abstracts

The Confusion over Silicon Drift Detectors

Mark Kelsey, Bruker AXS Microanalysis, 312 North Harvey Ave., Oak Park, IL (mark.kelsey@Bruker-axs.com)

Silicon drift detectors were first commercialized over 10 years ago. Though they have always had the advantage of high count rates and not requiring liquid nitrogen they lacked the resolution needed for microanalysis. Over the years, the resolution has improved. Today the most advanced detectors outperform the traditional Si(Li) detectors in spectral resolution. The talk will discuss the principles, history and applications of these detectors.

Mark Kelsey received his BS from St. Louis University in chemistry and his MS from Purdue University in Analytical Chemistry. He has been working in the field of material characterization since 1976. He have authored a number of papers on thermal analysis and have been involved with microanalysis for the last 5 years.

Recent advances in Low kV Microanalysis

Vernon E. Robertson, JEOL USA, Inc. 11 Dearborn Road, Peabody, MA (vern@jeol.com)

Advances have occurred with both the electron optics and the spectrometers offering dramatic improvements in overcoming the fundamental limitations of doing good low kV microanalysis. Advances in hardware and software will be discussed along with applications related examples.

Vern received a BSc. in Earth Science from the University of New Hampshire. Industrial experience included 7 years as a principle analyst in an independent testing laboratory with a primary focus on environmental & industrial problem solving. Experience included: light microscopy, SEM, EDS, WDS, X-Ray Diffraction, and inorganic wet chemical analysis. Vern joined JEOL USA, Inc. in 1986 as a Senior SEM Applications Specialist and has been directly involved in hands on SEM analysis ever since. His current position is National Laboratory Manager and Field Emission SEM Product Manager.

Practicality, Functionality and Economy Concepts in Micro and Nanotechnology Imaging

Eugene Paransky, Ph.D., LVEM5 Senior Application Engineer

Today's research at the micro and nanoscale demands tools that enable researchers to achieve more, more easily, and all the while staying within the limits of a reasonable budget. In other words, tools need to break through traditionally-rigid practical and economical accessibility restrictions while maintaining or notching up the level of performance. Nanotechnology imaging tools should lead the way in this shift of research resources - from restrictive and overly complex to accessible and operable - as electron microscopes are most likely the most susceptible instruments to restrictions based on size, cost and complexity, while perhaps the instrument most capable of accelerating and broadening research programs were these barriers of use not present. The new class of electron microscope, the Benchtop low voltage combined transmission and scanning LVEM5 removes access barriers and introduces ultra-high contrast EM for every lab.

Dr. Eugene Paransky is Delong America's applications engineer.

Raman Microanalysis Without an Optical Microscope: Bringing Raman Spectroscopy to the SEM Microscope

Richard W. Bormett, Ph.D., Renishaw Inc., 5277 Trillium Blvd., Hoffman Estates, IL (Richard.Bormett@renishaw.com)

Advances in Raman instrumentation and the ease of use of modern micro-Raman instruments have allowed Raman microscopy to become a routine method of chemical analysis in an optical microscope. However Raman imaging in an optical microscope remains a time intensive spectroscopic method generally not well suited to surveying large areas where there are potentially unknown constituents. Raman spectroscopy can now be incorporated into scanning electron microscopes. The scanning electron microscope supports a number of "fast" chemical and topographical contrast methods, including energy dispersive x-ray analysis and cathode luminescence and fluorescence, that can greatly simplify area composition distribution analysis. Examples and advantages of chemical/topographical imaging using non-optical microscopes to identify regions of difference/interest for Raman chemical analysis will be shown.

Richard Bormett has been with Renishaw Inc, Hoffman Estates IL., since 1996 and the Renishaw Business Manager for Raman products since 2002. Richard earned his Ph.D. in Analytical Chemistry in 1996 from the University of Pittsburgh working with Professor Sanford Asher on new instrument technology for deep UV Raman spectroscopy and vibrational circular dichroism. Richard's interest in vibrational spectroscopy developed during his brief time at UW-Madison's Synchrotron Radiation Center studying the chemistry of photoresists for the Center for X-ray Lithography.

An Introduction to the Helium Ion Microscope

John A. Notte, Ph.D., ALIS Corp (a Carl Zeiss SMT AG Company), 10 Technology Drive, Peabody, MA (notte@smt.zeiss.com)

The performance of scanning electron microscopes (SEMs) and focused ion beams (FIBs) has long been limited by the quality of the source of the charged particles. A new type of gas field ion source has allowed us to make an easily focused beam of helium ions. The helium ions can be used to image samples with higher resolution and better contrast mechanisms than SEMs or FIBs. The extension of this technology to heavier gases will permit operation like a traditional FIB but without gallium contamination. This talk will provide an overview of this new technology and several applications.

John Notte received his Bachelor's degree in Physics from Case Western Reserve University in 1987. As a part of his undergraduate research, he developed a precision torsion balance for measuring very small gravitational forces. John received his Ph.D. in experimental electron plasma physics from U.C. Berkeley in 1993 where he developed a trap for confining low energy electrons for many hours. While confined, the plasma equilibrium shape and dynamics were controlled and studied using an innovative MCP imaging system. At Bates College, John taught physics, astronomy, and math while constructing another electron trap with a grant from the Howard Hughes foundation. Since leaving academia, John has worked for a variety of companies specializing in high performance imaging: AMRAY, KLA-Tencor, and FEI. In these companies John worked on electron optics, detector optimization, system automation, and image analysis. John began work at ALIS Corporation in 2005, specializing in the physics of the helium ion source. The ion beam from this source has a virtual source size smaller than a single atom, and can be focused to a spot size as small as 2.5 Angstroms. John is now employed at Carl Zeiss where he is developing further commercial improvements to the helium ion microscope.

Microscopists Wanted

MICROSCOPY POSITION
University of Iowa
Assistant Research Scientist

The Office of the Vice President for Research, Central Microscopy Research Facility, Iowa City, IA seeks an Assistant Research Scientist to perform basic research utilizing light, confocal and electron microscopy on mammalian cells and tissue. Responsibilities include the identification and selection of new questions to be addressed, the selection and application of experimental approaches to address these questions and analysis of the results obtained. Requires a Ph.D. in a biomedical science or equivalent professional degree as well as demonstrated experience and knowledge of light, confocal and electron microscopy as it applies to mammalian cell and tissue structure and function. Desires experience in neuroscience and cancer cell biology; and experience with the analysis of the subcellular distribution of cell components in live and fixed specimens by microscopy or other imaging techniques. Also desires established track record of scientific productivity (e.g., authorship in peer- reviewed publications); excellent organizational and communication skills; ability to work independently; and willingness to work flexible hours. Go to website at http://jobs.uiowa.edu/ to apply for this position (Req #53771).

Microscopy Activity Development Intern
Science Museum of Minnesota

The Science Museum of Minnesota is looking for an unpaid intern to help develope activities involving the Museum's new fluorescent/brightfield microscope. Requirements include college work in biology or a related field, friendly presence and helpful attitude, good interpersonal communication skills, and ability to work well with others as well as independently. Application deadline is April 13, 2007. For more information and to apply, visit: http://www.smm.org/getinvolved/internships/

TEM MICROSCOPIST
University of Minnesota, Characterization Facility
Research Associate

The Characterization Facility at the University of Minnesota is seeking applicants with experience in advanced TEM methodology (energy filtering a plus), high-resolution TEM imaging, analytical TEM, specimen preparation, and data interpretation. SEM experience is also required. The successful candidate must be able to work both independently and in discussion with diverse users, ranging from those seeking microscopy services to those seeking intense training (students, postdocs, industrial clients) so as to become independent microscopists. A Ph.D. in materials science, chemical engineering or similar science or engineering field is required, and 5+ years experience using transmission electron microscopy for the characterization of both inorganic and organic materials.

The duties include operation, calibration and troubleshooting of electron microscopes (4 TEMs and 4 SEMs, under service contracts) and ancillary hardware. Training of users. Interpersonal skills are exceedingly important, including the ability to interact well with industry (analytical services/training, collaboration and technical aspects of marketing) as well as one-on-one and small-group teaching. This further requires exceptional multitasking and organizational skills. The position includes independent research, which will increase with success in grant co-authorship and industrial collaboration, and oversight/co-mentorship of undergrad, grad and postdoctoral research projects.

For more information go to the University of MN job site link: http://employment.umn.edu/applicants/Central?quickFind=60679 or contact Michael Boucher at mboucher@tc.umn.edu.

Future Events

Microscopy & Microanalysis 2007

Location

Broward County Convention Center
Fort Lauderdale, Florida

Dates

August 5 - August 9, 2007

Tutorials

- High pressure freezing for electron microscopy of biological specimens.
- Freeze substitution method: tutorial and roundtable discussion.
- A novel sample freezing method.
- Electron tomography for materials science.
- LACSBI: incoherent imaging for quantitative TEM.
- Atomic force microscopy (AFM) and related microscopy techniques and applications.
- X-ray microCT.

More Information

http://microscopy.org/MMMeetings/MM07/

Scanning 2007

Location

The Portola Plaza
Monterey, California

Dates

April 10 - April 12, 2007

Short Courses

- Scanning microscopy in forensic science.
- Introduction to atomic force microscopy.
- Advanced topics in SEM.
- Quantitative measurements using atomic force microscopy.
- Materials sciences applications of atomic force microscopy.
- Mastering the digital image.

More Information

201-818-1010
www.scanning.org

Surface Analysis 2007

Call for Papers

29th Annual Symposium on Applied Surface Analysis

Location: Radisson University Hotel
Minneapolis, Minnesota
Dates: June 11- June 13, 2007
Registration: Online at www.mnavs.org

This conference is sponsored by the Applied Surface Science Division of the American Vacuum Society (AVS) and the Minnesota AVS Chapter. It is intended for scientists in disciplines related to surface analysis techniques and their applications. Topics of particular interest will include:

- imaging with high lateral resolution,
- compositional depth profiling,
- applications of quantitative surface analysis.

Invited Talks Include:

- ◆ High-resolution *in-situ* XPS/UPS as probes of composition and electronic structure in oxide semiconductor MBE film growth.
- ◆ Surface characterization of fuel-cell components.
- ◆ Surface characterization at the biointerface.
- ◆ Probing coating morphology and polymer-drug segregation with novel environmental SPM methodology.
- ◆ Local electrode atom probe characterization of magnetic recording materials.
- ◆ Direct detection of products from cellular metabolism using ToF-SIMS.
- ◆ 3D characterization of organic/polymeric thin films using cluster SIMS.
- ◆ Raman imaging of biomedical coatings.

The deadline for submitting abstracts is April 13th. Go online to www.mnavs.org for more information and for submitting abstracts.

Sustaining Members

Sustaining members are the backbone of financial support for the Society. These members make it possible for the Society to support Project Micro and to cover many expenses of the regular meetings and the Spring Symposium. We greatly appreciate the continued support of these individuals and corporations. To become a Sustaining Member, complete and return the MMS membership form at the end of the newsletter.

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If any Sustaining Members are missing from this list, *please* contact either: Jason Heffelfinger (763-514-1021, jason.r.heffelfinger@medtronic.com) or Peter McSwiggen (612-781-2282, PMcS@McSwiggen.com).

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The Minnesota Microscopy Society would like to express sincere thanks to our Patron Members. These members provide financial support to the organization above the standard membership fee. This additional support makes it possible for MMS to maintain its financial well being. To become a Patron Member, complete and return the MMS membership form at the end of the newsletter.

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Minnesota Microscopy Society – Membership Form

All microscopists are urged to support their Society at one of the membership levels offered below. The more dues-paying members we have, the more likely we are to attract sustaining corporate memberships which form the financial backbone of our Society. Often, supervisors will support MMS memberships out of their project budget because they recognize that it is a very inexpensive way to maintain and increase the skills of their microscopists. If you have been a member over the years and recognize the value of MMS to the community of microscopists it serves, consider upgrading your membership this year to the patron or sustaining level. Thank you.

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Indicate the method by which you would like to receive the Newsletter: mail_____ e-mail/web_____ both _____

Check here _____ if you do NOT want your name and address to appear in the Society directory.

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Student ($5)_____ Basic ($10-$24)_____ Patron ($25-$99) _____ Corporate Sustaining ($100-) _____

Payment: _____ Check _____ Visa _____ Mastercard _____ American Express _____ Discover

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Spring Symposium