Minnesota Microscopy Society

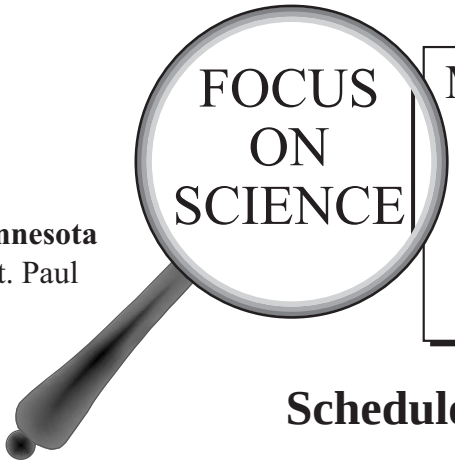
Local affiliate of the ***Microscopy Society of America***
and the ***Microbeam Analysis Society***

Newsletter

April 2005

Date:
Friday, May 6, 2005

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



Minnesota Microscopy Society Spring Symposium

Cutting Edge Technologies in Microscopy

Schedule

7:30 - 8:15 AM	Registration, Continental Breakfast, and Vendor Displays
8:15 - 9:00 AM	Tom Isabell, JEOL USA, Inc. *Trends in Electron Microscopy, A Corrected View of the Future*
9:00 - 9:45 AM	David Larson, Imago Scientific Instruments; *Analysis of Materials on an Atomic Scale*
9:45 - 10:30 AM	Break and Vendor Displays
10:30 - 11:15 PM	Scott Chumbley, Iowa State University *WebSEM: Interactive, On-Line Microscopy for Education*
11:15 - 12:00 PM	Scott Chumbley and Amy Chumbley - ***WebSEM Demo***
12:00 - 1:00 PM	Lunch and Vendor Displays
1:00 - 1:30 PM	Business Meeting (Society elections, Project MICRO, etc.)
1:30 - 2:15 PM	Paul Voyles, University of Wisconsin, Madison *Imaging Single Impurity Atoms with Z-contrast STEM*
2:15 - 3:00 PM	Break and Vendor Displays
3:00 - 3:45 PM	Duane Krueger, University of St. Thomas *Windows into Fragile Materials: Confocal Light Microscopy and ESEM*

Registration

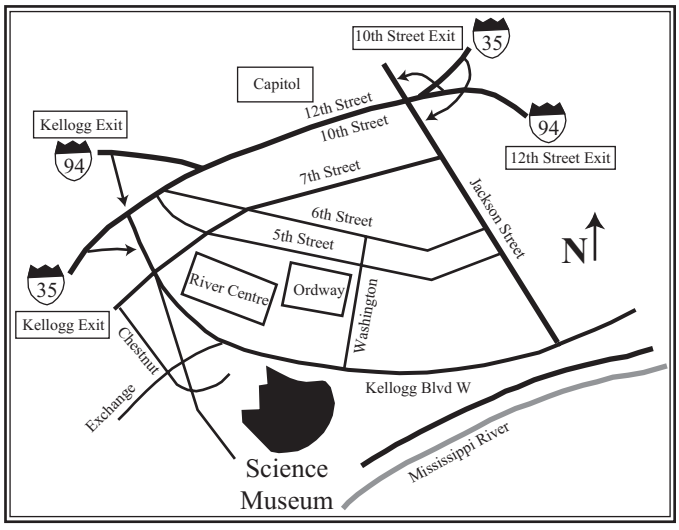
The cost of the meeting will be $75 for MMS members and $85 for nonmembers. This fee includes the meeting, buffet lunch, breakfast, coffee breaks, and **a free pass to the Museum exhibits** (a $7 value). Registrants can pay at the door, but reservations must be made in advance.

For students and K-12 teachers the registration fee is $35.

You must make your reservations by Tuesday, May 3rd, and you can do so by contacting Robert Lundquist (robltt@juno.com; 763-494-7945). Include your name, address, and phone number or e-mail address with your reservation. Due to the high cost to the Society, we will have to bill those who make reservations but do not show.

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 Omnitheater features are "Kilimanjaro" and "Mars 3D". Tickets to the Omnitheater are extra.

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.

Having Trouble Getting onto the MMS Web Site?

Some members have reported having trouble accessing the MMS Web site. Some of these problems are a result of filtering that is taking place at the member's own organization. Some IT departments are blocking Web sites that redirect the user to a second Web address. This is what happens when the MMS Web site is accessed. The actual physical Web site is housed on a University of Minnesota server. Therefore when www.MNmicroscopy.org is entered into your browser you should be redirected to www.charfac.umn.edu/MnMicSoc.html. If this doesn't happen, try entering the University URL directly. If you still cannot access the Web site, report the problem to our webmaster at stuartm@umn.edu.

Trends in Electron Microscopy, A Corrected View of the Future

Thomas C. Isabell, JEOL USA, Inc., 11 Dearborn Rd, Peabody, Massachusetts 01960, USA

Abstract

Characterization of technologically important materials increasingly needs to be done at the atomic or even sub-atomic level. This characterization includes determination of atomic structure as well as structural chemistry. The characterization tool of choice has been the transmission electron microscope (TEM), operating in either TEM or scanning (STEM) modes. Recent advances in instrumentation have pushed the spatial resolution of the TEM to sub-Ångstrom levels. This has been accomplished through the use of spherical aberration (Cs) correctors, both for the imaging (TEM corrector) and probe forming (STEM corrector) lenses of the microscope.

With Cs correctors, TEM spatial resolution of better than 0.8 Å has been achieved and analytical probe sizes of better than 0.7 Å have been formed for STEM. In addition to improvements in resolution, Cs correctors offer a number of other significant improvements and benefits. A probe forming Cs corrector gives more beam current in the same small probe used for chemical analysis. This allows chemical characterization to be done more rapidly, and with better spatial accuracy. Spatial chemical characterization, such as EDS or EELS line profiling and mapping, can be performed in a fraction of the time as previously done, offering benefit for beam sensitive specimens.

A Cs corrector allows a wider objective lens pole piece gap to be used on the microscope to attain the same spatial resolution. This has benefit by allowing more room for additional tilt and for insertion of probes and/or gases for in-situ experiments. Furthermore, resolution sensitivity to specimen tilt diminishes since coma is eliminated as Cs disappears.

Biography

Tom Isabell is the Assistant TEM Product Manager for JEOL USA, Inc. Tom has seven years experience in the electron microscopy field. His experience includes business development, domestic and international sales, customer support, applications support, and design and development of specimen preparation equipment for electron microscopy. His research has included application development and the study of relationships between atomic scale structure and properties at various interfaces. Tom received a Ph.D. from Northwestern University in Materials Science and Engineering, and a Bachelor of Science in Materials Science and Engineering from the University of Minnesota.

WebSEM: Interactive, On-Line Microscopy for Education

S. Chumbley, A. Chumbley, G. Casuccio, Iowa State University, Ames, Iowa

Abstract

Since the early 1990's the Materials Science and Engineering Department (MSE) at Iowa State University (ISU) has been involved in adapting the traditional single user scanning electron microscope (SEM) to be more compatible in a multi-user teaching environment. The current status of this effort is embodied in the WebSEM, an interactive, on-line SEM that can be operated by means of a simple web interface. Developed in conjunction with RJ Lee Group, the WebSEM is a free service offered to educators. Teachers and students can move the sample, control image quality and appearance, collect images and elemental compositions using the integrated energy dispersive spectrometer (EDS) all from a classroom computer connected to the Internet. The design of the system is such that a wide range of computers and browsers are supported, with no proprietary hardware or software requirements. This talk will give a brief history of the development of the system and the special difficulties associated with working with K-12 classrooms, as well as show some examples of lessons that have been conducted around the world using the WebSEM.

Windows into Fragile Materials: Confocal Light Microscopy and ESEM

Duane A. Krueger, University of St. Thomas, St. Paul, MN

Abstract
Confocal light microscopy is divided into three different instrumentation types: Nipkow spinning disk, scanning laser, and 2-photon. All three instruments operate on the basic premise of scanning across a sample to obtain a very shallow depth-of-field in-focus image slice. Multiple image slices act to "optically section" the sample of interest. The slices may be stored in a computer, then recombined to provide a high resolution, extended focus of the sample that is not possible using a normal light (optical) microscope. By using fluorescence wavelengths to analyze a neat or component-specific stained sample, internal and structural information can be rapidly obtained that would not be possible using other techniques. Confocal microscopy is a powerful tool for biological research and, less commonly, used to examine industrial materials. The analyst must consider the effects of a high photon flux on the sample that may cause bleaching of the fluorophore or physically damage the sample being analyzed. As with any common light-based analysis technique, the wavelength of light limits resolution to approximately 0.2 mm.

The Environmental Scanning Electron Microscope (ESEM) and similar instruments, such as variable pressure scanning electron microscopes (VPSEM), allow high resolution surface imaging of wet, vacuum sensitive, and electrically insulating samples. The instrumentation is a dynamic tool to study samples at high magnification without the necessity of conductively coating the sample, and to study materials in a moist or gaseous environment of choice. The instrument also allows elemental analysis and can be modified to perform and observe temperature and/or mechanical manipulation effects of the sample.

The talk will include a brief background concerning the theory, instrumentation, use, and application considerations of each technique.

Imaging Single Impurity Atoms with Z-contrast STEM

Paul Voyles, University of Wisconsin, Madison

Abstract
David Muller and I have demonstrated the first images with quantifiable contrast from single impurity atoms inside a bulk crystal using Z-contrast STEM on heavily antimony-doped silicon. I will discuss how we know we see contrast from single atoms and what the images tell us about dopant - point defect complexes in doped silicon. I will also briefly discuss the potential for imaging single atoms using spherical-aberration corrected STEM.

Biography
Paul M. Voyles is an Assistant Professor in the Department of Materials Science and Engineering of the University of Wisconsin, Madison. He holds a Ph.D. from the University of Illinois at Urbana-Champaign, where he worked with Murray Gibson on fluctuation electron microscopy of nanoscale structure in amorphous silicon. He was a post-doctoral member of technical staff at Bell Labs, in Murray Hill, NJ with David Muller, where he applied high-resolution Z-contrast STEM to the study of defects in highly-doped silicon. He joined the faculty at Wisconsin in 2002, where he is studying nanoscale order in metallic glasses and defects and alloying in superconductors.

ProjectMicro Gets a New Director

Jeff Payne has taken over the leadership of MMS's ProjectMicro. Jeff has been a volunteer since 1996, and has agreed to take over responsibility for coordinating events from Ann Palmer, who has been director for the past three years. Ann has been forced to cut back on her commitments due to a heavy graduate school workload.

For those interested in volunteering for upcoming ProjectMicro events contact Jeff Payne at jjpayne@mmm.com. ProjectMicro will have a table at the upcoming MMS Spring Symposium and volunteers will be needed.

Position

Electron Microscopy Technician

Aerotek Scientific is looking to hire an Electron Microscopist on a Full Time basis. Specific responsibilities include daily operation of scanning electron microscopes (SEM) and energy dispersive spectroscopy (EDS) systems. This includes the evaluation of incoming materials, monitoring product at various processing stages, failure analysis and evaluation of vendors products. Hands-on experience with the operation and maintenance of scanning electron microscopes (SEM) and energy dispersive spectroscopy (EDS) is required. Additional responsibilities include maintaining and troubleshooting SEM's, EDS systems and accessories and maintaining records on equipment usage. The candidate must be highly interactive, willing to collaborate on diverse projects and able to identify and research the best methods of specimen preparation and examination. This position requires a high amount of customer interface. The candidate must demonstrate excellent interpersonal and communication skills. The candidate must also demonstrate excellent technical and analytical skills and be comfortable working in a fast pace environment to assure prompt and quality service. The successful candidate should show evidence of laboratory aptitude, computer experience, vacuum systems experience and a positive work ethic.

Education: The candidate should have a 2 year minimum degree in technical-vocational school.

All Interested Candidates should contact:

Raquel Severson
Aerotek Scientific
651-415-6638
rseverso@aerotek.com

Upcoming Meetings and Courses

Microscopy and Microanalysis 2005

Upcoming MSA and MAS Meeting

This year the Microscopy and Microanalysis Conference will be held July 31 - August 4 at the Hawaii Convention Center, Honolulu, Hawaii. What more needs to be said? The meeting can be summed up in one word...Hawaii. But for more information see the meeting's official web site at; http:// MM2005.microscopy.org.

Photoshop Seminar

Automating Photoshop:
Quantization, Layout, Colorizing & Enhancement

Date: May 5, 2005, 1:30 - 4:30 PM
Location: Coffman Union, University of Minnesota
Instructor: Jerry Sedgewick, Univ of Minnesota
Cost: $39.95

The course is directed at automating tasks within Photoshop. The registration fee includes a CD with scripts to automate every function used in research, including colorizing, pseudocolor, layout and saving. For more information go to: http://rawlight.com/seminars2.html. To register, e-mail Jerry Sedgewick at sedge001@umn.edu.

SCANNING 2005

Date: April 5 - 7, 2005
Location: Monterey Conference Center
Monterey, CA
Sponsor: FAMS, Inc. (Foundation for the Advances in Medicine and Science) and *Scanning, The Journal of Scanning Microscopies*
For more information: www.scanning.org

Sustaining Corporate Members

Sustaining members are the backbone of financial support for the Society. These members make it possible for the Society to support ProjectMicro 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.

Tory Bourgholtzer	**Foundation for Advances in Medicine & Sci.**	201-818-1010
Michael Boykin	**Mager Scientific, Inc.**	734-426-3885
Sally Cameron	**Leeds Precision Instruments**	612-546-8575
Michael Coscio	**Medtronic Inc.**	763-505-4561
Lester Engel	**Engel Metallurgical Ltd.**	320-253-7968
Larry Hanke	**Materials Evaluation & Engineering Inc.**	763-449-8870
Gary Hawkinson	**Thermo Electron Corporation**	608-835-0816
Brad Johnson	**North Central Instruments, Inc. / Leica**	612-559-3008
Mark Kelsey	**PGT**	708-386-9684
Jim Liddle	**HITACHI High Technologies America, Inc**	847-273-4359
Peter McSwiggen	**McSwiggen & Associates**	612-781-2282
Robert Mierzwa	**JEOL USA, Inc.**	920-803-8945
Ruth Murray	**Oxford Instruments USA**	859-384-9861
Ted Pella	**Ted Pella, Inc.**	800-237-3526
Russell Pylkki	**Aspen Research Corp.**	800-811-3037
Gary Saxrud	**Fryer Company, Inc.**	952-942-6747
Jean Schlosser	**Crane Engineering and Forensic Services**	763-557-9090
Chad Tabatt	**Gatan Inc.**	888-778-7933
Joe Ullmer	**EDAX / TSL**	801-495-2750
Ken Witherspoon	**IXRF Systems, Inc.**	281-286-6485

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).

MMS Patron Members

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 type of added 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.

Jacqueline Aguiler	3M Company, St. Paul
Gib Ahlstrand	University of Minnesota, Mpls
Tony Anderson	Surmodics, Eden Prairie
Joel Ash	Focus Precision Inst., Victoria
Paul Baker	Medtronic Inc., Minneapolis
Ellery Frahm	University of Minnesota, Mpls
Chris Frethem	University of Minnesota, Mpls
John Humenansky	Guidant Technology, Arden Hills
Duane Krueger	University of St. Thomas, St. Paul
Lori LaVanier	Evans PHI, Chanhassen
Stuart McKernan	University of Minnesota, Mpls
Devora Molitor	3M Company, St. Paul
Ove Thompson	FEI Compnay, Excelsior
Susan Okerstrom	Medtronic Inc., Brooklyn Center
Ev Osten	3M Company, St. Paul
Ann Palmer	University of Minnesota, Mpls
Jeff Payne	3M Company, St. Paul
Christina Pierce	Surmodics, Eden Prairie
Judith Resler	
Paul Resler	3M Company, St. Paul
Alice Ressler	University of Minnesota, Mpls
Mark Sanders	University of Minnesota, St. Paul
Dan Schaub	FEI Company, Oronoco
Gordon Schrank	St. Cloud State University, St. Cloud
Mary Swierczek	3M Company, St. Paul
Jerry Tangen	JEOL USA, Inc., Monticello
Carol Wells	University of Minnesota, Mpls
Bede Willenbring	H.B. Fuller Co., St. Paul
Neal Zimmermann	Seagate Technology, Prior Lake

MMS BOARD and OFFICERS 2004-2005

President: Dwight Erickson, 3M Center, Bldg. 251-1A-03, St. Paul, MN, 55144; (651) 736-2830, dderickson3@mmm.com

Past-President: Ann Palmer, University of Minnesota Dept. of Pediatrics, MMC 491, 420 Delaware St., Mpls., MN, 55455; (612) 626-3708, palme003@umn.edu

President-Elect: Jason Heffelfinger, Medtronic Inc., 6700 Shingle Creek Parkway, Brooklyn Center, MN 55350; (763) 514-1021; jason.r.heffelfinger@medtronic.com

Secretary: Robert Lundquist, Boston Scientific, One SciMed Place, Maple Grove, MN 55442; (763) 494-7945; robltt@juno.com

Treasurer: Bede Willenbring, H.B. Fuller Co., St. Paul, MN; (651) 236-5470, Bede.Willenbring@HBFuller.com

Corporate Liaison: Jason Heffelfinger, Medtronic Inc., 6700 Shingle Creek Parkway, Brooklyn Center, MN 55350; (763) 514-1021; jason.r.heffelfinger@medtronic.com

Webmaster: Stuart McKernan, IT Characterization Facility, University of Minnesota, Minneapolis, MN, 55455; (612) 624-6009, stuartm@umn.edu

Newsletter Editor: Peter McSwiggen, McSwiggen & Associates, 2855 Anthony Lane S., Suite B1, St. Anthony, MN, 55418; (612) 781-2282, PMcS@McSwiggen.com
Copy Editing: Barbara Meier

MAS Representative: Michael Coscio, Medtronic Inc., 710 Medtronic Parkway, Minneapolis, MN 55432-5604; (763) 505-4561; mike.coscio@medtronic.com

ProjectMicro Director: Jeff Payne, 3M Center, Bldg. 201-BE-16, St. Paul, MN 55144-1000; (651) 733-2352, jjpayne@mmm.com

Other Board Members:

Ev Osten, 3M Center, St. Paul, MN; (651) 736-0104, efosten@mmm.com

Sue Okerstrom, Medtronic Inc., Minneapolis, MN; (763) 514-4678, sue.okerstrom@medtronic.com

Paul Baker, Medtronic Inc., Minneapolis, MN; (763) 514-4519, paul.baker@medtronic.com

Mary Swierczek, 3M Center, St. Paul, MN; (651) 736-5087; mswierczek@mmm.com

Steve Block, JEOL USA, Inc., s-block@comcast.net

Adam Dickson, Cymbet Corp., Elk River, MN adickson@cymbet.com

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.

Name_____ Dr____Mr____Ms____Phone (_____)_____

Affiliation_____Position_____

Address_____ZIP_____

E-mail address _____

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

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

Make checks payable to MMS and mail to our Treasurer:
Bede Willenbring, MMS Treasurer, 4763 Decatur Ave. North, New Hope, MN 55428-4402

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

Are you an MSA member? ____ MAS Member? ____ Other Professional groups? _____

Area of interest: Bioscience_____ Materials Science _____ Light _____ SEM _____ TEM _____ X-ray _____

Per MMS bylaws, article VIII: "For purposes of membership The Society's year shall run from October 1 to September 30. Dues shall be payable between October 1 and December 31st of each year."

Minnesota Microscopy Society
Peter McSwiggen, MMS Editor
McSwiggen & Associates
2855 Anthony Lane South, Ste B1
St. Anthony, MN 55418

Forwarding and Address
Correction Requested

May 6, 2005:

MMS Spring Symposium:

Cutting Edge Technologies in Microscopy