Minnesota Microscopy Society

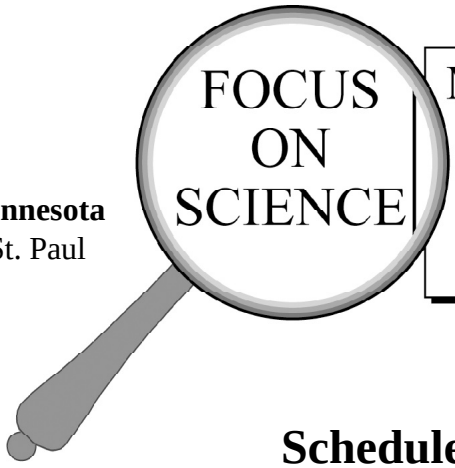
Local affiliate of the ***Microscopy Society of America***
and the ***Microbeam Analysis Society***

Newsletter

April 2004

Date:
Friday, May 7, 2004

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



Minnesota Microscopy Society Spring Symposium

Our Digital World

Schedule

7:30 - 8:15 AM	Registration, Breakfast, and Vendor Displays
8:15 - 10:15 AM	John Mackenzie, North Carolina State University, Electron Microscopy Center *Digital Imaging Workflow in the Modern Microscopy Laboratory (Part I)*
10:15 - 10:35 AM	Break and Vendor Displays
10:35 - 11:20 PM	John Basgen, University of Minnesota, Department of Pediatrics *Stereology: The Measurement of 3-Dimensional Structure using 2-Dimensional Images*
11:20 - 11:45 AM	Business Meeting (Society elections, Project MICRO, etc.)
11:45 - 1:00 PM	Lunch and Vendor Displays
1:00 - 1:40 PM	Mike Prokosch, Corporate Research Analytical Laboratory, 3M Corporation *Film and Digital Photography - A Perspective*
1:40 - 2:00 PM	Break and Vendor Displays
2:00 - 4:00 PM	John Mackenzie, North Carolina State University, Electron Microscopy Center *Digital Imaging Workflow in the Modern Microscopy Laboratory (Part II)*
4:00 - 4:30 PM	Digital Micrograph Contest Awards and Drawing for Door Prizes

Registration

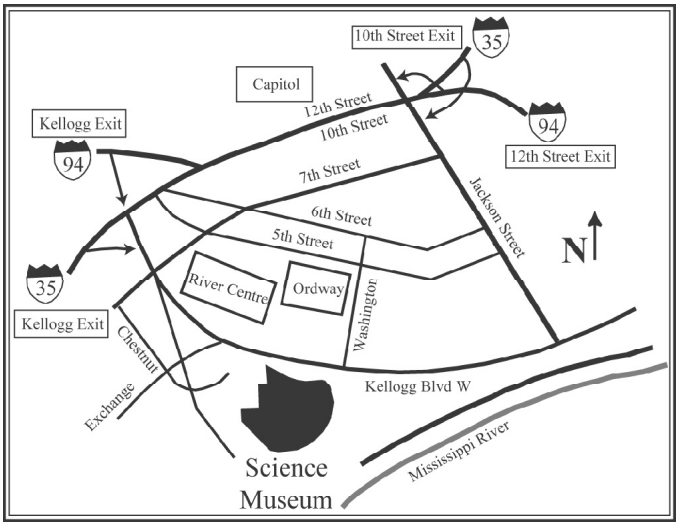
The cost of the meeting will be $75 for MMS members and $85 for nonmembers. This fee includes the meeting, buffet lunch, breakfast, coffee breaks, and **a free pass to the Museum exhibits** (a $7 value). It also includes a chance to win a Door Prize. Registrants can pay at the door, but reservations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

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

You must make your reservations by Friday, April 30th, and you can do so by contacting Robert Lundquist (robltt@juno.com; 763-633-1789). 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 exiting array of exhibits. In addition, right now they have a special exhibit entitled, "Robots and Us," and the feature OmniFilm is "Lewis and Clarke: Great Journey West."

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.

Digital Micrograph Contest

At the MMS Spring Symposium, there will be a contest for the best digital micrographs. There will be two categories for entries: "*Images for Science*," which is limited to micrographs publishable in a scientific journal, and "*Images as Art*," which is limited only by your imagination. First and second place prizes will be awarded in both categories. The best images will be used for next year's MMS poster. To enter, you must be a MMS member, registered at the Symposium, and agree to allow the Society to use your image in upcoming publications.

Each MMS member may enter one image in just one of the categories. Images should be no larger than 8"x10", and should include on the back the submitter's name, address, phone number, e-mail address, contest category, and an optional title. ***For a complete listing of the rules go to the MMS web site.***

Digital Imaging Workflow in the Modern Microscopy Laboratory

John Mackenzie, Director, Electron Microscopy Center, North Carolina State University

Abstract

Digital imaging is replacing conventional photography in many applications. As the quality of digital images improves, more applications move to an all digital approach. This talk will examine the current state of the art in digital imaging. The best strategies available today will be outlined with special emphasis on providing affordable solutions.

Although digital imaging is replacing photography in many applications, it is still not ready for the demands of TEM. The most critical problem with translating our knowledge of photography to digital imaging is that photography operates exclusively via logarithmic functions. The exposure versus density curves common to photography has an x-axis that is logarithmic. The development curves for film and paper are logarithmic. Human vision is also logarithmic. The slope of the log-linear portion of this curve is designated gamma.

Somehow, in the world of digital imaging, a linear scale was adopted. As this is not the same as the manipulations normally performed in photography, it is difficult to produce satisfactory digital images consistently. If, on the other hand, we manipulate the gamma function of the image, we can produce images of publishable quality with little difficulty. It will be shown that the proper gamma adjustment requires a unique gamma for every image. It will be demonstrated that using gamma adjustment in conjunction with histogram stretching will allow superior results to be obtained with a wide variety of output devices.

Several low cost printers will be discussed including stunning advances in inkjet printer technology (Epson C82/84). The quality of this printer not only surpasses that of the expensive dye sublimation printers, but also achieves photographic quality. The problems of longevity, and special inks will be discussed.

There is a fair amount of discussion about image storage. This talk will address strategies for creating the best workflow for digital imaging. Several major topics that must be understood are the necessity of choosing the best image resolution, why compression (especially jpeg) should only be used in Web-based applications, the longevity of the ink/paper combination.

The current generation of image scanners is truly amazing. The Epson perfection 3200 now achieves an optical resolution of 3200 pixels per inch in both reflective and transmissive modes. This scanner can be used to quickly scan TEM negatives at the film's native resolution. It will be shown why the best results are obtained when negatives are scanned as positives at sixteen bit resolution and then converted to 8 bits in Photoshop.

Although not perfect as yet, the future of digital imaging is bright. The striking improvements in speed and resolution of modern digital imaging, coupled with the almost exponential drop in price, promise to make digital imaging an important part of image recording in the future. While it may take a while to replace film in all instances, digital imaging is capable of greatly enhancing our imaging capabilities. As we go forward, it is important to understand that the capabilities of digital imaging have not as yet reached a plateau.

Biography

John Mackenzie is Professor of Microbiology and Coordinator of the Center for Electron Microscopy at NC State University. He was born and raised in Boston, MA. In 1969 he graduated from Dartmouth College with a B.A. Degree in Biology. In 1977 he graduated from Harvard University with a Ph.D. Degree in Cell and Developmental Biology. Before coming to NC State University, he did postdoctoral research at Carnegie Institution of Washington, Stanford University, and Baylor College of Medicine. He joined the faculty at Baylor as an Assistant Professor of Neurology. He teaches courses in transmission electron microscopy, scanning electron microscopy and digital imaging. His current research interests include instrument design and development, with an emphasis on computer control, digital imaging, stereoscopic display and high speed networks.

Stereology: The Measurement of 3-Dimensional Structure using 2-Dimensional Images

John M. Basgen, Department of Pediatrics, University of Minnesota Medical School

Abstract

Even in this age of molecular biology, there is still much interest in measuring the internal structure of 3-dimensional tissues or organs. In order to observe and measure internal structure it is usually necessary to section the tissues or organs. Historically, physical sections were cut using a microtome. Today it is sometimes possible to obtain "optical" sections using MRI, CT scan, or confocal microscopy. No matter how sections are obtained, we are usually left with 2-dimensional images of the 3-dimensional organ. Instead of seeing the 3- dimensional structure we now see 2- dimensional samples of the 3-D structure. This presentation will describe methods for obtaining morphometric information about 3- dimensional tissues and organ by making measurements on 2-dimensional images from the tissue or organs. In addition, techniques will be presented which allow one to determine the optimal number of animals to be used in an experimental group and the optimal number of measurements to make per animal.

Biography

John is a Senior Scientist in the Department of Pediatrics, University of Minnesota Medical School. For more than 25 years, he has used stereology to quantitate structure within biological tissue. He received his Bachelor degree in Biology from the University of Minnesota in 1971, and learned the techniques of stereology from workshops presented by the International Society for Stereology and during visits to the laboratory of Hans Jørgen Gundersen at the University of Aarhus, Aarhus, Denmark. John has taught stereology courses for the Microscopy Society of America, the Minnesota Microscopy Society, the Iowa Microscopy Society, and the Chinese Society for Stereology. He has published numerous papers related to the quantitation of structure. He continues to work at the University on projects related to structural changes in the diabetic kidney.

Film and Digital Photography - A Perspective

Michael Prokosch, Corporate Research Analytical Laboratory, 3M Corporation

Abstract

From the Arctic to Africa to the Falklands to New Zealand, Mike Prokosch has done extensive film photography. With his switch to digital photography for his recent trip to the Antarctic region he will give us his perspective, and images, on these two modes of photography.

Biography

Michael is a research specialist in the surface analysis laboratory of the Corporate Research Analytical Laboratory of 3M. Presently, he is specialized in the application and design of x-ray electron spectrometers with an emphasis on "at-line" analysis. During his 30 year career at 3M, Mike has been involved in molecular spectroscopy, electrochemistry, chromatography and polymer characterization, with major applications in the pharmaceutics and pressure sensitive tape divisions.

For the past decade, Mike has been active in the photography community in the Twin Cities. He has provided advertising images for use by the New London to New Brighton Antique Car Run, the Star of the North Games, and the Mora Vasaloppet. In addition, he has been active in the Photographic Society of America both as an award winning photographer and as a chairman and/or judge of several international competitions. In 2002, he converted from imaging on film to digital imaging. He has done digital photography in both the Arctic and Antarctic regions (and quite a few places in between).

Upcoming Meetings and Courses

Microscopy and Microanalysis 2004

Upcoming MSA and MAS Meeting

This year the Microscopy and Microanalysis Conference will be held August 1st - 5th in Savannah, GA. Savannah is a charming old southern town with lots of history and things to do. It is a beautiful city with elegant antebellum mansions and restored houses, lovely city squares with stately old trees draped in Spanish moss, and fabulous restaurants with gracious service.

SCANNING 2004

Date: April 27 - 29, 2004
Location: Hotel Washington
15th & Pennsylvania Ave., N.W.
Washington, D.C.
Sponsor: FAMS, Inc. (Foundation for the Advances in Medicine and Science) and *Scanning, The Journal of Scanning Microscopies*
Contact: Tory Bourgholter
Foundation for Advances in Medicine and Science
201-818-1010; scanning@fams.org, or www.scanning.org

Short Course

AFM and Other Scanning Probe Microscopes
June 21-25, 2004
North Carolina State University

This one-week short course on atomic force microscopy (AFM) is designed for technicians, scientists, engineers, and researchers. The course includes lectures and laboratories with hands-on time to use a variety of scanning probe microscope (SPM) systems. Each student will receive a notebook of all materials presented in the lectures and animation/simulation software covering AFM principles.

Topics include:

- History and Development of SPM
- Controlling the Probe-to-Sample Gap
- Electronics and Feedback
- SPM Tip Technology
- AFM Modes
- Properties of Force Sensors
- Other SPM Techniques including: LFM, MFM, EFM, ECM, STM
- Digital Imaging: Data to Hardcopy
- Probe-Sample Interactions
- SEM versus AFM
- Resolution Issues
- Metrology
- Nano-mechanics with SPM
- SPM Applications Examples
- How to Choose and Use SPMs

Cost: $1,600.00 (includes lunch daily and a banquet)

Contact: Dr. Dale Batchelor
919-515-3841
dale_batchelor@ncsu.edu
www.ncsu.edu/aif/afmcourse

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@McSwiggenAssoc.com).

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The Minnesota Microscopy Society would like to express a 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.

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Your MMS Annual Membership dues are payable in September/October!

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_____

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

E-mail address _____

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

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

Basic $10_____ Patron ≥ $25_____ Corporate Sustaining $100_____ Student $5_____

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Forwarding and Address
Correction Requested

May 7, 2004:

MMS Spring Symposium:
Our Digital World