

Minnesota Microscopy Society

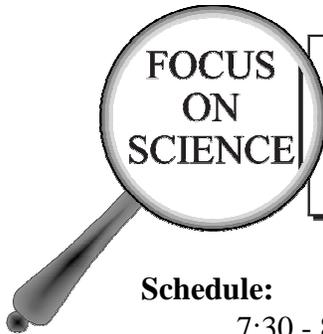
Local affiliate of the Microscopy Society of America
and the Microbeam Analysis Society



Newsletter

May 2009

"Imaging and Microscopy in Medicine"



Minnesota Microscopy Society
Spring Symposium

Date: Friday, May 8, 2008

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

Schedule:

- | | |
|------------------|--|
| 7:30 - 8:30 AM | Registration, Continental Breakfast, and Vendor Displays |
| 8:30 - 9:30 AM | <i>PET and PET/CT: Metabolic Medical Imaging</i> Geoffrey Bodeau, Consulting Radiologists LTD |
| 9:30 - 10:30 AM | <i>Biological EM in the 21st Century: Cryotechniques, Correlative LM/EM, and Cellular Tomography</i> Kent McDonald, University of California, Berkeley |
| 10:30 - 11:00 AM | Break and Vendor Displays |
| 11:00 - 12:00 PM | <i>Advances in Sample Preparation Methods for Light and Electron Optics</i> Mark Sanders, University of Minnesota |
| 12:00 - 1:30 PM | Lunch and Vendor Displays |
| 1:30 - 1:45 PM | Business Meeting |
| 1:45 - 2:45 PM | <i>Ultrasound Imaging: Not Just for Babies Anymore</i> Erick Agrimson and Sue Hummel, College of St. Catherine |
| 2:45 - 3:05 PM | <i>Tribute to Stan Erlandsen</i> |
| 3:05 - 3:15 PM | Door Prizes, Closing Remarks |

Additional Program to Follow:

*U of M Sponsored Recognition Event for Stan Erlandsen,
at the University of Minnesota (Please see Page 3 for details.)*

Registration:

The cost of the meeting will be \$80 for MMS members, \$90 for nonmembers, and \$40 for students and K-12 teachers. 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 no later than Wednesday, April 29th**. Register by e-mail (preferred) to Bede Willenbring at reservations@mnmicroscopy.org, or by phone at 651-236-5470. Include your name, company, phone number, and email address.

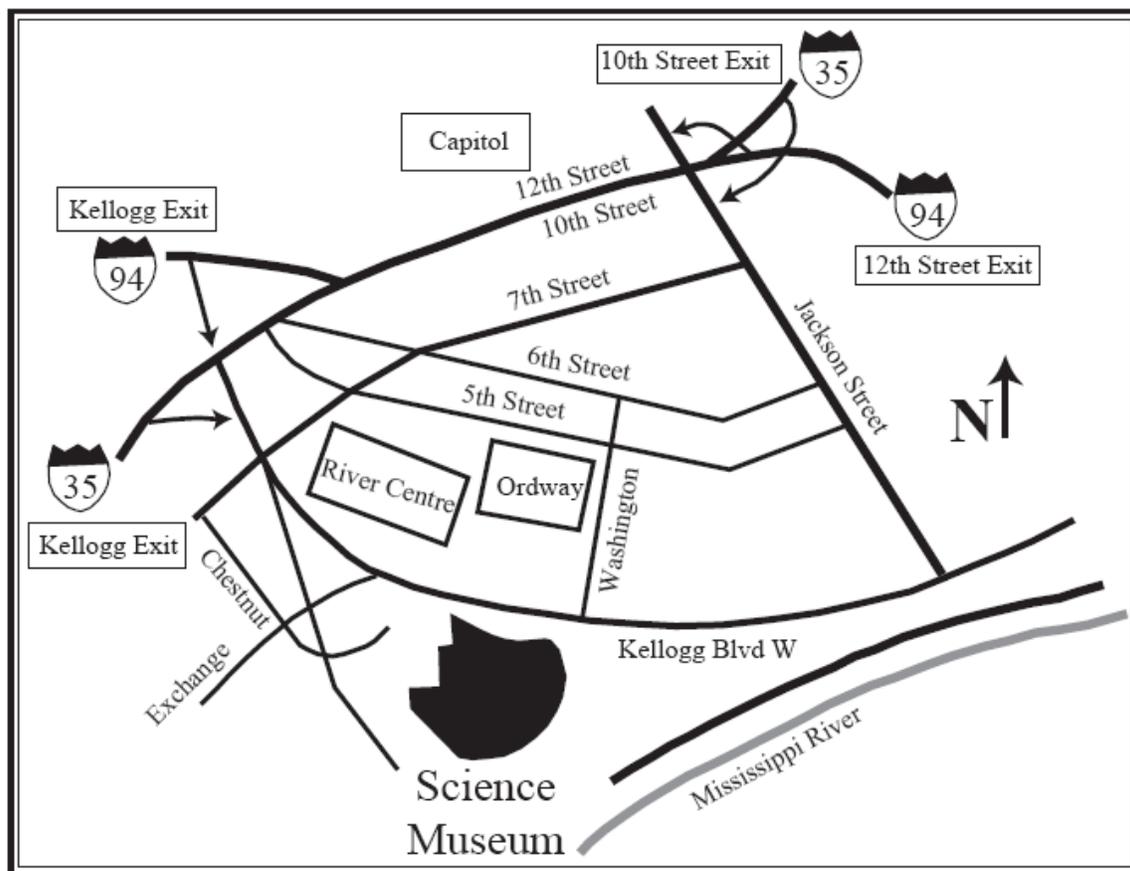
Luncheon Buffet

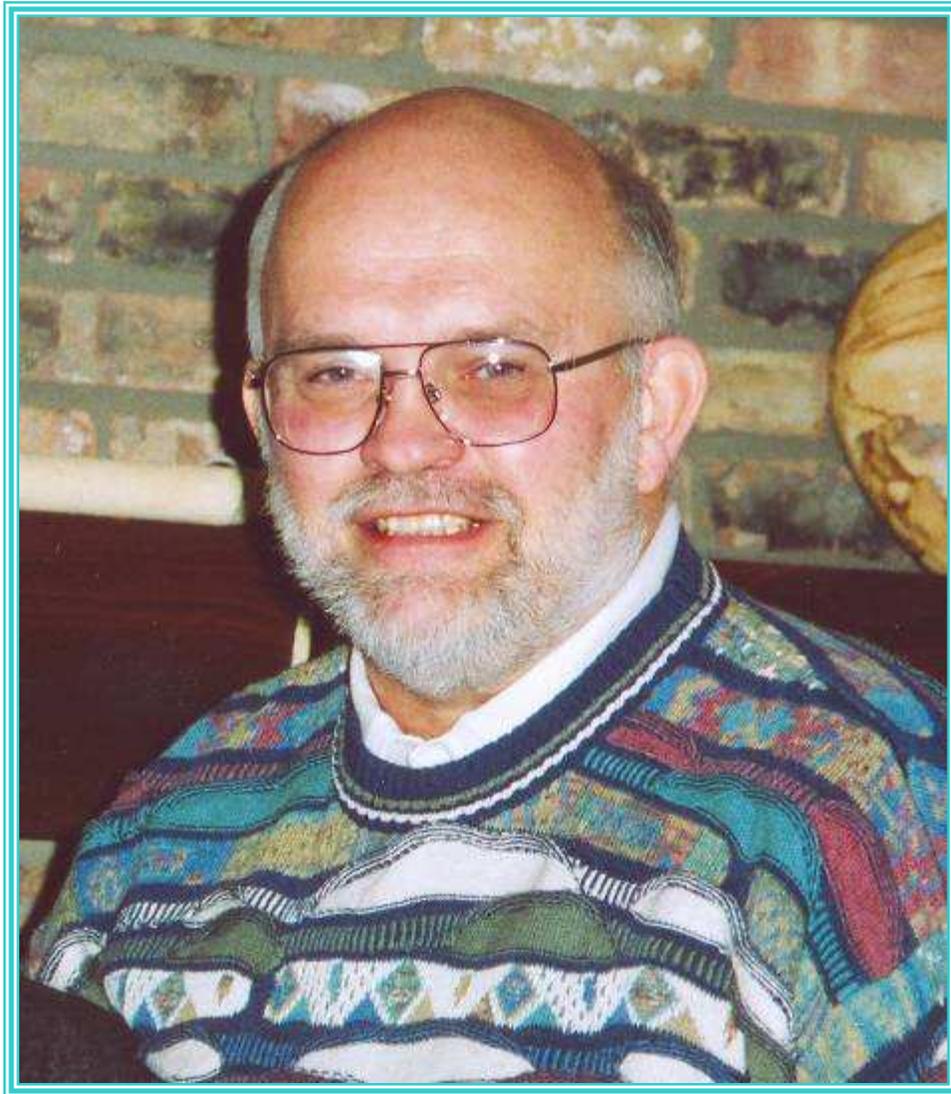
- Platters of cold roast beef, roast turkey, and smoked ham.
- Slices of swiss, cheddar, and pepper jack cheeses.
- Fresh lettuce, sliced tomatoes, onions, and pickles.
- Freshly baked bread, rolls and petite croissants.
- Country potato salad, penne pasta salad primavera, and kettle chips.
- Fresh sliced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

Location of the Science Museum, Parking, 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.

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.





University of Minnesota Reception Honoring the Contributions of

Stan Erlandsen

*Jointly sponsored by his department (Genetics, Cell Biology, and Development),
the Characterization Facility, and the Medical School*

Friday, May 8th, 3:30-5:30pm

There will be a reception in the second floor atrium of Hasselmo Hall, with a small program beginning at ~ 4:30 in Room 2-101, after which a plaque honoring Stan will be unveiled adjacent to the EM Laboratory on the first floor of Hasselmo*.

*Hasselmo Hall is at the corner of Church St. SE and Washington Ave. SE on the Minneapolis East-Bank campus, next door to Coffman Memorial Union

MMS Spring Symposium 2009 – Speakers

PET and PET/CT: Metabolic Medical Imaging

Geoffrey Bodeau,
Consulting Radiologists LTD

Biography

Dr. Geoffrey Bodeau graduated from the University of Minnesota Medical School in 1984. He did a surgical internship at Hennepin County Medical Center and his radiology residency at the University of Minnesota. He completed additional fellowship training in Nuclear Medicine at the University of Minnesota. He has worked as a radiologist with Consulting Radiologists, Ltd since 1994. He is currently the director of Nuclear Medicine and PET Imaging at Abbott Northwestern Hospital in Minneapolis and is the Medical Director for the LifeScan Minnesota PET Center in Edina, Minnesota. Dr. Bodeau has read over 15,000 PET and PET/CT scans.

Abstract

This lecture will discuss:

- What is PET and PET/CT imaging and how is it performed?
- What radiopharmaceuticals are used in PET imaging?
- A brief history of PET.
- What are the current medical applications of PET and PET/CT (with case examples).
- What are some of the research applications of PET?
- Future directions of PET and PET/CT.

MMS Spring Symposium 2009 – Speakers

Biological EM in the 21st Century: Cryotechniques, Correlative LM/EM, and Cellular Tomography

Kent McDonald,
University of California, Berkeley

Biography

Kent McDonald received his Ph.D. in Botany from the University of California, Berkeley in 1972. Following a year teaching at UCLA, he took a Post-doctoral position at the University of Colorado, Boulder. In 1975, he re-focus his research on the cell biology of mitosis which led him back to Berkeley in 1979 to work on correlative light and electron microscopy of PtK cells and diatoms. In 1987 he returned to Boulder to join the High Voltage EM Lab and at this time realized the importance of cryofixation by high pressure. In 1993 he moved back to Berkeley to assume the Directorship of the campus Electron Microscope Laboratory. His current research interest is improving the instrumentation for correlative light and electron microscopy using high pressure freezing and tomographic 3-D imaging. In 2008 he hopes to learn the art of vitreous cryosectioning and apply that skill to several research questions with collaborators at UC Berkeley.

Abstract

For biologists, the two most common imaging modes are light and electron microscopy and in recent years there have been very exciting developments in each of these areas. For light microscopists the development of reporter molecules that can be genetically engineered into living cells has resulted in powerful insights into how cells work. At the EM level, developments in high resolution 3-D imaging such as cellular tomography are providing unprecedented views of the actual molecular mechanisms behind cell function. Our goal is to create a workable bridge between these two imaging modes so that the advantages of each can be used to their fullest extent. To observe a living cell by LM and then correlate that information with high resolution images from EM provides a confidence in the resulting data that cannot be matched by uncoordinated samplings by either method. From the EM side of the equation, it is essential that specimen preparation methods preserve the living structure with the greatest possible fidelity. This is where high-pressure freezing plays an important role. HPF machines have recently been developed to go between live imaging and fast freezing with high time resolution but there is much more that can be done to improve their performance. In this presentation, we report on some of our efforts to further develop correlative LM-HPF-EM imaging technology.

MMS Spring Symposium 2009 – Speakers

Advances in Sample Preparation and Imaging Methods for Light and Electron Optics

Mark A. Sanders,
University of Minnesota

Biography

Mark Sanders earned his degrees in biology from the University of Akron and held Research Assistant positions at the University of Akron (Dept. of Biology), and Case Western Reserve University (Dept. of Developmental Genetics and Anatomy and Dept. of Neurosciences). Mark was part of the paramedical staff in the Laboratory for Cell Biology Coordinator, Department of Biochemistry and Molecular Biology at the Mayo Clinic from 1989-1995, and has been Program Director of the Imaging Center at the University of Minnesota College of Biological Sciences for the past 14 years. He is a past president of MMS, has served several times as Session Chair for MSA conferences, was the 2006 Food Structure & Functionality Division chair of the AOCS, and serves as a panelist for the NSF Major Research Instrumentation (MRI) Panel.

Abstract

Recent advances in sample preparation and observations for light microscopy have been implemented to study the distribution of a variety of biofilms and devices in *in vitro* tissue studies. A novel low temperature preservation method will be described along with advances in microwave sample processing to conserve ultrastructural integrity. Spectral and hyperspectral image acquisition and subsequent spectral analysis of tissues and devices shed promise to monitor drug distributions and directly detect responses in tissues and devices.

We have recently applied an immersion freezing methodology on various tissues and processed them for histology, immunohistochemistry and imaging. The technique provides a rate of cooling that is fast enough to capture rapid events and labile structures that are not retained in chemically fixed material. Further sample processing is performed at reduced temperatures or using freeze-substitution techniques to conserve sample integrity.

Additionally, microwave energy as a method of rapid tissue processing has gained increasing acceptance to facilitate routine chemical processing in laboratories where rapid and accurate specimen processing is required. Controlled low power microwave energy was used in conjunction with microwave accessory called the ColdSpot™ (Ted Pella, Inc., Redding, CA) that creates a uniform environment of microwave irradiation to the samples.

This report demonstrates the use of low power microwave energy on a number of different nucleic acid and protein probes tested on known systems. The reported results indicate low power microwave energy combined with better control of the microwave environment produce uniform results across a wide spectrum of ultrastructural labeling techniques. As an example single antibody immunolabeling turnaround times are now reduced to under 1-hour. These rapidly prepared tissues can be analyzed by a variety of methodologies. Spectral and hyperspectral imaging (HSI) is an advance which when used in conjunction with fluorescence microscopy, can discriminate, classify, identify as well as quantify materials present in the image. HSI allows one to detect objects of interest and abundance estimation, which allows one to detect concentrations of different signature spectra present in the tissue. HSI is of considerable use in identifying endogenous and exogenous fluorophores and specifying spectral windows that would either maximally accept or reject signals. HSI is useful in comparing tissues that have been treated differentially. (i.e. +/- drug).

Clearly, this advent of better preservation and imaging technologies, will lead to novel observations when compared current to conventional methods. Work in this direction has begun; however, many more experiments will be needed to utilize these advances into routine practical.

MMS Spring Symposium 2009 – Speakers

Ultrasound Imaging: Not Just for Babies Anymore

Erick Agrimson and Sue Hummel,
College of St. Catherine

Biographies

Erick attended Augsburg College and received a B.S. degree with a concentration in space physics in 1998. He graduated Cum Laude, and received the Augsburg College presidential scholarship and NASA space grant scholarship as well as graduating from the Honors program at Augsburg. He attended the University of Iowa receiving a physics master's degree in 2001 and completion of PhD credits in 2003. Erick's thesis work centered on the plasma physics phenomena related to ion acoustic and EIC plasma shear wave instabilities, with articles published in *Physics of Plasmas*, *Physics Letters A* and *Physical Review Letters*. In the spring of 2002 he studied at the University of Iowa hospitals and clinics taking a medical physics class covering the areas of CT, MRI and radiology. Erick joined the College of St. Catherine in the fall of 2004 as a lecturer, and in the fall of 2006 joined the full time faculty as an assistant professor in physics and sonography. Erick has been listed in *Who's Who in America* for 2009. In addition to teaching courses in ultrasound physics and physics for the health sciences, Erick currently has research interests in the areas of high altitude ballooning and radio astronomy. Erick is a member of the American Association of Physics Teachers giving two presentations in the last year. He has also been a 4-H aerospace leader in Dakota County for the past 10 years. Erick was married in May of 2006 and lives with his wife in St. Paul, enjoying walks, fishing, watching baseball and hiking.

Susan D. Hummel, is the Program Director for Sonography at the College of St. Catherine. She has been an educator in Sonography for the past 13 years.

Susan graduated from Argosy University/Twin Cities with a MAEd in Organizational Leadership. She is also a Registered Diagnostic Medical Sonographer (RDMS) in her field of expertise. Susan is a Team Chair site visitor for the Joint Review Committee on Education in Diagnostic Medical Sonography. She was also a co-contributor to Erick Agrimson's talk for the American Association of Physics Teachers in February 2009.

Abstract

Diagnostic ultrasound is a imaging modality that uses high frequency (2-20MHz) sound waves in order to create an image. We will cover the image creation process from first principles, including items such as the piezoelectric effect, Huygens' principle, hemodynamics and Doppler as they apply to this imaging modality. We will also discuss applications, as well as explore some of the new frontiers in this exciting medium. We will present viewpoints from a experienced veteran of medical and clinical ultrasound (Susan Hummel) as well as an ultrasound physicist (Erick Agrimson).

MMS Spring Symposium 2009 – Corporate Sponsors

Please visit these Corporate Sponsors at the vendor tables during the Symposium.

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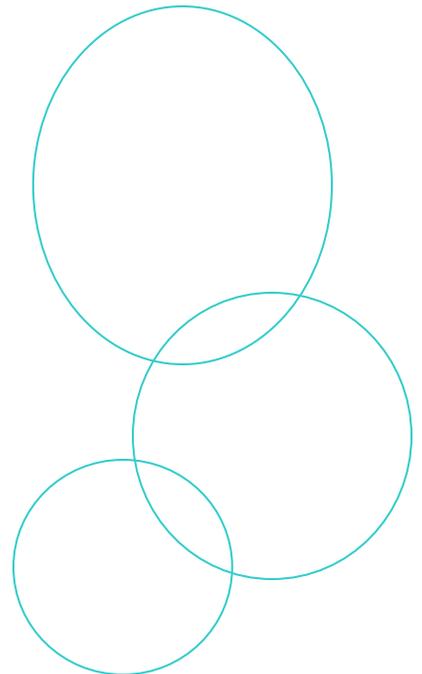
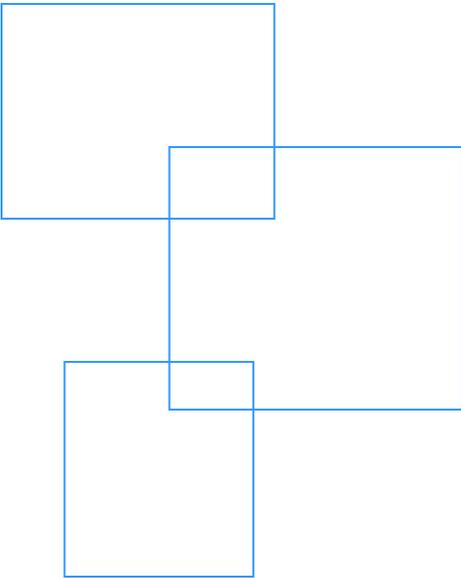
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Microscopy & Microanalysis 2009 – Registration & Housing Open!

Registration is now open for M&M 2009 in Richmond, Virginia. Be sure to register early (By June 3) and save \$100 over the regular price! Click on the link below to register & pay online:

ONLINE MEETING REGISTRATION: <http://www.hacherohill.com/show/MM2009/at/1>

HOTEL RESERVATIONS are also available online and open for booking. M&M 2009 has arranged blocks in eight hotels in historic downtown Richmond, with a wide range of rates and amenities. All hotels (except the Marriott and the Hilton Garden Inn) will have regular daily shuttle bus service to the Richmond Convention Center.

Click on the link below to make immediate online hotel reservations through the Richmond housing bureau. Special rates are good only until June 3, so book early!

https://hr.idssasp.com/home.aspx?XSHvr1xsjof5M1Ieqj3FQINiy4ifH11knpM49WqC9vCezPSufOp*jQnL8LUfwZjmv39o9ROMkkaYqJX3yCvww

Be sure to check out the list of fantastic **Richmond-area tours and activities** being offered in conjunction with the M&M 2009 meeting! A full description of activities, and online tour registration, are available by clicking on this link:

<https://www.richmonddiscoveries.com/mandmregistration.php>

For questions regarding registration, housing, or the meeting in general, please email the Meeting Manager at MeetingManager@microscopy.org.

Special Note for Students...

To all students (or those of you who might have students) attending the M&M 2009 meeting in Richmond, please consider the student bursary program offered by MSA. The purpose of these bursaries is to encourage students to attend the annual MSA/MAS Microscopy and Microanalysis meeting, where they can meet and interact with the established microscopy community while defraying some meeting costs.

The students work for 20 hours (or up to 40 hours) during the meeting and pre-meeting events and are paid \$10 an hour. The jobs involve such things as providing support in the different symposia (helping with audio-visual needs, maintaining an attendance count, and helping speakers set up for their presentation), staffing the MSA Megabooth or volunteer office, monitoring use of the Internet Café, and helping with poster set-up and take-down.

Once the final program has been established, each bursary will be contacted and allowed to choose the times and activities they would like to work. Many times they end up “working” sessions they would attend anyway. There is an added bonus of a \$10 cash meal allotment for each morning and/or afternoon sessions worked.

If anyone would like to participate in the bursary program, please check the “I wish to apply for a student bursary” box in section 2 of the registration form. Bursary space is limited, so sign-up early. Applicants for the bursaries must be members of MSA or MAS, and enrolled as students at a recognized educational institution. Don’t forget to check the MSA website for special discounted hotel rates especially for students as well as other scholarships to help defray even more meeting costs.

For those ‘non-students’ we could always use volunteers to help with the above mentioned meeting activities as well. Although not paid on an hourly basis as the student bursaries, volunteers do receive some compensation along with the same cash allotment for meals. Plus they also have the opportunity to interact more with the microscopy community as they assist with meeting tasks.

If anyone has any questions about the bursary/volunteer program, or would like to participate, please contact:

Amanda Lawrence

Electron Microscope Center

Mississippi State University

662-325-3019

alawrence@entomology.msstate.edu

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 Kathy Hough (651-353-8458, katiu@frontiernet.net).

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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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Upcoming Events

Wednesday, April 29, 11:30am

MMS Board Meeting – Olive Garden, Roseville

Friday, May 8 (Registration starts 7:30am)

Spring Symposium: "Imaging and Microscopy in Medicine"

Sunday, July 26 – Thursday, July 30

M&M 2009 – Richmond, VA

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Reminder: Membership in MMS runs from January through December. Have you paid your 2009 dues?

Please visit the MMS website, www.MNmicroscopy.org, for a fill-and-print pdf version of the membership form...

Minnesota Microscopy Society – Membership Form

All microscopists are urged to support their Society at one of the membership levels offered below. 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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 Newsletters are sent via email only.**

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

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