

Minnesota Microscopy Society

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



Newsletter

April 2002

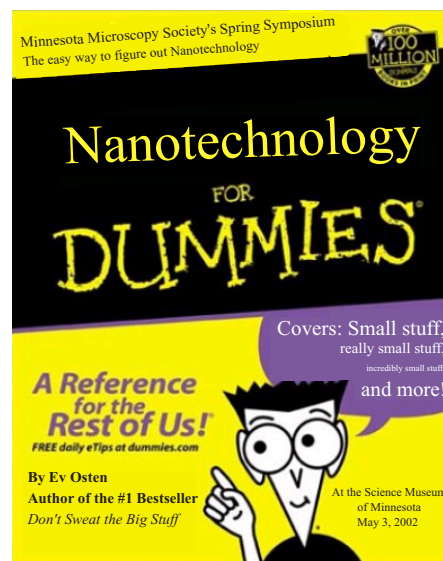
Minnesota Microscopy Society's 2002 Spring Symposium

Friday, May 3, 2002

NANOTECHNOLOGY

Schedule of Events

- | | |
|------------------|---|
| 8:15 - 9:00 AM | Registration, Breakfast, and Vendor Displays |
| 9:00 - 9:45 AM | Ev Osten, 3M Company, <i>Nanotechnology 101</i> |
| 9:45 - 10:30 AM | Richard W. Siegel, Rensselaer Polytechnic Institute
<i>Nanotechnology: From Atoms to Applications Through Nanoscience</i> |
| 10:30 - 11:15 AM | Break and Vendor Displays |
| 11:15 - 12:00 PM | Thomas F. Kelly, Imago Scientific Instruments Corporation, <i>There May Be an Atom Probe in Your Future.</i> |
| 12:00 - 1:15 PM | Lunch and Vendor Display |
| 1:15 - 1:30 PM | Business Meeting (Society election, Project Micro, etc.) |
| 1:30 - 2:00 PM | Jack Uldrich, Minnesota Office of Strategic and Long Range Planning, <i>Why Nanotechnology Will Arrive Sooner than Expected</i> |
| 2:00 - 2:45 PM | Klaus Wormuth, SurModics, Inc.
<i>Encapsulated Magnetic Nanoparticles for Biomedical Applications</i> |
| 2:45 - 3:00 PM | Break |
| 3:00 - 3:45 PM | Steve Campbell, University of Minnesota
<i>Nanoparticle Synthesis, Processing, and Applications; A Synopsis of Research at the University of Minnesota</i> |
| 3:45 PM | Drawing for door prizes. (Must be present to win.) |



(with apologies to Hungry Minds, Inc.)

Registration

The cost of the meeting is \$75 for MMS members and \$85 for nonmembers. This fee includes the meeting, breakfast, buffet lunch, coffee breaks, and a **free pass to the Museum exhibits** (a \$7 value). Registrants can pay at the door. For students and K-12 teachers the registration fee is \$25.

You must make your reservations by Friday April 26th, and can do so by contacting Mike Coscio, Medtronic, Inc., (mike.coscio@medtronic.com; 736-505-4561). 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 attend. Cost for those without a reservation is \$90.

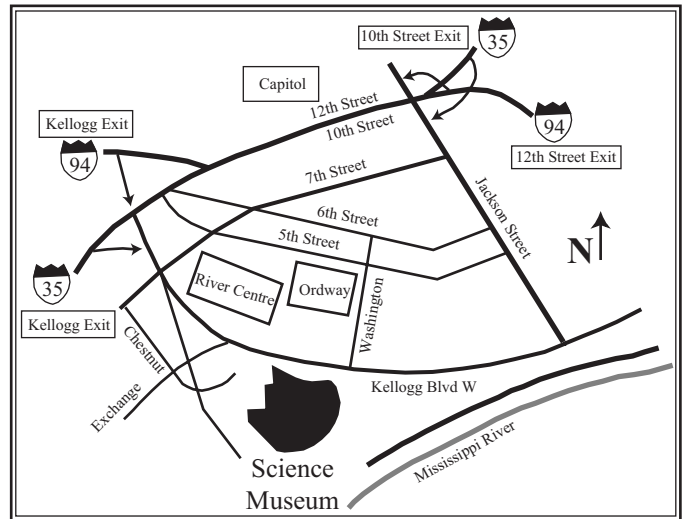
Luncheon Buffet

- 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.
- Colombian coffee, decaffeinated coffee, and tea.

Location

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

See the map below for directions to the Science Museum.



Finding Discovery Hall at the Science Museum

After entering the Museum from Kellogg Blvd, go through the Lobby, angle left just after the Box Office, and continue to the stairs/elevators. Discovery Hall is one floor down. You can pick up your pass to the Museum exhibits at the MMS registration table.

Parking

The Science Museum’s parking ramp can be accessed from either Kellogg Boulevard or Chestnut. Enter the museum by taking the parking ramp elevator to the Lobby level.

Parking is \$1/hour or \$9 for up to 12 hours.

The River Centre ramp is an alternative to the Science Museum’s ramp.

Speaker Abstracts

Nanotechnology 101

by Ev Osten
3M Company
St. Paul, MN

The word “nanotechnology” has become very popular and is used to describe many types of research. It is a broad (from electronics to plastics to fuel cells to biology) research area that is expanding exponentially – there were over 150 papers on just nanoparticles at the MRS meeting in Boston last November. It is also used by some more zealous individuals to describe a current revolution that will affect almost every aspect of our lives and change the world. This presentation will bring everyone up to speed in the generalities of the topic, with some examples of nanotechnology we utilize today.

Ev Osten has a degree in Anthropology from the University of Minnesota. After stints in graduate school in Physical Anthropology, and Law School, he joined the 3M Company’s Corporate Analytical Technology Center. He is currently Group Leader for 3M’s Electron Microscopy Laboratories, and is also a Director of the Microscopy Society of America. His research areas have included the generation and replication of surface nanostructures.

There May Be an Atom Probe in Your Future

by Thomas F. Kelly
Imago Scientific Instruments Corporation
Madison, WI

The atom probe today is mostly unknown in the world but all this is changing. Recent developments and commercial engineering efforts will make it possible to obtain three-dimensional atomic-scale compositional images of almost any material from flat specimens with minimal preparation. Furthermore, typical images will require minutes to acquire rather than days. These developments suggest that these new atom probes can be applied to problems in many fields on time scales that make them attractive as research tools and valuable as metrology tools.

Tom Kelly received his Bachelor of Science in Mechanical Engineering from Northeastern University, and a Ph.D. in Materials Science from M.I.T. He is a former professor in the Department of Materials Science and Engineering at the University of Wisconsin, and is currently CEO of Imago Scientific Instruments Corporation, Madison, Wisconsin. He has been active in the fields of analytical electron microscopy, atom probe microscopy, rapidly solidified materials, and electronic and superconducting materials for over 20 years. He is the inventor of major new technologies for three-dimensional atom probes, which are currently being built.

Why Nanotechnology Will Arrive Sooner than Expected

by Jack Uldrich
Minnesota Office of Strategic & Long Range
Planning, St. Paul, MN

Jack Uldrich will outline eleven fundamental factors that are driving nanotechnology into the fabric of our lives. He will also discuss possible actions the state of Minnesota can take in order to best position itself to take advantage of the “nanotechnology revolution.”

Jack Uldrich is Deputy Director of the Minnesota Office of Strategic & Long Range Planning. He is the author of numerous articles on the topic of nanotechnology. His work has been published by the Minneapolis Star Tribune, St. Paul Pioneer Press, CityBusiness and The Futurist. He is also the author of a forthcoming book to be published by Random House in January 2003 entitled *The Next Big Thing is Really, Really Small: Nanotechnology and the Future of Business*.

(Abstracts, continued)**Nanotechnology: from Atoms to Applications Through Nanoscience**

by Richard W. Siegel
Rensselaer Polytechnic Institute,
Troy, NY

The past decade has seen explosive growth worldwide in the synthesis and study of a wide range of nanostructured materials, the substance of nanotechnology. Microscopy has played a central and critical role in this development. An overview of nanoscience and nanotechnology and their relationship to novel functional materials assembled from nanoscale building blocks will be presented within the framework of the United States National Nanotechnology Initiative and the six new National Science Foundation Nanoscale Science and Engineering Centers, including our Center for the Directed Assembly of Nanostructures at Rensselaer. Several examples from our recent research results will be presented with an emphasis on the role of various microscopies in elucidating nanoscale behavior. These examples will include investigations of functional nanocomposites that could find use in a variety of structural, electrical, and biomedical applications. Some future challenges in this exciting new area will be discussed.

Professor Siegel received his Ph.D. in metallurgy in 1965 from the University of Illinois at Urbana. After postdoctoral research at Cornell University, he served on the faculty of the State University of New York at Stony Brook from 1966 to 1976. He was a research scientist in the Materials Science Division of Argonne National Laboratory from 1974 to 1995, serving as group leader for much of this time. Professor Siegel is a founder and Director of Nanophase Technologies Corporation, and a 1994 recipient of an Alexander von Humboldt Foundation Senior Research Award. He joined Rensselaer Polytechnic Institute in June 1995 and served as Department Head from 1995-2000. He has authored approximately 200 publications.

Encapsulated Magnetic Nanoparticles for Biomedical Applications

by Klaus Wormuth
SurModics, Inc.
Eden Prairie, MN

In the laboratory, magnetic nanoparticles aid the separation, purification, and immunoassay of cells, DNA fragments, and enzymes. In the human body, magnetic nanoparticles enhance image contrast in magnetic resonance imaging (MRI), deliver drugs to tumors, and help destroy tumor tissue. These biomedical applications require biocompatibility, usually obtained by coating the nanoparticles with natural and synthetic polymers.

The synthesis of polymer latex (140-220 nm in diameter) loaded with 5 nm diameter magnetic iron oxide particles comes about by using block copolymer dispersants along with inverse emulsion polymerization methods. Extensive characterization by scanning and transmission electron microscopy, dynamic light scattering, thermogravimetric analysis, and magnetic measurements indicates the latex is magnetically active, contains 18 wt% magnetic iron oxide, and exhibits complete and uniform encapsulation of the nanoparticles. These encapsulated magnetic nanoparticles are potentially useful for biomedical applications.

Dr. Klaus Wormuth is currently Director of Surface Characterization at SurModics, Inc., in Eden Prairie, MN. Previously he was Research Scientist at the Max Plank Institute of Colloids and Interfaces in Berlin, Germany, in addition to holding positions as Research Specialist at Imation Corp. and 3M Company in St. Paul, MN.

Nanoparticle Synthesis, Processing, and Applications; A Synopsis of Research at the University of Minnesota

by Steve Campbell,
University of Minnesota

The University has a long history of studying nanoparticles. For many years this work focused on nanoparticulate contamination in the atmosphere, on point sources such as diesel engines, and in specialized environments such as semiconductor processing equipment. This work has led to a wealth of understanding of nanoparticle synthesis and dynamics, as well as a host of new technologies for detecting and sizing nanoparticles. Important contributions continue to be made in these areas. More recently, however, researchers have also begun to investigate potential applications of nanoparticles as energy sources, for wear coatings, in pharmaceutical applications, in optical devices, and for building electronics devices. In this talk I will present a brief synopsis of the work that is ongoing at the University and point out a few possible new directions in nanoparticle research, as well as challenges that this work presents for microscopy and characterization.

Stephen A. Campbell is a Professor of Electrical and Computer Engineering and the Director of the Microtechnology Laboratory at the University of Minnesota. His current research interests include the use of nanoparticles in novel integrated structures, high permittivity materials for deep submicron field effect transistors, and micro magnetic devices that can be built with IC processing techniques.

American Vacuum Society Short Courses

The Minnesota Chapter of the American Vacuum Society is hosting a series of short courses May 6 -10, 2002 at the Hotel Sofitel in Minneapolis. Courses offered include, "An Overview of Applied Vacuum Technology", "Operation and Maintenance of Vacuum Pumping Systems", "Surface Characterization of Biomaterials", "Sputter Deposition", and many more. For more information or to register on-line go to <http://www.avs.org>

June 21 - Friday

Tour of the Mayo Clinic Joint meeting with the Iowa Microscopy Society

The Minnesota Microscopy Society is going to try something new this year. We are going to have a joint meeting with the Iowa Microscopy Society. The Board picked a location that will provide an interesting venue and will be within a reasonable driving distance for members of both societies. The meeting will be held at the Mayo Clinic, a world class medical and research facility in Rochester, Minnesota. This location will allow us to have both a technical meeting and some very interesting tours of the medical/research facilities and microscopy labs. The meeting will be held on Friday afternoon, June 21, 2002.

Program:

- 1:00 - 3:00 PM
Registration and poster setup
- 2:00 - 3:00 PM
Tours of the Mayo Clinic and its Microscopy Labs
- 3:00 - 4:00 PM
Poster viewing and social hour
- 4:00 - 5:00 PM
Speaker: Ken Moore, Iowa
Stem cell research and genetic therapy
- 5:00 - 5:30 PM
Break
- 5:30 - 7:00 PM
Dinner: Italian Buffet
- 6:30 - 7:30 PM
Speaker: Sara Miller, Duke University,
Emerging Pathogens

Sara Miller's talk was a big hit at the M&M meeting last summer in Long Beach. This should be a really good meeting, so put it on your calendar now. The Board is looking into renting a bus to make the trip to and from the meeting easier.

Sustaining Corporate 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.

Peter Braverman	Cadmet Inc.	800-543-7282
Alex Butzer	North Central Instruments, INc. / Leica	612-559-3008
John Crowe	Denton Vacuum Inc.	612-377-2077
Andrew Davis	Cameca Instruments Inc.	203-459-0623
Lester Engel	Engel Metallurgical Ltd.	320-253-7968
Robert Evans	Ted Pella, Inc.	800-237-3526
Larry Glassman	G. W. Electronics, Inc.	770-449-0707
Charles Garber	SPI	610-436-5400
Greg Halvorson	Solution Partners	952-931-0811
Larry Hanke	Materials Evaluation & Engineering Inc.	612-449-8870
Marie Hansen	FEI Company	612-382-5321
Gary Hawkinson	Thermo NORAN Instruments	608-244-7812
John Humenansky	Physical Electronics	952-828-6387
Stacie Kirsch	Electron Microscopy Sciences	800-523-5874
Betsy Larwa	Mager Scientific, Inc.	800-521-8768
Robert Mierzwa	JEOL	920-803-8945
Curt Morrison	Leeds Precision Instruments	763-546-8575
Ruth Murray	Oxford Instruments USA	859-384-9861
Cathy Ryan	Micro Star Technologies	409-291-6891
Gary Saxrud	Fryer Company, Inc.	952-942-6747
Jean Schlosser	Crane Engineering and Forensic Services	763-557-9090
Gary Smith	Innovatech Labs, Inc.	952-361-5570
Mary Sullivan	Scanning / FAMS, Inc.	201-818-1010
Gene Taylor	M. E. Taylor Engineering, Inc.	301-774-6246
Roger Teppert	HITACHI High Technologies America, Inc	847-966-2980
Callie Thomas	Tousimis Research Corp.	301-881-2450
John Treadgold	LEO Electron Microscopy Inc.	630-497-8166
Steve Ziegler	Digital Instruments	512-912-1615

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- 624-7370, mcswi001@umn.edu).

MMS Patron Members

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.

Ronald Adkins, 3M Company, St. Paul
Gib Ahlstrand, Imaging Center, U of M
Paul Baker, Medtronic Inc., Minneapolis
Barry Carter, University of Minnesota, Mpls
Michael Coscio, Medtronic Inc., Brooklyn Center
Kevin Cowden, Medtronic Inc., Brooklyn Center
Stan Erlandsen, Cell Biol. & Neuroanatomy, U of M
Chris Frethem, Cell Biol. & Neuroanatomy, U of M
Kathryn Hanna, College of Biol. Science, U of M
Mike Herron, Medicine, University of Minnesota
Stuart McKernan, University of Minnesota, Mpls

Susan Okerstrom, Medtronic Inc., Brooklyn Center
Ev Osten, 3M Company, St. Paul
Ann Palmer, Entomology, U of M
Jeff Payne, 3M Company, St. Paul
Dan Schaub, Philips Electron Optics, Inc., Oronoco
Gordon Schrank, St. Cloud State University
Carolyn Sutherland, Otolaryngology, U of M
Jerry Tangen, JEOL USA, Inc., Monticello, MN
Greg Trettel, BF Goodrich Aircraft Sensors, MN
Rae Vigeant, Random Microscopy Services, St. Paul
Bede Willenbring, H.B. Fuller Co., St. Paul

MMS BOARD and OFFICERS 2001-2002

President: Peter McSwiggen, University of Minnesota, Dept. of Geology & Geophysics, Minneapolis, MN 55455; (612) 624-7370, mcswi001@umn.edu

Past-President: Jean Schlosser, Crane Engineering and Forensic Services, 3905 Annapolis Lane N., Plymouth, MN 55447; (763) 557-9090, Fax (763) 557-0710, tcrane@skypoint.com

President-Elect: Mary Swierczek, 3M Center, Bldg. 201-BE-16, St. Paul, MN 55144; (651) 736-5087, Fax (651) 733-0648, mjswierczek@mmm.com

Secretary: Mary Swierczek, 3M Center, Bldg. 201-BE-16, St. Paul, MN 55144; (651) 736-5087, Fax (651) 733-0648, mjswierczek@mmm.com

Treasurer: Dwight Erickson, 3M Center, Bldg. 251-1A-03, St. Paul, MN, 55144; (651) 736-2830, Fax (651) 736-7496, usmmm214@ibmmail.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, FAX (612) 626-7530, stuartm@umn.edu

Newsletter Editor: Peter McSwiggen, University of Minnesota, Dept. of Geology & Geophysics, Minneapolis, MN 55455; (612) 624-7370, mcswi001@umn.edu

Copy Editing: Barbara Meier

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

Other Board Members:

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

Jeff Payne, 3M Center, St. Paul, MN; (651) 733-2352, jjpayne@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

Ann Palmer, University of Minnesota, St. Paul, MN apalmer@mmm.com

Diana Kittleson, Pillsbury Technology East, St. Paul, MN; 651-917-5859, dkittleson@pillsbury.com

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 \geq \$25 _____ Corporate Sustaining \$100 _____ Student \$5 _____**Make checks payable to MMS and mail to our treasurer:****Dwight Erickson, MMS Treasurer, 3M Center, Bldg. 251-1A-03, Saint Paul, MN 55144-1000.**

Minnesota Microscopy Society
Peter McSwiggen, MMS Editor
University of Minnesota
310 Pillsbury Drive, SE,
Minneapolis, MN 55455

May 3, 2002**MMS Spring Symposium:
Nanotechnology**

Forwarding and Address
Correction Requested