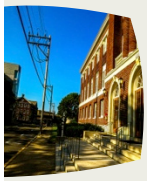

9 | April | 2014

NESM news

PROMOTING THE INTERCHANGE OF KNOWLEDGE OF MICROSCOPY AND ITS TECHNIQUES IN NEW ENGLAND

President's Letter –

Embracing Change

Dear Fellow Microscopists,

As your newly appointed 43rd president, it is with great pleasure that I welcome you all to another exciting year for microscopy in New England. I am delighted to have the opportunity to update the membership on the status of our society and discuss some of the plans, projects, and paths the Board of Directors are exploring for the current and coming years. As we all know, the past five years have been particularly trying and uncertain times for regional societies and science in general. Despite the challenges facing our society, NESM is now reporting its highest membership activity in recent history. I would like to take a moment to acknowledge the behind-the-scenes work that has allowed NESM to grow in such a harsh funding climate.

A look back at NESM activities in the past five years reveals one overarching theme – change. On the surface, members have seen and experienced a variety of changes from our registration process to a new website to online services to another new website. The Board of Directors has recognized the need to stay relevant in our technological age. We also recognize the important role technology can play in simplifying and automating the tasks involved in running a society. With the recession imposing constraints on the amount of volunteer time available to our Board of Directors, we began employing various technologies to help us become more efficient. We have increased the productivity and accessibilityof NESM Board Meetings by transitioning from in-person meetings to web meetings via Google+. The new NESM website is structured around two different databases that allow the Board of Directors to easily post reviews of past meeting and automate registration for future meetings. These systems are certainly not without their bugs; however, they are a critical step forward in allowing NESM to provide new and useful services to our growing society.

In addition to providing novel services for our members, the improved NESM website has functioned to broaden the outreach of our regional society. NESM has recently received recognition from the Microscopy Society of America for our ability to adapt to a web-based world. By increasing the visibility of NESM on the web, we have enabled the recruitment of vital new corporate sponsorship and facilitated the growth of our membership. The Board of Directors plans to continue the development of these services and utilities in an effort to raise awareness of local microscopy news and events, including NESM meetings and symposia.

We have already started the 2014 NESM calendar with an exceptional February Meeting at Cabot Corporation. You can find a review of this and other meetings on the NESM website (http://www.nesmicroscopy.org/meeting-reviews/). To continue the trend of fantastic lectures for 2014, the Board of Directors has assembled a dynamic list of speakers and workshops for the upcoming Spring Symposium at the Marine Biological Laboratory, in Woods Hole on May 1 & 2. We are now in the planning stages for the Fall Meeting, which is to be hosted by UMass Amherst. The date of the Fall Meeting will be announced at the upcoming Spring Symposium and on our website.

Dr. Toivo Kodas presents at the Spring Meeting

If you would like to contribute to the future direction of NESM or to take part in any upcoming event planning, including speaker suggestions, please write to us at info@nesmicroscopy.org or via the contact form on our website. We value any input from our membership and make every effort to accommodate requests and suggestions.

I look forward to seeing you all at the Spring Symposium!

Sincerely,
Blair Rossetti
NESM President

31st Annual Spring Workshops at the Marine Biological Laboratory

Thursday, May 1, 2014

1:00PM **Welcome:** Louie Kerr, *Treasurer*

1:10PM **Workshops Part I:**

2:30PM **Afternoon Break:** Coffee and refreshments

3:00PM **Workshops Part II**:

5:00PM **Closing Remarks:** Louie Kerr, *Treasurer*

Workshop Abstracts

Digital Image Analysis – Dr. Lai Ding, Harvard University
This workshop, taught by Dr. Lai Ding, PhD., manager of the Harvard NeuroDiscovery Center Enhanced Neuroimaging Core, introduces ImageJ, its basic functions, and its macro programming capabilities. Using data from real imaging projects, Dr. Ding will demonstrate common image analysis tasks such as basic filtering processing, cell counting and measurement. Macro writing will be covered to demonstrate how to automate a series of ImageJ commands, to process datasets automatically and to store results as desired.

Introduction to Scanning Probe Microscopy – Brent Lapointe, Nanosurf Inc, & Dr. Fettah Kosar, Harvard University
Since the introduction of the Scanning Tunneling Microscope by Binning and Rohrer more than 25 years ago, and the subsequent development of the Atomic Force Microscope thereafter, these tools have become indispensable for the study of both nanoscale features and more broadly, physical characteristics of materials. These tools help researchers visualize, analyze, and manipulate objects at the nanoscale. Following optical microscopy and scanning electron microscopy, Scanning Probe Microscopy may fittingly be called a third generation technique for the evaluation of these material properties. The scanning probe microscope greatly enhances lateral resolution compared to optical techniques and offers true three dimensional topographical information as compared to the SEM. A further consequence, the Scanning Probe Microscope may also be used in biologically relevant conditions including ambient temperature, liquid environment, and living cells/tissue.

Looking forward, Scanning Probe Microscopy has not stood still. New applications have been developed for nanomanipulations including coupling with fluidics, tissue diagnostics, and ultrafast scanning. With the advent of these new techniques, the Scanning Probe Microscope is well positioned to remain an important tool for nanoscale analysis into the future.

Cathodoluminescence Imaging – Maximizing Compositional Analysis in Mineralogy: A practical guide to commercial and exploration mineralogy techniques, and how they can be supported with selected CL imaging. – Dr. Tony Mariano, geological consultant
This workshop will illustrate how correlating different types of microscopy can aid in the analysis of the mineral components of whole rocks. The workshop will include demonstrations of how a wide range of microscopy techniques can be utilized to this end, including polarized light petrography, cathode-luminescence, UV-luminescence, and scanning electron microscopy combined with energy-dispersive x-ray spectroscopy.

VISIT
nesmicroscopy.org
for more details

Register online today!

Workshops: $15.00

31st Annual Spring Symposium at the Marine Biological Laboratory

Friday, May 2, 2014

9:00AM **Registration (Swope Center):** Coffee and refreshments

10:00AM **Welcome (Meigs Room):** Blair Rossetti, *President*

10:10AM **"Characterization of InGaN Nanowires by Electron Microscopes"**, Dr. Wei Guo, *University of Massachusetts Lowell*

10:50AM **"Rafts in Colloidal Membranes"**, Dr. Zvonimir Dogic, *Brandeis University*

11:30AM **Exhibiting Vendor Session**

12:30PM **Lunch (Swope Center)**

1:30PM **Keynote: "3-D and In-situ Characterization of Nanomaterials in the Scanning Transmission Electron Microscope",** Dr. Ilke Arslan. *Pacific Northwest National Laboratory*

2:30PM **Afternoon Break:** Coffee and refreshments

3:00PM **"How ultrastructural analyses of neuronal synapses provide new insights into Parkinson's Disease",** Dr. Jennifer Morgan, *Marine Biological Laboratory*

3:40PM **"Single-molecule analysis of Cytoskeleton Assembly",** Dr. Amy Gladfelter, *Dartmouth College*

4:20PM **Closing:** Blair Rossetti, *President*

VISIT
nesmicroscopy.org
for more details

Register online today!

Regular member: $60.00
Student member: $30.00
Retiree member: $50.00
Exhibiting Vendor: $115.00

Past & Future Meetings:
The Year So Far

47th Annual Fall Symposium & Business Meeting, Brandeis University – December 5, 2013

The NESM fall meeting was held at Brandeis University this year. Lab tours were offered during registration. Interim President Fettah Kosar opened the meeting with the unfortunate news that Xiaowei Zhuang had lost her voice and would be unable to speak. Luckily, Jeff Gelles from Brandeis University stepped in at the last minute to present his CoSMoS (Colocalization Single Molecule Spectroscopy) microscopy technique which uses a set of micro mirrors to do dichroic-less Total Internal Reflection Fluorescence (TIRF) microscopy. Andrew Magyar from Harvard University then followed with another technique talk, presenting Atom Probe Tomography. APT is a time-of-flight mass spectroscopy technique with a position-sensitive detector. The results are three-dimensional reconstructions of the atomic composition and spatial arrangement of the sample. Examples such as segregation of aluminum in aluminum-doped zinc oxides were presented. Adam Martin from MIT presented some of his group's work on *Drosophila* embryo tissue development using time-lapse confocal microscopy. The work focused on how the cells were mechanically deformed in a pulsed manner during embryo development.

The annual business meeting was held and new officers were elected to the board. Jennifer Ross from UMass Amherst was chosen as President Elect, Louis Kerr of the Marine Biological Laboratory continued as Treasurer, Wendy Salmon from the Whitehead Institute at MIT was welcomed as a new Biological Sciences Director, Huilang Zhang from Harvard University was re-elected as Physical Science Director, and Avital Rodal from Brandeis University was appointed as interim Biological Sciences Director. Minor changes to the bylaws were put to a vote and accepted also.

There was much socialization over dinner in the Brandeis faculty club. Finally, Bruce Goode gave the evening's keynote lecture about actin and cytoskeletal dynamics. The talk combined single-particle electron microscopy and single-molecule TIRF microscopy to probe the assembly and disassembly of actin filaments in cells and to identify the first-ever actin depolymerase.

NESM President Blair Rossetti introduces the new website

Thanks to all the speakers and to the Brandeis MRSEC program for sponsoring Brandeis student meeting fees.

- Arthur McClelland
Physical Sciences Director

Spring Meeting, Cabot Corporation – February 25, 2014

On February 25th, 2014, the Spring meeting was held the Cabot Corporation headquarters in Billerica, MA starting at 5:30pm. The evening started with members socializing over a delicious meal generously provided by Cabot, before the Welcome address from NESM President Blair Rossetti. Dr. Toivo Kodas from Cabot Corporation spoke first and began by reminding us that Francis A. Heckman, first president of NESM in 1967 (then the New England Society for Electron Microscopy), was a microscopist at Cabot. He then proceeded with a brief history of Cabot Corporation, a wonderful explanation of the types of materials that Cabot makes and the types of applications for which Cabot particles are used. Next, Dr. Bjoern Schimmoeller gave a more detailed but very accessible talk about the different processes used to generate different types of particles, a few recent advances they have made in particle design and how they use electron microscopy for product evaluation and R&D. He finished with a great classic scientific story about successfully troubleshooting unexpected results using a non-standard method—in this case, imaging fused silica particles by TEM instead of SEM—with beautiful images.

Dr. Shalin Mehta of the Marine Biological Laboratory in Woods Hole, MA then spoke about his work with fluorescence anisotropy microscopy. After an introduction to polarized light with a fun demonstration, a brief history of polarized light in biological research and at the MBL and an introduction to fluorescence polarization he went into more detail about how this group uses fluorescence anisotropy to measure the orientation of aligned fibers within fixed and live cells. Dr. Mehta showed stunning images of actin fiber alignment in mammalian HeLa cells, and septin alignment during mitosis in the budding yeast. He also touched on work by Tomomi Tani which uses fluorophore tumbling to calculate structure. He ended by talking about his group's newest endeavor into light field microscopy, using a lenslet array to collect three dimensional data within a single image.

- Wendy Salmon
Biological Sciences Director

NESM News *Live*

Looking for upcoming meeting dates? Wondering how to become a NESM member? Interested in affiliated societies? Keep updated on all things NESM by checking us out on the web. Visit our homepage, nesmicroscopy.org, for the latest information on meetings and events. Peruse the website to find membership applications, Society documents, and contact information. Scan the QR codes below with your smartphone to find NESM on the web.

nesmicroscopy.org | Facebook | Twitter

2014 Corporate Members

Many thanks to those who help keep NESM alive and growing

Advanced Microscopy Techniques
Andor Technology
Bruker
Chroma Technology
Electron Microscopy Sciences
FEI Corporation
Hitachi High Technologies America, Inc.
Horiba
JEOL USA, Inc.
Kramer Scientific
NanoMagnetics Instruments, USA
Nanosurf Inc.
Nanotech Consulting
Oxford Instruments
SPI Supplies/Structure Probes, Inc.
Ted Pella, Inc.
TESCAN USA Inc.
Tousimis Research Corporation

NESM would like to extend our deepest thanks and appreciation to all of our Corporate Members. Your sustained commitment to NESM allows us to continue to promote excellence in microscopy here in New England. NESM would also like to thank our affiliated societies – MSA, MAS, and ConnMS – for their continued support.