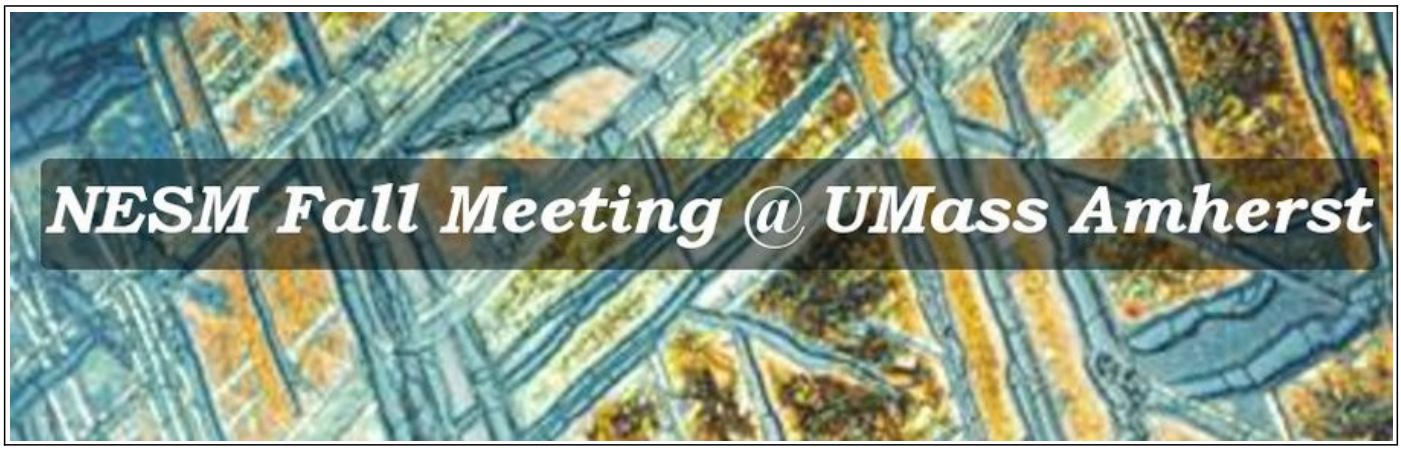

Fall Meeting @ UMass Amherst

Hosted by UMass Physics and Polymer Science and Engineering Depts.

Register Now

Meeting Description:

Join NESM for our annual Fall Meeting on Friday, September 28 at UMass Amherst. The meeting is composed of four concurrent afternoon workshops, a buffet dinner, and two technical talks.

Workshop Cost (spaces limited)
$20 Workshops

Meeting Costs (including a buffet dinner and refreshments):
$20 Regular Members
$45 Regular Non-members (includes 2013-year membership)
$10 Student Members
$20 Student Non-members (includes 2013-year membership)
$10 Retiree Members
$20 Retiree Non-members (includes 2013-year membership)

Bring a Colleague:
NESM members who bring two new members to join during 2012, will receive free membership for 2013!!!

Help us Spread the Word:
Post our flyers around your workplace or campus to encourage colleagues and students to attend.
Fall Meeting 2012
Fall Meeting 2012 Black & White

Meeting & Workshop Schedule:

Friday, September 28

2:00 PM **Workshop Registration (Campus Center)**

2:30 PM **Workshops:** All workshops run concurrently and workshops are not included in the meeting registration (separate registration required - one ticket per person). Please see below for workshop descriptions.

5:00 PM **Meeting Registration (Campus Center):** Coffee and refreshments available.

6:00 PM **Dinner:** Included in meeting registration

6:50 PM **Welcome (Campus Center):** Dr. Fettah Kosar, *NESM President*

7:00 PM **"Single-molecule-sensitive fluorescence microscopy of droplet-confined biomolecules"**, Lori Goldner, Ph.D., UMass Amherst

7:45 PM **"Extraterrestrial metal as observed by electron microscopy techniques"**, Joseph Goldstein, Ph.D, UMass Amherst

8:30 PM **Closing Remarks:** NESM Board

Workshops:

All workshops run concurrently. You may only purchase one workshop ticket per person.

Introduction to HRSEM for Soft Materials – Alex Ribbe, UMass Amherst (Limit 4 Participants)
The workshop will demonstrate low voltage imaging of uncoated soft material samples under high vacuum conditions using various modes of operation. This includes the impact of beam decoration and UC (UniColore) modes on contrast and resolution while minimizing sample charging.

Lessons Learned by Building a Multicolor TIRF/STORM Microscope – Ross Lab, UMass Amherst (Limit 4 Participants)
The Ross Lab from UMass will share the tips and tricks that they have learned building a multicolor TIRF/STORM microscopy system. An introduction to the techniques will be presented to bring all participants up to speed, then the home built system will be demonstrated. Along the way, pitfalls and dead ends to avoid in designing your own system will be pointed out.

Modern Raman Spectroscopy and Emerging Applications in Materials Science, Nano-Technology and Other Fields – Joe Dorsheimer & Alex Rzhevskii, Thermo Scientific (Limit 6 Participants)
The presentation will cover the most recent developments in micro-Raman spectroscopy and provide examples of its applications in materials science and nano-technology including carbon-based nanomaterials, composite polymers, thin films, micro drug development and others. Thermo Scientific DXR Raman Microscope will be provided for demonstration and test sample measurements. Attendees are encouraged to bring samples for measurements.

Helium Ion Microscopy for Materials Application and Biological Imaging – Bernhard Goetze & Bipin Singh, Carl Zeiss (Limit 25 Participants)
The ORION Plus helium ion microscope (HIM) from Carl Zeiss has been commercially available for 5 years. A number of preeminent academic, government and industrial research institutions have adopted this technology. Helium ion microscopy has become a mainstream technique, demonstrated by over 100 publications in key journals and dedicated sessions at major international conferences. The ORION Plus has been used so far in a variety of nanofabrication applications such as nano-pores.
A more recent strength of helium ion microscopy is in the area of biological imaging. While at a quick glance, an image captured using helium ion microscope might look similar to what can be achieved using scanning electron microscope, the differences are quite significant. For using ORION Plus, the samples don't need to be coated with conductive carbon or metal overcoat. A highly effective yet simple to use charge compensation system allows quick imaging of even the most difficult insulating samples. Five to ten times larger depth of field and sub-nanometer resolution result in complete focus in the whole field of view and outstanding clarity.
In this talk and remote demonstration, we will describe the underlying principles of helium ion microscopy and give examples for applications in both material sciences and imaging of biological specimen.

Abstracts & Bios:

7:00 PM - "Single-molecule-sensitive fluorescence microscopy of droplet-confined biomolecules", Lori Goldner, Ph.D., UMass Amherst

Abstract: In recent years, it has become possible to optically observe structural changes and enzymatic activity of single biomolecules in solution or even *in vivo.* In these measurements, attached dye molecules are used as fluorescent reporters of inter- or intramolecular distances or orientation. For *in vitro* observations, biomolecules are typically localized by attachment to a coverglass surface at very low density. Surface attachment has its limitations; glass surfaces are generally inhomogeneous and perturbative to both dye properties and biomolecules. Transient or irreversible interactions are also difficult or impossible to study on surfaces. More recently, other methods that do not require surface attachment are being adopted to locate and observe single molecules. I will review some of these techniques and describe our own effort to make quantitative measurements of individual RNA-protein interactions in aqueous nanodroplets in oil. I will give an overview of single-molecule sensitive fluorescence measurement and discuss schemes for trapping, tracking, mixing, and making measurement in nanodroplets.

Bio: Lori Goldner is a professor of physics at the University of Massachusetts in Amherst. Prior to her appointment at UMass in 2008, she was in the Optical Technology Division of the Physics Laboratory at the National Institute of Standards and Technology, where she started two separate programs, one in near-field optics and a second in single molecule measurement and manipulation. She holds an undergraduate degree in Physics from Cornell University and a Ph.D. from the University of California at Santa Barbara. Her background is broad, with thesis work in low temperature physics and nonlinear dynamics, an NRC Postdoctoral Fellowship (1992-94) working with William D. Phillips in atomic physics, and considerable interest in instrumentation development. Her past work included the development of a near-field polarimeter for measuring the optical properties (linear birefringence and dichroism) of thin polymer films with 50 nm resolution. Her current interests are in the biophysics, with a particular emphasis on understanding molecular behavior in confining and complex environments.

7:45 PM - "Extraterrestrial metal as observed by electron microscopy techniques", Joseph Goldstein, Ph.D., UMass Amherst

Abstract: Extraterrestrial metal is found in various types of meteorites and lunar soils. In most cases, the metal has had been cooled in an asteroid starting some few million years after the formation of the solar system. During this cooling process, various metallographic structures are formed such as a Widmanstatten pattern, martensite, spinodal and inclusions of sulfide, carbide, and phosphide. Electron microscopy techniques (SEM, TEM, EPMA, AEM) have been applied to examine the very unique phase transformations that have taken place and in many cases one can determine the cooling history and cooling rate (10,000 to 0.2K per million years) of the metal. Metal from the core of several asteroids is now available for analysis and we have had the opportunity to determine the cooling history and size of the parent asteroids. In this talk, I will show several examples of how electron microscopy has allowed us to study the metal phases and to determine the history of the early solar system.

Bio: Dr. Goldstein is a materials scientist-metallurgist with a BS, MS and ScD from MIT. He has taught at Lehigh University and most recently at UMass Amherst. In addition, he served as the VP for research at Lehigh and Dean of Engineering at UMass. His research interests are in solid state diffusion and phase transformations, particularly in extraterrestrial materials, as well as the development of x-ray microanalysis in the SEM and TEM. He has some 200+ publications and is the first author of the text book "SEM and X-ray Microanalysis", Springer, 2003. An asteroid, "JoeGoldstein", has been named in his honor. He is a fellow of MSA, ASM, and the Meteoritical Society. He has been honored with the Duncumb Award for excellence in microanalysis by MAS, the Leonard Medal of the Meteoritical Society, the Chancellors Medal by UMass, etc. Finally, he is the founder of the Lehigh Microscopy School which has given courses in electron microscopy techniques for over 40 years.

Location:

UMass Amherst

1 Campus Center Way, Amherst, MA 01003

Parking:

Attendees arriving before 5:00PM may pick up a discounted $5 parking pass for the parking garage at the meeting registration desk (165-69 Campus Center). Attendees arriving after 5:00PM are charged a flat $3 fee at the parking garage. Garage Parking Map

Register Now

Image credits:
Banner - Joseph Goldstein, UMass Amherst
Polished and etched slice of the Carlton IIICD iron meteorite showing a Widmanstatten pattern. Kamacite plates (blue) formed on the close-packed planes of the parent taenite phase. Plessite, a fine mixture of kamacite and tetrataenite, formed in the prior taenite regions between the kamacite plates. Schreibersite, phosphide, precipitates are observed in the centers of some of the kamacite plates

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