[AIMS] Arizona Imaging and Microanalysis Society

Using light, electrons, ions, electromagnetism and x-rays

AIMS Newsletter Volume 7, Issue 2

PRESIDENT'S NOTE

Page Baluch, AIMS 2013-2014 President

Welcome back to another great year of microscopy! I would like to extend a big thank you to Brooke Beam, Patty Jansma, Doug Cromey, David Elliott and Phil Anderson who did a great job planning and hosting the 2013 AIMS conference at the University of Arizona. Each year we trade off and host the event at one of the university campuses and this year the 2014 conference is scheduled for **Friday March 21, 2014** at **Arizona State University** in the **Carson Ballroom at Old Main**. In collaboration with our colleagues at the University of Arizona we are also happy to announce that in conjunction with the conference we will be hosting a half day **Bioimaging Ethics Workshop** on Thursday March 20th from 12:00-4:30pm. The Workshop and Conference are two separate events and must be registered for individually. The workshop is open to everyone but you must sign up as a member to attend and register for the AIMS Conference on March 21st.

This leads to the next big announcement which is: the AIMS website has been rebuilt and includes some great new features! One new feature is that you can now register and pay online through our PayPal account link. Another great feature is that we now have online forms for registration. On the website there are separate registration forms for the Imaging Ethics Workshop and for the 2014 AIMS Conference. These are clearly indicated in the tab menu. You must still first register for membership online at www.azmicroscopy.org at the student, individual or corporate levels to

qualify for free admission to the AIMS conference. Corporate members have the option to register at various sponsorship levels which includes a table at the conference. Due to limited seating, only those who officially registered for conference attendance will be admitted to the luncheon. We welcome any feedback or suggestions on our new website and ask that you remain patient with us as we work out any issues as they arise.

In addition to these announcements we also wish to welcome the new assistant director of the Imaging and Histology Core Facility at Northern Arizona University, Aubrey Funke, who will be coming in as AIMS President elect for the 2014-2015 membership year and who has offered to host the 2015 AIMS conference in Flagstaff next year! Welcome back and we are looking forward to a great meeting!

ATTENTION STUDENTS:

The Arizona Imaging and Microanalysis Society annual meeting is scheduled for **Friday March 21st at ASU's Old Main (Carson Ballroom)**. We would like to invite any undergraduate or graduate student who uses microscopy to visualize their research to present a poster at the conference. There will be **6 poster awards ($100 each) for the best light and EM based posters in both undergraduate and grad/postdoc categories**. You can register and submit your abstract online at **http://azmicroscopy.org.** Your student membership, only $5, will pay for your admission to the conference and meals at the event. You can pay the membership fee at the check in table on the day of the conference, submit your payment online or mail a check in advance to the address listed on the website. You must **register in advance** to enter the poster competition and to have admission to the conference and luncheon. Your **poster abstract must be submitted by March 14th** to be included in the conference program. Below I have listed the poster guidelines and evaluation criteria for the competition. Please feel free to contact me if you have any questions: page.baluch@asu.edu.

Student Poster Guidelines:

1. Applicants must be or have been an undergraduate or graduate student during the academic year of the meeting.

2. The work must consist of original research authored by the participant and be co-authored by his/her advisor.

3. Each student will be given 2 minutes to present the most important aspects of their poster. It is suggested that the student prepare 1-2 PowerPoint slides to assist in the presentation.

4. The poster must be formatted to fit within an area of 48 inches wide by 36 inches high.

5. The poster should contain: title, author and affiliation, abstract, introduction, methods and materials, results, discussion, figures and legends, and references.

Award Evaluation Criteria:
The AIMS judges will use the following criteria to evaluate the student's poster and oral presentation:

1. Scientific merit
2. Soundness of the research proposal
3. Experimental design and thoroughness of investigation
4. Validation of conclusions
5. Application of microscopy/microanalysis in answering the experimental question
6. Quality of micrographs/images/data
7. Presentation
8. Response to questions
9. Diversity of instrumentation and technique
10. Clarity and quality of writing
11. Grammatical correctness

2014 AIMS SPONSORS

Platinum Sponsors

Electron Microscopy Sciences	FEI
Lumen Dynamics Group, Inc.	Photometrics/QImaging

Gold Sponsors

Boeckeler	Edax, Inc.
Fisher Scientific	Gatan, Inc.
Hitachi	Leica Micros/NC Instruments
Olympus America, Inc.	

**Don't see your name? It's not too late to become a sponsor for the meeting. Go to http://azmicroscopy.org to register!

AIMS 2014 Conference | Arizona State University

Digital Images and their Ethical Use in Science Workshop

Old Main, Basha Library
March 20th, 2014

Overview: Images are a form of scientific data that must be obtained, processed and analyzed without compromising integrity. This workshop will review what is required to obtain good images as well as the terminology and concepts associated with digital imagery. Topics include pixels, resolution, over-saturation, color space, bit depth, image processing filters and common formats used in presentations. While the use of digital images is common in a wide variety of scientific disciplines, this workshop will focus on image data that is acquired through microscopy. A particular focus of this workshop will address the accepted limitations of image manipulation and the ethical responsibility of presenting and publishing image data. It should be noted that this is not a workshop on image analysis, microscope techniques or a Photoshop/ImageJ tutorial. This presentation provides four hours of training that can be applied to the ethics training required by NSF and NIH funded grants. A record of attendance will be collected for each attendee.

| 12:00 - 12:30p.m. | **Check-In & Lunch**

| 12:25 – 12:30p.m. | **Opening remarks** Page Baluch - AIMS President

| 12:30 - 1:15p.m. | **What is a Digital Image,** Brooke Beam, W.M. Keck Center for Imaging, Univ. of Arizona, Tucson, Az.

| 1:15 - 2:00p.m. | **Presenting and Viewing Digital Images,** Doug Cromey, SWEHSC, ARL-Biotechnology, and Cellular and Molecular Medicine, Univ. of Arizona, Tucson, Az.

| 2:00 - 2:15p.m. | **Break**

| 2:15 - 3:05p.m. | **Ethics & Scientific Digital Imaging,** Doug Cromey

| 3:05 – 3:45p.m. | **Demonstrations: Manipulating Digital Images (I),** David Elliott, Cellular and Molecular Medicine, Univ. of Arizona, Tucson, Az.

| 3:45 - 4:00p.m. | **Break**

| 4:00 – 5:00p.m. | **Demonstrations: Manipulating Digital Images (II),** David Elliott

2014 AIMS CONFERENCE PROGRAM

ASU Old Main – Carson Ballroom
March 21, 2014

| 8:00 - 8:45a.m. | Check-In

| 8:30 - 8:45a.m. | Welcome: **Page Baluch** - President AIMS

| *8:45 - 9:45a.m.* | **Jingyue Liu**, Department of Physics, Arizona State University, Tempe, AZ. " *Aberration Correction: Imaging at Atomic Resolution*"

| 9:45 - 10:45a.m. | Student Presentations

| 10:45 - 11:25a.m. | Morning Break - Vendor demonstrations/Poster Sessions

| 11:30 - 12:30p.m. | **William J. Landis**, Department of Polymer Science, University of Akron, OH. *"Advancements in Tissue Engineering"*

| 12:30 - 1:30p.m. | Buffet Lunch – Old Main, Carson Ballroom

| 1:30 - 1:55p.m. | Poster Session

| 2:00 - 3:00p.m. | **Catherine Galbraith**, Spatial Systems Biology Center at Oregon State University, " *Nano to micro: connecting molecular dynamics to cell motility decisions*"

| 3:00 - 4:00p.m. | **Michael Traynor**, Professional Photographer, Phoenix, Az. "*What is in a Picture*"

| 4:00 - 4:30p.m. | Afternoon Break – Vendor Exhibits/Student Awards

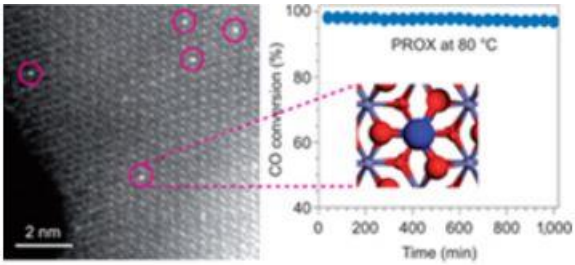
| 4:30 - 5:30p.m. | **Jason Newbern**, School of Life Sciences, Arizona State University, Tempe Az. "*Transgenic Mouse Models Used in Imaging the Developing Brain*"

| 5:30 - 5:45p.m. | Closing Remarks***/***Annual Society General Meeting (open to the public)

| 6:00p.m. | No Host Dinner

SPEAKERS

Jingyue Liu, Department of Physics, Arizona State Univ., Tempe, AZ.



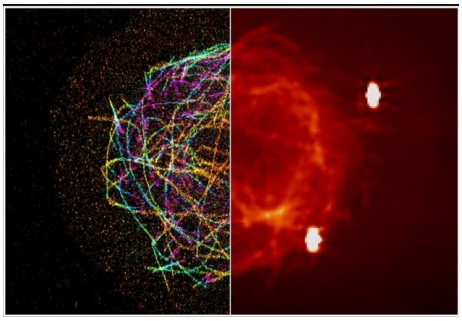
Innovative and sustainable technologies are emerging from the proper integration of nanoscale building blocks and devices. Nanoscience and nanotechnology are expected to play a major role in providing sustainable energy to power our planet and in improving the quality of human life. Our group focuses on the fundamental understanding of the synthesis-structure-performance relationships of nanostructures and nanostructured systems. We develop and utilize advanced electron microscopy techniques (imaging, diffraction and spectroscopy) to help us understand the synthesis processes of nanoscale materials, their unique properties and their applications in energy harvesting and storage, heterogeneous catalysis, sensing, or delivery. Our key research goals are to understand the formation processes of nanostructures so that we can develop scalable synthesis methodologies to manufacture better controlled nanostructures for desired applications and to understand the charge generation and transfer processes in nanostructures and nano-architectured systems.

William J. Landis, Department of Polymer Science, Univ. of Akron, OH

The Landis Laboratory concerns itself with several aspects of connective tissue molecular biology, biochemistry, structure and function. These include research investigations of (1) Mineral-matrix structure and interaction in normal (bone, calcifying cartilage and tendon, enamel, dentin, and cementum) and abnormal (osteogenesis imperfecta, osteoporosis, osteopetrosis) vertebrate tissues; (2) Bone, cartilage, and tendon biochemistry; (3) Tissue engineering of connective and calcified tissues to fabricate models of human digits, ears, and knees; (4)

Effects of mechanical, gravitational, and electromagnetic forces on calcified tissues; and (5) Orthopaedic pathologies such as those involving osteoarthritis, slipped capital femoral epiphysis, hypothyroidism, dysplasia, clubfoot and others.

Catherine Galbraith, Associate professor in the Spatial Systems Biology Center at OHSU and a Discovery Engine Investigator at the Knight Cancer Institute.



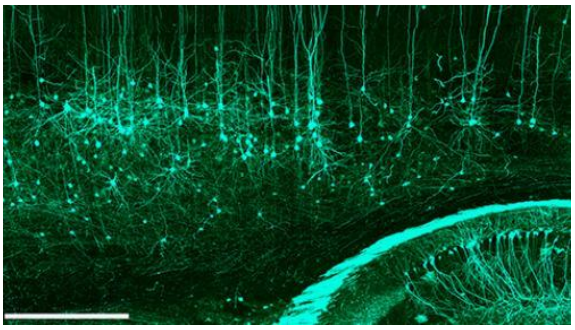
Dr. Catherine G. Galbraith is trained as both an engineer and a cell biologist. She obtained her Ph.D. in bioengineering at UCSD with Dr. Shu Chien and did her post-doctoral work in cell biology at Duke University with Dr. Michael Sheetz. This fall she moved her research program from the NIH to OHSU where she is an associate professor in the Spatial Systems Biology Center and a Discovery Engine Investigator in the Knight Cancer Institute. Dr. Galbraith's laboratory uses a combination of cutting edge microscopy and biophysics to study problems in cell migration. Her approaches have provided new insights into how cells choose specific directions for migration. Most recently her work involving super-resolution microscopy has led her to making measurements at different length and time scales to create a comprehensive picture of molecular dynamics that define the mechanistic rules that underlie cellular motility and signal transmission. Dr. Galbraith has received several awards in recognition for her work, including the Bioengineering Society Young Investigator Award, a NIH Director's Challenge Award for high-yield, high-risk research, and a NIDCR Special Act Award for her contributions to super-resolution microscopy. She has also served as a judge for the international Olympus Bioscapes Competition and as an editor for The Image Library and the Journal of Optics.

Michael Traynor, Professional Photographer, Phoenix, Az

Michael has been an active photographer for 50+ years and has experienced the transition from film to digital. Long before digital became available to the general public, Michael worked with large commercial clients, learning the benefits and limitations of digital photography. He has continued to expand his knowledge base, staying breast of the latest technology and printing. Part of what drew Michael to photography was that he could

create images as fast as he could picture them in his mind. While he started in painting and sculpture, these two art forms required far less technical knowledge than photography. It has taken Michael most of his career to learn the technical and artistic subtleties of photography. Over the years Michael has amassed a fantastic library of books on photography, detailing advances and long lost photographic techniques. Pouring over his collection has enabled him to continuously refine his own photographic skills.

Jason Newbern, School of Life Sciences, Arizona State University, Tempe, AZ



Jason Newbern's research is centered on developmental neuroscience. His laboratory studies the biochemical mechanisms that direct the formation of the brain and spinal cord. He uses genetic, cellular, and molecular techniques to investigate the development of neurons and glia in the brain. Newbern's team is also interested in a protein called "ERK/MAP kinase." The neuro-developmental syndromes — Neurofibromatosis Type 1, Noonan-, and CFC-Syndrome — are caused by mutations in regulators of this protein. Abnormal activation of this protein may also be involved in schizophrenia andautism spectrum disorders. Newbern's laboratory is studying precisely how ERK/MAP kinase controls the formation of neural circuits in the brain. The team is also developing new ways to reverse the effects of pathological ERK/MAP kinase — with the goal of stimulating neurological recovery.

MICROSCOPY & MICROANALYSIS 2014 CONFERENCE

M&M 2014 MICROSCOPY & MICROANALYSIS AUGUST 3 – 7 • HARTFORD, CT

We invite you to join us on August 3-7, 2014 at the Connecticut Convention Center in downtown Hartford, CT. for Microscopy & Microanalysis 2014. Microscopy and Microanalysis 2014 promises to be the epitome of scientific diversity, spanning disciplines from the life sciences to the physical sciences, all unified by the tools of our trade. The program committee has developed a strong

program highlighting the latest microscopic and microanalytical advances in fields such as nanotechnology, biological sciences, materials science, clinical diagnoses, and metallurgy. Many interdisciplinary symposia have been organized, reflecting the current environment of collaboration between scientists in different disciplines. The exhibits will demonstrate state-of-the-art equipment, and the vendor tutorials will continue to be a significant part of the meeting. The meeting will also feature "Back to the Basics" tutorials and workshops to be held during the meeting in addition to the traditional Sunday Short Courses. For more information go to:
http://www.microscopy.org/MandM/2014/index.cfm.

CURRENT ARIOZNA MICROSCOPY NEWS

New Grant Advances ASU Microscopy Imaging Initiative [2013]
At Arizona State University's Biodesign Institute, Nongjian (NJ) Tao has been designing advanced microscopy methods with the ambitious aim of capturing molecular-scale phenomena in living systems. The new techniques, which combine multiple imaging modalities, are poised to revolutionize the study of biology and the development of new drugs.
For the complete story please go to: https://asunews.asu.edu/20130807-grant-asu-microscopy

University of Arizona Receives NIH Grant for Dual Modality System for Imaging Colon Cancer in Mice [2013]
Mouse models of colon cancer are a critical experimental tool for determining the role of specific genes in carcinogenesis, studying tumor initiation and progression, and testing potential chemopreventive and therapeutic compounds. Typically, mouse study outcomes are determined by sacrifice and colon tissue harvesting for procedures such as tumor count, immunohistochemistry, and various assays. Since each animal can only be analyzed once, comparison across timepoints must be done statistically. With this method, it is impossible to know the progression (and possible regression) history of a lesion. We are changing the current destructive paradigm through the use of miniaturized combined reflectance and fluorescence endoscopes.
For the complete story please go to:
http://www.octnews.org/articles/4804488/university-of-arizona-receives-nih-grant-for-dual-/

[AIMS]


[AIMS] Arizona Imaging and Microanalysis Society
Using light, electrons, ions, electromagnetism and x-rays.
AIMS 2014 Conference
Bioimaging Ethics Workshop
March 20, 2014
12:00-5:00pm
ASU Old Main Basha Library
2014 AIMS Conference
March 21, 2014
8:00am – 5:30pm
ASU Old Main Carson Ballroom
Sponsors
Platinum
Electron Microscopy Sciences
FEI
Lumen Dynamics Group, Inc.
Photometrics/QImaging
Gold
Boeckeler
Edax, Inc.
Fisher Scientific
Gatan Inc.
Hitachi
Leica Micros/NC Instruments
Olympus America Inc.
Imaging at Atomic Resolution
Jingyue Liu
Advancements in Tissue Engineering
William Landis
Micro to Nano: Moving To Super Resolution
Catherine Galbraith
What is in a Picture?
Michael Traynor
Developmental Neurobiology Imaging Advancements
Jason Newbern
Student Posters
New Microscopy Tools