[AIMS] Arizona Imaging and Microanalysis Society

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

AIMS Newsletter Volume 02, Issue 01

# Spring, 2008
# AIMS Meeting

**Our next AIMS meeting** will be in Flagstaff. The date is **Thursday, April 17**, **2008** so please **mark your calendars**. It will be a 12 noon to 8 pm. meeting to allow travelers to arrive from Tucson and the Phoenix area. The meetings will be held at the Radisson Woodlands Hotel, 1175 West Route 66, in Flagstaff. We also have a hold on 35 rooms at the special rate of $89.00 and 5 Parlor Suites rooms at $109.00. These rates will be honored until Thursday, March 27, 2008. Please be sure to make your reservations early. Radisson information at the following site: http://www.radisson.com//flagstaffaz

**2008 Registration:**

**If you are a member**, go to http://www.azmicroscopy.org/members/login.php and Log In, then click on Conference Registration.

**If you are not a member**, go to http://www.azmicroscopy.org/forms/registrationform.php and fill out the membership registration form. After completing all the information, you will receive an email confirming your membership. Then, register for the meetings at http://www.azmicroscopy.org/members/login.php, Conference Registration.

## The 2008 conference made possible by the generous support of the following companies:

**Ametek**
**Diatome**
**EMS**
**Gatan**
**ICMAS, Inc., WITec**
**Leica**
**Carl Zeiss Microimaging, Inc**
**Carl Zeiss Microimaging, Inc**
**Edax Inc.**
**FEI**
**Hitachi**
**JEOL USA Inc.**
**Leica Microsystems**

# Arizona Imaging and Microanalysis Society Meeting 2008 – Program

April 17, 2008
**Check-In**
| 11:30 – 12:30 |

**Welcome and Opening remarks**
Marilee Sellers - AIMS President
| 12:30 - 12:45 |

**Presentation 1 – 60 mins**
William Landis, Ph.D. Department of Microbiology, Immunology and Biochemistry, Northeastern Ohio Universities College of Medicine (NEOUCOM)
*"Tissue engineering of models of human digits and ears"*
| 12:45- 1:45 |

**Presentation 2 – 30 mins**
Steve Pfeiffer, Gatan Inc.
"*SBSFM: bridging the gap between confocal & TEM"*
| 1:30 - 2:00 |

**Student Poster Presentations 3 – 45 mins**
Presentations by students and judging of student posters
| 2:00 - 2:45 |

**Afternoon Break – Vendor exhibits and poster viewing and judging**
**Coffee and Pastries – 45 mins**
| 2:45– 3:30|

**Presentation 4 – 30 mins**
Donald Speer, M.D. Professor Emeritus, Department of Orthopaedic Surgery, UACM
*"Uses of Polarized Light for Imaging and Analysis"*
|4:00 – 4:30 |

**Presentation 5 – 30 mins**
Tim Vail, Ph.D., Department of Chemistry/Biochemistry, NAU
*"Nanotechnology and the Diagnosis of Methicillin-Resistant /Staphylococcus/ Biofilms"*
| 4:30 – 5:00 |

**Presentation 6 – 30 mins**
Charles Kazilek, School of Life Sciences, Arizona State University
*"Through the Looking Glass in 3-D: engaging young minds in the classroom and beyond"*
| 5:00 – 5:30 |

**Dinner Buffet – 60 mins**
| 5:30 - 6:30 |

**Presentation 7 – 60 mins**
Allen West, Ph.D., GeoScience Consulting
"Extraterrestrial Markers Found at Clovis Sites Across North America"
| 6:30 - 7:30 |

**Closing Remarks and Student Award Announcement – 30 mins**
| 7:30 - 8:00 |

## AIMS BUSINESS MEETING:

**Annual Society general meeting, the public is welcome.**

## Abstracts:

**William J. Landis, Department of Microbiology, Immunology and Biochemistry, Northeastern Ohio Universities College of Medicine (NEOUCOM), Rootstown, Ohio. (330) 325-6685;** wjl@neoucom.edu

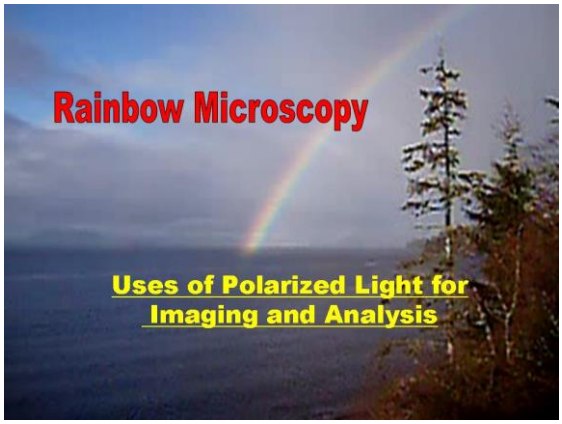
***"Tissue engineering of models of human digits and ears"***

Tissue engineering is a relatively new and potential powerful means of augmenting, repairing, and replacing various tissues that may be congenitally defective, injured, diseased, damaged or otherwise impaired in the human body. The approach of tissue engineering commonly involves seeding isolates of specific cells onto a biodegradable polymer scaffold to form a cell/scaffold construct. The construct is subsequently developed in vitro or in situ for ultimate use as a possible replacement tissue. Bone and cartilage structures, such as a human digit or ear, have now been modeled by tissue engineering methods. The presentation will describe by light and electron microscopy, correlated with laser capture microdissection and gene expression, the tissue engineering of current models of human phalanges and ears. Compared to bone and cartilage in vivo, these models demonstrate several similarities in structure, composition, and response to mechanical forces and they suggest great promise for further advances in clinical applications.

**Dr. Landis** is a professor in the Department of Microbiology, Immunology and Biochemistry and in the Department of Orthopedic Surgery at the Northeastern Ohio Universities College of Medicine (NEOUCOM) in Rootstown, Ohio. He holds joint faculty appointments at Kent State University, the University of Akron, Case Western Reserve University and the University of Pennsylvania. He has research interests in biomineralization, tissue engineering, and the effects of mechanical forces on mineralized tissues. Dr. Landis has published more than 125 peer-reviewed journal articles, book chapters, and reviews in these areas.

**Steve Pfeiffer,**
**Gatan, Inc.**
***"SBSFM: bridging the gap between confocal & TEM."***
*Serial Block Face Scanning Electron Microscopy (SBFSM) is a new technique allowing the automatic acquisition of serial images at the ultrastructural level in an SEM. This technique was developed by Denk & Horstmann at the MPI, Heidelberg. Using an automated ultramicrotome mounted within the SEM chamber, a 20 to 50nm layer is shaved off a block of standardly embedded TEM sample. The freshly exposed block face is then imaged in back scatter mode. This is repeated over a distance of up to 400 microns. Images are acquired in perfect serial section registration, with no subsequent image realignment necessary. Large block faces (500 micron by 500 micron) have been imaged with this technique. This technique is meant to bridge the gap between confocal microscopy & TEM serial section reconstruction. While not having quite the resolution of a TEM image, resolution is more than adequate to reconstruction neurons over large volumes. A number of serial image series will be shown.*

**Donald P. Speer, MD, Department of Orthopaedic Surgery**
**University of Arizona Medical Center, Tucson**
***"Uses of Polarized Light for Imaging and Analysis"***




*Polarized light microscopy (PLM) is a venerable but generally underutilized method for assessing organic (biological) materials. Most commonly, birefringent properties of crystalline or anisotropic materials are exploited using PLM. Other optical properties of materials and, significantly, of common histological stains are considered less often, or not at all, in biological applications. Study of serial sections prepared (1) unstained, (2) with H&E staining and (3) with*

*metachromatic staining (typically Mason trichrome or toluidine blue) permits correlation of several properties of target tissues and/or materials. Rotation of histological specimens between the polarizer and analyzer affords a "cinematic" image of broad areas, allowing two- and three-dimensional reconstruction of tissues and/or materials. Introduction of various filters or wave plates is a useful adjunct, not only for analysis but for enhancement of photomicrographs*

*Several applications of these protocols helpful in our studies will be reviewed, including:*

1. *Reconstruction of normal collagen microarchitecture of growth plate and articular cartilage;*
2. *Comparison of chemical crosslinking methods in the biodegradation of an extruded collagen filament implant material;*
3. *Assessment of biological fixation of a collagen implant to bone.*

**Dr. Donald Speer**, Professor Emeritus, Orthopaedic Surgery at the University of Arizona, will also speak. His talk will focus on his applications of Polarizing Light Microscopy in the evaluation of connective tissues. Before retiring, Dr. Speer specialized in Pediatric Orthopedics and Musculoskeletal Oncology. Dr. Speer earned his undergraduate degree from Stanford University, attended medical school at the University of Southern California, and did his internship at the University of California Hospital, followed by residencies at the University of Kansas Hospital and at the University of Arizona. Dr. Speer has been involved in both basic science and clinical research, giving presentations at national and international meetings on topics ranging from pediatric hip surgery to pathogenesis of hemophilic arthropathy.

**Timothy Vail, Ph.D., Department of Chemistry/Biochemistry**
**Northern Arizona University, Flagstaff, Arizona**

***Nanotechnology and the Diagnosis of Methicillin-Resistant /Staphylococcus/ Biofilms****

*Infectious biofilms result from bacterial communities encased within an exopolysaccharide matrix. They are resistant to antibiotics and the host's immune defenses. Biofilms are often associated with indwelling medical devices, including cathers, prosthetic heart valves, and prosthetic joints. There are currently no approved biofilm-specific point-of-care diagnostic devices or therapeutics. This presentation will focus on the development of a biofilm-specific rapid assay that utilizes nanoparticle colloidal gold coupled with the host's own immune response as a probe-reporter pair. Implications for further development of nanoparticle-based therapeutics will also be discussed.*

**Charles Kazilek, Director of Technology Integration and Outreach, School of Life Sciences,**
**Arizona State University, Tempe, Arizona**

***"Through the Looking Glass in 3-D: engaging young minds in the classroom and beyond"***

*Capturing the attention of young minds in the sciences can be a challenge. Often we place the details of science first and leave the fun things to the last. For microscopy this need not be the case and in fact microscopic images can be some of the most exciting content students come in contact with in the classroom and on the Web. The Paper Project chronicles handmade and mould made paper images produced by a scanning-laser confocal microscope. As a scientific tool confocal microscopy has clearly shined. Beyond its use in scientific research this instrument has also provided a wealth of images and content that can be used in the classroom and at home to engage people of all ages. In its ninth year, the Paper Project has grown from a small web-based project, to an extensive program that includes a touring gallery exhibit, a 3-D immersive room installation, and a dance performance. Educators are able to use multiple content areas and activities from the Paper Project web site to capture the imagination of their students and stimulate their interest in science.*

**Allen West**
***GeoScience Consulting, Dewey, AZ 86327***
***Email:*** *allen7633@aol.com*

**"Extraterrestrial Markers Found at Clovis Sites Across North America"**

There is substantial evidence on Earth for an extraterrestrial (ET) impact event about 12,900 years ago. We propose that it triggered severe changes in climate and led to abrupt environmental changes that contributed to broad-scale extinctions and rapid human behavioral changes at the end of the Clovis Paleoindian Period. Twenty-five 12,900-year-old sites in North America are marked by a thin, discrete layer, containing varying peak abundances of many ET markers, including nanodiamonds, magnetic microspherules, carbon spherules, soot, fullerenes with ET helium, and iridium. The talk will include data from a number of well- known Clovis sites, including Murray Springs, AZ, near Sierra Vista, which is one of the best known Clovis mammoth kill-sites. There, a distinctive carbon-rich impact-related layer, called a "black mat," lies above extinct mammoth bones, and a thin layer, containing the impact event markers, lies just under the black mat and drapes over the mammoth bones and Clovis artifacts.

**Dr. West** is also a co-author of The Cycle of Cosmic Catastrophes, Flood, Fire, and Famine in the History of Civilization. Dr. West was owner and CEO of an international scientific consulting company, and now lives in Prescott, Arizona.

## CALL FOR STUDENT POSTERS AND ABSTRACTS:

As always, student participation is an important part of the AIMS meeting and faculty are encouraged to have their students attend and present. Abstracts for student presentations should be submitted not later than April 7, 2008. Student travel support in the amount of $50 will be available to the first 10 students (outside of Flagstaff) submitting abstracts. You may submit your abstracts online after you have applied for membership in AIMS, or renewed your membership at the following site.
http://www.azmicroscopy.org/index.php

The format the student presentations will be the same as the last few years. Each student will give a 3 minute platform summary of their research with a maximum of 3 PowerPoint slides. Following these presentations, there will be a poster session. The students will present and discuss their posters to the meeting visitors and judges. Awards will be given for the Best Materials Poster and Best Biological Poster at the end of the meetings.

## FLIERS, PRODUCT INFORMATION, BROCHURES

I wish to invite all of our corporate members upon registering, to send me their fliers, new product information, business cards, etc. to be incorporated into our website newsletter. Also, I invite all AIMS members to submit any workshop brochures, lecture, educational, or outreach information that would benefit the AIMS membership.

## SOCIAL EVENTS:

Since most of our attendees will be staying over night in Flagstaff, there are many opportunities for enjoying the unique Flagstaff and Sedona area on Friday, April 18.

**GOLF OUTING: It has been a few years since having an AIMS Golf Outing.**
A golf outing is planned for the morning of April 18th for those that enjoy a round on one of Arizona's premier courses, the Village of Oakcreek Country Club, designed by Robert Trent Jones, Jr. and Robert Trent Jones, Sr.
http://oakcreekcountryclub.com/

Tee times would begin at 9AM on Friday, April 18. Reservations are required by April 4th. Special rate: $60.00 including cart (Regular April rate - $115.00). Please RSVP Marilee Sellers if you plan to attend (Marilee.Sellers@nau.edu). Please join the AIMS social/picnic following at the Sellers home.

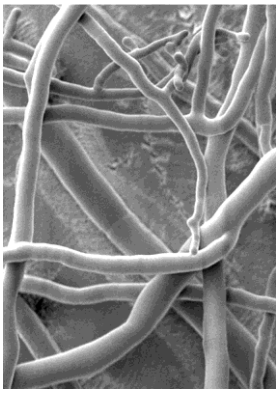
**AIMS SOCIAL and PICNIC:** After a day of hiking, shopping, biking, or golf; please relax join everyone or a couple hours before heading home to Phoenix, Tucson, or points beyond. Marilee and Jerry Sellers will host a casual picnic at her home in the Village of Oak Creek from 2 to 5 PM. Friday, April 18, 2004. Please RSVP by April 10, 2008. Directions follow.

Jerry and Marilee Sellers
185 Cathedral Rock Drive
Sedona, AZ 86351
http://www.mapquest.com/

1: Start out going SOUTH on S MILTON RD toward W UNIVERSITY AVE. 0.4 miles Map
2: S MILTON RD becomes I-17 S. 40.7 miles Map
3: Take the AZ-179 exit- EXIT 298- toward SEDONA / OAK CREEK CANYON. 0.2 miles Map
4: Turn RIGHT onto AZ-179. 7.2 miles Map
5: Turn LEFT onto VERDE VALLEY SCHOOL RD. 0.7 miles Map
6: Turn RIGHT onto BELL ROCK BLVD. 0.2 miles Map
7: Turn LEFT onto CATHEDRAL ROCK DR. 0.2 miles Map
8: End at 185 Cathedral Rock Dr

## SEND US YOUR IMAGES

We continue to encourage all our members to submit their exciting and eye-catching images for the AIMS web site. Recently Dr. Robby Roberson has been proving that microscopy is not just for science and scientist. His images have been exhibited at several Arizona Galleries including the Tilt Gallery in Phoenix and the Arizona Science Center also in downtown Phoenix.



The Fungal Body –
Robby Roberson

# Microscopy and Microanalysis Meetings Announcement

**REGISTER NOW for M&M 2008!** Be sure to register for M&M 2008 this August!

This year's meeting will be in Albuquerque, NM, August 3-7, 2008. An exciting program is being assembled, including scientific symposia, tutorials, and educational sessions that reflect emerging topics in microscopy and microanalysis, such as biofuels, biofilms and stem cells in the life sciences, to ultrafast microscopy, nuclear materials, and helium ion microscopy in the physical sciences.

It's easy! It's fast! Go to https://www.hacherohill.com/show/mm2008/a/1 to register for the meeting online (credit card required).

If you need to send a check, or prefer to register by fax or mail, simply go to www.microscopy.org/MMMeetings/MM08/HomePage.html and click on "Registration/Forms" to download a PDF registration form.

**RESERVE YOUR HOTEL ROOM NOW!**

Hotel rooms are going fast! Call the hotel of your choice, or log on to one of the group reservations websites below to reserve your room in Albuquerque. Be sure to say you're with the Microscopy Meeting.

**Hyatt Regency Albuquerque** - $169 s/d - Reservations: 800-233-1234

http://albuquerque.hyatt.com/groupbooking/albuqmssa2008

**Albuquerque Embassy Suites Hotel & Spa** - $155 s/d - Reservations: 1-800-EMBASSY

http://embassysuites.hilton.com/en/es/groups/personalized/ABQEMES-MIC-20080731/index.jhtml

**Hilton Albuquerque Hotel** - $139 s/d - Reservations: 1-800-274-6583

www.hilton.com/en/hi/groups/personalized/ABQHIHF-MSA-20080730/index.jhtml

**Fairfield Inn by Marriott** - $119 s/d - Reservations: 800-228-2800

**Questions?** Email MeetingManager@Microscopy.org or call 703-964-1240 x17

**To all of you who have students (or are students) that are planning to attend the Microscopy and Microanalysis 2008 meetings in Albuquerque, NM this summer….**

Please encourage them (plan) to sign up to be student bursaries. 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, monitoring use of the Internet Café, and helping with poster set-up and take-down.

Once the final program has been established, the bursary will be contacted and allowed to choose the times and activities they would like to work. Many times they end up "working" things they would attend anyway.

Not only does working as a bursary benefit the society, it gives the student a chance to interact with the established microscopy community as well as help off-set the cost of meeting attendance. There is an added bonus of a $10 cash meal allotment for morning or afternoon sessions worked. If students would like to participate in the bursary program, please have them check the "I wish to apply for a student bursary" box in section 2 of the registration form. Bursary space is limited, so students need to sign-up early.

Don't forget to have your students contact meeting management for special discounted hotel rates especially for students.

If anyone has any questions about the bursary program, please contact me.

Amanda Lawrence
Electron Microscope Center
Box 9775
Mississippi State, MS 39762
662-325-3019

alawrence@entomology.msstate.edu