



**REGISTER FOR THE
AIMS MEETING
ONLINE**

www.azmicroscopy.org

**Special points
of interest:**

- Meeting Schedule Announced
- Abstracts
- Travel Advisory
- MMM 2009 Conference
- Student Information
- AIMS Ballot

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Arizona Imaging and Microanalysis Society Conference, March 12, 2009

PRESIDENT'S NOTE

The annual AIMS meeting this year will be held on March 12 in the Student Union South Ballroom, at The University of Arizona in Tucson. We have an exciting variety of invited speakers, so please let everyone know about the meeting and plan to attend. Students please submit abstracts for the poster session! Two cash awards will be presented for the best student poster. There will be a catered lunch for AIMS members (included with membership). In addition to the posters and invited speakers, corporate sponsors will be at the meeting with demonstrations and the latest technical and sales information. Check out our website: (<http://www.azmicroscopy.org/>) for registration, abstract submission, and other details you will need regarding the meeting.

It is appropriate at this time to thank our outgoing President, Marilee Sellers (NAU) for her years of service in all aspects of AIMS.

We are self funded (thanks members and corporate contributors), and in these trying economic times this meeting brings together researchers who spend long hours characterizing challenging samples the ability to meet in the spirit of camaraderie, in addition to keeping current in new technological developments. Our membership numbers are growing and we are slowly but surely collecting members that had been lost from the rolls over the years. A good meeting turnout says AIMS is a useful technical society and sends a message to our supporters, our corporate members, our vendors, MSA, and MAS, that AIMS is a good investment of our time, their time, and their financial support.

See you there!

Phil Anderson / AIMS President

MEETING SCHEDULE

South Ballroom, Student Union, The University of Arizona

7:30-8:00	Registration
8:00-8:15	Welcome: Philip Anderson - President AIMS
8:15-9:00	Dave Killick, Univ of AZ
9:00-10:00	Bryan Tracy, Spansion, Inc.
10:00-11:00	Coffee Break – Vendor demonstrations
11:00–12:00	Paul Hlava, MSA Tour Speaker
12:00-1:00	Buffet Lunch
1:00-2:00	Peter Smith, Phoenix Mars Project. Univ of AZ
2:00-2:45	D. Page Baluch ASU
2:45-3:30	Student Presentations
3:30-4:15	Break
4:15-4:45	Student Awards
4:45-5:00	Close Meeting
5:00-6:00	Business meeting
6:30-	No Host Dinner





ABSTRACTS



Paul Hlava MSA Tour Speaker
Access to Gems and Minerals, Inc., Albuquerque, NM

From antiquity, gemstones have been so very highly prized for their beauty and rarity that they have always been difficult and/or expensive to acquire. Therefore it seems only natural that people would try to mimic them with less costly, artificial materials, often with noble intentions, sometimes with not so noble intentions. In olden times, let us say before 1800, these artificial materials were mere substitutes or simulants of variable quality. It wasn't until the end of the 18th century, when the science of analytical chemistry was well developed, that people knew what elements and contaminants were needed to form the desirable stones. From then on the race was afoot to produce synthetic materials identical to the best, perfect, natural stones. These quests benefited science and technology in that the researchers had to develop/perfect and control means of producing and stabilizing very high temperatures, medium to very high pressures, and extremely pure starting materials. In this well illustrated and colorful talk I will discuss many (but not all, e.g., opal will not be covered) of the technologies used to produce true synthetic gemstones as well as simulants. After defining a few terms used throughout the talk, I will follow a more or less chronological path to briefly cover the various techniques and the materials they create. People often have questions as to the ethics of synthesizing gems, their effect on natural stone sales, how to distinguish synthetic stones from natural stones, pricing issues, and more, so I will briefly address some these issues.

Come prepared! There is a short quiz at the beginning of the talk to test your pre-talk knowledge of synthetic gemstones.

Selected Reading: K. Nassau, Gems Made by Man, Gemological Institute of America, Santa Monica, CA, 1980.

AIMS Meeting – March 12, 2009 – The University of Arizona – Student Union – South Ballroom



D. Page Baluch, Joseph Georges, Pierre Deviche and William J. Tyler
Arizona State University, School of Life Sciences

The rapid modulation of presynaptic neurotransmitter release and synaptic vesicle recycling at hippocampal excitatory synapses by estradiol.

The steroid hormone estrogen is known to stimulate a variety of neuronal responses by acting through the classic estrogen receptors α and β (ER α and ER β) to regulate animal behavior and physiology. As a potent regulator of neuronal plasticity and cognition, estrogen has been found to trigger postsynaptic effects on neurons such as inducing dendritic spine formation, regulating neurotransmitter receptor recycling, and to mediate dendritic branch remodeling. The effects of estrogen on presynaptic neurotransmitter release probability and synaptic vesicle recycling in the hippocampus is largely unknown but is thought to have a profound influence on synaptic plasticity and the learning and memory processes. The signaling affect of estrogen described to date is generally slow (hours to days), dependent on ER α activation and requires gene transcription. Recent studies in various neural systems, as well as other tissues, have identified rapid (seconds to minutes) estrogen signaling pathways which are initiated by activation of the membrane bound estrogen receptor GPR-30. In this study, estrogen was observed to modulate neurotransmitter release in a rapid manner by acting through GPR-30 receptors in hippocampal excitatory synapses. Changes in presynaptic neurotransmitter release were optically monitored using the pH-dependent reporter synaptopHluorin which assists in visualizing synaptic vesicle exo- and endocytosis. This investigation utilized electrophysiological analyses of quantal neurotransmitter release, immunocytochemical identification of estrogen signaling components as well as ultrastructural examination of synaptic vesicle pools using transmission electron microscopy to identify if the rapid modulation of presynaptic neurotransmitter release and synaptic vesicle recycling in hippocampal excitatory synapses is regulated by the GPR-30 non-nuclear estrogen receptor signaling pathway.



Dave Killick, Dept. of Anthropology and Materials Science & Engineering,
 The University of Arizona, Tucson, AZ

To be announced.

AIMS Meeting – March 12, 2009 – The University of Arizona – Student Union – South Ballroom

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 ONLINE**

First, sign up as an AIMS member
 then you can register for the
 conference through the Member
 Control Panel.

[http://www.azmicroscopy.org/
 conferences.php](http://www.azmicroscopy.org/conferences.php)



Bryan Tracy, Alline Myers, Max Sidorov,
 Amalia del Rosario, and Maggie Guillena
 Materials Characterization Lab,
 Spansion, Inc., Sunnyvale, CA

The Dual Challenges for FIBXTEM in the Era of sub-50nm Feature Sizes

Since the first demonstration of the usefulness of FIB technology for preparing site-specific TEM cross sections from sub-micron features, the focused ion beam has now become *the* method of choice for TEM sample preparation in materials science. The advantages of this method have been reviewed extensively, but essentially, it is now possible to prepare a TEM sample from any material that can be introduced into a FIB chamber. FIBXTEM is especially prevalent in the semiconductor and hard drive industries.

However, in the era of sub-50nm feature sizes, two distinct TEM specimen preparation challenges have arisen: (1) the production of feature sizes significantly smaller than the normal thickness of TEM samples, and, (2) the choice of capping material during FIBXTEM preparation is now nearly as important as the material of the sample itself. It is the purpose of this presentation to illustrate these two points and to present some of the solutions our laboratory has developed to mitigate their effects.



**Peter Smith: The Phoenix Mars Mission,
 University of Arizona**

Peter Smith and the Journey of the Phoenix

On May 25, 2008, the Phoenix team began operation of a robotic laboratory on the northern plains of Mars. Inside the Arctic Circle at 68 degrees, the undulated terrain driven by the ice underneath forms polygons. The robotic arm quickly dug a trench 5 cm deep and exposed the underlying ice table; samples of soil and ice were retrieved and analyzed in three instruments. The results of those instruments reveal an alkaline environment buffered by Ca-carbonate with nutrients and potential chemical energy sources. This may be a habitable environment for microbes if liquid water is periodically available. The Phoenix weather station monitored atmospheric conditions as the sky turned from dusty to cloudy, seeing ice snowing onto the surface late in the mission. We are investigating conditions in previous epochs to determine if water could wet the soil at times when the obliquity exceeds 30 degrees.



NASA's Mars Exploration Program

Visit USIF
<http://usif.arizona.edu/>

Travel Advisory for those Driving to Tucson

I-10 construction: off-ramp closures



A campus map with parking marked can be found at <http://parking.arizona.edu/pdf/maps/visitor.pdf>. For those coming from out of town (from the North) take the Prince exit and proceed on the frontage road (freeway construction continues unit 2010). Turn Left onto Speedway (East). Travel 2-3 miles past Euclid to Mountain. Turn Right on Mountain (South) to 2nd St. Turn Left on 2nd (proceed East, one way). Get immediately into the Right lane and turn Right into the parking Garage. Parking is \$7.00 per day. (Cash only)

Interstate 10, or I-10, is the one and only freeway that runs through Tucson, and is undergoing a MAJOR reconstruction project. Freeway on-ramps and off-ramps through the main section of the city are closed. This includes the on-ramps and off-ramps at Speedway Blvd, which is the primary route used to drive to and from the University of Arizona.

If you are approaching Tucson from the north (Phoenix area), the last off-ramp that is open is Prince Road (Exit 254). Exit the freeway at the Prince Road off-ramp. This will put you into the eastbound frontage road that parallels the freeway. Stay on the frontage road (southbound, but the signs may say eastbound) to Speedway Blvd. Make a left onto Speedway Blvd and proceed eastbound on Speedway Blvd until you reach the University of Arizona (about 1.5 miles). Note: Signage for the I-10 freeway will say "eastbound" when driving from the Phoenix area to Tucson.



If you are approaching Tucson from the south (El Paso/areas east of Tucson), the last off-ramp that is open is 29th St. Exit the freeway at the 29th St off-ramp (Exit 259). Watch the freeway signs closely as it is a bit tricky to exit the freeway and find the 29th St off-ramp. This will put you onto the westbound frontage road that parallels the freeway. Stay on the frontage road (northbound, but the signs may say westbound) to Speedway Blvd. Make a right onto Speedway Blvd and proceed eastbound on Speedway Blvd. until you reach the University of Arizona (about 1.5 miles). Note: Signage for the I-10 freeway will say "westbound" when driving from the El Paso area to Tucson.

USIF

Envision Tomorrow

David Bentley, Executive Director:
 520-621-5097, usif@email.arizona.edu

Al Agellon: 520-621-5097,
usif@email.arizona.edu

Phil Anderson: 520-307-1864,
pla@u.arizona.edu

Steven Hernandez - 520-621-5097,
usif@email.arizona.edu

For the Director

Supapan Seraphin, Ph. D., Director 520-621-6075, seraphin@email.arizona.edu

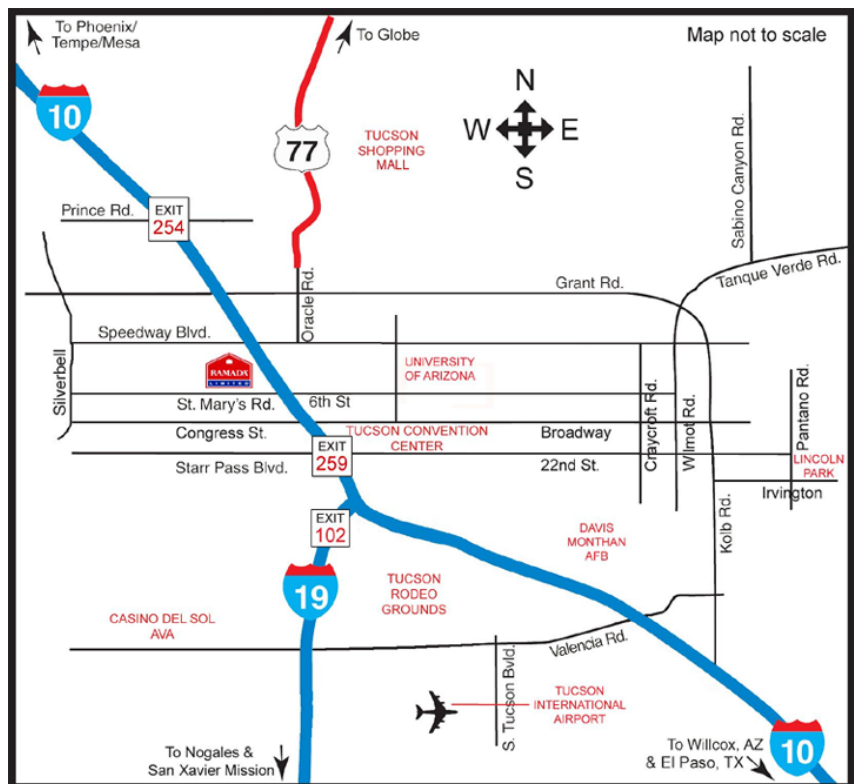
For Confocal Microscopy

Doug Cromey: 520-626-2824, cromey@arizona.edu

For Medical Research EM

Tony Day: 520-626-6009, waday@email.arizona.edu

As an alternative to exiting the freeway at 29th St, take the Kino St/Campbell Blvd off-ramp from westbound I-10 and proceed about 3 miles northbound on Kino/Campbell to the campus. Kino Blvd. will turn into Campbell Blvd. and will take you to the east side of campus.



SEND US YOUR IMAGES

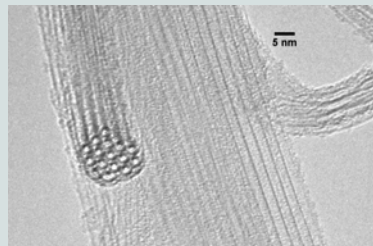
We continue to encourage all our members to submit their exciting and eye-catching images for the AIMS web site. AIMS members have excellent web sites that show many of their images. Confocal images of the Paper project are viewable on the site <http://paperproject.org/> and presented by Charles Kazilek of ASU.

Dr. Robby Roberson (ASU) has been proving that microscopy is not just for science and researchers. His images have been exhibited at several Arizona Galleries including the Tilt Gallery in Phoenix and the Arizona Science Center also in downtown Phoenix.

<http://www.azmicroscopy.org/gallery.php>

If you have questions about submitting an image, contact Charles Kazilek (kazilek@asu.edu).

The image below is a rare TEM cross sectional view of a bundle of carbon nanotubes.



Philip Anderson, Hitachi H8100 TEM, USIF, University of Arizona.

Pre-Register and Update Your Contact Information

Please help us plan for the meeting by pre-registering through the web page. We are planning a lunch, which is included in the registration cost (your membership in AIMS). We will also have a no-host dinner. Your pre-registration will allow AIMS to save money by more closely estimating our attendance. Even if you cannot attend the meeting, the web page can be used to update our records, so that we have the most recent contact information for you. As in the past, when you pay your dues at the meeting, you are paying for a one-year membership, and for the meeting registration.

REGISTER ONLINE

<http://www.azmicroscopy.org/>

Microscopy & Microanalysis 2009 Conference



The Microscopy & Microanalysis 2009 Conference will be held July 26-30 at the Greater Richmond Convention Center in Richmond, Virginia. Over 2,500 attendees from around the globe are expected - a prime opportunity for you to showcase your research, network with other scientists doing similar work, and contact possible employers and clients. We encourage both newcomers and veterans of M&M to submit an abstract of your work for presentation in Richmond.

This WWW site demonstrates the diversity of this meeting, which spans many disciplines from the life sciences to the physical sciences, all unified by the tools of our trades.

<http://www.msa.microscopy.org/MMMeetings/MM09/HomePage.html>

There will be an exceptional scientific program again this year, as well as a grand opening reception. The exhibits always demonstrate state of the art equipment and the vendor tutorials have been expanded. Many interdisciplinary symposia have been organized by the Program Committee and reflect the increasing trend of collaboration between scientists in different disciplines. There are also new initiatives this year with workshops and "Back to the Basic" tutorials to be held during the meeting in addition to the traditional Sunday Short Courses. Attending Microscopy & Microanalysis 2009 allows one to stay abreast of new technologies, learn new techniques, and see new instrumentation.

FULL- DAY SHORT COURSES: Sunday, June 26. Topics include

- Electron tomography
- Cryo EM
- Digital imaging
- FIB methodologies
- Variable pressure and environmental SEM imaging and analysis
- Interpretation of metallographic microstructures

See Registration forms online at <http://mm2009.microscopy.org> for details

- **OVER 30 SYMPOSIA**—applications in biological and physical sciences, as well as emerging trends in instrumentation and techniques
- **CONTIBUTED SESSIONS**—to encompass fields of study not covered by the topical symposia
- **HUNDREDS OF STELLAR POSTER PRESENTATIONS**—will offer the best opportunity for one-on-one discussion with your colleagues, held in the late afternoons. Refreshing beverages served!
- **TUTORIAL SESSION**—on the imaging process & interpretation in 3D, EM sample preparation for material scientists, and career development for the scientific professional
- **ROUND-TABLE DISCUSSIONS**—on artifacts and on low-cost options for cryotechniques.

AIMS EMAIL LIST

AIMS has established an email list for the purpose of forwarding information about seminars and demonstrations of interest to members of Arizona's microscopy, imaging, and microanalysis community. Persons wanting to submit a seminar or demonstration announcement to the list should send an email or regular postal mail with the following information: seminar demonstration title, speaker/company, location (including directions), date, time, contact person,

and a brief description of the topic. Submissions require the approval of two AIMS Executive Council members before they may be sent out to the list. Submissions should be sent to:

Al Agellon, (520) 621-5097 email: agellon@email.arizona.edu

UPCOMING EVENTS



Visit the University Spectroscopy and Imaging Facilities (USIF) for events relevant to AIMS.

USIF offers training workshops and other events throughout the year.

Go to USIF announcements...

<http://usif.arizona.edu/announcements/>

STUDENT POSTER INFORMATION

AIMS has a longstanding commitment to serve as a supportive and constructively critical forum for students. We strongly encourage you to give your students the opportunity to make a poster presentation. By way of incentive, you might note to them that the meeting offers not only the chance to hone their skills in front of a friendly scientific audience, but also the possibility of winning a Students' Award. We invite individuals (especially undergraduate and graduate students) to present posters on their research projects. Two student poster awards (one for life sciences and one for physical sciences) of \$150 will be given for the best poster/presentation.

- Each presenter will be given 1-2 minutes to present the most important aspects of their poster (this should be limited to the topic of the poster and the main conclusions).
- Each presenter will be allowed a small number of PowerPoint slides (be reasonable) for the presentation. Contact Phil Anderson (520) 307-1864, (email: pla@email.arizona.edu) for the PowerPoint format form. Posters should be formatted to fit onto an area 60 inches wide by 40 inches high.

Please Pre-register for your poster presentation on the website so that we can have your easel ready!

Student Poster Award Guidelines

1. Applicants must be or have been an undergraduate student or graduate student during the academic year of the meeting.
2. Each applicant must be sponsored and validated by a signed statement from a non-student member of AIMS verifying item #1 (see form below).
3. The work must consist of original research authored by the participant, but may be co-authored by his/her advisor. The poster must be formatted to fit an area 60 inches wide by 40 inches high. The written portion should also contain a research summary.

AIMS Student Poster Award Application

1. Title:
2. Author and Affiliation:
3. Summary of research includes:
 - ___ Title, Author's, Affiliation
 - ___ Introduction
 - ___ Materials and Methods
 - ___ Results
 - ___ Discussion
 - ___ Figures and Legends

4. Sponsors, please sign the following statement:

I verify that the above listed participant is/was an
 ___ undergraduate
 ___ graduate student during this academic year.

Signed _____

Sponsor Name and affiliation: _____

Award Method of Evaluation

The AIMS Poster Judges will use the following criteria to evaluate the student posters and oral presentations.

Poster

- Scientific Merit
- Soundness of research proposal
- Experimental design and thoroughness of investigation
- Validation of conclusions
- Application of microscopy/microanalysis in answering an experimental question
- Quality of Micrographs/Images/Data
- Presentation of specimen
- Instrumentation
- Photographic quality
- Quality of Writing
- Organization
- Clarity
- Grammatical correctness



ATTENTION CORPORATE MEMBERS

If you would like to have a 6-ft exhibit table at the meeting please notify Phil Anderson (520) 307-1864, (email: pla@email.arizona.edu) so that arrangements for electricity, etc. can be made. The fee for an individual table is \$150.00 for members, but is included in your dues if you have sponsored the society at a tier 3 level or higher. Please contact Phil Anderson for a copy of the tier structure and other sponsorships if you have not received it already.

Award Method of Evaluation

Oral Presentation and Responses to Questions

- Clarity
 - Communication
 - Response to questions
 - Observance of presentation time limits
 - Originality and use of correlated techniques
 - Arizona Imaging and Microanalysis Society (AIMS)
 - Student Poster Award Chairperson's Responsibilities
1. The meeting program must contain enough time for the poster judges to meet with each of the students at their poster for questioning.
 2. Poster guidelines should be on the website, along with all forms.
 3. The forms for the oral presentation should be turned in (five) days prior to the meeting, and overheads made from these forms. No other format is allowed for the oral presentation, and a single page is the limit.
 4. The students should also turn in an abstract suitable for publication, and their research summary and text material from the poster, (five) days before the meeting. The chairperson should make copies of this material available to the poster judges prior to the meeting.
 5. Determining poster judges is the chairperson's responsibility. Past meetings have made use of the MSA and MAS tour speakers, and one or more corporate members, as poster judges.
 6. AIMS traditionally presents two awards, one for physical sciences and one for life sciences. The chairperson and judges may decide on additional awards.

AIMS Corporate Members

Agilent Technologies	stuart_spencer@agilent.com
Boeckeler Instruments Inc	dave@boeckeler.com
Bruker AXS Microanalysis	Alan.Hollaar@bruker-axs.com
Carl Zeiss Microimaging, Inc	lroberts@zeiss.com
EDAX, Inc.	tina.wolodkowicz@ametek.com
Electron Microscopy Sciences	sgkckc@aol.com
EM Lab Services	Roberts@emlabservices.com
FEI Company	tcarpenter@feico.com
GATAN	spfeiffer@gatan.com
Hamamatsu Corp.	rkershaw@hamamatsu.com
Hitachi	jamie.collier@hitachi-hhta.com
ICMAS, Inc. WiTEC	bob@icmas.com
JEOL USA INC	crood@jeol.com
Leeds Precision Instruments	mhowell@leedsmicro.com

AIMS Corporate Members

Leica, Diatome, EMS Hitachi	pdegeroge@marinereef.com
Nikon Instruments Inc.	cmiller@nikon.net
Olympus America Inc.	Myron.McKenzie@Olympus.com
Oxford Instruments	Haritos@ma.oxinst.com
Southwest Precision Inst.	rchiovettie@swpinet.com
Thermo NORAN	wayne.watson@thermofisher.com

CORPORATE SPONSORS

As always, some of our corporate members will be attending the meeting to demonstrate their equipment, provide literature, and serve as a resources for resolving questions surrounding the use of purchase of microscopy/imaging equipment and accessories.

Further information for vendors is included below. We thank our vendors for their continued support of our society and the annual meeting. For more information on the commercial exhibit please contact:

Philip Anderson (520) 307-1864,
pla@u.arizona.edu

FEI

<http://www.fei.com/products/default.aspx>

Electron Microscopy Sciences

<http://www.emsdiasum.com/default.htm>

Gatan

<http://www.gatan.com/>

Hitachi

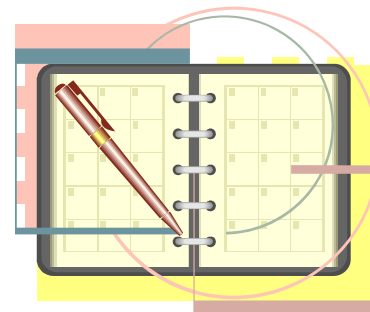
<http://www.hitachi-hitec.com/global/em/index.html>

EM Lab Services

<http://www.emlabservices.com/>

2009

AIMS MEETING



March 12, 2009

**The University of Arizona
Student Union — South Ballroom**

Edax

<http://www.edax.com/>

Bruker AXS Micoranalysis

<http://www.bruker-axs.com/>

Boeckeler Instruments

<http://www.boeckeler.com/>

Carl Zeiss Microimaging

<http://www.zeiss.com/micro>

ICMAS

<http://www.icmas.com/>

JEOL

<http://www.jeolusa.com/>

Leica Microsystems

<http://www.leica-microsystems.com/>

Olympus America

http://www.olympusamerica.com/seg_section/seg_home.asp

Nikon Instruments

<http://www.nikoninstruments.com/>

Leeds Precision Instruments

<http://www.leedsmicro.com/leedsmicro.asp>

Oxford Instruments

<http://www.oxford-instruments.com/PRODUCTS/Pages/products.aspx>

Southwest Precision Instruments

<http://www.swpinet.com/>

Thermo Electron Microscopy

<http://www.thermo.com/>

Hamamatsu Corp

<http://www.hamamatsu.com/>

Agilent Technologies

<http://www.home.agilent.com/>

OFFICER ELECTIONS

Once again, it's time to renew our society's leadership! New terms begin with the March annual meeting. Two people have volunteered to become candidates for President and Secretary 2009 – 2010.

D. Page Baluch – President - page.baluch@asu.edu

David Lowry – Secretary - dlowry@asu.edu

BALLOT: Arizona Imaging and Microanalysis Society, 2009

Please return to Phil Anderson, 1235 E. James Rogers Way, PO Box 210012., Tucson, AZ 85721-0012.
PLEASE RETURN YOUR BALLOT IN AN ENVELOPE WITH YOUR SIGNATURE ON THE OUTSIDE OF THE ENVELOPE. Please also tape the ballot closed before putting in the envelope, so that we can maintain confidentiality of ballots.

For President Elect:

D. Page Baluch _____

Write-in Candidate: _____

For Secretary:

David Lowry _____

Write-in Candidate: _____