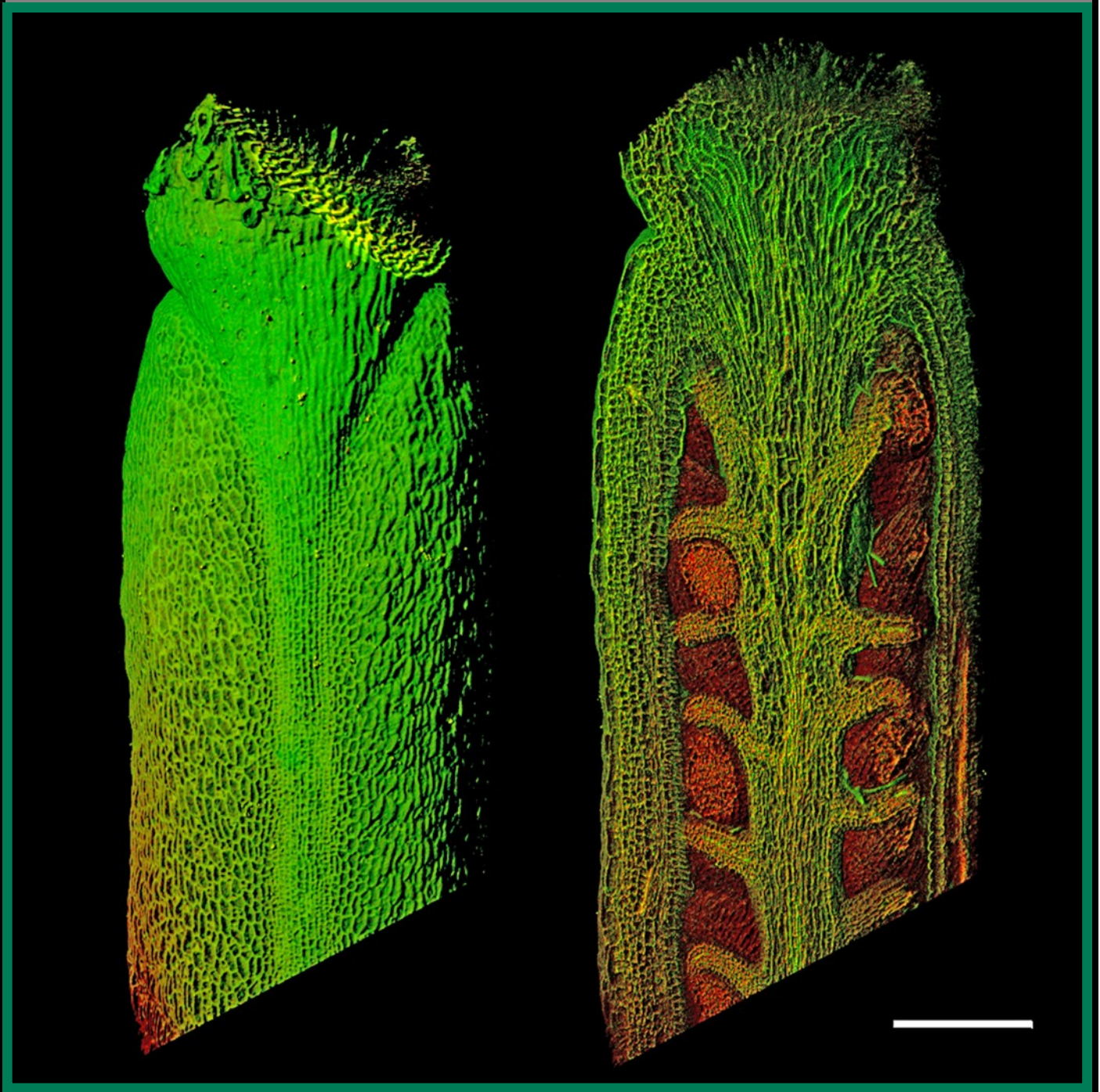


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# FALL NEWSLETTER

**Oklahoma Microscopy Society**  
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# ABOUT THE COVER . . .

## Shaded model of an *Arabidopsis thaliana* pistil six hours after pollination.

Daniel S. Jones

Microbiology and Plant Biology  
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(Left) Outer epidermis of an intact pistil rendered with low angled lighting to enhance shading of cell walls. (Right) Pistil with outer tissue removed to reveal ovules (predominantly red) aligned along the septum (structure in center) with pollen tubes (bright green tubes near ovules) elongated into the pistil interior. Whole pistil was excised, fixed in 4% paraformaldehyde, dehydrated gradually, and cleared and mounted in methyl salicylate ( $n = 1.53$ ). Pistil was imaged as a series of optical sections using a step size equal to pixel size to produce cubic voxels (3D pixels). Images were taken on a Leica SP8 Scanning Confocal Microscope using a 20 $\times$  multi-immersion objective with oil. Broad-spectrum autofluorescence was excited using a multiphoton laser set at 840 nm and detected as green (420 nm – 560 nm) and red (584 nm – 720 nm). Fluorescent channels were merged and rendered using the normal shading setting in Imaris<sup>®</sup> v7.6.  
Scale – 150  $\mu$ m





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# Oklahoma Microscopy Society

Dear OMS Members,

I would like to thank the members of the Oklahoma Microscopy Society for electing me president for 2014-2015. It is a great honor to serve our society in this capacity. I would also like to thank Dr. Jin Nakashima for his fantastic work serving as president this last year. Under his guidance, this year's Spring Meeting at the Samuel Roberts Noble Foundation in Ardmore was a success. The participation in Kid's Night was impressive and the quality of the speakers and vendor exhibition was outstanding. I will work hard to continue the efforts of previous presidents in helping organize the upcoming Spring and Fall Meetings.

I am privileged to be working in a field where the utilization of microscopy has exploded in the last several years. Thin section optical microscopy has long been an essential tool for geologists in the petroleum industry. Now with the shift towards exploiting less porous and less permeable reservoir rocks, there has been a need to bring in new, higher-resolution microscopy techniques. In addition, we are pursuing advanced microscopy technologies such as 3D microscopy, high-resolution large area microscopy, and dynamic microscopy. As such we are finding that we have to be multidisciplinary and borrow ideas from other fields. OMS is a great forum for this as we can learn from other fields, apply this knowledge to our own problems, and share the knowledge we gain. The diversity of scientific disciplines within OMS is one of its greatest attributes.

I look forward to serving OMS as president this next year. My goals as president are to increase and diversify our membership. For the Spring Meeting I hope to arrange speakers from diverse academic fields as well as introduce some emerging microscopy technologies.

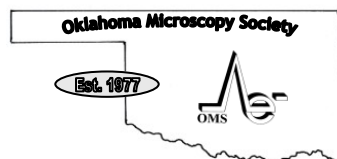
Sincerely,

A handwritten signature in black ink, enclosed in a rectangular box. The signature reads "Mark Curtis".

Mark E. Curtis, OMS President, 2014-2015



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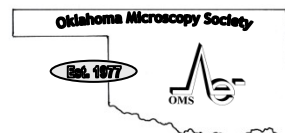
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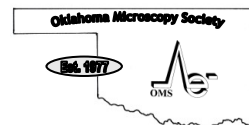
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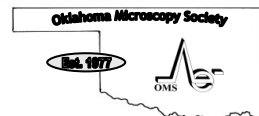
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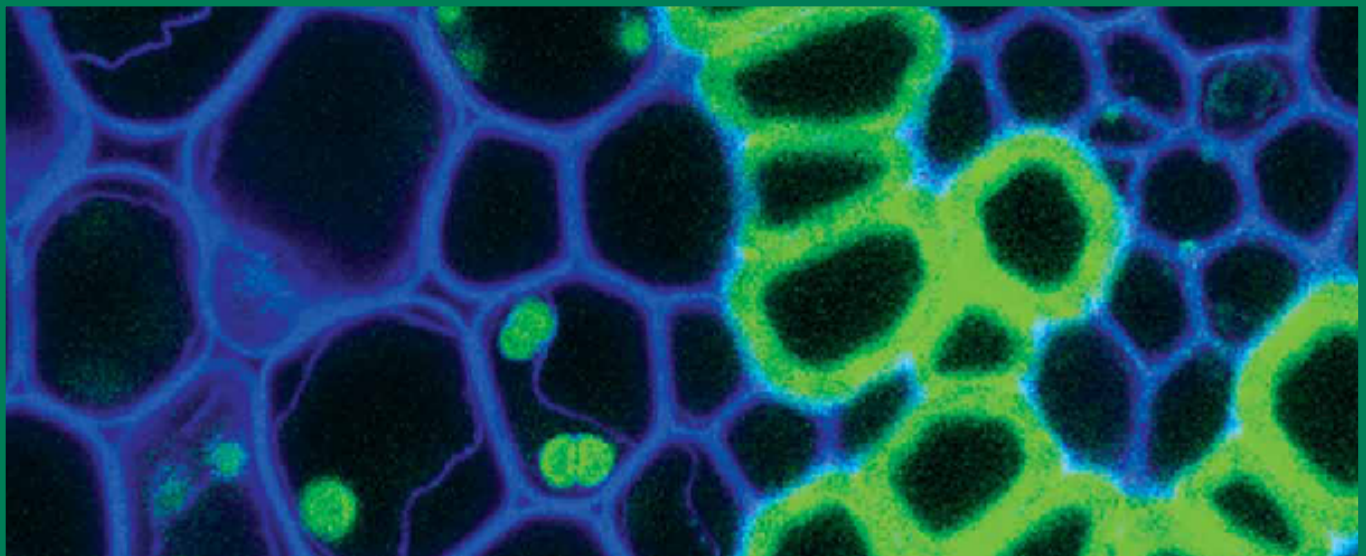
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# OKLAHOMA MICROSCOPY SOCIETY (OMS) 2014 SPRING WORKSHOP

## *Correlative Microscopy - Bridging Light and Electron Microscopy*

9 a.m.-4:00 p.m. (includes lunch)

Friday, April 4

Noble Foundation Kruse Auditorium

Registration: 8:00 a.m.

Professor Thomas E. Phillips, Director of the Molecular Cytology Core,  
University of Missouri, will be the keynote speaker

### **Other Activities**

- Optional tours of the Noble Foundation campus
- Kids night with a microscope – April 3 (5:30 p.m. - 7:30 p.m.)

The Samuel Roberts  
Noble Foundation  
2510 Sam Noble Parkway  
Ardmore, Okla.





## SUCCESSFUL SPRING WORKSHOP 2014

Jin Nakashima, president of the Oklahoma Microscopy Society (OMS), hosted the spring meeting at the Kruse Auditorium on the Samuel Roberts Noble Foundation Campus in Ardmore, Oklahoma.



The Keynote Speaker, Dr. Thomas Phillips, University of Missouri, fields questions after his talk about Correlative Microscopy and antigen sampling.



Dr. Barbara Armbruster from Hitachi High Technologies America spoke on techniques for examining cell monolayers with correlative light and transmission electron microscopy.



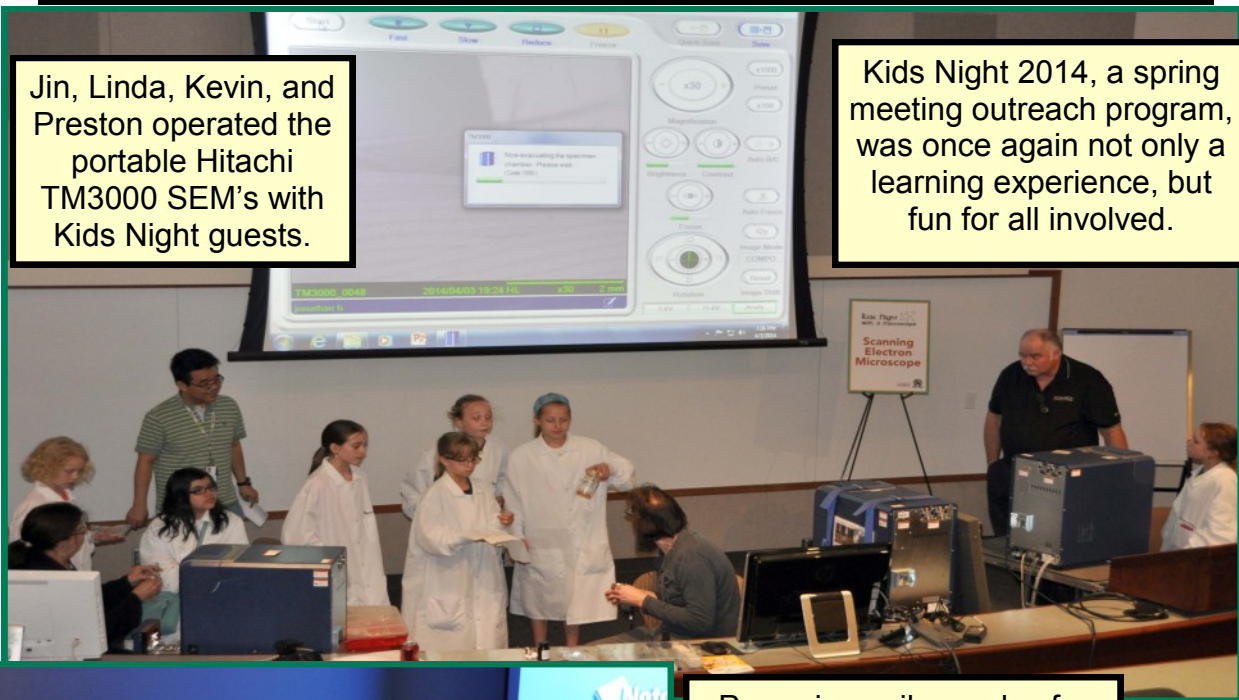
Dr. Chris Vega from Leica microsystems spoke about correlative light microscopy .

# SUCCESSFUL SPRING WORKSHOP 2014

## Kids Night with a Microscope...

Jin, Linda, Kevin, and Preston operated the portable Hitachi TM3000 SEM's with Kids Night guests.

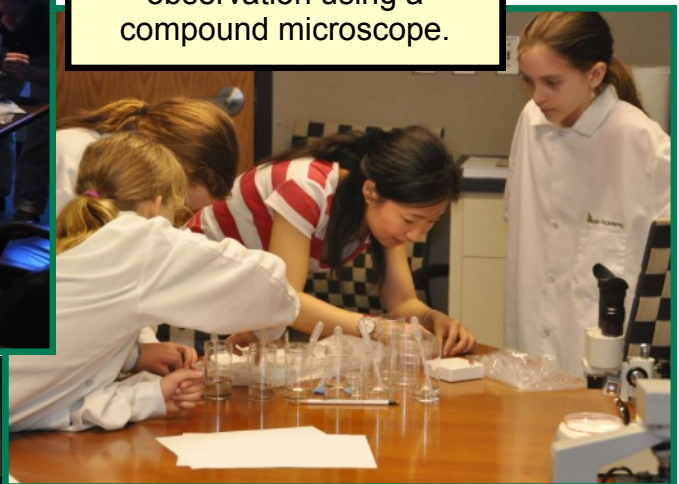
Kids Night 2014, a spring meeting outreach program, was once again not only a learning experience, but fun for all involved.



Preparing soil samples for observation using a compound microscope.



Everyone, even parents, seemed to enjoy looking through microscopes at the pond water station.



RGB color perception... How do computer monitors display color? Student investigate RGB pixels on computer monitor with handheld microscope.





## SUCCESSFUL SPRING WORKSHOP 2014 Kids night...



Investigating fluorescence (above). Successfully completing the light obstacle course means having to use all the lenses, prisms, and gated boxes (right).



Students (above) had the opportunity to use compound light microscopes to view water and soil samples with assistance from experts in those areas as well as operate one of three available Hitachi TM3000 portable scanning electron microscopes via mouse and computer screen (right).



## Addition of a Deben Ultra Coolstage to the Zeiss Neon 40 EsB

### Microscope at the Microscopy Lab at OU

M.B. Johnson, N. Barry, P.R. Larson

Homer L. Dodge Department of  
Physics and Astronomy, University of Oklahoma Norman, OK 73019

The microscopy lab at the University of Oklahoma has recently installed a Deben Ultra Coolstage Specimen Cooling Unit onto our existing dual beam Zeiss Neon EsB microscope. This removable attachment allows Peltier heating and cooling capabilities from  $-50^{\circ}\text{C}$  to  $50^{\circ}\text{C}$ .

As an initial example of the capabilities of the cooler, figure (a) shows a backscattered electron image of a solid mercury amalgam containing primarily gallium and aluminum impurities at  $-50^{\circ}\text{C}$  while figure (b) shows a focused ion beam (FIB) image of a FIB-etched cross structure in the material used as a reference mark. The uneven or rough surface in the exposed cross is likely due to the different FIB etching rates of mercury versus the impurities. A movie (link) was taken of the reference cross structure as the solid amalgam was heated from  $-50^{\circ}\text{C}$  which shows the metal melting to a liquid phase at approximately  $-40^{\circ}\text{C}$  in line with the melting point of pure mercury which occurs at  $-38.83^{\circ}\text{C}$ .

Finally, figure (c) shows a backscattered electron image of a different area on the amalgam surface at  $-50^{\circ}\text{C}$  illustrating regions of different metals. Energy dispersive spectroscopy

(EDS) mapping was done on this area (figure (d)) to confirm the presence of mercury (shown in green) and gallium (shown in red). The small misalignment between the overlaid EDS map and the backscattered image is due to geometrical effects from EDS mapping on the curved surface of the specimen.

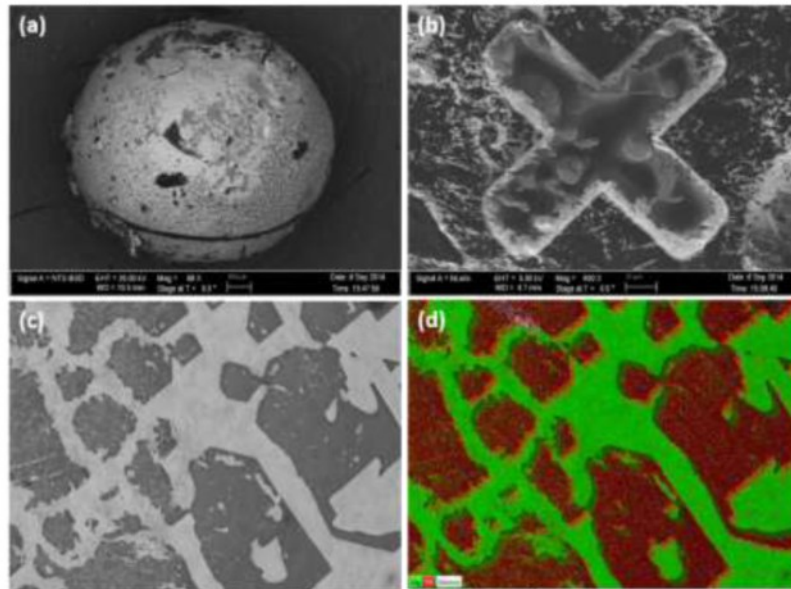


Figure (a) Backscattered electron image showing a “ball” of mercury amalgam (b) FIB-etched cross structure used as a reference feature (c) Backscattered electron image of an area showing different metals in the amalgam (d) EDS map overlaid on image (c) illustrating regions of mercury (green) and gallium (red).

[Click to view movie of melting reference structure](#)



UPCOMING MICROSCOPY MEETINGS . . .

# Oklahoma Microscopy Society

Spring 2015 OMS Workshop

## INTERNATIONAL Meetings



GÖTTINGEN, GERMANY

FOCUS ON MICROSCOPY 2015

MARCH 29 - APRIL 1 2015

FOMM  
2015

January 7-9, 2015

Quantitative Bioimaging  
Insitute Pasteur, Paris, France



## Microscopy and Microanalysis

Portland  
Oregon

August 3-7 2015

Columbus  
Ohio

July 25 - July 28, 2016



St Louis  
Missouri

July 23 - July 27, 2017

## **OMS 2014 ANNUAL FALL MEETING**

Northeastern State University  
Broken Arrow, OK

Friday, November 7, 2014

### **Keynote Speaker**



**Dr. Jay Jerome**  
Vanderbilt University

"Scientific Digital Imaging and Digital  
Image Formats"



**2014 Annual Fall Meeting  
Keynote Speaker**

**Dr. Jay Jerome**

**Co-Director  
Cell Imaging Shared Resource  
Vanderbilt University Medical Center  
Nashville, Tennessee**

**Scientific Digital Imaging and Digital Image  
Formats**

**Abstract:**

Most microscopy is now digital image based, yet many microscopists do not fully understand digital image concepts. Unfortunately, with modern digital imaging it is far too easy to inadvertently alter the image without even knowing that you have done so. The image is the data and not understanding basic "scientific" digital imaging can lead to accumulation of artefactual errors. This talk covers, in an easy to follow manner, the basics of microscopic digital imaging in order to provide the microscopist with sufficient information to avoid common pitfalls that can degrade the quality of your data or introduce spurious information. We will review how to match the microscope parameters and image capture parameters in order to maximize image fidelity. We will also discuss post image processing and how these can affect the image data. Finally, the basics of image formats are critical but not always understood, so we include a discussion of scientifically relevant image formats and how they should be implemented.

**2014 Annual Fall Meeting  
Keynote Speaker**

**Dr. Jay Jerome**

**Cell Imaging Shared Resource  
Vanderbilt University Medical Center  
Nashville, Tennessee**



Biographical Sketch:

Jay Jerome is Associate Professor of Pathology, Microbiology and Immunology and Associate Professor of Cancer Biology at Vanderbilt University. He is Co-Director of the Cell Imaging Shared Resource at Vanderbilt. Jay is a Past-president of the Microscopy Society of America, the Co-Editor of a textbook on confocal microscopy, and an Editor for the journal *Microscopy and Microanalysis*. He is a fellow of both the Microscopy Society of America and the American Heart Association. Jay's research focuses on intracellular lipid metabolism and how disruption of normal lipid metabolism contributes to diseases such as cardiovascular disease, diabetes and obesity.

VANDERBILT  UNIVERSITY  
MEDICAL CENTER

# PROGRAM FOR FALL MEETING

36<sup>nd</sup> Annual Fall Meeting with the Oklahoma Academy of Science

November 7, 2014

Northeastern State University in Broken Arrow

## SECTION K: Microscopy

Building: BALA 232

Morning Session – Jin Nakashima, Samuel Roberts  
Noble Foundation



- 9:00 † **Three-Dimensional Visualization of the Female Gametophytes of *Oryza Sativa* and *Arabidopsis thaliana* using multiphoton microscopy.** Daniel S. Jones, Joshua M. Chesnut, Benjamin E. Smith, Greg Strout, Scott D. Russell. University of Oklahoma.
- 9:20 † **Photobleaching-Coupled Fluorescent Lifetime Imaging: Detecting Forster Resonance Energy Transfer to Identify Protein Interactions.** Zachary Myers, Roderick Kumimoto, Benjamin Smith, Ben Holt. University of Oklahoma.
- 9:40 Break
- Keynote Address:*
- 10:00 **Scientific Digital Imaging and Digital Image Formats.** Jay Jerome, Vanderbilt University Medical Center.
- 11:00 **OMS Business Meeting and Election**
- 12:30 Academy Luncheon (over Ugly Bug Contest)

† OMS Timpano Award Competition

# DIRECTIONS TO FALL MEETING

## Northeastern State University in Broken Arrow

### **From Northwest Oklahoma**

From the Cimarron Turnpike, connect to Highway 51 near downtown Tulsa (Broken Arrow Expressway). Take the BA Expressway through Tulsa and Broken Arrow to the "Creek Turnpike West" exit (just past the Highway 51 "Coweta" exit). The "Creek Turnpike West" exit will actually take you south to the NSU-Broken Arrow campus. You will see the campus on the right as you approach 101st Street (also called New Orleans Street). Take the 101st/New Orleans Street exit, which will lead you directly to the main campus entrance.

### **From West or Central Oklahoma**

From the Turner Turnpike, take the "Creek Turnpike East" exit, which is just past the Sapulpa exits. This will take you through south Tulsa. After passing the Memorial Street exit, make sure you are in the right lane to remain on the Creek Turnpike through south Broken Arrow (rather than going north on Highway 169). Continue on the Creek Turnpike until it curves north (approximately 6 miles) and you will see the campus directly in front on you. As you approach 101 st Street (also called New Orleans Street), the road veers to the right around the campus. Take the 101st/New Orleans Street exit, then turn west (right) on 101st Street to the traffic light at the main entrance of the campus.

### **From the Muskogee Turnpike**

As you arrive in east Broken Arrow, take the "Creek Turnpike West" exit, which will actually take you south to the NSU-Broken Arrow campus. You will see the campus on the right as you approach 101st Street (also called New Orleans Street). Take the 101st/New Orleans Street exit, which will lead you directly to the main campus entrance.

### **From the South**

From Highway 75, take the "Creek Turnpike East" exit, which is just a few miles north of the Glenpool traffic light on Highway 75. This will take you through south Tulsa. After passing the Memorial Street exit, make sure you are in the right lane to remain on the Creek Turnpike through south Broken Arrow (rather than going north on Highway 169). Continue on the Creek Turnpike through south Broken Arrow until it curves north, and you will see the campus directly in front on you. As you approach 101st Street (also called New Orleans Street), the road veers to the right around the campus. Take the 101st/New Orleans Street exit, turn west (right) on 101st Street to the traffic light at the main entrance of the campus.

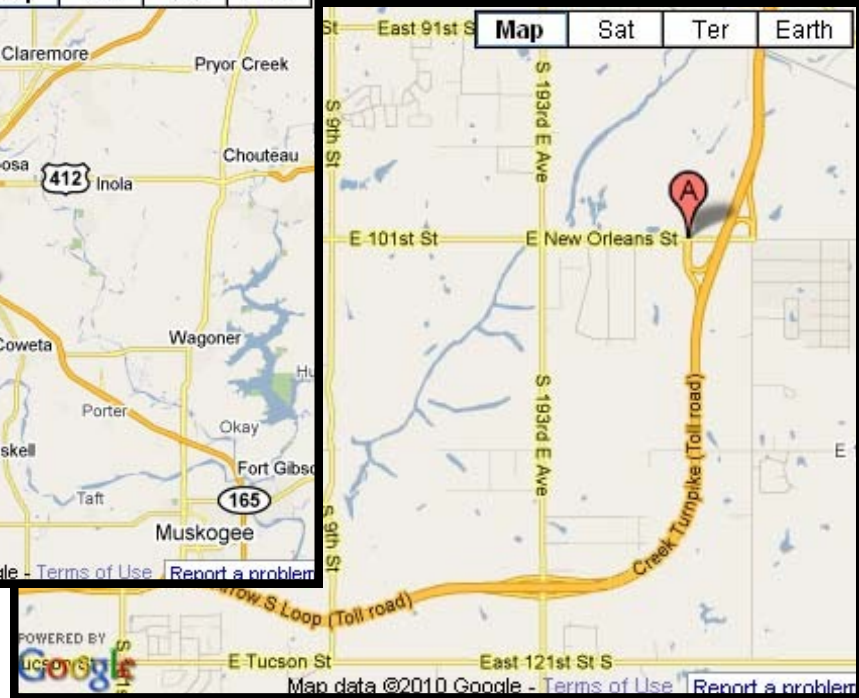
### **From the North**

If arriving in the Tulsa area on Highway 75 from Bartlesville, connect with Highway 51 East (Broken Arrow Expressway) near downtown Tulsa. Take the BA Expressway through Tulsa and Broken Arrow to the "Creek Turnpike West" exit (just past the Highway 51 "Coweta" exit). The "Creek Turnpike West" exit will actually take you south to the NSU-Broken Arrow campus. You will see the campus on the right as you approach 101st Street (also called New Orleans Street). Take the 101st/New Orleans Street exit, which will lead you directly to the main campus entrance.

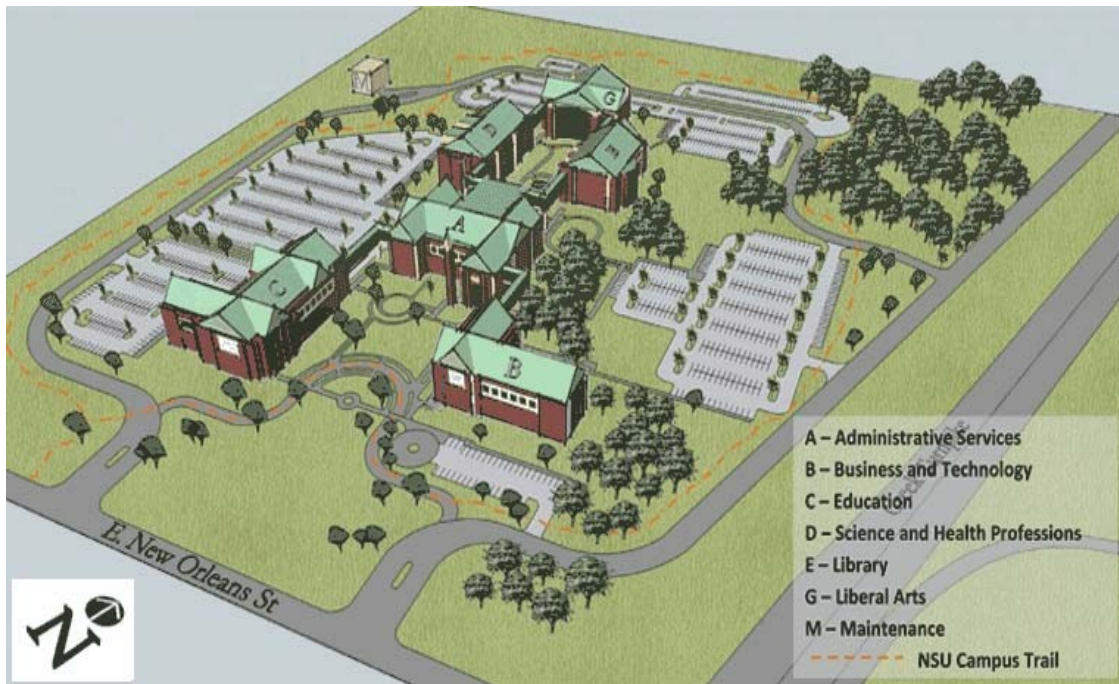
### **From the Northeast**

From the Will Rogers Turnpike, take the "Creek Turnpike West" option as the Will Rogers Turnpike terminates near Catoosa. Continue south on the Creek Turnpike to the 101st Street (also called New Orleans Street) exit. This exit will take you directly to the main campus entrance.

# FALL MEETING SITE



**We will be meeting in building G, the Liberal Arts Building, on the north end of campus. Use the parking lot on the north side of the building.**





# TIMPANO COMPETITION ABSTRACTS

## THREE-DIMENSIONAL VISUALIZATION OF THE FEMALE GAMETOPHYTES OF *ORYZA SATIVA* AND *ARABIDOPSIS THALIANA* USING MULTIPHOTON MICROSCOPY

Daniel S. Jones<sup>1</sup>, Joshua M. Chesnut<sup>1</sup>, Benjamin E. Smith<sup>2</sup>, Greg Strout<sup>2</sup>, Scott D. Russell<sup>1,2</sup>

<sup>1</sup>*Department of Microbiology and Plant Biology, University of Oklahoma Norman, OK 73019*

<sup>2</sup>*Samuel Roberts Noble Microscopy Laboratory, University of Oklahoma Norman, OK 73019*

Flowering plants accomplish sexual reproduction through haploid generations known as gametophytes. The female gametophyte (embryo sac) is encased in multiple cell layers of diploid sporophytic tissue (ovary and ovule), typically necessitating sectioning for observation with light microscopy. The advent of two-photon and three-photon microscopy used in conjunction with optical clearing of tissues provides a technique for the analysis of thick specimens such as these at high-resolution, without the need for manual sectioning. In this study we imaged the embryo sacs of *Oryza sativa* ssp. *japonica* and *Arabidopsis thaliana* at various stages during early fertilization with a Leica TCS SP8 multiphoton-equipped microscope. Using optical sections spaced such that each voxel (3D pixel) has equal, cubic dimensions in all axes, high-resolution three-dimensional images can easily be obtained. Such an imaging system allows 3D reconstructions of thick specimens without any of the artifacts inherent to sectioning and serial reconstructions. Ovaries and ovules were fixed and then cleared/mounted in methyl salicylate ( $n = 1.53$ ) and excited using a multiphoton laser set at 830 nm. Broad-spectrum autofluorescence emission was detected using two HyD detectors, set at 350 nm–550 nm and 550 nm–750 nm or using a two channel photo multiplier tube in the non-descanned position. A spectral scan analysis of emission data from multiple structures within the tissue reveals differential patterning of autofluorescence, and merged channels provide contrasting and complementary images of the three-dimensional organization of these embryo sacs, providing new insights into sexual reproduction and subsequent development in plants.



# TIMPANO COMPETITION ABSTRACTS

## **PHOTOBLEACHING-COUPLED FLUORESCENT LIFETIME IMAGING: DETECTING FORSTER RESONANCE ENERGY TRANSFER TO IDENTIFY PROTEIN INTERACTIONS**

Zachary Myers, Roderick Kumimoto, Benjamin Smith, and Ben Holt

*Department of Microbiology and Plant Biology, University of Oklahoma, Norman, Oklahoma 73019 USA*

Plants perceive and respond to light through the integration of multiple distinct transcription factor signaling networks. Efforts to understand the photochemistry of light perception and to identify primary effectors and integrators of light signaling have progressed significantly; however, mechanistic descriptions of these processes and identification of additional proteins involved has lagged. Study of the NUCLEAR FACTOR-Y (NF-Y) proteins indicates a role in light signaling, and in order to identify that role, a robust method to detect protein-protein interactions through Forster Resonance Energy Transfer (FRET) has been developed. By combining and improving on two FRET measurement techniques, acceptor photobleaching (AB) and Fluorescent Lifetime Imaging (FLIM), we are able to detect FRET while simultaneously controlling for false positives associated with each individual measurement regime. Briefly, we are able to collect AB measurements through Fluorescence Recovery After Photobleaching (FRAP), where the changes in donor and acceptor intensity are used to control for autofluorescence. By comparing the donor fluorescent protein's lifetime before and after the FRAP regiment, we are able to control for the variation in the cellular environment between samples and the convolution of the acceptor and donor lifetimes. Use of this method to detect FRET is very robust, and it is currently in use to elucidate the role of NF-Y in light signaling.

# TIMPANO COMPETITION . . .

## *OMS Best Student Paper Award:*

### THE TIMPANO AWARD

This Award, commemorating the late Dr. Peter Timpano, is based on student presentations at the Fall OMS meeting, which is held annually in conjunction with the meeting of the Oklahoma Academy of Science (OAS). All applicants for the Timpano Award must be members of OMS at the time that they declare themselves as candidates for the Award and must be enrolled in a degree program in an institution of higher learning in Oklahoma.

**First Prize:** All-expense-paid trip for the first place winner to the national meeting of the Microscopy Society of America (MSA) or Microbeam Analysis Society (MAS) to present a paper or poster on his or her research. The total travel allowance (including MSA or MAS contribution, if any) will be \$1,100.00, with all reasonable expenses reimbursed upon presentation of receipts. In addition, a \$100.00 cash scholarship to be used toward the student's research career will be awarded. (If the student is selected as a finalist in the MSA Presidential Student Awards Competition, then MSA will provide registration and airfare, and OMS will provide an additional \$200.00 bonus.)

**Second Prize:** A \$100.00 cash scholarship will be awarded to the second place winner for use toward the student's educational/research expenses. This and the above award are tax exempt if used for educational/research expenses.

*The best student paper will be evaluated on the basis of the following criteria:*

1. Quality of presentation
2. Quality of slides and micrographs
3. Scientific approach
4. Materials and methods
5. Value of contribution to scientific knowledge
6. Merit of microscopic work
7. Quality of submitted abstract

**Rules for the Competition:** This competition shall be judged by a committee of at least 3 OMS members appointed by the OMS Executive Board; those having a conflict of interest will be excluded. Votes shall be cast by secret-ballot and will be accepted by the Secretary-Treasurer (or designated OMS Officer) after the final competing presentation. (OMS reserves the right to set minimum standards for the best paper and may choose to select a second place winner without selecting a first place winner, at its discretion.)

**Conditions of Award:** Upon winning first place, the awardee must, by December 15 of the current year, submit a letter of intent or declination regarding attendance at the MSA or MAS meetings. If the awardee notifies OMS that he or she declines to attend MSA or MAS for any reason, a \$100 prize will be awarded in lieu of the trip to the meeting, provided that *the declination is received within the stated time limit*. If the winner declines the first place prize, the second place winner will be offered the opportunity to attend the meeting and present a paper as provided above. A student may compete for the Timpano Award throughout his or her career, but may attend an MAS or MSA meeting at OMS expense only once. Students winning additional Timpano competitions will receive a \$ 100 cash scholarship.

# CONSTITUTION & BYLAWS OF THE OMS

## **Article I. NAME**

The name of this organization shall be the Oklahoma Microscopy Society. The acronym shall be OMS. OMS is a non-profit organization.

## **Article II. PURPOSE**

The purpose of OMS shall be the advancement of the science of microscopy in Oklahoma and nationally by:

encouraging the dissemination of knowledge of microscopy including its technology and instrumentation.

promoting the free exchange of ideas and data among interested individuals and

encouraging interdisciplinary interaction between microscopists.

## **Article III. MEMBERSHIP**

### Section 1. Types:

Regular membership shall be open to any person who has an interest in microscopy.

Corporate membership shall be open to any commercial or non-profit organization that has an interest in microscopy. A member organization may designate one representative to receive all privileges of membership. Other members of the same organization may become regular members.

Honorary membership may be given to a person named an Honorary member by vote of the Executive Committee.

Section 2. Enrollment: Any eligible person or organization may make application for membership to the Executive Committee of OMS. Completed application forms shall be submitted to the Secretary-Treasurer of OMS with one year's dues.

Section 3. Privileges: All members have the right to vote at any business meetings held by OMS and to hold elective office.

# CONSTITUTION & BYLAWS OF THE OMS

## Section 4. Dues:

Annual dues shall be proposed by the Executive Committee and affirmed by a vote of the membership.

Changes in dues adopted by the membership shall become effective on the next July 1 after the adoption. Dues shall become payable on July 1 of each year for the following twelve months.

Any member delinquent in payment of dues for a period of six months shall be dropped from membership. Members thus dropped may be reinstated thereafter by paying one year's delinquent dues and the current year's dues.

## Article IV. MEETINGS

At least one business meeting per year shall be held. The time(s) and place(s) of such meetings shall be designated by the Executive Committee and duly announced. Business meetings shall be conducted according to Robert's Rules of Order.

## Article V. OFFICERS

Section 1. The officers of OMS shall be a President, a President-Elect, a Secretary-Treasurer, a Member-at Large for Biological Sciences, a Member-at Large for Physical Sciences, a Member-at Large for student members, and Member-at-Large for Corporate Members. These officers shall perform the duties prescribed by these bylaws and by the parliamentary authority adopted by the Society.

### Section 2. Duties:

- a. The President shall preside at all meetings of the Executive Committee and business meetings of the OMS and promote the interests of OMS both within the state and nationally.
- b. The President-Elect shall assist the President, substitute for him/her when necessary, perform any duties assigned by the President and be responsible for organizing the regular spring workshop/seminar.
- c. The Secretary-Treasurer shall maintain records of OMS and communicate with members. This officer shall be custodian of OMS funds, collect all dues, notify members delinquent in membership and account for OMS funds in accordance with accepted business practice.
- d. Members-at-Large shall represent their respective constituents.

# CONSTITUTION & BYLAWS OF THE OMS

## Section 3. Term of Office:

The President, President-Elect, and Members-at-Large shall each serve for one year beginning July 1 and ending June 30 of the following year.

The Secretary-Treasurer shall serve for two consecutive years beginning July 1 and ending July 30 of the second following year.

## Section 4. Election: Officers shall be elected as prescribed in Article VII of these bylaws.

Section 5. Vacancies: If the President cannot serve, the President-Elect shall immediately succeed to that office. If the President-Elect or any other officer cannot serve for any reason, the Executive Committee shall appoint a person to serve pro tem in the vacant office. Any such appointed officer shall be replaced by one duly elected at the next annual election in May.

## **Article VI. EXECUTIVE COMMITTEE**

Section 1. Composition: The Executive Committee shall consist of the officers of OMS, plus the Newsletter Editor ex officio who shall be without vote.

## Section 2. Duties:

The Executive Committee shall conduct the business of OMS as specified herein and otherwise as necessary, and shall advise the membership on matters concerning the management of OMS. It shall appoint the Newsletter Editor.

The Executive Committee shall hold not fewer than two meetings annually, on call of the President or a majority of its members.

## **Article VII. ELECTIONS**

Section 1. Nominations of officers except the President shall be made by a nominating Committee appointed by the President and approved by the Executive Committee. This Committee shall consist of five persons, at least one of whom is from the field of Biological Sciences and one from the field of Physical Sciences. Nominations may be solicited from the membership at any time.

Section 2. The Nominating Committee shall present a slate of consenting candidates (two for each office) to the President prior to the spring general business meeting. The President and Secretary-Treasurer shall announce this list to the membership at the spring general business meeting. Additional nominations of persons willing to serve may be solicited from the floor at this time.

# CONSTITUTION & BYLAWS OF THE OMS

Section 3. The Secretary-Treasurer shall prepare and email ballots to all members by May 15 and shall accept ballots until May 31.

Section 4. Ballots shall be counted by at least two Executive Committee members and may be reviewed by the entire board if deemed necessary. In each case the candidate receiving the largest number of votes shall be declared elected. Any tie shall be resolved by vote of the combined Executive and Nominating Committees. Results shall be announced by the Secretary-Treasurer at the next business meeting or by email to all members.

## **Article VIII. AD HOC COMMITTEE**

The President shall appoint ad hoc committees as necessary or helpful in managing affairs of OMS. Committee members shall be considered automatically discharged at the end of the appointing President's term of office unless the new President specifically requests that they continue. The committee itself shall continue until its purpose has been fulfilled or it is dissolved by vote of the executive board or the membership at large.

## **Article IX. AMENDMENTS**

Section 1. Amendments may be suggested at any OMS business meeting. However, amendments to these bylaws may be formally proposed in only two methods:

By the Executive Committee or

By petition of ten percent of the members.

Section 2. The proposed amendment shall then be promptly submitted by email to the membership by the Secretary-Treasurer, along with the signed statement of reasons for support and/or opposition. Returned ballots shall be accepted by the Secretary-Treasurer for three weeks after the date of emailing. The Executive Committee shall count the ballots and the amendment(s) shall be declared ratified if a two-thirds majority of the votes cast is favorable.

Section 3. Any member who so desires may be present at the counting of such ballots.

## **Article X. DISSOLUTION**

In the event of the dissolution of the OMS, upon the discharge of all its debts and obligations, any remaining assets shall be given to such tax-exempt scientific organization as the Executive Committee may determine. In no case shall any assets be used for the direct benefit of any member of OMS.



## Oklahoma Microscopy Society Membership Application/ Renewal Form

Name: \_\_\_\_\_

Business Phone: \_\_\_\_\_

FAX: \_\_\_\_\_

Email: \_\_\_\_\_

Institution: \_\_\_\_\_

Address: \_\_\_\_\_

Check here if Address is New/Revised: \_\_\_\_

**Membership in Affiliated Societies:**

MSA \_\_\_\_\_

MAS \_\_\_\_\_

OAS \_\_\_\_\_

**Microscopy Interests:**

Physical Sciences \_\_\_\_\_

Biological Sciences \_\_\_\_\_

Other \_\_\_\_\_

**Membership Dues:**

Type:

Corporate (\$50.00) \_\_\_\_\_

Professional (\$15.00) \_\_\_\_\_

Student (\$5.00) \_\_\_\_\_

Amount Enclosed: \_\_\_\_\_

Please enclose a check for one year's dues (July 1, 2014 - June 30, 2015) made out to:  
OMS" or "Oklahoma Microscopy Society" and mail to:

Scott Russell, Secretary/Treasurer, OMS

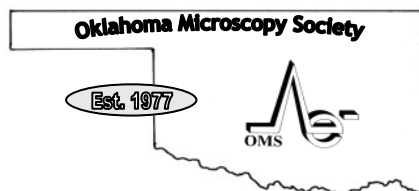
Dept. of Microbiology and Plant Biology

University of Oklahoma

770 Van Vleet Oval

Norman, OK 73019

Email: [srussell@ou.edu](mailto:srussell@ou.edu)



*We thank the following  
for their support  
of the Fall 2014 Newsletter*

**Microstar Diamond Knives**

**Electron Microscopy Sciences**

**JEOL**

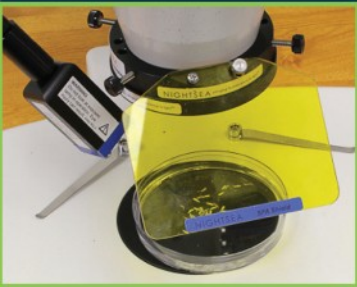
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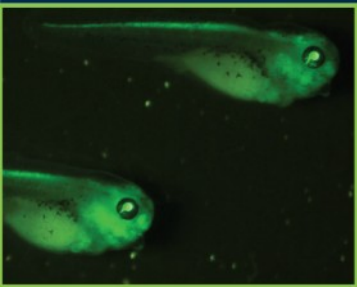
**Diatome Diamond Knives**

**EMS HAS IT...**

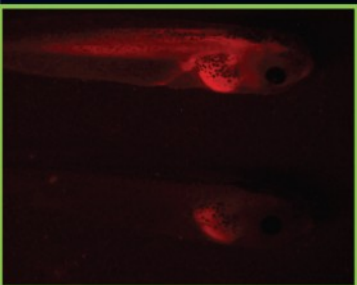
# an economical solution for fluorescence...



Stereo microscope configured for green fluorescence, viewing *Xenopus* through shield filter for sorting.



Stage 41 *X. tropicalis*, transgenic OTX-GFP eyes. Photograph © NIGHTSEA/ Charles Mazel



Fluorescent and non-fluorescent Stage 46 *X. laevis* with messenger RNA injected ubiquitous GFP and membrane RFP. Photograph © NIGHTSEA/ Charles Mazel

## NIGHTSEA

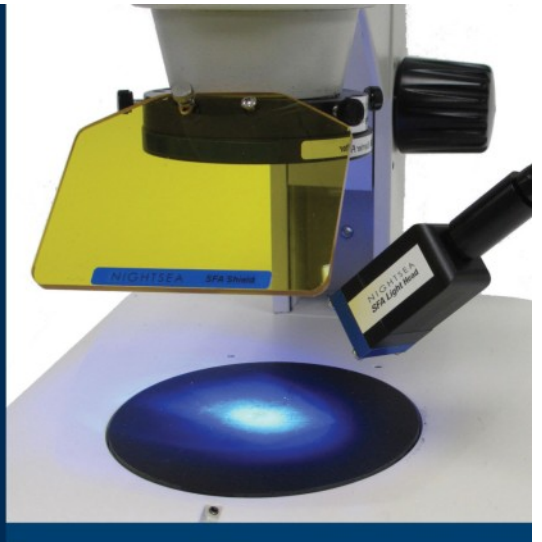
### FLUORESCENCE VIEWING SYSTEMS

Fluorescence has become the tool of choice for studying many animal models on upright and inverted research stands. New technology from NIGHTSEA™ now extends fluorescence to your *existing* standard routine stereo microscopes, where its specificity and sensitivity provide an ideal assist for life science applications.

### THIS SIMPLE SYSTEM IS EXCELLENT FOR:

- Quick screening of your fluorescent genotypes – *Xenopus*, *Drosophila*, zebrafish, *C. elegans*, ...
- Genotype sorting
- Fluorescence-aided dissection, injection, or micromanipulation
- Freeing up your research-grade fluorescence microscopes for more demanding work
- New faculty start-up budgets
- Bringing fluorescence into the teaching laboratory

### PLEASE CONTACT US FOR MORE INFORMATION



## Electron Microscopy Sciences

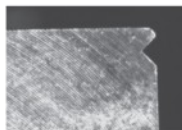
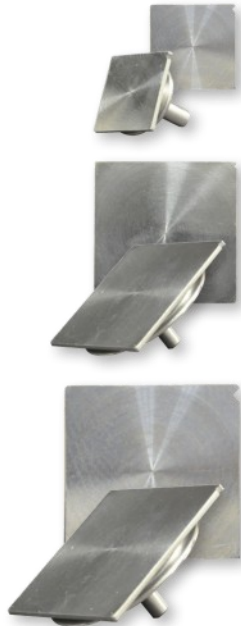
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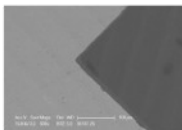




A New, Fundamentally Improved Pin Stub for Correlative, Corroborative & Repetitive Microscopy



LM Image of Reference Notch



SEM Image of Reference Notch

## PELCO® Q SEM PIN STUBS

Especially designed for correlative microscopy, corroborative SEM investigations and repetitive SEM imaging/analysis and specimen preparation, square PELCO® Q Pin Stubs have an easy to locate reference notch on one of the corners. Using the SEM X and Y stage movements and read-outs, each position on the PELCO® Q Stub can be easily indexed to the reference notch. Once the position of a location is recorded with reference to the reference notch, the location can be easily found again using the same SEM, another SEM, or even a FIB system, X-ray imaging system, Auger system, SIMS, light microscope or any imaging system with X-Y and stage movements. It will work with manual, motorized and computerized stages as long as there is a position read-out. Depending on the precision of the stage, the recorded position can be retrieved with an accuracy of +/- 5µm. The reference notch in the corner of the PELCO® Q Stub enables intrinsic indexing – no additional holders needed and the positions are all relative to the notch in the stub.

The sample surface of the PELCO® Q Pin Stubs is square for easy alignment of the sides of the Q Stub with the X and Y movements of the sample stage. An additional advantage is the larger sample surface area; over 20% larger than round stubs. Below the square top, the PELCO® Q Stubs are identical to the conventional round pin mounts and are fully compatible with existing SEM grippers, storage boxes, sample preparation equipment and most multiple pin stub holders.

## PELCO® Q SEM Pin Stubs Features and Benefits

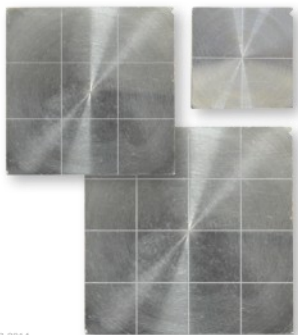
- Reference notch for intrinsic indexing
- Square shape for alignment with the X and Y axis of the SEM stage
- Reliable relocation of any position on the Q Stub
- Ideal for correlative microscopy – same locations can be easily found on multiple imaging/analyzing platforms with X-Y axis stage
- Enables corroborative microscopy – share between SEM platforms or re-investigate same position afterwards
- Perfect for repetitive microscopy and repetitive sample prep procedures – exact same position can be easily found and imaged over again
- Larger sample area than traditional round stubs
- Fully compatible with all existing tools, grippers, SEM holders and specimen preparation equipment

16187-12	PELCO® Q SEM Pin Stub, 12.7 x 12.7mm (0.5" x 0.5")	each
16187-19	PELCO® Q SEM Pin Stub, 19 x 19mm (0.75" x 0.75")	each
16187-25	PELCO® Q SEM Pin Stub, 25.4 x 25.4mm (1" x 1")	each

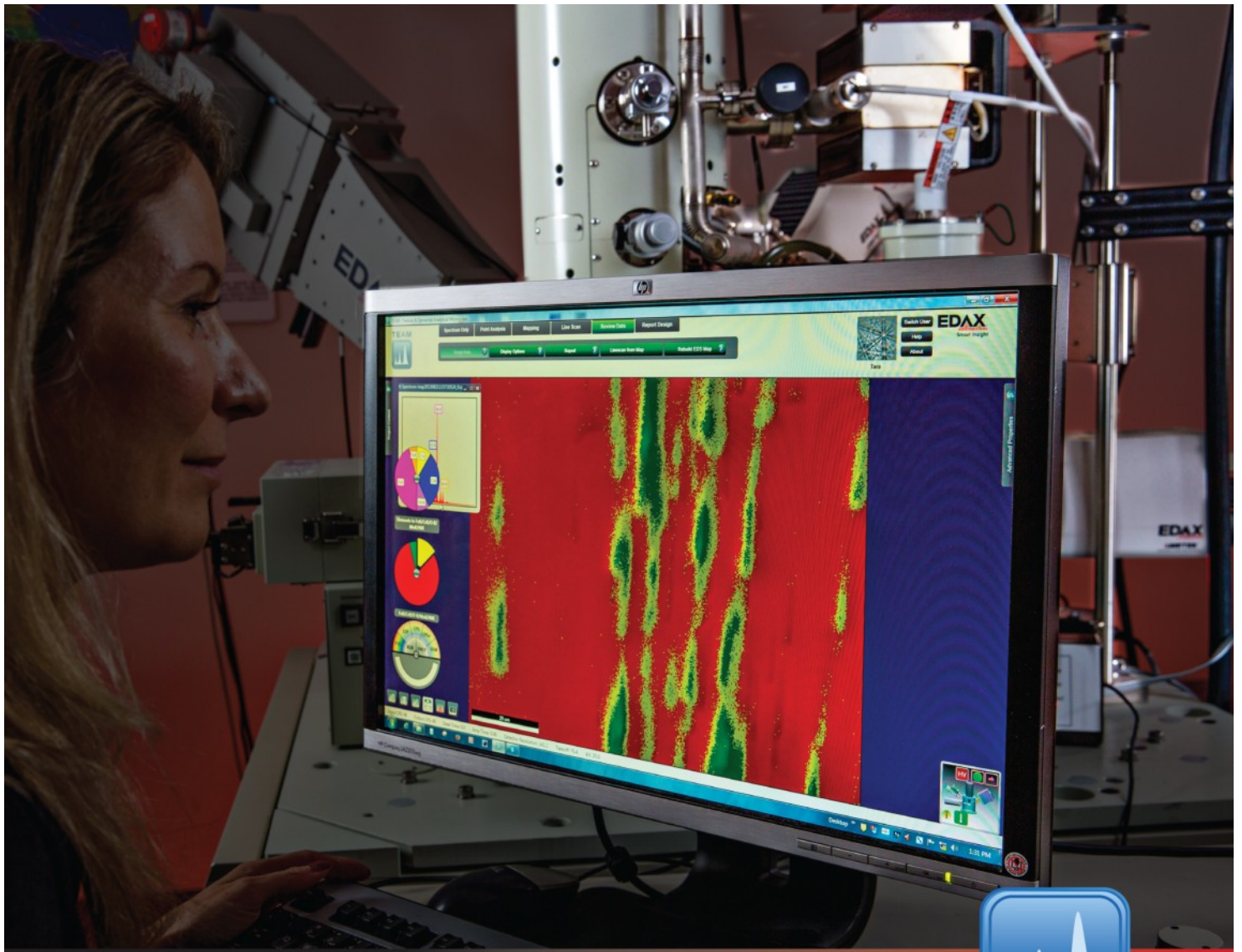
## ENGRAVED PELCO® Q SEM PIN STUBS

PELCO® Q Pin Stubs are also available with engraved lines to accommodate multiple small samples on one stub and to simplify indexing. The sharp notch can be used as a master reference point and the engraved crosses can be used as sub-reference points; ideal for low magnification applications. The engraved lines divide the PELCO® Q Pin Stubs in equally sized squares of 6.3 x 6.3mm (0.25" x 0.25").

16190-124	PELCO® Q SEM Pin Stub, 12.7 x 12.7mm (0.5" x 0.5"), 4 Divisions	each
16190-199	PELCO® Q SEM Pin Stub, 19 x 19mm (0.75" x 0.75"), 9 Divisions	each
16190-2516	PELCO® Q SEM Pin Stub, 25.4 x 25.4mm (1" x 1"), 16 Divisions	each







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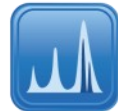
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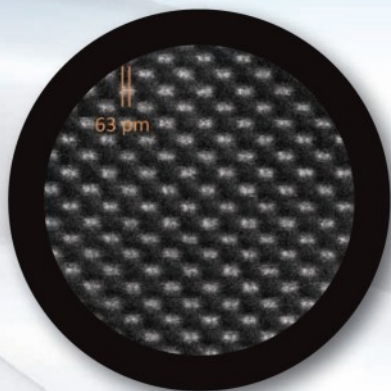
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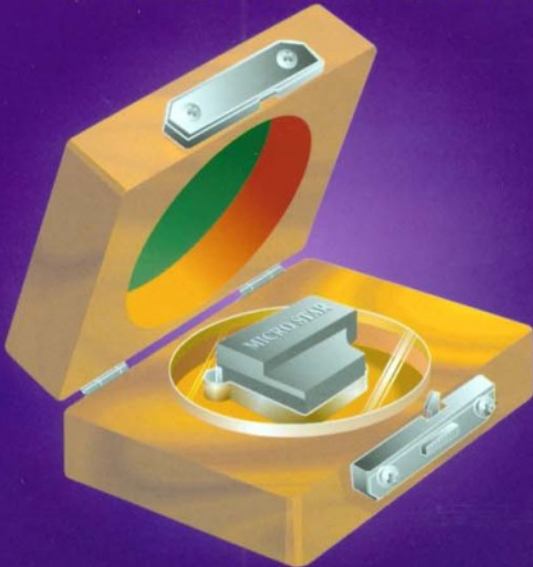


# MICRO STAR DIAMOND KNIFE

# TYPES

TYPES	AVAILABLE EDGE LENGTHS	AVAILABLE INCL. ANGLES*	RANGE OF SECTION THICKNESS	APPLICATIONS
SU	1 to 8 mm	45° 35° 55°	25nm to 200nm	Standard ultramicrotomy sectioning of biological and other material specimens.
CW	1 to 8 mm	45° 35°	50nm to 1µm	Frozen specimens sectioned wet with liquids like ethylene glycol. Set in "W" style boat.
CD	1 to 8 mm	45° 35°	50nm to 1µm	Frozen specimens sectioned dry. Set in "D" style boat.
TS	1 to 8 mm	45° 55°	50nm to 2µm	Thick sections or alternating thick and thin sections.
MT	2 to 8 mm	45° 55°	50nm to 2µm	Industrial materials sectioning. Not tested to the same ultra high standards as the types above, hence their lower price.
LC	4 to 12 mm	45° 55°	0.1µm to 5µm	Frozen specimens to be examined at light microscopy magnifications. Set in "D" or "W" style boat.
LH	4 to 12 mm	45° 55°	0.1µm to 5µm	Sections to be examined at light microscopy magnifications.

\* The standard included angle of 45° is suitable for most applications. Knives with 35° reduce morphological deformation but the edge is more fragile. 55° is recommended for routine hard specimen sectioning. Custom angles and lengths available per request at no extra cost.



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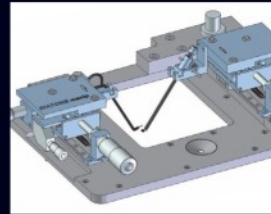
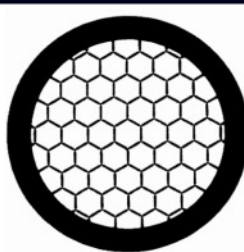


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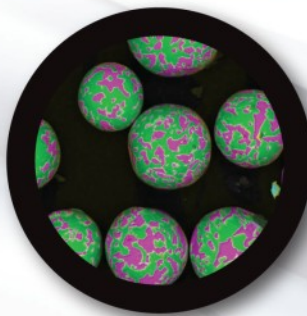
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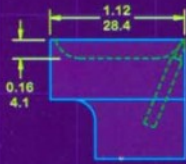
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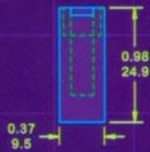
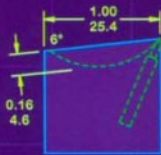


# MICRO STAR BOAT STYLES



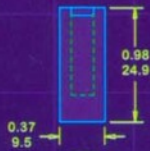
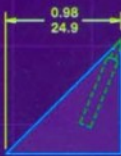
S

STANDARD BOAT WITH OVAL CAVITY. BLACK ANODIZED. SUPPLIED WITH ALL NEW KNIVES EXCEPT CRYO AND KNIVES LARGER THAN 7mm, UNLESS OTHERWISE REQUESTED.



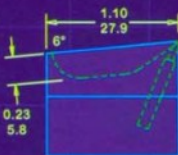
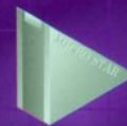
W

WET CRYO SECTIONING BOAT. MADE OF NON GLARE STAINLESS STEEL. CYLINDRICAL CAVITY AND 6° INCLINED TOP.



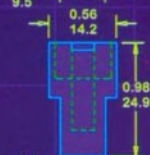
D

DRY CRYO SECTIONING BOAT. MADE OF NON GLARE STAINLESS STEEL.



G

OVAL CAVITY BOAT. 6° INCLINED TOP. AVAILABLE IN NON GLARE BLACK, GOLD OR BLUE ANODIZING.



H

CYLINDRICAL CAVITY BOAT. 6° INCLINED TOP. AVAILABLE IN NON GLARE BLACK, GOLD OR BLUE ANODIZING.



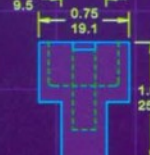
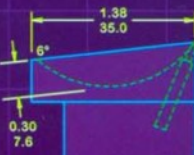
M

WIDE OVAL CAVITY BOAT. BLACK ANODIZED.



N

NARROW BOAT WITH DEEP CYLINDRICAL CAVITY. BLACK ANODIZED.



K

LARGE CYLINDRICAL CAVITY BOAT. 6° INCLINED TOP. AVAILABLE IN NON GLARE BLACK, GOLD OR BLUE ANODIZING. SUPPLIED WITH 7mm AND LARGER KNIVES.



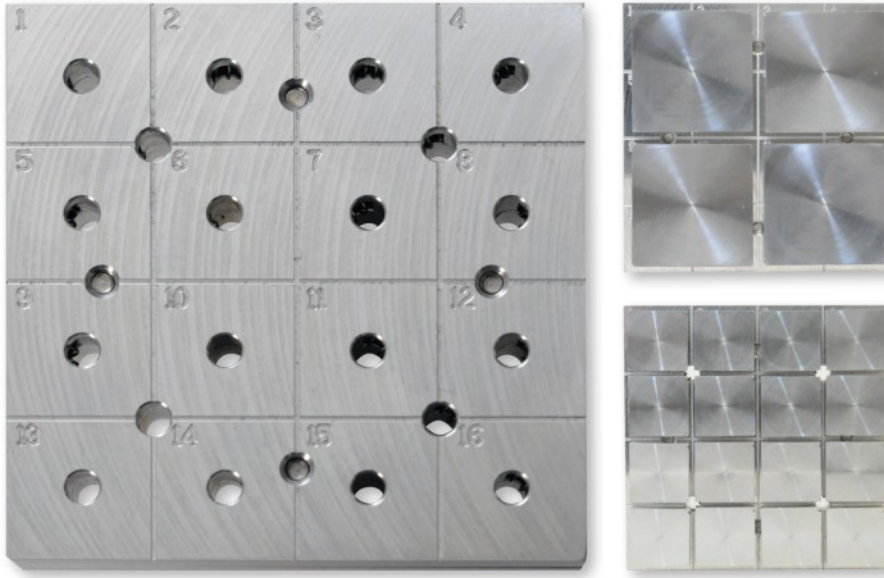


# PELCO® Q MULTI-PIN STUB HOLDERS

FOR PRODUCT DETAILS AND COMPLETE SELECTIONS

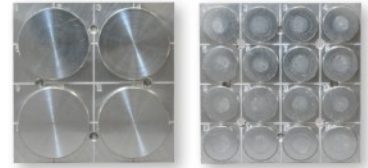
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*The Perfect Companion for PELCO® Q SEM Pin Stubs; Enabling Correlative & Corroborative Microscopy*



### PELCO® Q Multi-Pin Stub Holders comprise a number of helpful features.

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- Engraved lines for alignment with the X and Y axis of the SEM stage
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- Numbered positions for quick reference
- Efficient coverage when used with the square PELCO® Q Pin Stubs
- Removable pin for imaging with light microscopes
- Fully compatible with existing conventional pin stubs



*PELCO® Q Multi-Pin Stub Holders are fully compatible with conventional pin stubs.*

Compatible with SEMs, FESEMs, SEM/FIB systems from FEI/Philips, Tescan, Cambridge, Leica, Amray and CamScan. Also suitable for Zeiss/LEO instruments if they can accommodate the longer 9mm pin instead of the standard 6mm pin. Available for 4, 8, 16, 24, 36 and 48 PELCO® Q Pin Stubs or standard pin stubs with 12.7mm (0.5") head.

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15334-44	PELCO® Q Multi-Pin Stub Holder for 16 ea.	12.7mm (0.5") or 4 ea. 25.4mm (1") Pin Stubs.....	each
15334-55	PELCO® Q Multi-Pin Stub Holder for 24 ea.	12.7mm (0.5") Pin Stubs.....	each
15334-66	PELCO® Q Multi-Pin Stub Holder for 36 ea.	12.7mm (0.5") or 9 ea. 25.4mm (1") Pin Stubs.....	each
15334-77	PELCO® Q Multi-Pin Stub Holder for 48 ea.	12.7mm (0.5") Pin Stubs.....	each

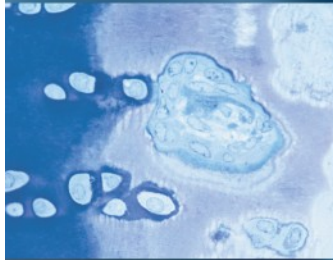
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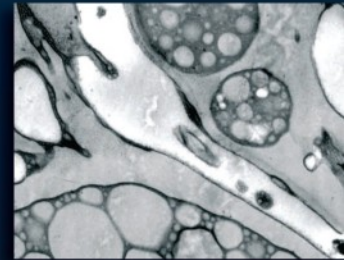
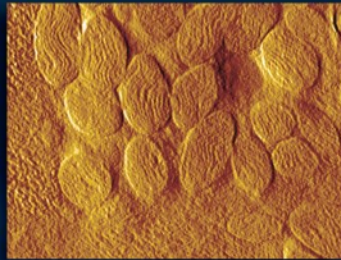
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