

Department of Biological Sciences

creating leaders in research, education and service

College of Arts & Sciences

THE UNIVERSITY OF
MEMPHIS
Dreamers. Thinkers. Doers.



2 From the Communications Committee

2 IN FOCUS: The Integrated Microscopy Center

The IMC is a core facility of the U of M providing expertise in the use of microscopy to faculty, students, and researchers in the Memphis area

4 2011 William H.N Gutzke Memorial Lecture

Established in 2009, this year's speaker was Lara LaDage

5 Faculty News: Awards, Presentations, Invited Talks

6 Graduate Student News: Defenses, Awards and Presentations

The Department mints 3 Ph.D.s
Graduate student receives NSF grant

7 Undergraduate News

Biology students receive Department and University Awards

Dean's List

8 Biologists@Large

Graduate Student goes to China
A Movie Star Amongst Us

9 Selected Publications

Faculty and graduate student research articles

10 Future Issues

Contact Information
Links
Credits



From the Communication Committee

Welcome to Volume 2 issue 1 of *Biology@Memphis*, the Department of Biological Sciences' continuing effort to keep in touch with our Alumni and friends, to inform the campus and the Memphis community of the research activities in the Department and demonstrate to potential students the benefits of joining us for the next stage in their academic careers.

It's been a productive period since our Fall Newsletter came out in October. Our faculty continue to produce high quality publications, give invited talks and win awards for their teaching and advising. Our graduate students are attending meetings, publishing papers, visiting faraway lands, and moving on to post-doctoral fellowships in excellent labs. Our undergraduates continue to receive awards for their academic achievements and move on the graduate careers at outstanding universities.

Drop us a line and tell us what's new with *you* so we can include you in our next issue.

The Communication Committee
bionews@memphis.edu

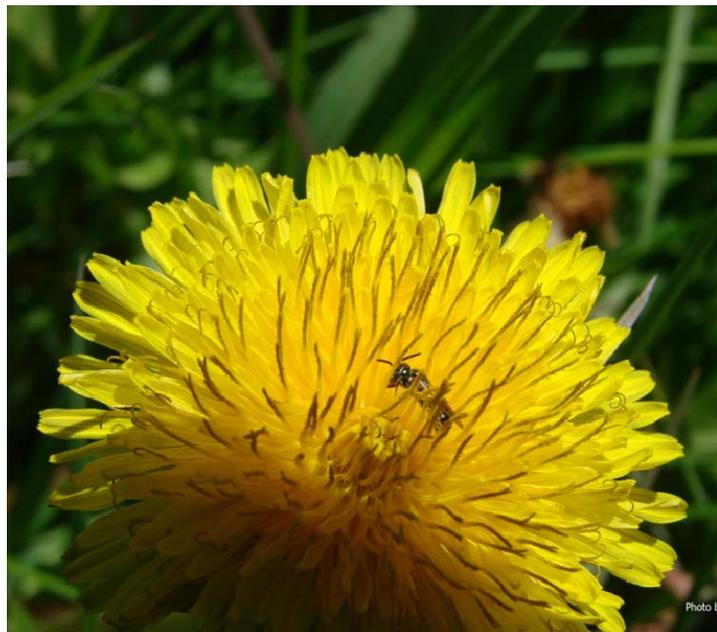
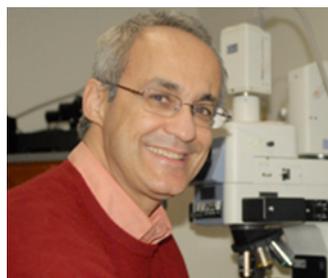


photo courtesy of J. Moore

In Focus: The University of Memphis Integrated Microscopy Center

The *University of Memphis Integrated Microscopy Center* (IMC), located on the ground floor of the Life Sciences Building, is a 14 room suite of specially designed rooms with about 2900 square feet of research space. The IMC is a research core facility of the University of Memphis and provides expertise in the use of microscopy to faculty and students and to researchers in the greater Memphis area. The IMC offers light, scanning, and transmission electron microscopy, confocal microscopy and ancillary equipment for sample preparation. The IMC reports directly to the Office of the Vice-Provost for Research and Graduate School. The staff of the IMC consists of a Director, a Coordinator and a staff of technicians. The Coordinator is responsible for the day-to-day operation of the IMC. Each staff member is a skilled microscopist with expertise in histology and electron microscopy that can assist users with sample preparation and microscopic observation.

In August 2010, **Dr. Lewis Coons** stepped down as director of the IMC and the directorship was assumed by **Dr. Omar Skalli**, Associate Professor of Biological Sciences. Dr. Skalli came to the University of Memphis from Louisi-



pictured: Dr. Omar Skalli

ana State University, where he was an Associate Professor in Cellular Biology and Anatomy and had a joint appointment in the Feist Weiller Cancer Center. Dr. Skalli's research seeks to unravel the physiological function of intermediate filament proteins such as *glial fibrillary acidic protein* (GFAP), vimentin, synemin and nestin

in the highly invasive astrocytoma cells. Synemin is of particular interest because it comprises a long C-terminal domain that interacts with several actin-associated proteins. Dr. Skalli's lab is characterizing those interactions and their role in the motility of astrocytoma cells.

Since arriving at the University of Memphis in August 2010, Dr. Skalli has been focused on upgrading facilities, increasing researcher use, and establishing dedicated research space. In January, he submitted a National Science Foundation equipment grant for a Field Emmission



Scanning Electron Microscope, which permits spatial resolution down to 5-10 nm, which is substantially better than conventional scanning electron microscopy. This microscope would greatly facilitate the examination of biomaterials such as nanoparticles and coatings as well as intracellular constituents such as ribosomes and cytoskeletal structures. In collaboration with the Departments of Physics and Chemistry as well as the Department of Bioengineering in the Herff College of Engineering, Dr. Skalli is also in the process of establishing a Suite for Materials Sciences to facilitate research in micropatterning, nanoparticles, semiconductors and the production of scaffolds required for tissue engineering.

Dr. Skalli is also in the process of acquiring a new confocal fluorescence microscope to enable UM users to perform high-resolution confocal fluorescence microscopy in the UV, green, red, and far-red with minimal photobleaching. It will also enable high-speed confocal fluorescence microscopy of live cells, spectral characterization of nanoparticles and other materials, differential interference contrast and polarization microscopy. This confocal microscope will be thus be invaluable for investigators across campus to characterize materials and to investigate dynamic events in live cells, such as protein-protein interactions, mechanisms and kinetics of uptake of nanoparticles and effects of drugs on organelles, signaling components, and intracellular ion concentrations. Finally, the new confocal microscope will represent a powerful tool to address fundamental cell biological and develop-

mental questions. In the images below, the ability of the microscope to demonstrate colocalization of proteins is revealed.

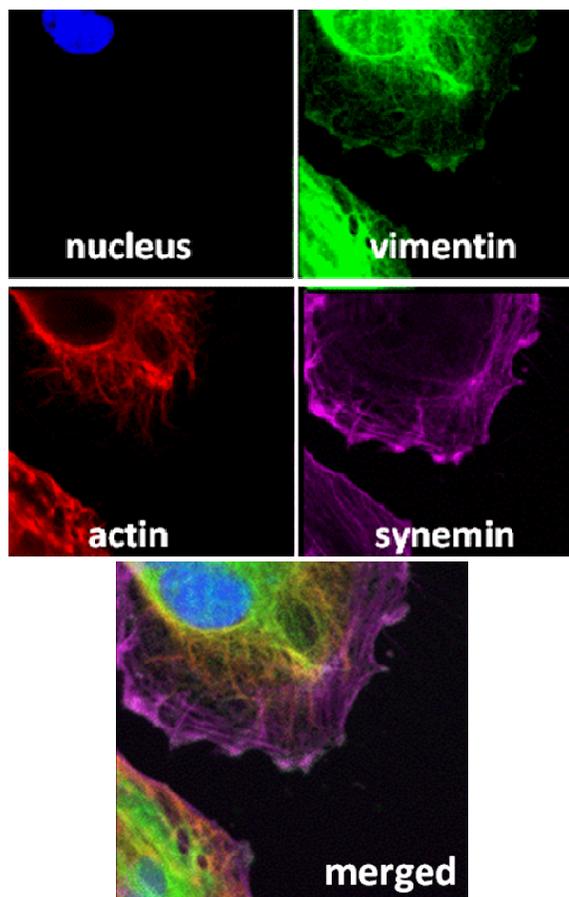
In addition to the new confocal system, Dr. Skalli would like to upgrade the ultramicrotomes used to cut thin sections for transmission electron microscopy (TEM), upgrade the scanning electron microscope (SEM), and purchase a cryostage for the TEM. He is committed to serving the research needs of the University of Memphis and plans on developing courses on the principles and uses of imaging technology.

Short list of Instrumentation Available in the IMC

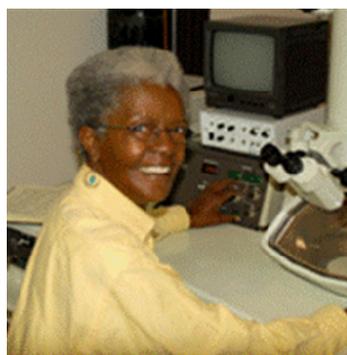
- Philips XL 30 Environmental Scanning Electron Microscope (ESEM)
- JEOL JEM1200EX II transmission electron microscope with AMT CCD Imaging System
- Ultramicrotomes and knife makers
- Veeco Metrology Digital Instruments 3100 Atomic Force Microscope (AFM)
- Veeco Metrology Digital Instruments Bioscope
- Tousimis Samdri 790 Critical Point Drying Apparatus
- EMS 550 Sputter Coating Device
- Balzers HPM 010 High Pressure Freezing Apparatus
- Balzers FSU 010 Freeze Substitution Unit
- Balzers 301 Freeze Etch Apparatus
- Edwards Auto 306 Vacuum Coater

For additional information on the use of the IMC contact Dr. Omar Skalli, (oskalli@memphis.edu, 901.678.1730) or Ms. Lou G. Boykins, Laboratory Coordinator (lgbaykns@memphis.edu, 901.678.4233 or 901.678-4457 (FAX).

To learn more about the facilities available in the IMC, visit www.memphis.edu/imc



In these images, astrocytes have been treated with stains to reveal the nucleus (blue), vimentin (red), actin (purple) and synemin (green). The last picture merges all 4 images to reveal that the vimentin network encircles the nucleus and that synemin connects the vimentin network to the more peripheral actin network.

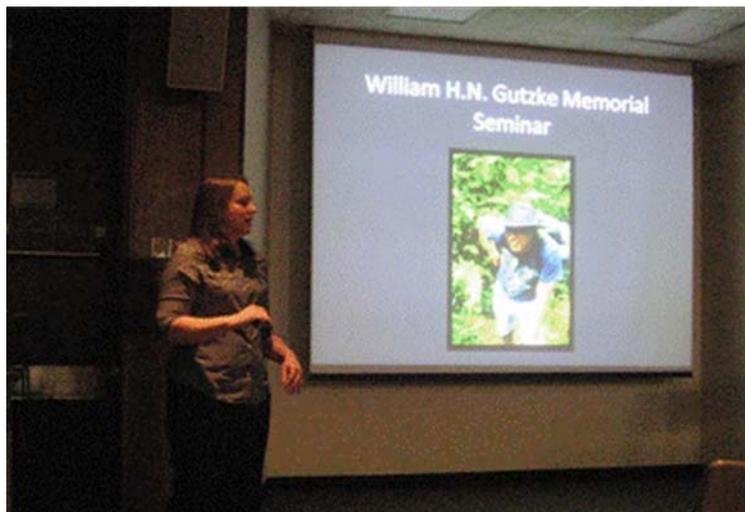
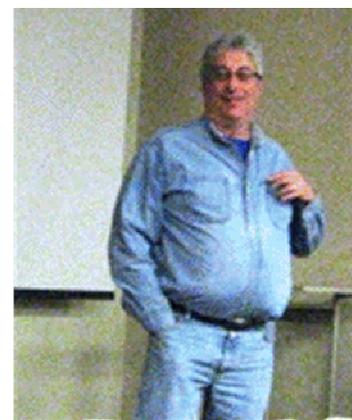


Staff (Clockwise from the top):

Ms Lou Bokins,
Laboratory Coordinator
Ms. Renada Scott
Research Technician II
Ms. Denise Banks



William H.N. Gutzke Memorial Lecture, 2011



pictured: clockwise: Dr Bill Gutzke, Dr. Bill Simco, Co-Director of the Ecological Resource Center who talks about Bill Gutzke and his contributions to the Department and the University of Memphis. Dr. Michael Ferkin, who directed Dr. LaDage's dissertation work, introduces the speaker. Dr. Lara LaDage talks about Dr. Gutzke as a mentor and friend prior to beginning her talk.

On January 13, 2011 Dr. Lara D. LaDage presented the 2011 William H.N. Gutzke Memorial Lecture. The Gutzke Seminar series was established by the University of Memphis' Ecological Resource Center in 2005 as a means of honoring the late Bill Gutzke, a well-known herpetologist, a respected member of the University of Memphis faculty, and valued colleague in the Department of Biological Sciences. Dr. Gutzke joined the Biology Department at what was then Memphis State University in 1986, and was promoted Associate Professor in 1989. He was a member of the American Society of Zoologists, the Society for the Study of Evolution, the American Society of Ichthyologists and Herpetologists, the Herpetologists League and the Society for the Study of Amphibians and Reptiles. [Dr. Gutzke](#) was [Dr. Lara D. LaDage's](#) mentor until his passing in 2004 at which time she moved under the direction of Dr. Michael Ferkin. Dr. LaDage defended her dissertation in 2007 and after completing her post-doctoral studies, she accepted a position as Research Scientist at The University of Nevada, Reno.

Dr. LaDage's talk entitled *Factors influencing the relationship between spatial processing and the brain* reflected her research focus on the evolution of spatial memory (the process of using past experiences to guide current behavior) and the hippocampus, an area of the brain heavily involved in spatially-based behaviors. Interestingly, animals that rely on spatial memory tend to have more neurons and larger hippocampi. Spatial processing and spatial memory have ramifications on territoriality, mate choice, navigation, acquisition of food resources, and many other ecologically-relevant behaviors.

Read more about

Dr. Gutzke at www.memphis.edu/biology/special/lladage.php

Dr. LaDage at <http://wolfweb.unr.edu/homepage/lladage/index.htm>

The Ecological Resource Center at www.memphis.edu/erc/

Faculty News: Awards, Invited Talks, Presentations

Awards

Dr. Ramin Homayouni, Associate Professor of Biological Sciences and Director, Bioinformatics Program was named Academic Editor of *PLoS ONE* in February 2011. *PLoS ONE* (www.plosone.org) is an open access journal which publishes original research from all disciplines within science and medicine. While articles are rigorously peer-reviewed,



pictured: Dr. R. Homayouni

they are not judged by their perceived importance or impact as long as they are technically sound. PLoS ONE believes that the importance of scientific papers should be judged by the research community, hence, has instituted article level metrics and online usage data, discussions and blog coverage. In 2010, PLoS ONE published over 6,700 papers, making it the largest journal in the world.

Dr. Anna Bess Sorin, Instructor, and Coordinator of The Biology Advising & Resource Center (BARC), received the 2011 *Alumni Association Distinguished Advising Award*. Each year, the Alumni Association may award Distinguished Advising Awards to one member of the faculty and to one professional advisor. This award, sponsored by the University of Memphis Alumni Association, was established to recognize excellent advising on our campus.



pictured: Dr. A.B. Sorin

Among the criteria used to determine the awardee are significant undergraduate student contact, strong interpersonal skills, demonstrated evidence of student success, mastery of institutional regulations, policies, and procedures, and the ability to engage in developmental advising.

Invited Talks

Dr. Duane McKenna attended the *Annual meeting of the Entomological Society of America* from December 12-15 in San Diego, CA with assistance from a College of Arts and Sciences travel grant. At the meeting he gave an invited plenary lecture titled "Ecological and evolutionary radiation of beetles", an invited symposium talk titled "Temporal lags and overlap in the diversification of weevils and flowering plants", and was a coauthor on a talk titled "Early evolution of the beetles".

Presentations

Heiss, R. S. and **S. J. Schoech**. Oxidative stress and life-history trade-offs in the cooperatively breeding Florida Scrub-Jay. *Annual meeting of the Society for Integrative and Comparative Biology*, Salt Lake City, UT, January 2011.

Small, T. W., E. S. Bridge, and **S. J. Schoech**. Targeted dietary supplementation in free-living Florida Scrub-Jays (*Aphelocoma coerulescens*): use of a novel "SmartFeeder" design. *Annual meeting of the Society for Integrative and Comparative Biology*, Salt Lake City, UT, January 2011.

Skalli O, Pitre A. Synemin Interacts with Akt to Influence the Proliferation of Astrocytoma Cells. *Annual meeting of the American Society for Cell Biology Meeting*, Philadelphia, PA, December 2010.



Graduate Student News: Defenses, Presentations, Awards

Dissertation Defenses

Three graduate students completed their doctoral work in the 2010-2011 Academic Year.



Dr. Michelle Rensell

On October 29, 2010 **Michelle A. Rensell** defended her dissertation entitled *Corticosterone Secretion in Young Florida Scrub-Jays: Correlates and Consequences*. Dr. Rensell performed her dissertation work with Dr. Stephan Schoech and is now a post-doctoral fellow with Dr. Barney (Barnett) Schlinger in the Department of Integrative Science and Physiology at UCLA.



Dr. Matthew Venesky

Matthew D. Venesky presented his defense of *Dynamics of an Emerging Infectious Disease of Amphibians: From Individuals to Communities* on February 18, 2011. Dr. Venesky performed his dissertation work with Dr. Matthew Paris and is now a post-doctoral fellow with Dr. Jason Rohr in the Department of Integrative Biology at the University of South Florida.



Dr. James Moore

On March 18, 2011 **James E. Moore** defended his dissertation work *Using Mississippi River Islands to Understand Plant Community Dynamic*. Dr. Moore performed his dissertation work with Drs. Scott Franklin and Randall Bayer and will start as an Assistant Professor of Biology at Christian Brothers University in Memphis, in the Fall of 2011.

Pictures (top to bottom) are courtesy of T. Wilcoxon, M. Venesky and J. Grubaugh

Awards

Christina Champion and **Mellessa Miller** received departmental travel awards to present their papers at the 2011 Experimental Biology Meeting in Washington D.C.

Wendy Rose received a departmental travel award to attend and present at the 111th General Meeting of American Society for Microbiology in New Orleans, LA

Congratulations to **Christopher Grow** (M. Sc. Kennedy) for receiving a Graduate Assistant Meritorious Teaching Award for the academic year. He was selected from among the more than 250 graduate students who teach courses at the university. This year two awards were given. As Dr. Weddle-West, U of M vice provost for Graduate Studies writes: "Your selection is a fitting tribute to the dedication and expertise you have shown as a teacher. The University of Memphis has a strong commitment to teaching excellence, and we value the work you have done."

Grants

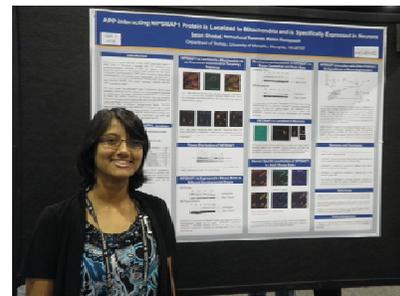
Rebecca Heiss, a Ph.D. candidate in Dr. Stephan Schoech's lab, received a National Science Foundation, "Doctoral dissertation improvement grant for her proposal entitled "Oxidative stress and trade-offs in the cooperatively breeding Florida scrub-jay (*Aphelocoma coerulescens*)." Michelle M. Elekonich, PhD, Program Director of the Behavioral Systems Cluster indicated "it was one of the top three and considered transformative by the panel". In addition, Ms Heiss received a **Morton Dissertation Award** which is presented to outstanding master's and doctoral students whose thesis or dissertation prospectus has been approved by their committee.



Pictured: Rebecca Heiss holding scrub jay nestlings

Presentations

Sarani Ghosal, (pictured below) a Ph.D. student in the laboratory of Dr. Ramin Homayouni, presented a poster entitled "APP- interacting NIPSNAP1 protein is localized to mitochondria and is specifically expressed in neurons" at 40th annual meeting of Society for Neuroscience held in San Diego, CA November, 2010.



Christopher Grow, a Masters student in Dr. Michael Kennedy's lab presented "A survey of mammalian biodiversity at Shelby Farms Park in Memphis, Tennessee" at the 34th Annual Meeting of the Tennessee Chapter of the Wildlife Society, March 2011.

Undergraduate News: Awards, Scholarships and Academics

The Biological Sciences Faculty Award



The **Biological Sciences Faculty Award** is presented to the undergraduate student who has made the most significant contribution to the department during the past academic year. This year's recipient is **Mr. Yasasvi Vasili** (pictured above).



The Chi Beta Phi Science Award



The **Chi Beta Phi Science Award** of the Phi chapter of Chi Beta Phi annually awards a plaque to a Graduating Senior in each of the basic science and math disciplines with the highest academic average. The Department of Biological Sciences winner is **Ms. Melanie A. Hinte**.

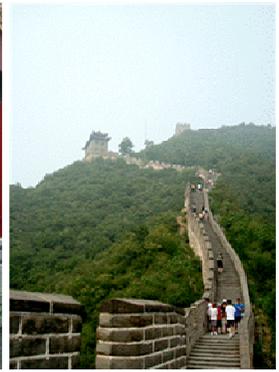
Academics

The Department had 103 major's on the Dean's list for Fall 2010

Biologists@Large

Graduate Student Goes to China

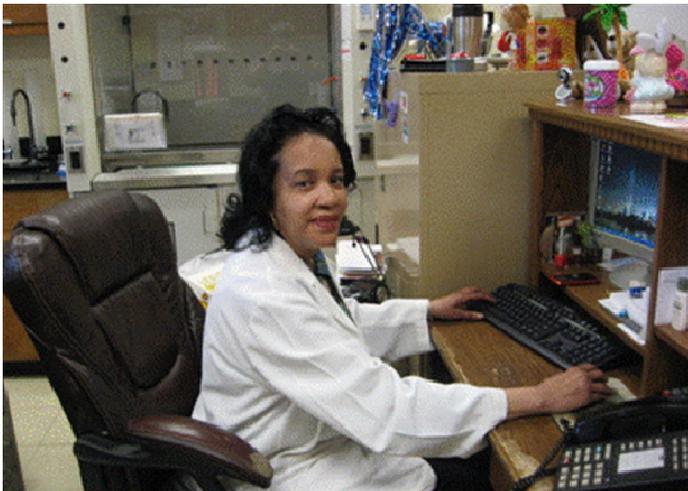
During my summer in Shanghai, China in 2010, I studied at Shanghai Jiao Tong University, School of Medicine in Dr Junling Liu's laboratory. Dr Liu's lab is in the Department of Hematology, and he specializes in platelets. During my time in the lab, I was able to participate in many experiments including bone marrow transplantation in mice following irradiation, immunohistochemical analysis of blood vessels, and the effects of anti-thrombotic drugs on tumor metastasis. Studying in Dr Liu's lab was a great experience. Not only was it interesting to see scientific research performed at an advanced institution, it was a unique experience to see it performed by individuals of another culture. In addition to learning useful laboratory techniques, I was able to spend some time exploring several Chinese cities. My mother and two sisters came to visit, and we toured areas of Beijing, Xi'an and Shanghai. We climbed The Great Wall of China, observed the Terracotta Warriors and walked through sacred areas like the Summer Palace and Forbidden City. We even had the chance to visit a typical Chinese home to see how the people live. It was surreal to stand in historical places you have seen many times in photographs or on television, and thanks to the connections at the University of Memphis I was given the opportunity to do so. It was a summer that I will never forget.



Biology graduate student **Hannah Shackelford** a Masters student with **Dr. T. Kent Gartner**, spent the summer of 2010 in Shanghai, China working in the laboratory of Dr Junling Liu, a former post-doctoral fellow of Dr. Gartner. Pictures by J Cole and H Shackelford.

The Movie Star Amongst Us

During the day, she preps Microbiology Labs for the Department of Biological Sciences. But on her own time, Ms E.O. Wade acts in films. That's right... she's in the movies! In 2009, she appeared as a crime lab technician in the movie *Cold Steele*, a murder mystery by independent film maker and U of M Professor of Business Law, Dr. Larry Moore. *Cold Steele* won the 2009 Best Feature Film- Comedy/Satire at the LA Independent Film Festival. Dr Moore cast Ms Wade after seeing her on the "Does it Work" feature with Andy Wise then with WREG channel 3. She assisted Mr. Wise in examining shopping carts in Memphis for the presence of bacteria. Impressed by her lab skills, Dr. Moore cast as her as the lab technician in *Cold Steele*. Ms. Wade is also working on Dr. Moore's next movie, another murder mystery. She doesn't use her laboratory skills in this one, but is seen eating at a restaurant and walking the runway in a fashion show. She has been assured by the director she will NOT be the murder victim. Stop by soon and ask for an autograph.



Pictured: Ms E.O. Wade at work in the prep room for the Microbiology labs.

Selected Publications by Faculty and Graduate Students

Bhavaraju K, Georgakis A, Jin J, **Gartner TK**, Tomiyama Y, Nurden A, Nurden P, Kunapuli SP. 2010. Antagonism of P2Y₁₂ reduces physiological thromboxane levels. *Platelets* 21:604-609.

Carver BD, **Kennedy ML**, Houston AE, Franklin SB. 2011. Assessment of temporal partitioning in foraging patterns of syntopic Virginia opossums and raccoons. *J Mammol* 92:134-139.

Heiss, RS, Cohen AA, Bowman R, Boughton RK, Bridge ES, McGraw KJ, **Schoech SJ**. 2011. Circulating carotenoid concentrations are positively correlated with later clutch initiation in Florida Scrub-Jays (*Aphelocoma coerulescens*). *J Exp Zool Part A: Ecol Evol Physiol* 315:101-111.

Khan SK, Malinski T, Mason RP, Kubant R, Jacob RF, Fujiooka K, Denstaedt SJ, King TJ, Jackson HL, Hieber AD, Lockwood SF, Goodin TH, Pashkow FJ, Bodary PF. 2010 Novel astaxanthin prodrug (CDX-085) attenuates thrombosis in a mouse model. *Thromb Res*.126:299-305.

Kramer CD, **Poole NM**, **Coons LB**, **JA Cole**. 2011. Tick saliva regulates migration, phagocytosis, and gene expression in the macrophage-like cell line, IC-21. *Exp Parasitol* 127:665-671.

Luna G, Lewis GP, Banna CD, **Skalli O**, Fisher SK. 2010 Expression profiles of nestin and synemin in reactive astrocytes and Müller cells following retinal injury: a comparison with glial fibrillar acidic protein and vimentin. *Molec Vision* 16:2511-2523.

McKenna DD. 2011. Temporal Lags and Overlap in the Diversification of Weevils and Flowering Plants: Recent Advances and Prospects for Additional Resolution. *Am. Entomologist* 57:55-56.

Nakazato T, Housworth E. 2011. Spatial genetics of wild tomato species reveals roles of the Andean geography on demographic history. *Am J Botany* 98: 88-98.

Ouyang X, **Tran QT**, **Goodwin S**, Wible RS, **Sutter CH**, **Sutter TR**. 2011. Yap1 activation by H₂O₂ or thiol-reactive chemicals elicits distinct adaptive gene responses. *Free Radic Biol Med* 50:1-13.

Rensel, MA, Wilcoxon TE, and **Schoech SJ**. 2011. Corticosterone, brood size, and hatch order in free-living Florida

Scrub-Jay (*Aphelocoma coerulescens*) nestlings. *Gen Comp Endocrinol* 171: 197-202.

Sasmal PK, Reddy DS, Talwar R, Venkatesham B, Balasubrahmanyam D, Kannan M, Srinivas P, Kumar KS, Devi BN, Jadhav VP, **Khan SK**, Mohan P, Chaudhury H, Bhuniya D, Iqbal J, Chakrabarti R. 2011. Novel pyrazole-3-carboxamide derivatives as cannabinoid-1 (CB1) antagonists: journey from non-polar to polar amides. *Bioorg Med Chem Lett*. 21(1):562-568.

Sutter CH, **Bodreddigari S**, **Sutter TR**, Carlson EA, Silkworth JB. 2010. Analysis of the CYP1A1 mRNA dose-response in human keratinocytes indicates that relative potencies of dioxins, furans, and PCBs are species and congener specific. *Toxicol Sci* 118:704-15.

Ukai-Tadenuma M, Yamada R, Xu H, Ripperger JA, **Liu AC** and Ueda HR. 2011. Delay in Feedback Repression by Cryptochrome 1 Is Required for Circadian Clock Function. *Cell* 144: 268-281

Venesky MD, Wassersug RJ, **Parris MJ**. 2010. How does a change in labial tooth row number affect feeding kinematics and foraging performance of a rapid tadpole (*Lithobates sphenoccephala*)? *Biol Bulletin* 218: 160-168.

Venesky MD, Wassersug RJ, **Parris MJ**. 2010. The impact of variation in labial teeth on the feeding kinematics of Southern Leopard Frog (*Lithobates sphenoccephala*) tadpoles. *Copeia* 2010:481-48.

Venesky MD, Wassersug RJ, **Parris MJ**. 2010. Fungal pathogen changes the feeding kinematics of larval anurans. *J Parasitol* 96:552-557.

Wilcoxon TE, Boughton RK **Schoech SJ**. 2010. Selection on innate immunity and body condition in Florida scrub-jays throughout an epidemic. *Biology Letters* 6:552-554.

Wilcoxon, TE, Bridge ES, Boughton RK, Rensel MA, Reynolds SJ, **Schoech SJ**. 2011. Parental, social, and environmental factors associated with hatching failure in Florida Scrub-Jays. *Ibis* 153:70-77.

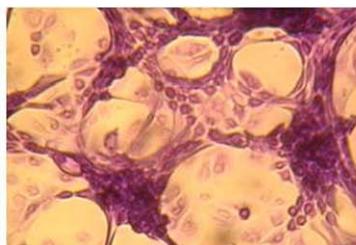
Xiang B, Zhang G, Liu J, Morris AJ, Smyth SS, **Gartner TK**, Li Z. 2010. A G(i) -independent mechanism mediating Akt phosphorylation in platelets. *J Thromb Haemost* 8:2032-41.



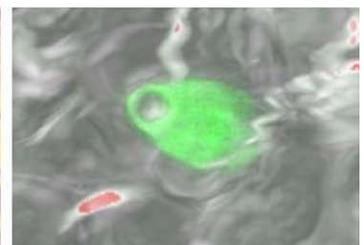
photos provided by: J Cole



N Poole



J Cole



L Ogari

Biology@Memphis

Department of Biological Sciences

creating leaders in research, education and service

College of Arts & Sciences

In the Next Issue

In Focus:

The Ecological Research Center

www.memphis.edu/erc/

Faculty Focus:

Twenty years of work on the Florida scrub-jay population at Archbold Biological Station in Lake Placid, Florida has yielded numerous surprises to **Dr. Stephan Schoech**. See what tracking individuals from egg to death has revealed about the physiology and behavior of this non-migratory and sedentary species.

Information links for this issue

Information for the Newsletter

bionews@memphis.edu

The Department of Biological Sciences Webpage

www.memphis.edu/biology

The Integrated Microscopy Center

www.memphis.edu/feinstone/

Seminar Series

www.memphis.edu/biology/news/seminar.php

Department News

www.memphis.edu/biology/news/news.htm

The Department of Biological Sciences

207 Life Sciences Building

The University of Memphis

Memphis, TN 38152

901.678.3749

