

Department of Biology

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College of Arts & Sciences

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The First Edition of Biology@Memphis

Welcome to volume 1 issue 1 of the Biology Department newsletter, our new means for keeping in touch with our Alumni, informing the Memphis community of the research activities in the Department and recruiting new students into the Biology Family. We will publish twice a year, updating you on department news, including recent publications, grants and awards to our faculty, students and staff and any new faculty joining the family. We'd like to know where you are and what you're doing, so drop us a line at Biolcc@memphis.edu

A Message from the Chairman

The past few years have been good ones for the Department of Biology. Our faculty continue to pro-

duce high quality publications and receive grant funding, we've hired three new faculty members (read about them on page 3) and continue to expand our graduate program. In the spring of 2008 we established BARC—the Biology Advising and Resource Center to guide our undergraduate majors through their academic careers. We have a new and improved website (www.memphis.edu/biology) to help attract the brightest and the best to work in the department. Now we want to brag on *you*, our alumni, friends, faculty and students so send us your news!

Dr. Randall Bayer, Professor and Chair

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In Focus: The Edward J. Meeman Biological Field Station



Left Aerial view of the Meeman Biological Field Station, Right Field Station directors past and present: Robert McGowan was the station's first director and was succeeded by Neil Miller and then Mike Kennedy. Jack Grubaugh is Meeman's present director. Pictured from left to right are Mike Kennedy, Robert McGowan with his wife Ellen, Jack Grubaugh, and Neil Miller.

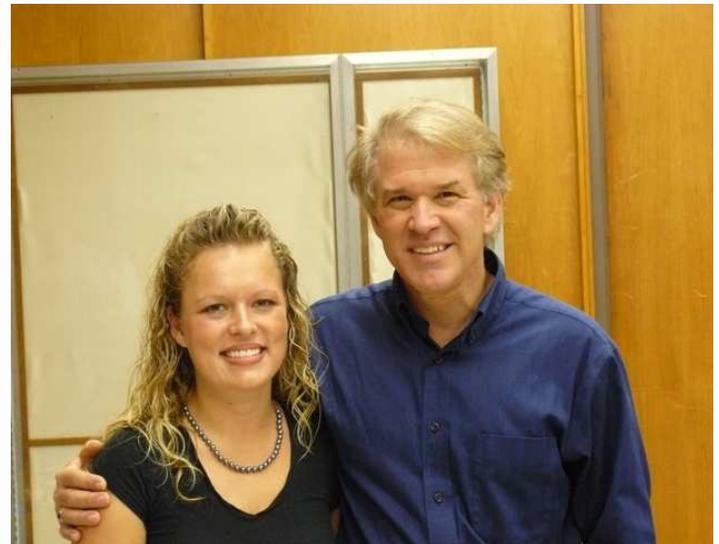
The research mission of the Meeman Biological Field Station (MBFS) is to examine the effects of spatial scale, spatial and temporal heterogeneity and periodicity on ecosystem functions. Its educational mission is to teach ecology and evolution using hands-on inquiry based learning. Current research at MBFS emphasizes multidisciplinary realms of inquiry. To facilitate its research endeavors, the MBFS maintains a weather station which provides year around measurements of air temperature, humidity, rainfall and soil temperature. These data are uploaded to MBFS computer facility where they are available to researchers online. The MBFS also spreads mist catch nets throughout the field station as means for producing an annual inventory. Jones array pit-fall traps are

also present in the MBFS and are monitored seasonally to survey vertebrate animal populations. The educational mission is to teach ecology and evolution using hands-on inquiry-based learning. The faculty, staff and students using the field station scientists are studying river, floodplain and wetland ecology, evolutionary ecology of hybridization, wildlife ecology, genetics, conservation biology and the evolution of mammalian behavior systems. Dr. Jack Grubaugh is the Director of the MBFS and Darrell Van Vickle is caretaker. Visit the website at www.memphis.edu/meeman.

The 2009 William H.N. Gutzke Memorial Seminar

The William H.N Gutzke Memorial Seminar Series was established by the Ecological Research Center in 2005 to honor the late Bill Gutzke, a well-known herpetologist and a long-time faculty member in the Department of Biology. Dr. Gutzke received his Ph.D. from Colorado State University and did his post-doctoral work with James Bull at the University of Texas. Dr. Gutzke joined the Biology Department at *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 also served as President of the Faculty Senate from 2000-2001 and was a member of the search committee that brought President Raines to the University of Memphis. In his tenure at the University of Memphis, he mentored four Ph.D. students, two Master's students and at least sixty undergraduates.

This year's speaker was Dr. Stephen Secor from the Department of Biological Sciences at the University of Alabama, Tuscaloosa. His talk, entitled *Evolutionary Responses to Feast and Famine* was presented Oct 29 to a large audience that included Dr. Gutzke's daughter Rachel (pictured with Dr Secor) and granddaughter



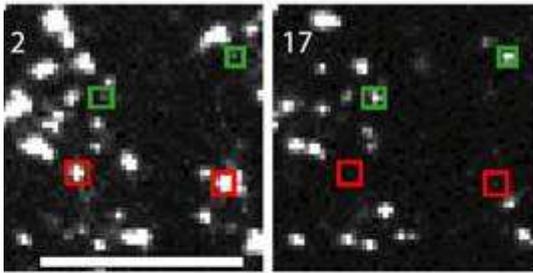
Kylee. Dr. Secor earned his doctorate from UCLA and did post-doctoral work with Dr. Jared Diamond. His research explores the evolution of digestive physiology, energetics, feeding ecology and morphology, and the underlying mechanisms of digestive and metabolic responses in amphibians and reptiles. Visit www.memphis.edu/biology/special/spring_seminar.php to see the seminar schedule for the spring.

Faculty News: New Faculty



Cephaloleia beetles studied by Dr. McKenna

Dr. Duane McKenna joined the Department as an Assistant Professor in January, 2010 after a post-doctoral fellowship at the Museum of Comparative Zoology, Harvard University. Dr. McKenna studies insect (especially beetle) molecular systematics and evolution, and the evolutionary-ecology of insect-plant interactions. He also has a general interest in phyloinformatics and the design and implementation of biological inventories involving insects. Dr. McKenna recently published *Temporal lags and overlap in the diversification of weevils and flowering plants*. Proc Nat'l Acad Sciences 106(17): 7083-7088, 2009.



Dr. Liu uses the photon-emitting molecular reporter *PER2::LUCIFERASE* to demonstrate periodicity of *Per2* expression

Dr. Andrew Liu joined the Department in Fall 2008. In mammals, many aspects of 24-hr rhythms in behavior and physiology are regulated by endogenous circadian clocks. His lab studies how the clock works (mechanism) using molecular genetics approaches and what the clock does (physiology) using genetics and genomics approaches. Dr. Liu's goal is to find methods for modulating our timing systems to improve treatments of clock-related disorders and enhance body fitness. Dr. Liu recently received a grant from the National Science Foundation and published *A Genome-wide RNAi Screen for Modifiers of the Circadian Clock in Human Cells* in Cell 139:199-210, 2009.



One of the natural habitats of wild tomato species in Santa Cecilia Ecuador, Nap, Ecuador used by Dr. Nakazato

Dr. Takuyu Nakazato joined the Department in September 2009, coming from Indiana University. Dr. Nakazato is interested in local adaptation and ecological divergence as well as genetic mechanisms involved in environmental stress mechanisms in wild tomatoes as well as polyploidy and genome evolution in ferns. Dr. Nakazato recently published *Investigating species boundaries in the Giliopsis group of Ipomopsis (Polemoniaceae): Strong discordance among molecular and morphological markers*. Am. J. Bot. 96:853-861, 2009.



Dr. Duane McKenna



Dr. Andrew Liu



Dr. Takuyu Nakazato

Faculty News: Tenure and Promotion



Dr. Judy Cole was promoted to Associate Professor and received tenure in the Fall of 2009. Dr. Cole's research involves understanding how many different receptor agonists can use a limited number of signaling molecules to produce agonist specific responses. She is focusing on the cross-talk between G protein-coupled receptors, receptor tyrosine kinases and use of the mitogen-activated protein kinase ERK to regulate cellular functions such as proliferation, migration and differentiation.



Dr. Carlos Lopez-Estrano was also promoted to Associate Professor with tenure in the Fall of 2009. Dr. Estrano studies *Plasmodium falciparum*, the causative agent of malaria which infects approximately 500 million people and kills approximately 2 million people per year. His research is focused on two aspects of malaria biology: (1) protein trafficking to the parasite food vacuole which is a metabolically active organelle and (2) Regulation of *Plasmodium* gene expression searching for potential targets for therapeutic intervention.

Faculty News: Post-doctoral Fellows



Dr. Tom Small joined Dr. Stephen Schoech's lab in 2009. Dr. Small comes to the Department of Biology after a post-doctoral experience with Dr. Ignacio Moore at Virginia Tech. Dr. Small is in charge of the day to day running of the projects detailed in Dr. Schoech's 2009 NSF Grant. Dr. Small's research focuses on the environmental and physiological regulation of life history stages in free-ranging animals. He is most interested in how animals regulate reproduction and reproductive trade-offs in environments where resource availability is spatially and temporally less predictable during the annual cycle, such as in deserts and tropical ecosystems.

Faculty News: Grants, Publications, Presentations

Grants

Dr. Stephen Schoech received a National Science Foundation Grant "*Collaborative research: influences of environmental manipulation on parental programming and stress physiology in a cooperatively breeding bird.*" with his co-PI Dr. Eli S. Bridge (\$525,609 over 3 years).

Dr. Andrew Liu received funding from the National Science Foundation Grant for his project entitled *Biochemical and Molecular Basis of Circadian Behavior* (\$550,000 over 3 years).

Dr. Thomas Sutter received a Johns Hopkins University Center for Alternatives to Animal Testing Grant entitled *Microarray Analysis Software for Comparisons and Extrapolations Relevant to Toxicology* (\$35,000 over 2 years) and is a co-investigator with Johns Hopkins University colleagues on an NIH/NCI grant entitled *Molecular Mechanisms of Chemoprevention: Nrf2 Signaling* (\$657,730 over 5 years).

Drs. Bill Simco, Cheryl Goudie and Michael Kennedy received funding from the University of Memphis Sustainable Campus (Green) Fee for the project *Institutionalizing Recycling Behavior at the University of Memphis: Bringing the 3 R's – Reduce, Reuse, Recycle – to the incoming Freshman Class* (\$27,000).

Dr. Carrie Hayes Sutter received funding from General Electric for a two year project starting in Jan 2010 to compare *in vitro* aryl hydrocarbon receptor-mediated responses in human keratinocytes exposed to environmental pollutants (total \$197,230).

Dr. Ramin Homayouni received a grant from the UM FedEx Institute of Technology to develop a mouse knock-out model for investigating the role of NIPSNAP1 in Alzheimer's Disease (\$79,393 for 1 year).

Dr. Michael Kennedy received funding from American Ordnance, LLC for work related to *White-tailed Deer Assessment* (\$26,000).

Drs. Michael Kennedy and Bill Simco received funding from Shelby Farms Park Conservancy for *An Inventory and Natural Resources Management Plan for Shelby Farms Park* (\$115,000) and from the Tennessee Department of Agriculture – Division of Forestry for *An Assessment of Forested Habitat at Shelby Farms Park* (\$20,000).

Dr. Judy Cole is a Co-Investigator on *The influence of cranberry beverage on systemic immune functions, urinary and systemic biomarkers of health and fecal characteristics of human subjects during a 10 week administration.* from Oceanspray (\$176,175 for 1 year)

Grants, Papers and Presentations

Selected Publications

Rensel, M. A., R. K. Boughton, and **S. J. Schoech**. 2010. Development of the adrenal stress response in Florida Scrub-Jays (*Aphelocoma coerulescens*). *General and Comparative Endocrinology* 165:255-261.

Schoech, S. J. 2009. Food supplementation experiments: A tool to reveal mechanisms that mediate timing of reproduction. *Integrative and Comparative Biology* 49:480-492.

C Sutter, H Yin, Y Li, J Mammen, **S Bodreddigari**, G Stevens, **J Cole**, **T Sutter**. 2009. EGF Receptor Signaling Blocks AH Receptor-mediated Transcription and Cell Differentiation in Human Epidermal Keratinocytes. *Proc. Nat'l Acad. Sci* 106:4266-4271.

Guerrero JA, Kyei M, Russell S, Liu J, **Gartner TK**, Storrie B, Ware J. 2009 Visualizing the von Willebrand factor/glycoprotein Ib-IX axis with a platelet-type von Willebrand disease mutation. *Blood* 114:5541-5546.

Zhang, E.E., **A.C. Liu** et al 2009. A Genome-wide RNAi Screen for Modifiers of the Circadian Clock in Human Cells. *Cell* 139:199-210.

Blaudow RA, **Coons LB**, **Cole JA**. 2009 Cyclic nucleotide crosstalk in salivary glands from partially fed *Dermacentor variabilis* (Say). *J Insect Physiol.* 55:805-812.

Rose WM, **Ourth DD** 2009 Isolation of lysozyme and an antifungal peptide from sea lamprey (*Petromyzon marinus*) plasma. *Vet Immunol Immunopathol* 15;132(2-4):264-269

Wood, T. E., and **T. Nakazato**. 2009. Investigating species boundaries in the Giliopsis group of Ipomopsis (Polemoniaceae): Strong discordance among molecular and morphological markers. *Am. J. Bot.* 96:853-861

Miller, E. H., S. P. Mahoney, **M. L. Kennedy**, and P. K. Kennedy. 2009. Variation, allometry, and sexual dimorphism in molar size of the black bear, with particular reference to Newfoundland. *J. Mammalogy* 90:491-503.

Venesky, M.D. and **M.J. Parris**. 2009. Intraspecific variation in life history traits among two forms of *Ambystoma barbouri* larvae. *American Midland Naturalist*. 162:202-206

Gopalakrishnan AM, Nyindodo LA, Ross Fergus M, **López-Estraño C**. 2009 Plasmodium falciparum: Preinitiation complex occupancy of active and inactive promoters during erythrocytic stage *Exp Parasitol*. 121(1):46-54

McKenna D. D.; Sequeira, A. S.; Marvaldi, A. E.; Farrell, B. D. 2009. Temporal lags and overlap in the diversification of weevils and flowering plants. *Proc Nat'l Acad Sci USA* 106(17): 7083-7088.

Lessman CA 2009. Oocyte maturation: converting the zebrafish oocyte to the fertilizable egg. *Gen Comp Endocrinol*. 161(1):53-57

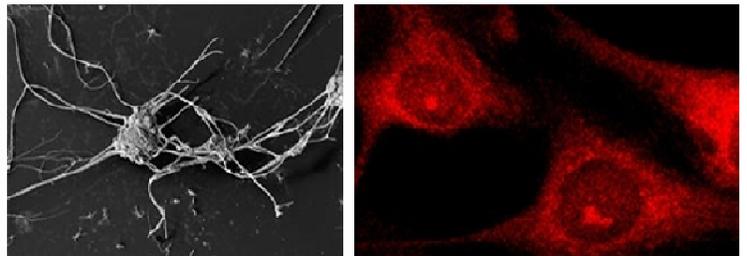
Ferkin MH, Pierce AA, Sealand RO 2009 Gonadal hormones modulate sex differences in judgments of relative numerosness in meadow voles, *Microtus pennsylvanicus*. *Horm Behav* 55(1):76-83.

Ospeck M, Coffey B, and **Freeman D** 2009 Light-dark cycle memory in the mammalian suprachiasmatic nucleus. *Biophysical Journal*, 97 1513-1524.

Goodwin, S.B. and **Sutter, T.R.** 2009 Microarray analysis of Arabidopsis genome response to aluminum stress. *Biologia Plantarum*, 53: 85-99.

Phan, V., Olusegun George, E., Tran, Q.T., **Goodwin, S.**, **Bodreddigari, S.**, and **Sutter, T.R.** 2009. Analyzing microarray data with transitive directed acyclic graphs. *J. Bioinf. Comp. Biol.*, 7: 135-136

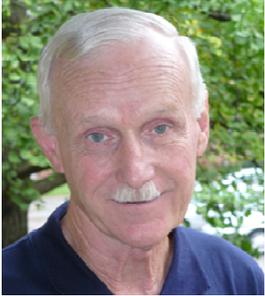
Roebuck BD, Johnson DN, **Sutter CH**, Egner PA, Scholl PF, Friesen MD, Baumgartner KJ, Ware NM, Bodreddigari S, Groopman JD, Kensler TW, **Sutter TR**. 2009 Transgenic expression of aflatoxin aldehyde reductase (AKR7A1) modulates aflatoxin B1 metabolism but not hepatic carcinogenesis in the rat. *Toxicol Sci*. 109(1):41-49.



Faculty News: Awards



Thomas W. Briggs Foundation's Excellence in Teaching Award: Dr. Anna Bess Sorin received The 2009 Thomas W. Briggs Foundation's Excellence in Teaching Award. The Briggs Award is highest award for excellence in undergraduate teaching.



Meritorious Faculty Award: Dr. Michael Kennedy received this award which is given by the College of Arts and Sciences to recognize exceptional faculty within the college.



College of Arts and Sciences Award for Excellence in Teaching. Drs. Charles Lessman (*top*) and Charles Biggers (*bottom*) received the Excellence in Teaching Award in recognition of exemplary teaching in undergraduate courses.

Graduate Student News

Defenses and Degrees

Jessica Erin Fender, a Masters student with Dr. Michael Kennedy, presented her thesis work entitled *Habitat Heterogeneity and Species Richness: Is Spatial Scale a Factor?* on August 13, 2009.

Jennifer Wendelyn Williams received her Master's in August 2009. Ms Williams did her graduate work with Dr. David Freeman and is the coordinator for the Anatomy and Physiology labs in the Department of Biology at the University of Memphis.

Charles Michael Knight defended his doctoral dissertation on *The Influence of Natural Selection on Interactions Between Native and Exotic Species in an Invaded Ecosystem* October 27, 2009. Dr. Knight was a student in Dr. Michael Kennedy's lab.

Brian D. Carver, a Ph.D. student with Dr. Michael Kennedy defended his dissertation entitled *Ecological Relationships of Virginia Opossums (*Didelphis virginiana*) and Raccoons (*Procyon lotor*)* November 9, 2009.

Matthew L. Smith received his Master's degree in December, 2009. Mr. Smith did his graduate work with Dr. Judy Cole.

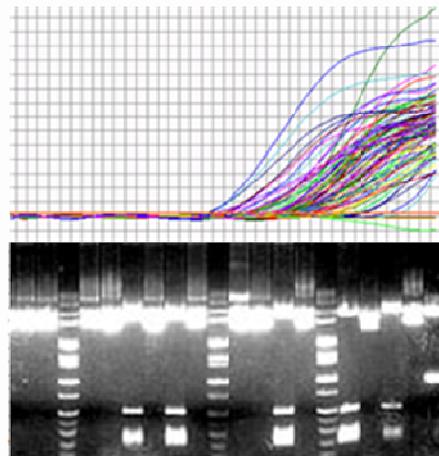
Derek Norman defended his Masters thesis entitled *Regulation of Immediate Early Gene Expression by α -Adrenergic Receptor-mediated ERK activation in Vasculature*

lar Smooth Muscle November 16, 2009. Mr. Norma was a student in Dr. Judy Cole's lab and is now a research associate with Dr. Abby Parrell in the Department of Chemistry at the University of Memphis.

Grants

Travis E. Wilcoxen is the co-PI with Dr. Stephen Schoech on a National Science Foundation, "*Doctoral dissertation improvement grant: reproductive senescence in the Florida scrub-jay (*Aphelocoma coerulescens*)*."

Michelle Rensel received a Grant-in Aid-of-Research from the Society for Integrative and Comparative Biology.



Graduate Student News

Publications

Wilcoxon, T.E. and **M.A. Rensel**. 2009. Invasive fire ants depredate nest of Florida Scrub-Jay (*Aphelocoma coerulescens*). *The Wilson Journal of Ornithology*. 121: 86-87

Rensel, M.A., Boughton, R.K. and Schoech, S.J. 2010. Development of the adrenal stress response in the Florida scrub-jay (*Aphelocoma coerulescens*). *General and Comparative Endocrinology* 165: 255-261.

Rensel, M.A.*, **T.E. Wilcoxon***, and S.J. Schoech. 2010. The influence of paternal provisioning and maternal nest attendance on nestling stress physiology in the Florida Scrub-Jay. *Hormones and Behavior* 57: 162-168
*co-first authors

Tran, Q.T., Xu, L., Phan, V., Goodwin, S., Rahman, M., Jin, V.X., Sutter, C.H., Roebuck, B.D., Kensler, T.W., George, E.O., and Sutter, T.R. 2009 Chemical genomics of cancer chemopreventive dithiolethiones, *Carcinogenesis*, 30(3):480-6.

Gopalakrishnan AM, **Nyindodo LA**, Ross Fergus M, López-Estraño C. 2009 Plasmodium falciparum: Preinitiation complex occupancy of active and inactive promoters during erythrocytic stage *Exp Parasitol*. 121(1):46-54

Venesky, M.D and M.J. Parris. 2009. Intraspecific variation in life history traits among two forms of *Ambystoma barbouri* larvae. *American Midland Naturalist*. 162:202-206

Rose WM, Ourth DD 2009 Isolation of lysozyme and an antifungal peptide from sea lamprey (*Petromyzon marinus*) plasma. *Vet Immunol Immunopathol* 15;132(2-4):264-269

Presentations

Michelle Rensel gave an oral presentation entitled "The influence of road disturbance on stress physiology and growth in young Florida Scrub-Jays" at the Annual

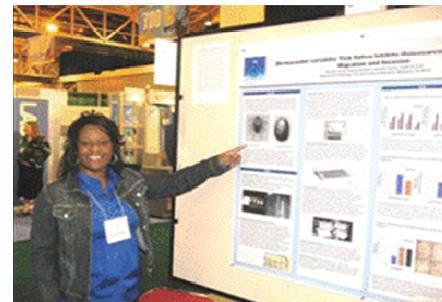
Meeting of the Society for Integrative and Comparative Biology, Seattle, WA, January 2010.

Travis E. Wilcoxon presented a paper entitled "Age-related differences in HPG responsiveness to GnRH challenge in Florida Scrub-Jays. at the Annual Meeting of the Society for Integrative and Comparative Biology, Seattle, WA, January 2010.

Nhu Quynh T Tran presented "Chemical genomics of cancer chemopreventive dithiolethiones" at the 48th Annual Meeting of the Society of Toxicology in Baltimore, MD.

Christopher Grow presented "A Survey of Mammals at Russell Cave National Monument" to the Tennessee Academy of Science, Knoxville, TN, October 2009

Derek Norman presented "ERK activation by the α_1 -adrenergic receptor agonist phenylephrine in human aortic vascular smooth muscle (AoSMC) cells" at Experimental Biology 2009 in New Orleans, LA



Nina Poole (pictured) presented *Dermacentor variabilis*: Tick saliva inhibits osteosarcoma (Saos) cell migration and invasion at Experimental Biology 2009 in New Orleans, LA.

Carolyn Kramer presented *Dermacentor variabilis*: Regulation of Macrophage Migration and Phagocytosis by Tick Saliva at Experimental Biology 2009 in New Orleans, LA..



Graduate Student News

Presentations, cont...

Dennison, J. S. 2009. An assessment of population density of white-tailed deer in western Tennessee utilizing aerial-thermal imaging. Tennessee Chapter of The Wildlife Society, Fall Creek Falls State Park, Pikeville, TN.

Wolcott, D. M. 2009. Population density of the Virginia opossum in a suburban area of western Tennessee. Tennessee Chapter of The Wildlife Society, Fall Creek Falls State Park, Pikeville, TN.

Awards

Nhu Quynh T Tran received the 2009 *Outstanding Graduate Student Award* from the Graduate Studies Committee and the Department of Biology.

Travis Wilcoxon and **Michelle Rensel** received travel awards to attend the International Ornithological Congress (2010) in Campos do Jordão - SP, Brazil.

Christopher Grow received a College of Arts and Sciences Travel Enrichment Fund for \$500, travel to Colima, Mexico to conduct mammalian biodiversity surveys

Jobs



Travis Wilcoxon has accepted a tenure-track Assistant Professor of Biology position at Millikin University in Decatur, IL. Founded in 1901 by James Millikin, a prominent Decatur businessman, the University serves approximately 2,400 students.

Staff News



Biology Staff Member helps in Educational Assessment

Ms E.O. Wade, who is the Lab Technician in charge of the Department of Biology's Microbiology labs, is a member of the *Center for Research and Education Project (CREP)* which provides funding to improve the reading skills of elementary school children. Ms Wade travels through the states of Tennessee, Mississippi and Missouri testing children's reading and comprehension skills. These data are then used to match students with appropriate reading programs and to assess the effectiveness of the Center's funding. Ms Wade has been participating in this project for the past 6 years and is also involved in science fairs projects in the City of Memphis Public Schools

Anna Christine (Chris) Powless, LTSII/Webmaster received the *Recognition for Innovative Technology Excellence* from Douglas Hurley, VP and Chief Information Officer October 21, 2009.

Donna Haskins, Administrative Secretary, received the *Distinguished Employee of the Year Award* for 2009 from Dr. Shirley Raines, President of the University of Memphis. This award is conferred upon four (4) University of Memphis employees whose efforts and contributions have been acknowledged as distinguished and above all others recognized during the same fiscal year

Cassandra Carthon received her B.A. in Organizational Leadership from the University of Memphis, December 2009



Biologists@Large

Collaborative Research on the Ecological Disturbances of Hurricane Katrina

Hurricane Katrina struck southeast Louisiana on August 29, 2005. The destructive forces of the hurricane, its accompanying storm surge, and an extended period of inundation created a major ecological disturbance event for vegetation growing in the affected areas. The revegetation and recovery of hurricane-disturbed areas is the research focus of Dr. Fukuju Yamamoto, Professor of Forestry at Tottori University, Japan, with cooperation of **Dr. Reza Pezeshki**, a long-time colleague and friend. This research was established as cooperative agreement between Tottori University and the University of Memphis shortly after the hurricane event. Dr. Yamamoto, along with his students and the University of Memphis research team, have traveled to the US gulf coast area twice per year since 2006 to establish research areas, study the patterns of revegetation and assess the recovery of hurricane-impacted native plants, such as *Taxodium distichum* and *Nyssa aquatica*. Project participants from the University of Memphis have been graduate students from Dr. Pezeshki's lab, including **Sam Pierce, Lyndsay Saunders, Melissa Koontz, and Burton Kirk**. These students aid in organizing trip logistics and data collection. In 2009, Pierce and Saunders co-authored a poster presentation on the work at the Annual Meeting of the Japanese Forestry Society at Kyoto University, Japan. During the most recent visit by the Japanese team in late February, a mini-symposium was held at the University of Memphis on the effects of flooding and natural disturbance on the physiological ecology of wetland plants. At this event, three scientists, Drs. Fukuju Yamamoto, Hitoshi Sakio, and Fumiko Iwanaga, and three students from Japan presented their research. The Japanese team is expected to return in September 2010 for further data collection.

Battle of the Brains

The City of Germantown sponsored the 2009 "Battle of the Brains," a math and science competition between Germantown High School and Houston High School students. The purpose of the event is to encourage high school students to pursue a field of science or mathematics. This year's theme was "Greening of America: positive environmental impact through applied math and science." Participants work individually or in groups to develop projects that provide innovative solutions and measurable outcomes using applied math and/or science to solve environmental problems.

The University of Memphis played an integral role in the Battle of the Brains"; Roy Van Arsdale (Earth Sciences) oversaw the event and judges include **Drs. Jack Grubaugh (Biology)**, Brian Waldron (Engineering), Abby Parrill-Baker (Chemistry), Arleen Hill (Earth Sciences), as well as Drs. Firouzeh Sabri and Sanjay Mishra (Physics).

Wildlife Without Borders - Mexico

As an outgrowth of 30+ years of mammalian biodiversity research in Colima, Mexico, faculty of the Ecological Research Center (**Drs. Michael Kennedy, Bill Simco, Juliann Waits and Cheryl Goudie**), the University of Oklahoma, Auburn University and Universidad Nacional Autonoma de Mexico met with the Secretary of Education to discuss an educational outreach program. Wildlife Without Borders is an international conservation program of the US Fish and Wildlife Service and in Mexico, SEMARANT, a government agency responsible for protection, restoration and conservation of natural resources. Discussions with the Secretary of Education centered around the Wildlife Without Borders signature initiative "Voices for Nature", a program to provide local stakeholders with information about their natural resources and to build capacity for biodiversity conservation and management. In addition to faculty from the above institutions, graduate students from Oklahoma University, the Universidad Nacional Autonoma de Mexico and Biology graduate student Chris Grow participated in studies of mammalian biodiversity in Colima, Mexico during December 2009 and January 2010.



Volcan de Fuego, Colima, Mexico, one of the most active volcanoes in North America.

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In Future Issues

In Focus:

The Feinstone Center for Genomic Research

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The Ecological Research Center

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The Integrated Microscopy Center

www.memphis.edu/imc/

The Bioinformatics Program

www.memphis.edu/binf/

Spring 2010 Graduation

Undergraduate News

Biology Scholarship Winners

Awards and Presentations

Information links for this issue

Information for the Newsletter

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The Department of Biology Webpage

www.memphis.edu/biology

The Meeman Biological Field Station

www.memphis.edu/meeman.

Seminar Series

www.memphis.edu/biology/special/spring_seminar.php



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