

Biology@Memphis

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Department of Biological Sciences

creating leaders in research, education and service

College of Arts & Sciences

THE UNIVERSITY OF
MEMPHIS
Dreamers. Thinkers. Doers.



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From the Communications Committee

We hope you enjoy the Spring issue of **Biology@Memphis**. Spring came early this year and pollen season was in full bloom by the middle of March (*pictured right*). In this issue we talk with Dr. Kent Gartner, who joined the faculty in 1972 and describe the impact of Bioinformatics on the study of Biology. We also visit with Fields Falcone, an alumna who is working at the Memphis Zoo. At the University of Memphis Centennial Research Celebration several faculty members were honored for bringing in more than \$1 million dollars in funding. Our graduate students continue to win awards, receive fellowships to support their work, and travel to present their research at national meetings. Finally, we identify those undergraduates who have received awards and scholarships from the Department. As always, you can keep up with events in the Department by following us on [Facebook](#) and let us know what you're doing by emailing your news to us at bionews@memphis.edu



IN FOCUS: The Bioinformatics Program

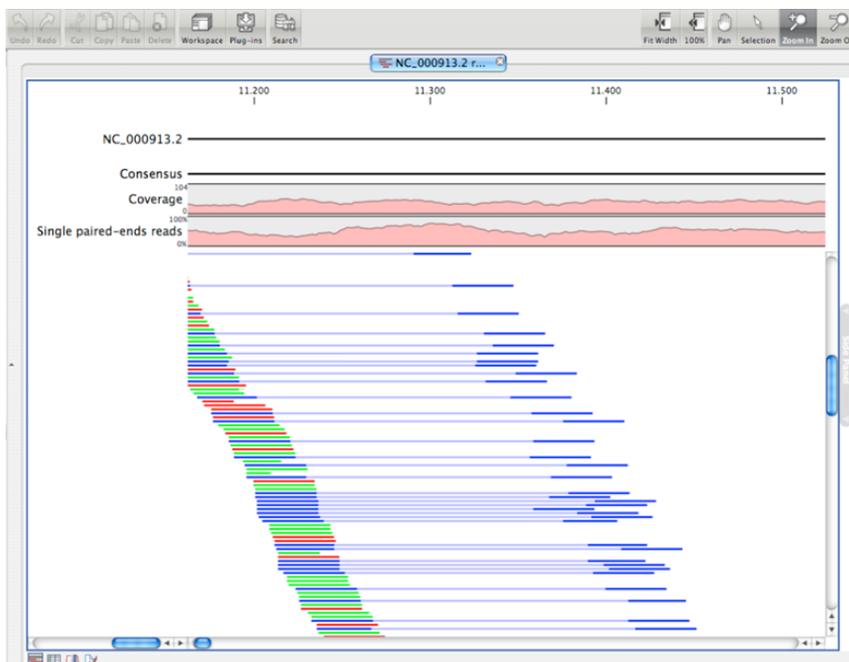
By combining mathematics, computer science, and biology, bioinformatics researchers develop tools and methods for understanding a range of complex biological problems such as the interaction between genes and environment, molecular evolution, mechanisms of disease, discovery of diagnostic/prognostic biomarkers, drug development, and much, much more.

What is Bioinformatics?

The field of bioinformatics marries biology, statistics, computer science and information technology into a single discipline. At a basic level, bioinformatics involves the creation and maintenance of large and often disparate databases to facilitate research and discovery.

Why is bioinformatics important?

The field of bioinformatics has been fueled by recent advances in molecular biology coupled with new technologies that enable sequencing of an organism's *genome* (the entirety of its hereditary information) within days. In addition to genome sequencing, other technologies are generating large amounts of data related to an organism's *proteome* (the entire set of proteins encoded by a genome), *transcriptome* (the set of all RNA molecules produced in a cell), *metabolome* (the complete set of the small molecule metabolites found in a cell) and *kinomes* (the set of protein kinases in an organism's genome). The biggest challenge for researchers is making sense out of these vast amounts of "omic" data. Thus, an emerging area in bioinformatics involves pairing these data with molecular and cellular knowledge published in the scientific literature.



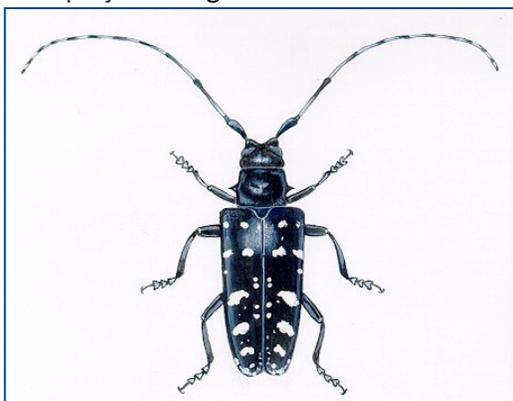
Pictured: A screenshot showing an example alignment of genomic DNA sequence fragments from a next generation DNA sequencer as viewed with the CLC Genomics Workbench genome browser (image courtesy of Dr. D McKenna)

What are the applications?

There are a host of applications; here are just a few. Bioinformatics can assist in identifying the gene(s) associated with particular diseases. This information can then be used to suggest changes in lifestyle, to develop new drugs or to find new drug targets. In the field of *Pharmacogenomics*, analyzing how a person's genes affect drug responses will help define the best drug therapy for that individual, a process termed *personalized medicine*. Sequencing the genomes of bacteria may lead to their use in cleaning up toxic waste sites, oil spills and reduce the levels of carbon dioxide in the atmosphere. Studying the genome of antibiotic-resistant bacteria will provide markers for identification and potential targets for preventing their spread and sequencing the genomes of eukaryotes and prokaryotes can help identify common ancestors (see <http://tolweb.org/tree/>) while comparing the genomes of different species can provide insights into gene function and the evolution of species

Bioinformatics at the University of Memphis

Capacity Building for a Major Wood Boring Pest: The Asian Long-horned Beetle (ALB) Genome Project In August 2011 **Dr. Duane McKenna** started sequencing the ALB (*Anoplophora glabripennis*) genome from tissue provided by U.S. Department of Agriculture- Animal and Plant Health Inspection Service (USDA-APHIS). His goal is to generate a genome-scale sample of nuclear protein-encoding genes from ALB to represent the family Cerambycidae (long-horned beetles) in a growing genome-scale DNA sequence matrix for beetles and relatives that is part of a long-term project in Dr. McKenna's lab. This project will gather data to facilitate study and control of this invasive pest and train researchers who can contribute to



female Asian Longhorned Beetle (image from www.vtjpr.org/urban/beetlebusters.cfm)

this effort (a process termed *capacity building*). Dr. McKenna also applied to have the nascent ALB genome project considered for inclusion in the [Insect 5000 Genomes \(i5k\)](#) pilot project whose aim is to sequence the genomes of 5,000 insect and arthropod species with importance to agriculture, food safety, medicine and energy production, as well as insects used as model organisms, those most abundant in ecosystems, and representatives from every branch of insect phylogeny. The ultimate goal of the i5K initiative is to achieve a deeper understanding of arthropod evolution and phylogeny. The i5k Species Selection Committee voted in favor of sequencing the ALB genome in partnership with Dr. McKenna's lab. The ALB genome is one of 18 insect genomes selected for the pilot project from more than 750 species proposed by researchers worldwide. From this point forward, sequencing for this project will be performed at the Baylor College of Medicine [Human Genome Sequencing Center \(HGSC\)](#). However, most bioinformatics work will be done in Dr. McKenna's lab or jointly by his lab and HGSC staff.

Dr. McKenna's involvement in the i5k project was facilitated by the Multicolored Asian Ladybug Genome Project (Ladybug Genome Project), which he started last year in collaboration with **Dr. Thomas Sutter** (Feinstone Center for Genomic Research) and **Dr. Ramin Homayouni** (Program in Bioinformatics) with funding from the University of Memphis FedEx Institute of Technology. Involvement in the i5k pilot project demonstrates the University of Memphis' growing capability in the areas of evolutionary genetics, genomics and bioinformatics.

Personalized Medicine: Tailoring Therapeutics for the Individual. According to a report by Personalized Medicine Coalition, approximately 50% of individuals do not respond to prescription drugs and, in some cases, individuals may have severe adverse reactions to drugs. These differences in drug responsiveness are thought to be caused by variations in individual genomes. Since there are approximately 3.5 million nucleotide variants between any two individuals (and an estimated 15 million variants in the entire human population) finding the critical genetic variations associated with drug responsiveness is very complicated and requires large patient cohorts. However, it is often difficult to obtain enough samples for a genome wide study, particularly for rare events or diseases. Dr. Homayouni's group is working closely with Computable Genomics and investigators at Vanderbilt University to develop methods to discover genetic biomarkers for rare conditions. In a pilot study funded by the FedEx Institute of Technology, the group is investigating the genetic basis of cardiovascular adverse events associated with anti-inflammatory cyclooxygenase-2 inhibitor drugs (e.g., Vioxx). Each group brings unique genomic and bioinformatics capabilities to the project. Vanderbilt houses one of the largest DNA Biobanks in the US, which is carefully linked to de-identified medical records of approximately 125,000 individuals. This unique resource allows investigators at Vanderbilt to select study subjects by simply searching through the medical records. The Homayouni lab along

with Computable Genomix have applied their text-mining tools to analyze over 1 million Medline abstracts and cull a set of likely candidate genes. Next, using other bioinformatics resources, the group created a custom DNA microarray chip that probes approximately 1,500 genetic variants simultaneously. DNA from the study subjects and controls are currently being interrogated with these microarrays. If successful, this study would lead to identification of genetic biomarkers that could predict the risk of adverse events when using Cox-2 inhibitor drugs. Moreover, this proof-of-concept project would open the door for similar genetic studies on many other rare conditions.

The Bioinformatics Program was established at the University of Memphis in 2006. Students are required to take core graduate level courses in computer science, statistics, and biology and electives in biology, biomedical engineering, chemistry, computer science, and math. **Dr. Ramin Homayouni** is the director of the Bioinformatics program and an Associate Professor in the Department of Biological Sciences and Adjunct Associate Professor of Neurology at the University of Tennessee Health Science Center. Dr. Homayouni leads a multi-disciplinary team of researchers investigating the mechanisms of neurodevelopment and neurodegeneration using mouse models. His lab is also developing automated text-mining tools to assist in interpretation of genomic data using biomedical literature. Dr. Homayouni's work has resulted in three U.S. patent applications and has been published in more than 35 peer-reviewed journal articles. Dr. Homayouni is a cofounder of Computable genomics and currently serves on the advisory board of Memphis Research Consortium and Cognovant (Kansas City, MO). He is also an Academic Editor of PLoS ONE, the largest scientific journal in the world. *To learn more about the Bioinformatics Program at the UofM visit www.memphis.edu/binf/*

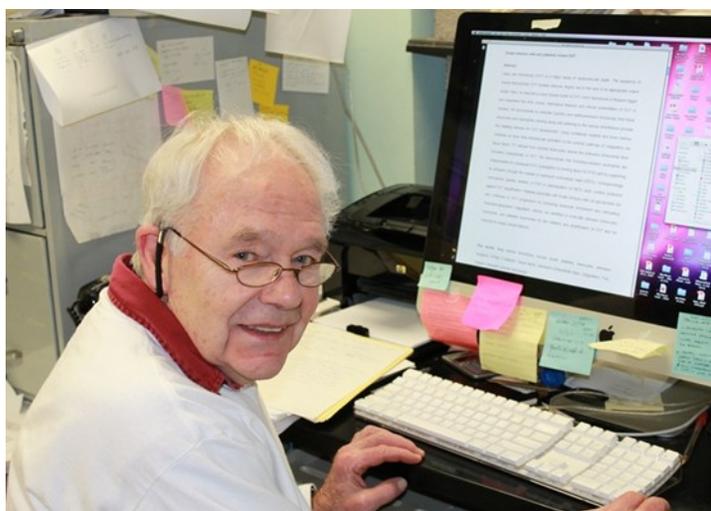
Information for this article came from the National Institutes of Health www.ncbi.nlm.nih.gov/About/primer/bioinformatics.html and the European Bioinformatics Institute www.ebi.ac.uk/2can/bioinformatics/bioinf_what_1.html



Dr. Ramin Homayouni, Director of the Bioinformatics Program

FACULTY FOCUS: From bacteria to platelets (with a brief stopover in dairy farming)

Dr. Gartner's work on platelet function lead to the development of antithrombotic drugs used to control thrombus formation. When asked to summarize his experiences at the University of Memphis he replied "I've seen the University improve every year".



Dr. T. Kent Gartner

Several weeks ago, 62 faculty members were recognized for their contributions to the research efforts at the University of Memphis as part of the University's Centennial Celebration. Among those recognized was Dr. T. Kent Gartner, Professor of Biological Sciences, who has been at the University

of Memphis since 1976. It seemed to be a good time to talk with Dr. Gartner about his career, how his research has changed over the years, and his participation in the growth of the research endeavor at the U of M.

Pre-Memphis: Dr. Gartner received his Ph.D. from The University of California-Davis where his work addressed questions related to bacterial physiology and genetics (*J Bacteriol.* 85:245-246, 1963). His first academic position was at the University of California-Santa Barbara where he worked on suppressor mutations that altered ribosome structure and function. He then gave up the lucrative world of academic science to try his hand at dairy farming in Montana. Yes, dairy farming in Montana. After realizing he missed science, he took a post-doctoral position at Cornell University to ease his way back into the laboratory. Dr. Gartner worked with Dr. Thomas Podleski at Cornell, where he helped to establish the conditions required for growing L6 muscle cells, isolated curare-resistant mutants with defects in nicotinic receptors, and described the importance of lectins in myotube fusion and muscle differentiation (*Biochem Biophys Res Commun.* 67(3):972-978, 1975).

University of Memphis: Dr. Gartner arrived at the UofM in 1976 as the institution was shifting from a teaching college to a research institution. He was hired to bring tissue culture techniques to the University and to teach bacterial genetics. He still teaches the course he developed (Molecular Genetics) every year. Shortly after his arrival, he attended a talk on platelet aggregation presented by Dr. David Phillips from St. Jude Children's Research Hospital.

TO BE COMPLETED BY PRINCIPAL INVESTIGATOR (Items 1 through 7 and 15A)	
1. TITLE OF PROPOSAL (Do not exceed 83 typewriter spaces) Control and Mechanism of Platelet Aggregation	
2. PRINCIPAL INVESTIGATOR	
2A. NAME (Last, First, Initial) Gartner, T(theodore) Kent	3. DATES OF ENTIRE PROPOSED PROJECT PERIOD (This application FROM 7/1/78 THROUGH 6/30/81)
2B. TITLE OF POSITION Associate Professor of Biology	4. TOTAL DIRECT COSTS REQUESTED FOR PERIOD IN ITEM 3
2C. MAILING ADDRESS (Street, City, State, Zip Code) Biology Department Memphis State University Memphis, Tenn. 38152	5. DIRECT COSTS REQUESTED FOR FIRST 12-MONTH PERIOD
2D. DEGREE Ph.D.	6. PERFORMANCE SITE(S) (See Instructions) Life Sciences Building Memphis State University Memphis, Tenn. 38152 8th Congressional District
2E. SOCIAL SECURITY NO.	Biochemistry Department St. Jude Children's Research Hospital Memphis, Tenn. 38101
2F. TELE. AREA CODE TELEPHONE NUMBER AND EXTENSION PHONE DATA: 901	
2G. DEPARTMENT, SERVICE, LABORATORY OR EQUIVALENT (See Instructions) Biology Department	
2H. MAJOR SUBDIVISION (See Instructions) College of Arts and Sciences	Congressional District No. 8

That talk sparked Dr. Gartner's interest in platelets and led to a collaboration that produced the preliminary data he used to acquire his first NIH grant and the first NIH grant awarded in the College of Arts and Sciences (the cover page of that grant entitled *Control and Mechanism of Platelet Aggregation* is pictured above). Work from this grant led to publications in *Science* (*Science* 200(4347):1281-1283, 1978) and *Nature* (*Nature* 289(5799):688-90, 1981) describing the importance of lectins platelet aggregation. Dr. Gartner indicated his most important paper came from work with his collaborator Joel Bennett at the University of Pennsylvania when they demonstrated that a tetrapeptide analogue of the cell attachment site of fibronectin composed of arginine-glycine-aspartate-serine (RGDS) inhibited platelet aggregation and fibrinogen binding to activated platelets (*J Biol Chem.* 260(22):11891-11894, 1985). This paper served as the basis for subsequent development by pharmaceutical companies' of anti-thrombotic agents composed of RGDS derivatives, and was followed up by another paper describing the peptide's mechanism of action (*J Biol Chem.* 267(17):11729-11733, 1992). Dr. Gartner brought knockout mice to campus to study signaling in platelets. The first KO mouse he introduced was missing a gene for the signaling molecule Src, followed closely by mice lacking the P2y12 purinergic receptor and about a dozen other types of signal

ing knockouts. After defining the signaling pathways activated in glycoprotein 1b (GP1b)-induced platelet signaling, Dr. Gartner asked whether or not the signaling characterized *in vitro* using inhibitors and KO mice was relevant to thrombus formation *in vivo*. To ask those questions, he used knockout

mice and a laser Doppler system to measure clot formation in the carotid artery and inferior vena cava. Currently his lab is working on sickle cell disease elicited bone abnormalities in mice. At the end of the conversation, Dr. Gartner was asked to summarize his experiences at the University of Memphis. His reply? "I've seen the University improve every year".

Tidbits: When Dr. Gartner arrived at the UofM, not all faculty members had a phone in their office. He was here when the first copy machine took up residence in the Life Sciences Building. Dr. Gartner has graduated 9 Ph.D.s and published 76 manuscripts during his career. His latest publication is *Peptide LSARLAF induces integrin β 3 dependent outside-in signaling in platelets*. Niu H, Xu Z, Li D, Zhang L, Wang K, Taylor DB, Liu J, Gartner TK. *Thromb Res.* 2012 Apr 4. [Epub ahead of print] PMID:22482832



THE WILLIAM H.N. GUTZKE MEMORIAL SEMINAR: *Dr. Christopher Guglielmo presented Fuel, water and energy budgeting in migratory birds and bats.*

Dr. Christopher Guglielmo from the Department of Biology at the University of Western Ontario in London, Ontario, Canada presented the 7th annual *William H.N. Gutzke Memorial Seminar* on February 23, 2012. The William H.N Gutzke Memorial Seminar Series was established by the Ecological Research Center in 2005 to honor the late Bill Gutzke , a



Dr. Christopher Guglielmo

well-known herpetologist and a long-time faculty member in the Department of Biology. Dr. Gutzke, who received his Ph.D. from Colorado State University and did his post-doctoral work with James Bull at the University of Texas, joined the Biology Department at *Memphis State University* in 1986. 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

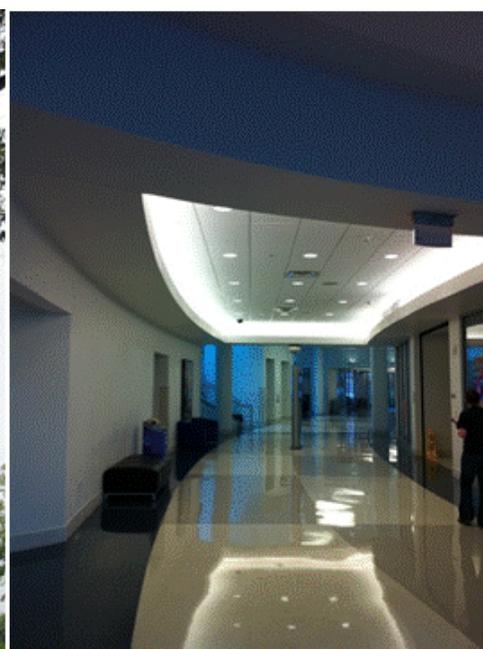
Herpetologists League and the Society for the Study of Amphibians and Reptiles. In his tenure at the University of Memphis, he mentored four Ph.D. students, two Master's students and at least sixty undergraduates..

Dr. Guglielmo's research is multi-disciplinary in nature and integrates physiology, biochemistry, behavior, ecology, evolution and conservation biology. In his talk entitled *Fuel, Water and Energy Budgeting in Migratory Birds and Bats* Dr. Guglielmo described how birds and bats utilize fat and



protein to sustain long periods of flight without refueling or drinking. Breakdown of fat releases more energy per unit mass than carbohydrates or proteins but protein and carbohydrate catabolism releases more water. Using a wind tunnel at the [Advanced Facility for Avian Research \(AFAR\)](#) at the University of Western Ontario in London, Ontario, Dr. Guglielmo revealed how birds utilize fat stores and the protein in muscles and organs to sustain themselves during migration. The hypobaric bird wind tunnel at AFAR is used to artificially migrate birds under environmental conditions they might experience in the wild; they can lower atmospheric pressure and temperature to mimic flight at altitude, raise and lower the relative humidity and alter wind speed. Then using Quantitative Magnetic Resonance they can measure body percentage of lean, fat and water in 2 minutes without anesthesia. They discovered was that birds didn't dehydrate or alter their fat breakdown under low humidity, but they did increase their breakdown of protein using their lean body mass to provide water during prolonged periods of flight.

To read more about Dr. Guglielmo's work, visit his [web page](#).



FACULTY NEWS: Awards, Invited Talks, Presentations, Service and Outreach, Post-doctoral Fellows

U of M Centennial Research Recognition

On February 28, 2012 the University of Memphis honored 62 professors who were recognized for their research projects which each brought in more than \$1 million in grant funds since 1996. Among them were **Drs. Michael Ferkin, T. Kent Gartner** (profiled on page 3), **Ramin Homayouni, Stephan Schoech**, and **Thomas Sutter** from the Department of Biological Sciences. The 62 honorees represented disciplines across campus, including the arts and humanities, business, public health, engineering, education, physics, chemistry, bioengineering and biological sciences sciences. Altogether, they have brought more than \$250 million in grant funding to the University since 1996.

Invited Talks

Dr. Omar Skalli gave an talk entitled *Regulation of the PP2A/Akt Axis by Intermediate Filament Protein Synemin* to the Department of Pharmacology at the University of Tennessee Health Science Center, Memphis TN on February 15, 2012.

Dr. Thomas Sutter gave several seminars in late 2011 and early 2012 including *Integrated Omic and Chemical Biology Approaches towards Understanding the Etiology, Treatment and Prevention of Cancer*, at Fox Chase Cancer Center and at the Wistar Institute in Philadelphia, PA, January 2012, *CYP1B1 Inhibitors to Target ER-Negative Breast Cancer* at the FedEx Institute of Technology at the University of Memphis in January 2012, and *Integrated Omic Approaches Identify the Mechanism by which Dioxin Accelerates Keratinocyte*

Differentiation at The University of Cincinnati School of Medicine's Department of Environmental Health Sciences, February 2012.

Faculty presentations

Small, TW, Bridge ES, and **Schoech SJ**. *Physiological stress responsiveness is transferable from parent to offspring in free-living Florida Scrub-Jays*. Annual meeting of the Society for Integrative and Comparative Biology, Charleston, South Carolina, January 2012.

Godapudi G and **Chung TK**. *Evidence for genotoxicity of 3-hydroxyanthranilic acid but not anthranilic acid in the presence of metal cofactor Cu(II) in vitro*. 42th Environmental Mutagen Society Annual Meeting, Montréal, Quebec Canada, Oct. 15-19, 2011. 40th

Weng Z, Wang Y, Zhang L, Kemin W, Sun Y, Chen G-Q, Chai W, Luo X, **Gartner TK** and Liu J, *PTEN Is a Key Regulator of Collagen-Induced Platelet Activation and Is Involved in α IIb β 3-Mediated Outside-in Signaling*. 53rd Annual Meeting of the American Society of Hematology, December 2011.

Wang Y, Sun Y, Li L, Zhang K, Wang W, Chai L, **Gartner TK** and Liu J. *P2Y12 is involved in cancer metastasis*. Annual Meeting of the American Society of Hematology, December 2011.

Tran QT, Kennedy LH, Leon Carrion S, Bodreddigari S, Goodwin SB, **Sutter CH** and **Sutter TR**. *EGFR regulation of epidermal barrier formation*. Annual Meeting of the American Society for Cell Biology, Denver, CO. December 2011





Commander Lawrence Kennedy, USN, Ph.D. (left) presented work from the Sutter lab at the Annual Meeting of the Society of Toxicology. Picture by C. Sutter

Kennedy, LH, Tran QT, Leon-Carrion S, Bodreddigari S, Kensicki E, Mohny R, **Sutter CH** and **Sutter TR**. *TCDD enhances lipid metabolism,*

corneocyte expression and reactive species, accelerating keratinocyte differentiation: An integrated genomic/metabolomics approach. 51st Annual Meeting of the Society of Toxicology, San Francisco, CA March 2012.

Smith RA, Shackelford H, Pestina T, Persons DA and **Gartner TK**. *Bone loss and structural changes in a sickle cell disease mouse model.* Annual Meeting of the Orthopaedic Research Society in San Francisco, CA February 2012.

Service and Outreach

Dr. Thomas Sutter served on the NIH XNDA Study Section, Xenobiotic and Nutrient Disposition and Action Study Section in Bethesda, MD, February 7-8, 2012 and was appointed to the Scientific Advisory Board of the Memphis Research

to the Scientific Advisory Board of the Memphis Research Consortium, Fall 2011.

Dr. Stephan Schoech judged and graded student Career Vision Poster presentations for ACAD 1100 and served as a judge for student poster and oral presentations at the Annual Meeting of the Society for Integrative and Comparative Biology in January 2012.

Post-doctoral fellows

Dr. Clarisse Muenyi (pictured right) joined the Department as a post-doctoral fellow in the laboratory of **Dr. Thomas Sutter**, Director of the W. Harry Feinstone Center for Genomic Research. Dr. Muenyi received her Ph.D. from the Department of Pharmacology and Toxicology at the University of Louisville in 2011. Her doctoral work focused on ways to make the cancer chemotherapeutic agent cisplatin more toxic to ovarian cancer. Dr. Muenyi came to the University of Memphis to work with Dr. Sutter on the effects of dioxin and other environmental toxins on skin development and skin diseases.



GRADUATE STUDENT NEWS: Degrees and Defenses, Fellowships, Awards, Presentations, and the Biology Graduate Student Association

Degrees and Defenses

Robert Autry completed the requirements for a Master's degree in Biology in March 2012 and will receive his degree in May 2012. Mr. Autry did his graduate work under the direction of Dr. Melvin Beck



Pictured left to right; Dr. Lilian Nyindodo-Ogari and Dr. Vamsi Vejerla.

On March 23, 2012, **Lilian Nyindodo-Ogari** defended her dissertation entitled *Characterization of protein import into endosymbiotic organelles*. Dr. Nyindodo-Ogari, who also has a Master's in Public Health in Epidemiology from the University of Memphis, performed her dissertation work in the laboratory of Drs. Carlos Estrano and Steven Schwartzbach.

Vamsi Vejerla defended his dissertation entitled *Studying the Functional Role of Protein Presequence Domains in Euglena* on March 27, 2012. Dr. Vejerla performed his dissertation work in the laboratory of Dr. Steven Schwartzbach.

Nicholas Hobbs defended his dissertation entitled *Condition-dependent Effects on Proceptive Behaviors in Meadow Voles* on March 29, 2012. Dr. Hobbs performed his dissertation work in the laboratory of Dr. Michael Ferkin. He will be heading to Michigan State University to do post-doctoral work with Dr. Marc Breedlove.

On April 2, 2012 **Hannah Shackelford** defended her Master's thesis entitled *Characterization of Bone and Brain Abnormalities Associated with Berkeley Sickle Cell Mice*. Ms.



Pictured left to right: Dr. Nicholas Hobbs and Ms. Hannah Shackelford

Shackelford performed her thesis work with Dr. T. Kent Gartner and will be attending Mississippi State University College of Veterinary Medicine in June 2012.

Fellowships

Blake Jones, a Ph.D. student in Dr. Stephan Schoech's lab, received a fellowship from the National Science Foundation (NSF) Graduate Research Fellowship Program (GRFP) for his proposal entitled *Learning predator avoidance: a hormonal mechanism*. The NSF GRF program "recognizes and supports outstanding graduate students who are pursuing research-based master's and doctoral degrees in fields within NSF's mission. The GRFP provides three years of support for the graduate education of individuals who have



Blake Jones (picture by Sara Bebus)

demonstrated their potential for significant achievements in science and engineering research."

Morton Thesis Award

Emily Elderbrock received a Morton Thesis Award which honor outstanding master's and doctoral students whose thesis or dissertation prospectus has been approved by their committee. These awards are a result of a generous donation by S. Morgan Morton ('63). Emily is a Master's student in the lab of Dr. Stephan Schoech.



Emily Elderbrock

Student Research Forum

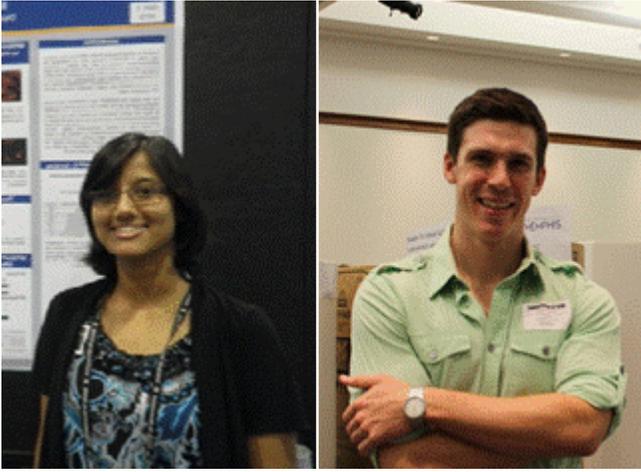
Hosted by the Graduate School, University Honors Program, and the Graduate Student Association, The University of Memphis Student Research Forum is an annual event which showcases the diverse research of undergraduate and graduate students. The purpose is to provide a venue for students matriculating at the University of Memphis to present their research to a panel of faculty judges in their respective



Poster presenters ; Top row (left to right): Gayathri Kaushik with Nimesh Kathale and Christina Campion with Dr. Anna Bess Sorin, middle row: L yndsay Saunders and Melissa Koontz. Bottom row: Madhumita Paul and Sandra Leon-Carrion.

disciplines. This forum enables students to develop their presentation skills and present their research in a formal, supportive environment. A number of the graduate students participated by presenting posters of their work (pictured above).

Two of our graduates students **Sarani Ghosal** and **Shane Hanlon** won 1st place in their respective divisions. Sarani is a Ph.D. candidate in Dr. Ramin Homayouni's lab and won 1st Place in the Life and Health Sciences category for her poster *Systems genetics analysis reveals NIPSNAP1, a novel mitochondrial protein, plays a role in pyruvate metabolism*. She also received a Memphis Mensa Award for her work. Shane is a Ph.D. candidate in Dr. Matthew Parris' lab and won 1st place in the Physical and Applied Sciences category for his poster *An Unforeseen Turn: Harmful effects of a pesticide and pathogen on amphibian health*



Pictured: Sarani Ghosal (left) and Shane Hanlon (right) winners at the 2012 Student Research Forum.

Outreach and Service

Dr. Tom Small, Rebecca Heiss, and **Blake Jones** (all working with Dr. Stephan Schoech) were judges at the Heartland Florida Regional Science Fair in February, 2012.

Shane Hanlon, a Ph.D. candidate in Dr. Matthew Paris' lab participated in career day at Raleigh Egypt Middle school on March 20, 2012 and is the Reviewer-In-Chief for the BioGSA service of paper and prospectus reviews for graduate students.

Student Presentations

Lyndsay Saunders a Ph.D. candidate in Dr. Pezeshki's lab presented *Mortality in Two Ditch Species Exposed to Root-Zone Glyphosate* at the Society of Wetland Scientists South Central Chapter Fall Meeting in Lafayette, LA October 2011.

Sanjoy Khan (pictured below), a Ph.D. candidate in Dr. Andrew Liu's lab, presented a talk entitled *Differential functions of mammalian cryptochrome 1 and 2 in clock function: genetic and biochemical dissection* at the 13th International EMBL PhD symposium, held at Heidelberg, Germany November 2011. Sanjoy received Travel Enrichment funds from College of Arts and Sciences, a Travel Grant from European Molecular Biology Laboratory (EMBL) and a Travel Grant from Student Government Association of the University of Memphis to attend this meeting.



Sara Bebus, a Ph.D. candidate in Dr. Stephan Schoech's lab presented *Corticosterone responsiveness at nutritional independence predicts behavior nine months later in the Florida*

Scrub-Jay (Aphelocoma coerulescens) at the Annual Meeting of the Society for Integrative and Comparative Biology, Charleston, South Carolina, January 2012.

Emily Elderbrock, a Master's candidate in Dr. Stephan Schoech's lab presented *Plasma corticosterone and feather quality in the threatened Florida Scrub-Jay* at the Annual Meeting of the Society for Integrative and Comparative Biology, Charleston, SC, January 2012.

Rebecca Heiss, a Ph.D. candidate in Dr. Stephan Schoech's lab presented *Experimental supplementation with antioxidants reduces reproduction-associated oxidative damage in breeding male Florida Scrub-Jays* at the Annual Meeting of the Society for Integrative and Comparative Biology, Charleston, South Carolina, January 2012.

Nicholas Hobbs presented *The response of male meadow voles to over-marks depends on the reproductive state of the female scent donors* at the Annual Meeting of the Society for Integrative and Comparative Biology in Charleston, SC, January 2012.

Biology Graduate Student Association News

Student Association (BioGSA) had a busy inaugural year. The BioGSA has held fall and spring semester kickoff mixers, participated in intramural sports, gathered for Tiger football tailgating events, and formed a Manuscript Peer Review Board. The BioGSA held their first fundraising event, a silent auction featuring photography by graduate students and other department members. The BioGSA silent auction was held in conjunction with the annual Student Research Forum (SRF). Dr. Karen Weddle-West, Vice Provost of Graduate Studies, was enthusiastic about the BioGSA's participation with the university-wide SRF, and it is hoped that this event



Forrest Brem examines photographs available at the BioSGA silent auction held in conjunction with the Student Research Forum on April 2, 2012.

will mark the beginning of an annual partnership between the SRF and the BioGSA. To round out the year, the BioGSA will hold a final general meeting, conduct elections for the 2012 - 2013 Executive Board, and gather for a year-end social event. For more information or suggestions, please email us biogsa@memphis.edu.



UNDERGRADUATE ALUMNI NEWS: Where are they now?

Fields Falcone is working at the Memphis Zoo. Fields Falcone was a bird watcher as a child and was fascinated by their behavior. At the University of Memphis, Fields earned a BS in Biology, then went on to earn a Master's from Western Carolina University (WCU), where she studied food availability for insectivorous birds in threatened forest habitats. Fields is especially interested in foraging and nesting ecology of birds, and invasive species ecology in forest ecosystems.



Pictured clockwise from top left: Fields Falcone with LeLe at the Memphis Zoo. LeLe, the male Giant panda at the Memphis Zoo enjoying some bamboo. Bamboo that the pandas won't eat is analyzed for differences in chemical composition. Bamboo and assorted panda treats are prepared in the Panda Kitchen.

Working with the U.S. Forest Service (USFS), the U.S. Geological Survey, PRBO Conservation Science, and Western Carolina University, her previous work has helped produce an invasive plant species database, assess songbird use of restored habitat, and examine the influence of insecticide use on forest songbird and arthropod communities.

Fields was working on a contract with the USFS when she saw an ad for a position for a research associate on a nutritional and foraging ecology study at the Memphis Zoo. While the research project was not involved in studying birds, it was a study examining the influence of bamboo nutrient composition on the foraging habits of the giant panda. Giant panda nutrition is particularly interesting as they are a carnivorous species eating a diet that is almost exclusively bamboo. Fields applied for and got the position as Research Associate/Technician and is now running the panda nutrition project. This project includes measuring the amount of time the pandas spend eating each day and analyzing the macronutrient of the bamboo they eat.

Sometimes pandas won't eat the bamboo offered to them while at other times they switch from eating leaves to eating stems. Analyzing the nutritional components of the bamboo over time should provide insights into the nutritional reasons for the shift in foraging and if they selecting for something they need or something they want to avoid.

In addition to managing the panda nutrition project, Fields monitors the reproductive status of some of the large mammals in the Zoo collection including the pandas, elephants, and large cats, takes care of the amphibian colony, oversees the work of Zoo interns and volunteers, and acts as the lab coordinator for researchers and other members of Conservation and Research Department at the Zoo. She's traveled to China as part of the Zoo's panda team and to the Mariana Islands as part of the Mariana Avifauna Conservation program. Pretty good use of a BS in Biology from the University of Memphis. To learn more about Fields and the conservation efforts at the Zoo visit

www.memphiszoo.org/meettheteam

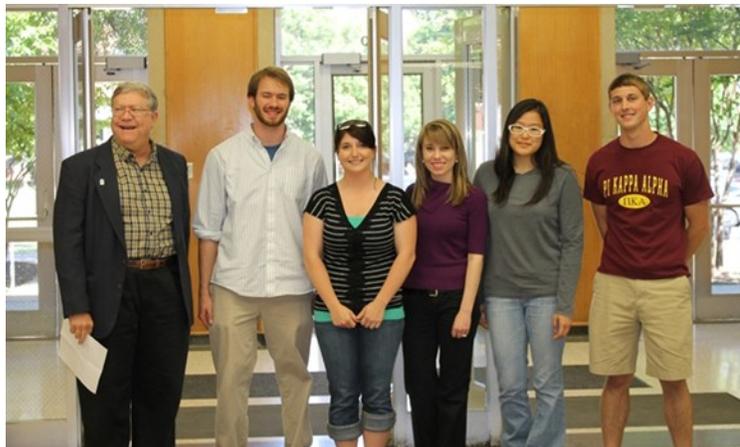


UNDERGRADUATE NEWS: Scholarships and Research

Winners of the Biology Faculty Award and the Department Scholarships for 2012-2013

The **Biology Faculty Award** is presented to the student who has made the most significant contribution to the department during the past academic year. Nominations are solicited from Biology faculty and the recipient is selected by the Biological Sciences Undergraduate Studies Committee.

Eunbit Grace Cho



Pictured left to right: Dr. Randall Bayer, Chair of Biological Sciences, David Skinner, Kathryn Jones, Elena Gheorghiu-Polk, Eunbit Grace Cho, and Murphy Wilson

The **Chi Beta Psi Award in Biological Sciences** is presented to the Biology Major with the highest GPA.

Elena Gheorghiu-Polk

The **Edward T. Browne Biology Scholarship** is given to a Sophomore, Junior or Senior majoring in Biology who has a GPA of at least 3.25 or the demonstrated potential for academic distinction in Biology.

Murphy Scott Wilson

The **Dr. Virginia M. Norton and Dan Norton Scholarship** is given to a Junior or Senior majoring in Biology with an expressed interest in a career in Health Sciences

David William Skinner

The **Priscilla Rushton Scholarship** goes to a Sophomore, Junior or Senior with a GPA of 3.25 or the demonstrated potential for academic distinction in Biology as well as leadership ability and the strong potential for professional success

Kathryn Diane Jones

The **Omar E. Smith Ecology Scholarship** is presented to a student majoring in Biology with preference given to students in Ecology. The student selected will develop an eco-

logical research project conducted under the guidance of a faculty member in the Department of Biological Sciences.

Jean Marie Phillips

For more information on the undergraduate scholarship available in the Department, visit

www.memphis.edu/biology/UnderGrad/scholar.php

Undergraduate Research

Faculty encourage students to pursue research as part of their undergraduate education. The department has two undergraduate courses that allow students to become involved in biologically related research with a faculty mentor. BIOL 4000 is a consultation, reading, and laboratory and/or field work in a selected area of biology under supervision of faculty member. BIOL 4001 is a continuation of the work begun in BIOL 4000 and consists of laboratory and/or field work; a formal paper and presentation of research results at a professional meeting or departmental seminar is required.



Pictured (left to right) Eric Bell, Leah Essary, Shannon Sanders, and Kathryn Jones who all work on Zebrafish research projects with Dr. Charles Lessman. Picture by Charles Lessman

BIOLOGISTS@LARGE: *What's going on off campus?*

What's that old saying? A bird in the hand is worth two in a bush? Seems like that was the order of the day for students in Dr. Schoech's ornithology class who found these avian beauties in Dr. Schoech's backyard. Ashley Atkins (*left*) is holding a red-bellied woodpecker and Eron Raines (*right*) has a northern cardinal.



photo by Jared Henson

The *Springfield Orchid Society* hosted their annual orchid show in March 2012. **Dr. Randall Bayer**, Professor and Chair of the Department of Biological Sciences received trophies for the Best *Dendrobium* (*Dendrobium nobile* 'Lisa' CCM/AOS), the Best Specimen Grown Orchid, and the Best Species Orchid in the show.



orchid picture courtesy of the Memphis Orchid Society

SELECTED PUBLICATIONS

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Godapudi, G. and **K.-T. Chung**. Comparative genotoxicity of 3-hydroxyanthranilic acid and anthranilic acid in the presence of metal cofactor Cu(II) in vitro. *Mutation Res* 726:200-208, 2011.

Hanlon SM and **Parris MJ**. The impact of pesticides on the pathogen *Batrachochytrium dendrobatidis* independent of potential hosts, Recent Publications Diseases and Toxicology in *FrogLog* 101:62, 2012.

Luciano M, Swanstrom AE, Chung K, Simon T, Haydon PG, **Khan SK**, **Liu AC**, Herzog ED and Beaulé C. Circadian regulation of ATP release in astrocytes. *J.Neurosci* 31:8342-8350, 2011.

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S J and **Schoech S J**. 2012. "Commentary - A known unknown: elaboration of the 'observer effect' on nest success. *Ibis* 154:1-4.

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Wu, Y. -I., C. -H. Chen, Wen-Huei Chang, **K.-T. Chung**, F. -J. Lu, Y. -W. Liu and C. -H. Chen. Anti-cancer effects of the protein extractions from *Calvatia lilacina*, *Pleurotus ostreatus* and *Volvaria volvaceae*. Evidence Based on Complementary and Alternative Medicine, Vol.2011 (article ID 982368):1-10, 2011.

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In the Next Issue

IN FOCUS: TIGUrS

The *Tiger Initiative for Gardens in Urban Settings* is the brain child of Dr. Karyl Buddington, Director of the Animal Care Facilities



FACULTY FOCUS:

Dr. S. Reza Pezeshki is assessing the impact of herbicides on native plants and using wetlands for nutrient reduction in the Mississippi basin



Information links for this issue

The Bioinformatics Program

www.memphis.edu/binf/

Information for the Newsletter

bionews@memphis.edu

The Department of Biological Sciences Webpage

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