

# 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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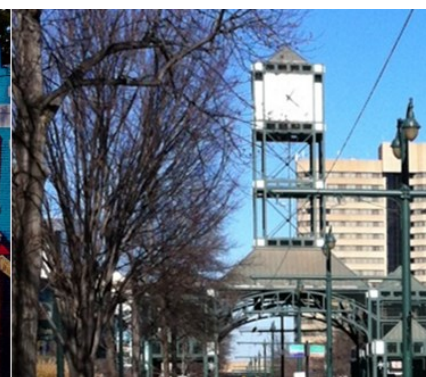
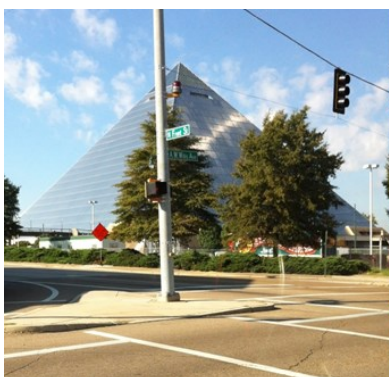


ship experiences, Biology Practicum defenses, and S.T.E.M. experiences in the department.

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## From the Communications Committee

We hope you enjoy the Fall issue of [Biology@Memphis](mailto:Biology@Memphis), the Department of Biological Sciences Newsletter. The cicada wing and the colored leaf tell us that summer's over, fall is here, and cold weather is not far behind. In fact, the first storm of the season canceled the two days of final exams. In this issue of the newsletter, we feature the departmental happenings from May to November and talk with Dr. Michael Ferkin about vole behavior. We find out what the faculty have been up to, where our graduate students have been going and what they've been doing. We catch up with the Department staff and graduate student who informed the public about the value of an anti-bacterial wipe and get reports from our undergraduates on what they did in their internships and off campus courses. Finally, we give you a taste of the recent publications by our faculty and students. All this and more in this edition of [Biology@Memphis](mailto:Biology@Memphis). If you have something you'd like us to share in the newsletter, email us at [bionews@memphis.edu](mailto:bionews@memphis.edu). You can also check out our [Facebook](#) page for who is presenting the departmental and graduate student seminars each week.



## FACULTY FOCUS: Modeling human behavior with meadow voles

### *Why voles? Why not?*

Throughout his professional career, Dr. Michael Ferkin has been interested in how animals behave. In his time at the University of Memphis, his research has focused on how animals communicate with one another and how their communication governs their social and sexual interactions. His animal model since 1977 has been the meadow vole, *Microtus pennsylvanicus*. Meadow voles, sometimes called meadow mice, are commonly found in grasslands from Labrador to New Brunswick, Wisconsin to Nebraska and Missouri, and South Carolina to northern most Georgia. They eat most species of grasses and are more than willing to dine on root and stem crops, making them agricultural pests. But none of those characteristics make them interesting to Dr. Ferkin. When asked why he was interested in voles, Dr. Ferkin replied "Why not? Seriously, they have interesting and distinct behaviors depending on sex (male *versus* female) and the time of the year and they have fascinating population dynamics that include huge increases in population density followed by dramatic crashes. 'We believe that social and behavioral interactions are important in governing vole demography (the size, structure and distribution of vole populations)'."

Dr. Ferkin's research focuses on the intricacies of vole social interactions, particularly as they regulate reproductive behavior. Key to these studies is examining the relationship between odor cues, scent marks, and over-marks (overlapping scent marks of two conspecifics). Voles are seasonal breeders and male voles have large home ranges with many females within each male's range. In contrast, females are solitary in the spring and summer, until after breeding when they live and raise their first litters together. Males are not a part of these groups and most do not survive the winter. Those male voles that do begin looking for females in the spring and utilize scent marks and over-marks to assess potential mates and identify competing males ([Ferkin and Pierce 2007](#)). Several studies have shown that food availability affects scent marking and reproductive behavior ([Pierce et al. 2005](#); [Hobbs and Ferkin 2011](#), [Sabau and Ferkin 2013](#)) and that when faced with reproductive competition, male voles can increase their sperm investment by ~80% when compared to males not exposed to scent marks or over-marks ([delbarco-Trillo and Ferkin, 2004](#)). Recently, Dr. Ferkin's work has taken some new directions. In the first, he is looking at the cognitive processes of familiarity, memories, and judgments relative to numerosness. He has



discovered that voles have episodic memory, i.e. memory for recalling the interactions with others including the *what* (male or female), the *when* (how long ago) and the *where of a previous event*. He has also discovered that voles have “proto-math skills” that may allow them to count, but certainly that allow them to discriminate between “more” and “less” with respect to food and the scents of other individuals. In fact, a male vole can use its math skills to find out how many other males are around available females so he can adjust his sperm allocation to match the reproductive fitness of his competitors and thus enhance his chances of reproducing. In collaboration with Dr. Stan Franklin and [the Institute of Intelligent Systems](#) at the [FedEx Institute of Technology](#) at the University of Memphis, Dr. Ferkin is now developing cognitive models of vole behavior (“virtual voles”) that behave in ways that will allow him to make predictions for behavior in real voles. His second new study, in collaboration of Dr. Aras Petrulis of Georgia State University, is examining the role of the immediate early gene c-fos in modulating neural activity (a neuro-reproductive loop) in male voles exposed to scent marks of competing males that are a risk to their reproductive success. Lastly, his newest graduate student, Lyndsey Pierson, is examining the role of dietary phytoestrogens (estrogen-like compounds found in plants) on reproductive activity and memory. His other student, Ramona Sabau, a doctoral candidate, studies how maternal diet and condition induce epigenetic effects on the behavior and physiology of their offspring.

Dr. Ferkin says on his webpage that “my research has provided me with much joy and a share of success. I am still excited about ‘doing science’ and ‘getting people excited about science.’ I am especially pleased with the opportunity to enhance the education and training of postdoctoral students, graduate students, and undergraduate students who have worked on interdisciplinary projects that taught them the importance of integrating diverse areas of study and thought. “



Meadow voles. Pictures courtesy of L. Pierson

## CENTER NEWS: The Integrated Microscopy Center opens the Materials Science Laboratory

On May 29, 2013, [the Integrated Microscopy Center](#) opened the [Materials Science Laboratory](#), under the direction of Dr. Omar Skalli. The Materials Science Lab is the first of its kind in west Tennessee and includes a class 1000 clean room, an AJA Orion deposition unit/sputtering system/thermal evaporator, a mask aligner/exposure system (Tamarack 152), wire bonder, spin coater, X-ray photoelectron spectrometer (XPS). The staff and equipment present in this facility will enable research and training for students, postdoctoral fellows, and researchers in micro-fabrication and surface characterization, and significantly enhances the University's capabilities and competitiveness in the targeted growth area of interdisciplinary materials science. Dr. Felio Perez, a Physics and Materials Science PhD, is responsible for the operation of the Materials Science Laboratory and he can be contacted at [fperez@memphis.edu](mailto:fperez@memphis.edu)



Dr. Omar Skalli



Dr. Felio Perez

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## FACULTY NEWS: Grants, Presentations and Travel, Awards, Outreach and Service.

### Grants

**Dr. Omar Skalli**, in collaboration with Drs. Joel Bumgardner and Erno Linder (Bioengineering) and Dr. Sanjay Mishra (Physics) received a National Science Foundation Major Research Instrumentation grant for the acquisition of a field-emission scanning electron microscope (FESEM).

**Dr. Ramin Homayouni** was awarded a 4-month pilot grant from the Bill & Melinda Gates Foundation (BMGF) to develop a System Dynamics model of growth in children. Dr. Homayouni's group will work directly with researchers at BMGF to test if this modeling technique is useful for understanding metabolic and environmental factors that contribute to growth stunting and neurocognitive delays in children across the globe. Working with a team of investigators headed by Dr. Kenneth Ward in the School of Public Health, Dr. Homayouni was also awarded a grant from the Tennessee Blue Cross Blue Shield Foundation of Tennessee to develop a web-tool called [FitKids](#) to assess the risk of obesity in children and to provide parents with personalized intervention strategies and community resources to promote healthier living.

### Presentations and Travels

On May 24, 2013, **Dr. Thomas Sutter** was a presenter at the Memphis Research Consortium Board Meeting for Program Review and spoke on *Stem Cell and Next Generation Sequencing Research* at the University of Memphis Fed-Ex Institute in Memphis, TN. In July, he travelled to Seoul, South Korea where he was an Invited Speaker at the International Congress of

Toxicology (ICT2013) and presented *Integrated Omic Approaches Identify the Mechanism by which Dioxin Accelerate Keratinocyte Differentiation* and chaired the Session on Applications of Systems Biology for Cancer Biomarkers. On July 4, he presented a talk at the College of Pharmacy, Chun-Ang University in Seoul South Korea entitled *Integrated Omic Approaches Identify the Mechanism by which Dioxin Accelerates Keratinocyte Differentiation* and he was also an Invited Speaker at the Dong-A Pharmaceutical Research Center, where he presented *Integrated Omic and Chemical Biology Approaches towards Understanding the Etiology, Treatment and Prevention of Cancer* on July 5.

In June 2013, **Dr. Duane McKenna** attended the 50th anniversary meeting of the Association for Tropical Biology and Conservation in San Jose Costa Rica where he gave an invited talk entitled *Patterns of cryptic speciation, host taxon specialization specialization and endemism in neotropical 'hispine' beetles (tribes Cephaloleiini and Arescini)*. Dr. McKenna traveled to Jena and Dresden, Germany in late September for a meeting of the *1000 Insect Transcriptome Evolution (1KITE) Project*, gave an invited talk at the Dresden (Germany) Insect Phylogenetics Meeting entitled *Genes and Genomes Reveal New Insights into the Evolution of Weevil (Coleoptera: Curculionidae) Megadiversity* and met with the organizers of the [Leibniz Graduate School in Genomic Biodiversity](#) in which he is a participant. The McKenna lab prepared and manned a booth on Insect Genomics at the FedEx Research and Innovation Expo (October 4). A noteworthy benchmark has now been met with the Asian Longhorned Beetle Genome Project (a collaboration



between Dr. McKenna and the Insect 5000 Genomes Project; i5k). Genome sequencing and assembly were completed early this year, automatic annotation has now been completed, and manual annotation will begin shortly. Dr. McKenna also traveled to eastern Idaho in early November to collect beetles for another of the genome projects he is working on as part of an international collaboration on insect genomic biodiversity.

**Dr. Thom-King Chung** gave an Invited Talk entitled is "Etiology of Bladder Cancer and Its Dietary Remedy." at the 3rd World Congress on Cancer Science & Therapy on October 22, 2013, San Francisco, California.

## Awards

### Service Awards

A number of Biology faculty were recognized for their service to the University of Memphis. **10 years:** Drs. Judy Cole, Carlos Estrano and Anna Bess Sorin. **25**

**years:** Drs. King-Thom Chung and Charles Lessman. **30 years:** Dr. Barbara Taller

**Dr. Anna Bess Sorin** won *The 2013 Dean's Office Award for Advising Excellence*. This award was established in 1994 to recognize a faculty member who has achieved distinction as an effective, caring mentor for students progressing through one of our programs. When students file to graduate, they are asked to complete an evaluation of the advising they have received during their academic career, and to nominate their advisor for this award, if they so wish. Dr. Sorin received the highest of praise from advisees who were unanimous in commenting on her helpfulness and knowledge.



## GRADUATE STUDENT NEWS: Degrees and Defenses, Grants, Fellowships, Awards, and Presentations

### Defenses and Degrees

On February 28, 2013 **Sarani Ghosal** successfully defended her doctoral dissertation entitled *Functional Characterization of a Novel Mitochondrial Protein NIP-SNAP1*. Dr. Ghosal performed her dissertation research in the laboratory of **Dr. Ramin Homayouni**.



Pictured (left to right): Dr. Sarani Ghosal, Ms. Gayathri Kaushik and Dr. Shane Hanlon

**Gayathri Kaushik** successfully defended her Master's thesis on June 25, 2013. The work for her thesis entitled *Ovarian dynamics in zebrafish (Danio rerio): A study of growth, vascularization, and estrogenic effects in follicle-enclosed oocytes in vivo* was performed with **Dr. Charles Lessman**.

On October 23, 2013, **Shane Hanlon** successfully de

fended his Ph.D. dissertation entitled *Varying effects of agricultural pesticides on host-pathogen interactions and aquatic ecosystems in an amphibian system*. Dr. Hanlon did his doctoral research in the laboratory of **Dr. Matthew Parris**.

### Grants and Awards

**Jerad Henson** received a grant from the Arkansas Audubon Society Trust to examine the effects of hunting on the stress physiology of Blue-winged Teal (*Anas discors*) during fall migration. Jerad is a Ph.D. candidate in the lab of Dr. Stephan Schoech.

**Blake Jones** was on a roll, receiving the American Ornithologists' Union Research Award, The Florida Ornithological Society Helen G. and Allan D. Cruickshank Research Award and the Student Presentation Award at the 131<sup>st</sup> Meeting of the American Ornithologists' Union, Chicago, Illinois. [See page 3 of the June 2013 AFO newsletter](#) that describes Blake's presentation where ...no one in attendance will forget the umbrella-wielding ninja who discovered that the initial stress response of Florida Scrub-Jays to a novel "predator" correlates with subsequent escape behavior from that stimulus. Blake is a Ph.D. candidate in the lab of Dr. Stephan Schoech.



## GRADUATE STUDENT NEWS: *Degrees and Defenses, Grants, Fellowships, Awards, and Presentations*



Pictured (clockwise from top left): Jerad Henson, Blake Jones, Dr. Shane Hanlon and Stephen Ferguson. Pictures of Jerad, Blake and Stephen courtesy of S Bebus.

**Dr. Shane Hanlon** received an American Society of Ichthyologists and Herpetologists Gaige Grant, a Society of Environmental Contamination and Toxicology Student Training Exchange Opportunity, and a U.S. Fish and Wildlife Services Small Projects Grant for his work on pesticide and herbicide effects on amphibian populations. Dr. Hanlon completed his dissertation work in the lab of Dr. Matthew Parris this fall.

**Stephen Ferguson** received a CAS Travel Enrichment Award in November to support his research program in Florida in the Spring 2014.

### Presentations

On July 1, 2013, **Shane Hanlon** presented [Focus on Frogs: The Amphibians-Human Connection](#) at the

Memphis Botanic Garden as part of the Wolf River Conservancy Summer Lecture series "A Naturalist's Guide to the Mid-South".



**Jones BC**, Bebus S, Bateman PW, Schoech SJ. They remember: Long-term memory and the link between stress physiology and anti-predator behavior in free-living Florida scrub-jays (*Aphelocoma coerulescens*). Joint meeting of the American Ornithologists' Union and Cooper Ornithological Society, Chicago, Illinois, August 2013, oral presentation.

**Bebus SE**, Small TW, Schoech SJ. 2013. Developmental corticosterone levels are correlated with learning and exploratory behavior in Florida scrub-jays (*Aphelocoma coerulescens*). Poster presentation at the American Ornithologists' Union Annual Meeting, Chicago, IL.

**Hanlon SM**, Kerby JL, and **Parris MJ**. Fungicide alters community and disease dynamics in an aquatic ecosystem. Society of Wetland Scientists Southwest Chapter, Starkville MS USA, 2013.

**Hanlon SM** and **Parris MJ**. Previous exposure of predatory fish to a pesticide alters palatability of larval amphibian prey. Society of Environmental Toxicology and Chemistry, Nashville TN USA, 2013.

**Hanlon SM**, Kerby JL, and **Parris MJ**. Beneficial contaminants? Pesticides reduce amphibian pathogen abundance and ameliorate negative pathogen effects on hosts. Ecological Society of America, Minneapolis MN USA, 2013.

## Presentations

**Hanlon SM**, Kerby JL, and **Parris MJ**. The mitigation of agricultural pesticides by an amphibian pathogen in aquatic communities. Wildlife Disease Association Annual International Conference, Knoxville TN USA, 2013.

**Aitken A** and **McKenna D**. "Phylgenomic data help resolve the phylogeny of Curculionoidea and yield insights into the evolution of weevil megadiversity". 50th

anniversary meeting of the Association for Tropical Biology and Conservation in San Jose Costa Rica


**Haddad S** and **McKenna D** Molecular phylogenetics, genomics, and evolution of the subfamily Lamiinae (flat-faced longhorned beetles). 50th anniversary meeting of the Association for Tropical Biology and Conservation in San Jose Costa Rica



Graduate students battle for the last student seminar date of the academic year. (photo courtesy of L Saunders.)

## UNDERGRADUATE NEWS: Internships, classes, S.T.E.M. and practicums

**Biology Internships and Off-campus Courses:** Several of our undergraduate majors had Biology internships or courses that took them off the UofM campus. What follows is what they did and where they went.




**Characterization of proteins and oxidative stress markers in the plasma of brevetoxin exposed Florida manatees**

Matthew B. A. Butawan<sup>1</sup>, Catherine J. Walsh<sup>2</sup>, Jennifer Yordy<sup>2</sup>, Courtney Bennett<sup>2</sup>

<sup>1</sup>The University of Memphis, Memphis, TN, USA

<sup>2</sup>Marine Immunology Program, Mote Marine Laboratory, Sarasota, FL, USA



**Matthew Butawan** took part in an *NSF Research Experience for Undergraduates* with Dr Cathy Walsh in the Marine Immunology Program at Mote Marine Labs in Sarasota, FL. Matt found this internship by "googling 'shark internships'." Matt conducted lab work and presented a poster based on the experiments he performed (see the title above). Matt also participated in other ongoing research in the Marine Immunology and Marine Biomedical Programs. Matt said "It was a lot of fun and a great experience!"

**Christopher Ford** attended the Gulf Coast Research Lab's Herpetology class during the Maymester in Ocean Springs MS. The course lasted approximately 2 weeks.

Christopher described his experience as "the best class that I had taken since I began my pursuit of a biology degree. We nearly went to the field every day, and minimized classroom time. I personally got to handle a lot of wildlife and gained a wealth of knowledge from experience rather than just book memorization. There was a lot I had to learn in my two weeks there, but the GCRL did their best to put you in dorms with roommates that are taking the same class. This made the studying process much easier. Although the drive to Ocean Springs was long, I recommend taking the Maymester Herpetology class to anyone".

On December 4<sup>th</sup>, 2013 **Caroline Havrilla**, a Biology major and Green Intern, presented *Sassafras albidum: Friend or Foe? Disentangling Sassafras Controversy* in partial fulfillment of her BIOL 4570 Practicum. Caroline carried out her practicum at The C.H. Nash Museum at Chucalissa with the supervision of museum director Dr. Robert Connolly. **Dr. Randy Bayer** was the faculty sponsor on Caroline's practicum committee.



## UNDERGRADUATE NEWS: Internships, classes, S.T.E.M. and practicums

### Science Technology Engineering Mathematics (STEM) NEWS



**The W. Harry Feinstone Center for Genomic Research** hosted Isabel Risch from Hutchison School in Memphis and David Jones who is doing post-graduate work in Dr. Duane McKenna's lab) for a learning session on DNA sequencing using the MiSeq System present in the Center. MiSeq is a desktop DNA sequencer used to sequence an organism's genome (the entirety of an organism's genetic information). Both learned about preparing genomic DNA for mate-pair and paired end sequencing on the Illumina MiSeq, loading and running the MiSeq, and post-sequencing analysis.



*Pictured (left to right) Dr. Michael Dickens, Isabel Risch and David Jones.*

## BIOLOGISTS @ LARGE

### McKenna lab collects beetles in Costa Rica

*by Stephanie Haddad*

In July, 2013 Graduate students **Stephanie Haddad** (Ph.D.) and **Alex Aitken** (M.S.) joined **Dr. Duane McKenna** to conduct field work at La Selva Biological Field Station in northeastern Costa Rica. La Selva field station, a beautiful protected nature reserve of lowland tropical rain forest, is owned and operated by the Organization for Tropical Studies. Dr. McKenna, Stephanie, and Alex collected beetles for their respective research projects and for ongoing projects in the lab. Nearly one thousand beetles were collected, most belonging to the beetle families Cerambycidae (Longhorned beetles), Curculionidae (True weevils), and Chrysomelidae (Leaf beetles). They were astounded by the amazing biodiversity of flora and fauna that they encountered at the field station. Highlights of their trip included the exciting animal encounters that they had as they frequently crossed the bridge across the Rio de Sarapiquí to get to certain trails at the reserve. Encounters included seeing a two-toed sloth with the resident insect populations (mostly moths) living in its fur, a Kinkajou (adorable rain forest mammal related to raccoons), a caiman down below soaking up the sun on the river bed, and a nosy giant green iguana that unnervingly resembles a dinosaur in appearance. They also happened upon other remarkable organisms that you would



*Pictured (left to right) glass wing butterfly, a weevil, a peanut bug (also known as a lantern fly), and leaf cutter ants. Pictures courtesy of A Aitken*



see in tropical ecosystems ecosystems such as poison dart frogs, bullet and leaf-cutter ants, toucans, and noisy howler monkeys (that conveniently start howling right before it rains). Another highlight of their trip was that they were the first researchers at La Selva to set up black lights and collect insects on 150 foot towers that soared above the rain forest canopy all the while being pelted by large hawk moths (*Sphingidae*) that were attracted to the lights in droves.



Pictures (left): Alex Aitken and Stephanie Haddad and (right) Alex (inside the red oval) atop a collection tower. Pictures courtesy of D. McKenna.

## The Quest to Discover the Structure of DNA.

In November, the Department of Biological Sciences and the [Marcus Orr Center for the Humanities](#) presented *The Quest to Discover the Structure of DNA*. 2013 marks the 60th anniversary of perhaps the most important scientific



advance in modern times: the discovery of the structure of DNA by James D. Watson and Francis Crick. This discovery was the culmination of a century-long quest to understand how heredity works. The story of this quest was told in a series of lectures during November at the University of Memphis. On November 6th, Dr. Andrew Berry, a Lecturer in Organismic and Evolutionary Biology from Harvard University spoke on *Mendel, Miescher, Darwin and Galton: the Birth of Genetics*. Dr. Alexander Gann, Professor and Dean of the Watson School of Biological Sciences at Cold Spring Harbor Laboratory and a Senior Editor at Cold Spring Harbor Laboratory Press, presented *The Discovery of the Double Helix and the Birth of Molecular Biology* on November 13th, and Dr. Duane McKenna, an Assistant Professor in the Department of Biological Sciences at the University of Memphis, a Faculty Associate of the Program in Bioinformatics and of the Feinstone Center for Genomics at the U of M presented the final lecture *In Light of DNA: Genomics & the Dawning of the Century of Biology* on November 20th.

## Future Biologists visit the Microbiology labs

On Friday November 1st, Ms. Janette Kirksey's 3<sup>rd</sup> grade class from the Memphis Promise Academy came to the Department to visit a real microbiology lab. Hosted by Ms. E.O. Wade, who preps the Microbiology Labs for the Department, the students watched a short movie explaining what bacteria were and then they each had a chance to look through a microscope at some Gram stained bacteria. They also saw how microbiologists grow bacteria on agar and to ask questions of working scientist. Who knows? Maybe in ten years or so, some will be registering for microbiology class and lab here at the University of Memphis.



## From Action News 5 Andy, Will It Work? Norwex Antibac Microfiber Cloth

Andy Wise from WMC TV channel 5's *Andy Will It Work?* in Memphis came to the Department to ask the help of **Ms Bridget Fisher** (Microbiology Lab coordinator and Ph.D. candidate in Dr. Estrano's lab) and **Ms E.O. Wade** (microbiology laboratory technician) in assessing the truth of the antibacterial claims of Norwex Antibac Microfiber cloth.



pictured: E.O.Wade (left) and Bridget Fisher (right)

Ms. Fisher designed an experiment which compared the cleaning properties of the Norwex cloth to a leading all-purpose cleanser. A number of petri dishes were contaminated with bacteria, then cleaned with the Norwex cloth soaked with water, a generic microfiber cloth soaked with water, or papers towels sprayed with the all purpose cleaner. After 24 hours, Ms Sutton reported that dishes cleaned with paper towels and the all-purpose cleaner removed none of the bacteria, the generic microfiber towel removed 84% of the bacteria and the Norwex cloth removed 92% of the bacteria. So, Andy, it works! If you'd like to see this segment, click on [Andy Will it Work?](#)



## SELECTED PUBLICATIONS

**Baud DR** and **Pezeshki SR** 2013. Adventitious rooting response in *Salix nigra* and *Acer negundo* cuttings to exogenous sucrose. *Environ Ecol Management* 2: 44-55; 2013

**Baud DR** and **Pezeshki SR**. Response of three bottomland hardwood forest tree species to root-zone exogenous ethanol. *J. Environ. Sci., Comp. Sci., Eng. & Tech.* 2 (4): 1007-1014, 2013.

**Brem FMR**, **Parris MJ**, and Padgett-Flohr GE. Re-isolating *Batrachochytrium dendrobatidis* from an amphibian host increases pathogenicity in a subsequent exposure. *PLoS ONE* 8(5): e61260, 2013.

**Brem FMR** and **Parris MJ**. Epidermal trauma reduces the impacts of *Batrachochytrium dendrobatidis* in Fowler's toads (*Anaxyrus fowleri*). *Open Zoology Journal* 6:1-7, 2013

**Carter SN**, Goldman BD, Goldman S, and **Freeman DA**. Social cues elicit sexual behavior in subordinate Damaraland mole-rats independent of gonadal status. *Hormones & Behavior* 65:14-21, 2013.

Cashion A, Stanfill A, Thomas F, Xu L, **Sutter T**, Eason J, Ensell M, and **Homayouni R**. Expression levels of obesity-related genes are associated with weight change in kidney transplant recipients. *Plos ONE* 8: e59962: 1-10, 2013.

**Fisher BS**, **Estrano CE** and **Cole JA**. Modeling long-term host cell-*Giardia lamblia* interactions in an *In Vitro* co-culture system. *PLoS ONE* 8(12): e81104. doi:10.1371/journal.pone.0081104, 2013.

**Hanlon SM** and Relyea R. Sublethal effects of pesticides on predator-prey interactions in amphibians. *Copeia* 2013(4): 691-698, 2013.

**Hanlon SM** and **Parris MJ**. 2013. Previous exposure of predatory fish to a pesticide alters palatability of larval amphibian prey. *Environ Tox Chem* 32(12): 1-5, 2013.

**Henson JR**, **Carter SN**, and **Freeman DA**. Exogenous T3 elicits long day-like alterations in testis size and the RFamides Kisspeptin and Gonadotropin-Inhibitory Hormone in short-day Siberian hamsters. *J Biol Rhythms* 28:193-200, 2013.

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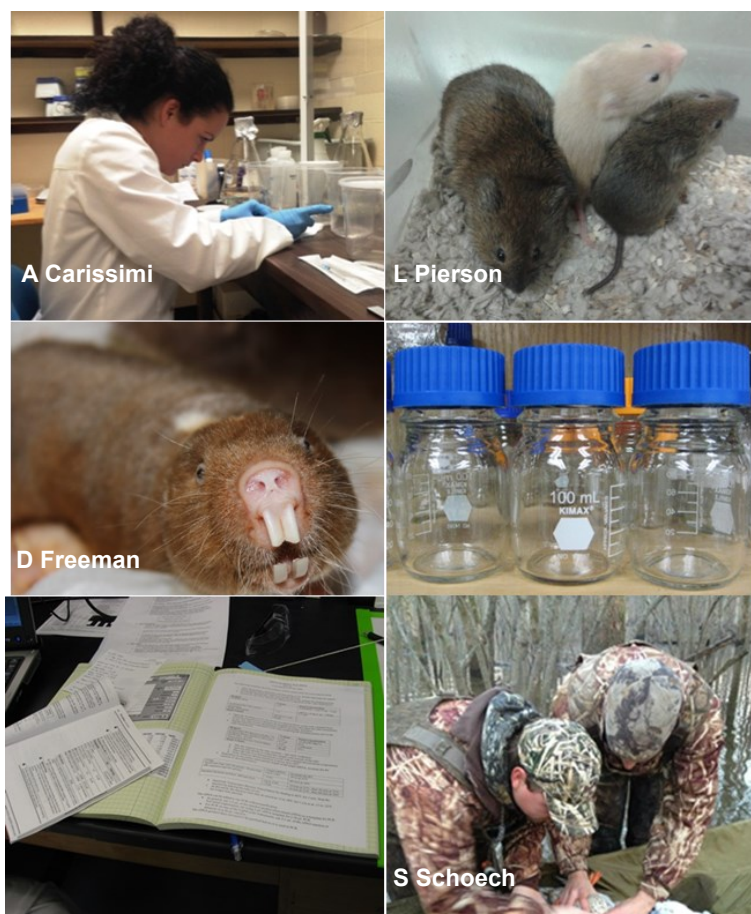
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Pierce SC, Koontz MB, **Pezeshki SR**, and Kröger R. 2013. Response of *Salix nigra* [Marsh.] cuttings to horizontal asymmetry in soil saturation. *Environmental and Experimental Botany* 87: 137 – 147.

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Qiao S, Kim SH, Heck D, Goldowitz D, LeDoux MS, **Homayouni R**. Dab2IP GTPase activating protein regulates dendrite development and synapse number in cerebellum. *PLoS One*. 2013; 8(1):e53635

**Sabau RM** and **Ferkin MH**. Food deprivation and restriction during late gestation affects the sexual behavior of postpartum female meadow voles, *Microtus pennsylvanicus*. *Ethology* 119: 29-38, 2013.



## SELECTED PUBLICATIONS, continued

**Sabau RM** and **Ferkin MH**. Food restriction affects the mass of dams and pups and the amount of maternal behavior provided by female meadow voles, *Microtus pennsylvanicus*. *J. Mammal.* 94: 1068-1076, 2013.

**Saunders LE**, Koontz M.B. and **Pezeshki R**. Root-zone glyphosate exposure adversely affects two ditch species. *Biology* 2:1488-1496. , 2013

**Schoech SJ**, Bowman R, Hahn TP, Goymann W, Schwabl I, and Bridge ES. The effects of low levels of light at night upon the endocrine physiology of western scrub-jays (*Aphelocoma californica*). *J Exp Zool Part A: Ecological Genetics and Physiology* 319A:527-538, 2013.

**Schoech, SJ**, Romero LM, Moore IT, and Bonier F. 2013. Constraints, concerns, and considerations about the necessity of estimating free glucocorticoid concentrations for field endocrine studies. *Functional Ecology* 27:1100-1106, 2013.

Starke WW and **Ferkin MH**. 2013. The effects of chemical cues from kingsnakes on the mating and reproductive success of house mice. *Current Zool* 59: 135-141, 2013

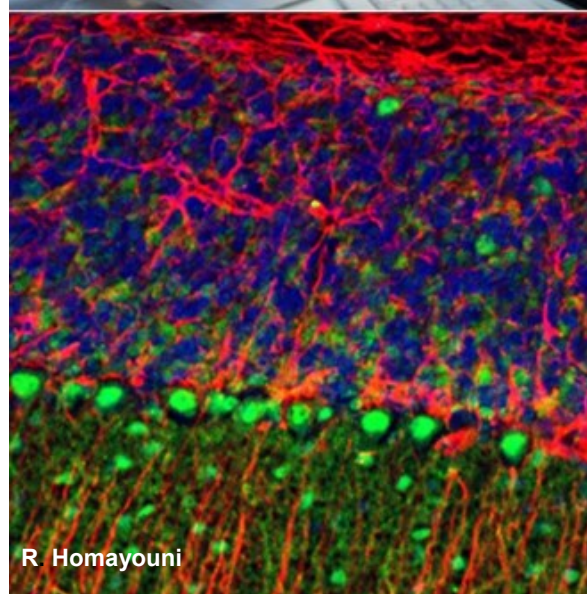
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Vlautin CT and **Ferkin MH**. The outcome of a previous social interaction with a same-sex conspecific affects the behavior of meadow voles, *Microtus pennsylvanicus*. *Ethology* 119: 212-220, 2013.

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