

BIOFEEDBACK

THE NEWSLETTER OF THE BIOLOGY DEPARTMENT AT RHODES

VOLUME 31

OCTOBER 2016

NUMBER 1

The Chair's Niche



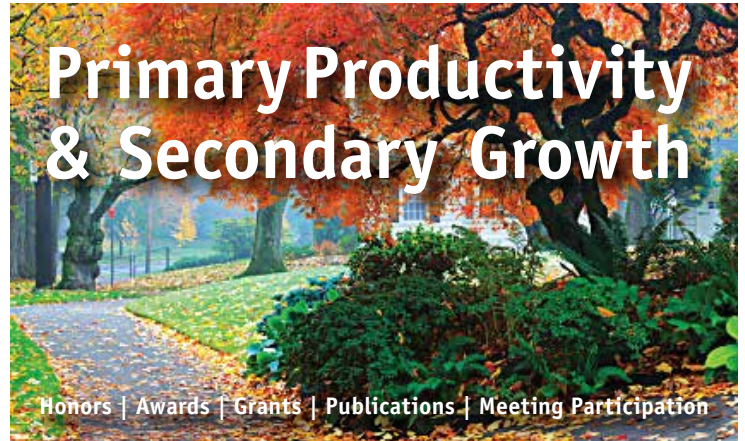
"What can I get out of a Biology major?" Biology is the investigation of life at all levels of organization, and our curriculum offers great breadth and depth of subjects for study and independent research. The study of Biology – of science in general – is important not only for the fascinating content you learn, but also for the awesome things you learn to do.

"[Science] is more than a school subject...It is an approach to the world, a critical way to understand and explore and engage with the world, and then have the capacity to change that world..."

**- President Barack Obama,
March 23, 2015 (www.ed.gov/stem)**

According to the U.S Department of Education, there is not only a need for students to pursue careers in STEM (science, technology, engineering, and math), but there is a critical deficit of STEM teachers. Many of you are here at Rhodes because of your passion for service to others. That service can come in many forms, including teaching – a career that allows someone to have a significant, perhaps even life-changing, impact on one's students. Did you know that just last year Rhodes introduced an Educational Studies major that prepares graduates to teach middle and/or high school in several academic areas including Biology, Chemistry, and Mathematics? A program for elementary education is expected to begin this spring. Students who wish to become teachers in secondary schools (middle school or high school) must major in both Education and in the discipline in which they plan to teach. So, if you are thinking about a Biology, Chemistry, or Mathematics major and want a career in which you can change students' lives, check out the new Educational Studies "Teaching and Learning" track.

- Carolyn Jaslow, PhD



HONORS AND AWARDS

Congratulations to:

Will Porter '16 received the Outstanding Biology Senior Award. He was also named to the Rhodes Hall of Fame and won the Seidman Trophy in Athletics.

Liz Bittner '16 received the Outstanding Research Award in Biology.

Tanner Martinez '19 and **Jacob Menke '19** received the Award for Excellence in First-Year Biology.

Pryce Michener '17 was awarded a Goldwater Scholarship.

Ellie Fratt NEUR '18 was named a BA Rudolph Foundation STEM Scholar.

Diana Vincent '18 received the Rosanna Cappellato Award in Environmental Science.

Kayla Shorten BIOM '17 won the Robert Allen Scott Award in Mathematics.

Jordan Kugler '16 was awarded the Seidman Trophy in Athletics.

Several students received presentation awards at the Western Regional Meeting of Tennessee Academy of Science, April 2, 2016. An oral presentation award was received by **Alexis Smith NEUR '16** (Honorable Mention, Biological Sciences) and poster presentation awards were received by **Jacob Hartline NEUR '16**, and **Alexis Smith NEUR '16** (First place, Biological Sciences), and **Brooke Rose ENVS '16** (Honorable Mention, Biological Sciences).

New Omicron Delta Kappa honor society members:

Megan Denny BMB '16, Emily Hayward BMB '16, Samantha Ouyang '16, Will Porter '16, Madhuri Prasad BMB '16, Sam Robertson '16, Brooke Rose ENVS '16, Iman Abdulkadir NEUR '17, Mary Crowell '17, Carolyn Dishuck '17, Rejina Fahhoom '17, Kendall Reed BMB '17, and Anania Woldetensaye BMB '17.

New Mortar Board Honor Society members:

Mary Crowell '17, Amanda DellaGrotta BMB '17, Carolyn Dishuck '17, Patrick Leavey '17, Ritika Mazumder NEUR '17, Rahul Peravali NEUR '17, Saniya Rashid NEUR '17, Kendall Reed BMB '17, Sylvie Sontheimer NEUR '17, and Albert Vacheron '17.

New Phi Beta Kappa society members:

Quenton Buck '16, Jacob Hartline NEUR '16, Emily Hayward BMB '16, Liana Kahn '16, Jordan Kugler '16, Allison Limmer '16, Chloe Meriwether '16, Samantha Ouyang '16, Arishna Patel BMB '16, Brooke Rose ENVS '16, Kathryn Roys '16, Aashray Singareddy BMB '16, Alexandra Smith BMB '16, Brandon Smith BMB '16, Pryce Michener '17, and William Porter '16.



Grants and Fellowships

Emily Lichtenberger '17. Searching for clues in shed skin: a novel technique for monitoring reproductive hormones in snakes. Conservation Action Network Grant from the Memphis Zoo and Aquarium.

Ashley Bruneau '18 and Sarah Boyle. Determining the effects of herpetarium renovations on animal welfare through behavioral research. Conservation Action Network Grant from the Memphis Zoo and Aquarium.

Jackson-Hayes L and **Hill T.** RUI: Protein-Protein Interactions of Protein Kinase C during Polarized Growth in Filamentous Fungi. National Science Foundation. \$483,924.



Publications

Shaffer C, Barnett A, Gregory T, De Melo F, Moreira L, Alvim T, Moura V, Filo A, Cardoso T, Port-Carvalho M, dos Santos R, **Boyle S.** 2016. Mixed-species associations in cuxius (genus *Chiropotes*). *American Journal of Primatology*. 78:487-492.

Barnett A, **Boyle S,** and Thompson, C. 2016. Pitheciid research comes of age: past puzzles, current progress, and future priorities. *American Journal of Primatology*. 78:487-492.

Fang F, **Frawley E,** Tapscott T, and Vazquez-Torres, A. 2016. Bacterial stress responses during host infection. *Cell Host & Microbe*. 20:133-143.

Fang F, **Frawley E,** Tapscott T, and Vazquez-Torres A. 2016. Discrimination and integration of stress signals by sathogenic bacteria.

Cell Host & Microbe. 20:144-153.

Gardner A, Fitz Gerald J, Menz J, Shepherd K, Howarth D, and **Jabaily R.** 2016. Characterizing floral symmetry in the Core Goodeniaceae with geometric morphometrics. *PLoS ONE* 11(5): e0154736.

Massad T and Castigo T. 2016. Investigating possible effects of climate change on tree recruitment: Responses of abundant species to water stress in Gorongosa National Park. *South African Journal of Botany*. 106:96-100.

Moore R ENVS '14 and J Hotchkiss. 2016. The importance of toxicity in determining the impact of hazardous air pollutants on the respiratory health of children in Tennessee. *Environmental Pollution* 216:616-623.

Wright B, Whittenberg J, Desai, A, **DiFelice C '17,** Kenis P, Lapi S and Reichert D. 2016. Microfluidic preparation of a 89Zr-labeled Trastuzumab single-patient dose. *The Journal of Nuclear Medicine*. 57:747-752.

Greenspan S, Morris W, Warburton R, Edwards L, Duffy R, **Pike D,** Schwarzkopf L, and Alford R. 2016. Low-cost fluctuating-temperature chamber for experimental ecology. *Methods in Ecology and Evolution*. DOI: 10.1111/2041-210X.12619

Greenspan S, Roznik E, Schwarzkopf L, Alford R, and **Pike D.** 2016. Robust calling performance in frogs infected by a deadly fungal pathogen. *Ecology and Evolution* 6:5964-5972.

Pike D, Clark R, Manica A, Tseng H, Hsu J, and Huang W. 2016. Surf and turf: predation by egg-eating snakes has led to the evolution of parental care in a terrestrial lizard. *Scientific Reports* 6:22207.

Dayananda B, Gray S, **Pike D,** and Webb J. 2016. Communal nesting under climate change: fitness consequences of higher incubation temperatures for a nocturnal lizard. *Global Change Biology* 22:2405-2414.

Wheeler B, Anderson E, Frøkjær-Jensen C, Bian, Q, Jorgensen E, Meyer B (2016). Chromosome-wide mechanisms to decouple gene expression from gene dose during sex-chromosome evolution. *eLife* DOI: <http://dx.doi.org/10.7554/eLife.17365>



Meetings

Western Collegiate Division Meeting of the Tennessee Academy of Sciences, Memphis, TN. Saturday, April 2, 2016

Oral presentations:

Magruder S NEUR '16. Constraining information.

Smith A NEUR '16 and **Kabelik D.** The effects of dopamine 1 and 2 agonists and antagonists on sexual and aggressive behaviors in male green anoles. (Honorable Mention, Biological Sciences)

Tews A '16 and **Boyle S.** Analysis of fecal glucocorticoid (FGM) concentrations in captive brown bears (*Ursus arctos*).

Posters:

Burman E '18, Giarla A ENVS '16, and **Ouyang S '16.** Aggressive behaviors between two female hippos (*Hippopotamus amphibius*) in captivity.

Carcelén E ENVS '17, Rose B ENVS '16, and **Ferguson S BIOL and ENVS '17.** Spatial and interactive data on captive meerkats of the Memphis Zoo.

Carr C ENVS '17 and **Tucker E '17.** Measuring active behavior in an aging African elephant (*Loxodonta africana*) in captivity.

Hartline J NEUR '16, Smith A NEUR '16, and **Kabelik D.** Serotonin activity in the male brown anole (*Anolis sagrei*) after social behavior encounters. (First Place, Biological Sciences)

Leavey P III '17, Goebel K BIO-ANSO '17, Howard A '15, and **Boyle S.** Hemoparasitic infection prevalence in small mammals living in forest fragments in Paraguay.

Brooke Rose ENVS '16. Land cover modification assessment for protected areas containing hippo study sites. (Honorable Mention, Biological Sciences)

Hughes O '17 and **Choudhury B ENVS '18.** Molecules to the rescue: clarification of new Australian wildflower species in Goodenia Clade B to facilitate conservation. Poster Presentation: Botanical Society of America meeting, Savannah, GA. 2016.

Jabaily R, Gardner A, Sessa E, Michener P '17, Johnson E '14, and Shepherd K. Molecules, morphology, and monophyly: revising the enigmatic Australian clade Goodenia s.l. (*Goodeniaceae*) using comprehensive sampling and big data. Botanical Society of America Conference, Savannah, GA. 2016.

Jabaily R, Gardner A, Shepherd L, Sessa E, and Howarth D. Phylogenetics and floral symmetry evolution of the core Goodeniaceae. Evolution Conference, Austin, TX. 2016.

Jones E '17 and **Bush C BIOM '19** Investigating life history in bromeliaceae using mathematical modeling. Poster Presentation: Botanical Society of America meeting, Savannah, GA. 2016.

Curricular Evolution

Biology Course Updates

Spring 2017

New Courses, More Sections, and Course Inversions

Biology Course Information for Spring

This spring we will be offering some courses that have not been seen for a while, including Mycology, Embryology, and Environmental Issues in Southern Africa (along with its Maymester field course to Namibia). In addition, Dr. David Pike, a new addition to the department, will be teaching Vertebrate Biology (BIOL 365). This will be similar to the Vertebrate Life course (BIOL 202) already in the catalog, but will include a laboratory component that will take students out into the field. See below for descriptions and other information about these exciting courses.

New Course:

BIOL 365 Vertebrate Biology

This spring, Dr. David Pike is very excited to offer a new upper-level lab course: Vertebrate Biology. This course will cover current topics related to the ecology, evolution, and behavior of vertebrates, including amphibians, birds, fishes, mammals, and reptiles with a focus on how science and technology advance our understanding of animal behavior, reproduction,

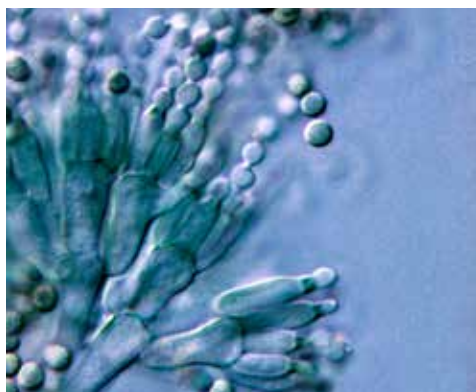
life history, natural selection, movements and habitat use. Vertebrate Biology will also address issues such as how and why climate change affects animals and their environments, and the consequences of human impacts (e.g., habitat loss, the pet trade, pest control). Ultimately we will integrate these topics to understand the challenges of conserving and maintaining biodiversity in a changing world, and the role of diverse disciplines in protecting animals or increasing their vulnerability to extinction. Dr. Pike's extensive experience conducting



research on vertebrates in the United States, Australia, Latin America, and Asia will provide a global context to these topics and expose you to many different animals, habitats, and ecosystems.

The course laboratories will offer unique experiences studying wildlife and their habitats in field settings, including visits to the Memphis Zoo, Overton Park, Shelby Farms, and other areas around Memphis. This will allow us to explore local ecological problems in detail using the global, multidisciplinary perspective gained in lecture. If you are interested in animals, how to study them, and how we are protecting them in our rapidly changing world, this course is for you! Lecture MWF 10-10:50; Lab Mon 1-4:00.

Pre-requisites are BIOL 130/131 and 140/141.



Mycology and Embryology Return

BIOL 201 Mycology: This spring, after a two-year hiatus, BIO-201 Mycology (Biology of the Fungi) will again be taught. The lecture/lab course examines the many roles played by animals' closest evolutionary cousins as symbionts and pathogens of animals and plants, as contributing members of a wide range of ecological communities, and as fascinating fellow creatures whose basic needs are really very like our own. (It's not really all that hard to "think like a fungus".) In addition to studying their relationships with other organisms, the course also examines fungi from perspectives of their diversity, reproductive strategies, and basic aspects of their genetics – as well as studying roles that fungi play in production of pharmaceuticals,

foods, and tasty adult beverages.

In laboratory, students gain experience in (among other things) isolating fungi from nature, identification of fungi based on microscopic observation, and hands-on experience in making beer and fermented foods. BIO-201 is listed as an upper-level elective for majors both in Biology and in Environmental Science.

BIOL 209 Embryology: The focus of this course is to trace the anatomical journey of the vertebrate body from the production of sperm and eggs through birth. The patterns of embryological development will be covered in different vertebrates, with emphasis on the steps of human embryology, and what goes wrong to produce birth defects. This class does not have an associated laboratory section, but some class periods will be used for hands-on work in lab.

Namibia Maymester

BIOL 212 Environmental Issues in

Southern Africa: Africa is known for its complex ecology, rich natural resources, and the cultural diversity of its people. Environmental Issues in Southern Africa will focus primarily on contemporary conservation issues. The role of parks and community-based conservation projects will be highlighted. Interactive class meetings will include discussions of research papers and case studies. Topics will include biodiversity protection, wildlife management, natural resources extraction, and environmental and human health. Prerequisites are BIOL 130/131 and 140/141 or BIOL 120 and CHEM 120. By itself, BIOL 212 is a 4-credit upper-level Biology course without lab that is open to anyone with the appropriate prerequisites. When combined with the Maymester course, (BIOL 214 Environmental Field Study in Namibia), BIOL 212 and 214 together will count as an upper-level Biology course with laboratory and will fulfill the F11 requirement (see description of BIOL 214 next page).



Continued on page 4



Optimal Foraging

The following courses will be offered next semester

Number	Course Title	Hours Offered
140-1	Biology II (4 Sections)	MWF 10:00-10:50; TuTh 9:30-10:45, 11:00-12:15
141-1L	Biology II Lab (7 Sections)	Tu 12:30-3:30, 4:00-7:00; W 1:00-4:00; Th 12:30-3:30
201	Mycology (Hill)	TuTh 9:30-10:45, Tu lab 12:30-3:30
204	Mech. of Development (Fitz Gerald)	MWF 9:00-9:50, Th lab 12:30-3:30
209	Embryology (C Jaslow)	TuTh 8:00-9:15
212	Env. Issues in S. Africa (Massad)	TuTh 11:00-12:15
253	Plant Genetics & Diversity (Fitz Gerald/Jabaily)	MWF 11:00-11:50, W lab 1:00-4:00
301	Microbiology (Frawley)	MWF 9:00-9:50, Th lab 12:30-3:30
304	Genetics (Miller)	TuTh 9:30-10:45, Tu lab 12:30-3:30
325	Molecular Biology (Wheeler)	MWF 8:00-8:50, W lab 1:00-4:00
340	Animal Physiology (Kabelik)	MWF 10:00-10:50; M lab 1:00-5:00
365	Vertebrate Biology (Pike)	MWF 10:00-10:50; M lab 1:00-4:00
375	Neuroendocrinology (Kabelik)	MWF 8:00-8:50
380	Topics in Biomedical Science (Lindquenter)	TuTh 8:00-9:15
CHEM 414†	Biochemistry (Jackson-Hayes/Stoddard)	MWF 11:00-11:50, 12:00-12:50
CHEM 416†	Mech. of Drug Action (Jackson-Hayes)	TuTh 11:00-12:15
NEUR 270†	Neuroscience (Gerecke)	MWF 10:00-10:50

Senior Seminar Sections

486-01	Immunity & Infectious Disease (Lindquenter)	TuTh 3:45-5:00
--------	---	----------------

Courses for non-majors (fulfill the F7 requirement)

105	Infectious Diseases: from the past and into the future (Honsa)	MWF 11:00-11:50, W lab 1:00-4:00 or Th lab 12:30-3:30
-----	--	---

† No more than two courses taken outside the Biology Department may count for the six upper-level courses required for the Biology Major

Maymester Course: BIOL 214 Environmental Field Study in Namibia is tentatively scheduled for 2017. If a minimum of students enroll, the Maymester will be offered May 9 – May 30. The course visits the Namib Desert, dry thornveld savannas, and the Kalahari sands, along with meeting indigenous people, NGOs, and governmental officers involved in local environmental issues. This 4-credit Maymester to Namibia (BIOL 214) may be combined with the 4-credit spring course at Rhodes (BIOL 212) to fulfill one upper-level Biology course with lab, an Environmental Science elective, and the F11 requirement. Interested students MUST enroll in BIOL 212 and should have attended an informational session held by Dr. Massad which will be announced in late October.

Rocky Mountain Ecology Field Research Maymester

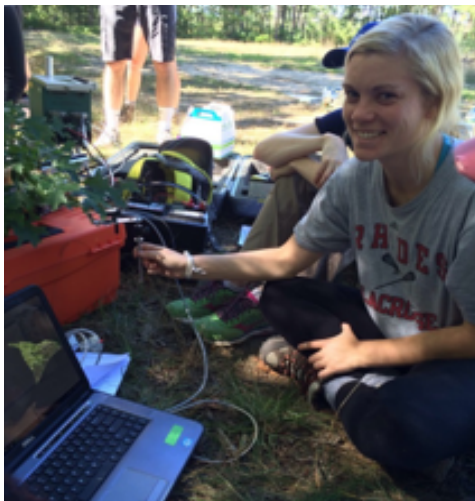
Are you interested in studying and gaining ecological field experience in Grand Teton and Yellowstone National Parks? If so, check out the Rocky Mountain Ecology Field Research Maymester (ENVS 170; F7 and F11). This year the course will be held from May 28 – June 22. The course is appropriate for science and non-science majors. Applications (and financial aid) are considered on a rolling basis, so apply early! Applications are available through the Buckman Center's site: https://internationalprograms.rhodes.edu/index.cfm?FuseAction=Programs.ViewProgram&Program_ID=26767. Please contact Dr. Boyle if you have any questions.

Environmental Summer Internships

Students with interests in environmental education and environmental research should contact Dr. Boyle about summer internship opportunities at the Teton Science Schools in Wyoming.

Coastal and Marine Biology Courses

Would you like to take a field course on manatees? How about studying marine ecology? The Gulf Coast Research Laboratory (GCRL) in Ocean Springs, MS is offering mini-courses in January and May, plus month-long summer courses, on these topics and more. Because Rhodes is an affiliate, courses offered at GCRL can count for Biology and Environmental Science majors. If you are interested, please talk to Dr. Collins.



Semester in Environmental Sciences at Marine Biological Laboratory

The Marine Biological Laboratory at Woods Hole offers a Semester in Environmental Sciences Program every Fall. This 16-credit program is geared towards Biology, Chemistry, and Environmental Science majors interested in ecosystem science and biogeochemistry. Students take courses such as Aquatic and Terrestrial Ecosystem Analyses, Microbial Ecology, and Independent Research, and get to know many of the staff and visiting scientists at Woods Hole. Above is a photo of Erin Gleeson ENVS '18, who is currently in the SES Program. Students who are interested in learning more about the program should contact Dr. Boyle. The SES deadline is March 20 for the Fall 2017 semester.

Senior Seminar News

This spring the Biology senior seminar is: BIOL 486-1: Immunity and Infectious Disease, TuTh 3:45-5:00 PM, taught by Dr. Lindquister. Students who signed up for this senior seminar during the lottery last spring should list it on their tree under "Other Courses" when they preregister this fall.

Juniors note that senior seminars for the '17-'18 academic year will be listed in the spring issue of BIOFEEDBACK, along with information about the lottery for enrollment.



The Hybridization Zone



Neuroscience Program Announcements:

Neuroscience majors—due to scheduled faculty sabbaticals and leaves, we have temporarily switched course offerings around this year. For example, Molecular and Cellular Neuroscience (BIOL376) is being offered in the Fall, whereas Neuroendocrinology (BIOL 375) will be offered in the Spring. Additional course offerings this Spring include one section each of NEUR 270 and NEUR 318, and two sections of senior seminar.

Environmental Studies and Sciences Program Announcements

In addition to the Spring 2017 Biology courses that count towards the ENVS majors and minors (Environmental Issues in Southern Africa, Microbiology, Mycology, Plant Genetics & Diversity, and Vertebrate Biology), Chemistry will offer CHEM 206 Environmental Chemistry as an upper-level course without lab. Environmental Chemistry is not offered every year, so take advantage of it this year! We will also offer ENVS 211 Hydrogeology (with lab) and two sections of INTD 225 (GIS). If you have not yet taken GIS, we encourage you to do so in Spring 2017 because there may not be as many GIS course options next year due to upcoming sabbaticals. Also, consider signing up for one of the environmentally-themed Maymasters (BIOL 214 Environmental Field Study in Namibia and ENVS 170 Rocky Mountain Ecology Field Research), or applying to the Semester in Environmental Sciences (SES) at the Marine Biological Laboratory in Woods Hole. If you are considering an ENVS major or minor, please speak with Dr. Boyle so she can make sure you receive important emails.

Biomathematics Major

Rhodes College is one of only a few liberal arts colleges offering a major in Biomathematics, a field which addresses questions arising from biological systems using mathematical and computational theory. Spring 2017 courses offered that could build towards the major include Calculus I (Math 121), Calculus II (Math 122), Differential Equations (Math 251), Biology II (Bio 140 + lab), and any upper level Biology course. The math modeling courses for the major (Math 214 and Math 315) will be offered again next fall. The only section of Applied Calculus (Math 115) being offered in Spring 2017 will be taught by Dr. Erin Bodine and will focus on biological applications.

Biochemistry and Molecular Biology Program

The Biochemistry and Molecular Biology Program has an impressive graduating class – warmest wishes to our graduating seniors! BMB majors are engaging in incredible research programs both on and off campus. Congratulations to our students and keep up the fantastic work. Our juniors should look forward to the lab coat celebration in the spring – be sure to respond to upcoming emails.

As you plan your schedules for next semester, the required BMB courses Biochemistry, Molecular Biology, and Organic Chemistry will be offered in Spring 2017. Cell Biology and Methods in BMB are not offered in the upcoming Spring semester, but will return in the Fall of 2017. As always, several elective course options are available in both semesters. Be sure to talk to your advisor about how to take advantage of these opportunities. As always, Dr. Miller is happy to answer any BMB related questions that you might have. Best wishes from the BMB program committee, we hope for the perfect annealing conditions for everyone's hybridizations!

DEPARTMENTAL MIGRATIONS

Interviews by Sarah Morris '18



David Pike

Dr. David Pike is excited to join the Biology Department as an Assistant Professor. Currently he is instructing Topics in Biology (BIOL 105) and looks forward to leading a course on vertebrate biology in the Spring of 2017. After graduating from the University of North Carolina with a BS in Biology followed by an MSc from Towson University in Maryland, he decided to pursue his PhD in Biology a little further from home at the University of Sydney. There, in addition to exploring the incredibly diverse ecology of Australia, he was able to work with the Broad Headed Snake. This endangered reptile lives year-round only on cliff faces in Sydney. He was able to identify the shade thrown by overgrown vegetation as a habitat restriction for these snakes. After removing the trees, he saw promising growth in snake colonization. A herpetologist, Dr. Pike is interested in the habitat use and movement of reptiles and amphibians. He researches how animals use and depend on the environment and often connects his findings to climate change and conservation. He is looking forward to scoping out Shelby Farms for possible new projects with the local ecology! New to the Liberal Arts scene, Dr. Pike is excited to work with small classes of engaged students. Also new to Memphis, Dr. Pike is getting along well with the Green Line and our increasingly bike-friendly city.



Erin Honsa

Although she is an Australian native, Dr. Erin Honsa is not exactly new to Memphis. Having just completed her postdoctoral research at St. Jude, she joins the Rhodes faculty as an Assistant Professor, currently instructing Microbiology (BIOL 301). Although she entered her undergrad career thinking she would end up either as a coroner or a pathologist, during her first year histology final she realized scanning microscope slides gave her bad motion sickness. Luckily she doesn't use a microscope so often now. From the Queensland University of Technology in Australia she moved to Houston to pursue her PhD in Microbiology at Baylor. Her biochemistry-heavy thesis project concerned the removal of mammalian hemoglobin from host cells by *Bacillus anthracis* (Anthrax) during infection. After leaving Houston she did four years of post-doctoral research at St. Jude where she worked on the development of new antibiotics. Here at Rhodes she hopes to pursue her continued interest in antibiotic resistance in bacteria and even explore the frequency of antibiotic resistant genes in the local soil.



Elaine Frawley

Joining the Biology Department as an Assistant Professor, Dr. Elaine Frawley currently instructs Biology 130 and 131. Although she completed her undergraduate studies at Washington University in St. Louis with plant biology as her main focus, Microbiology caught her attention just halfway through her first year of graduate school at Wash U. Searching for research experience by the best learning and training opportunity rather than by topic she found she was interested in the questions that microbiology was asking. From Wash U. she moved to Seattle to work in the laboratory of Dr. Ferric Fang at University of Washington as well as teach biology at Seattle Pacific University. Here at Rhodes, she is currently establishing her lab in which she studies bacterial metabolism and stress response. Working with *Salmonella typhimurium*, she is interested in observing the effects of host-generated attack mechanisms on the metal-containing proteins that hold integral roles in metabolic pathways in bacteria.

Having recently left the northwest, Dr. Frawley says she is enjoying the Memphis heat and the distinct lack of Seattle rain. Additionally, Dr. Frawley boasts an impressive amount of knowledge about American vernacular dance. Having picked it up in college, she has already dived in to the local blues scene and is enjoying the rich musical history that Memphis is famous for.

Signals & Displays

Short Communications



Tri-Beta News

Beta Beta Beta ($\beta\beta\beta$) is a national biological honor society with an active chapter at Rhodes. $\beta\beta\beta$ is dedicated to the enrichment of its members' scientific experiences and to the distribution of knowledge gleaned from those experiences. Current chapter activities include participation in the Rhodes Journal of Biological Science, coordination of student research presentations, organization of various fundraising events, and hosting of biological seminars. $\beta\beta\beta$ provides a forum to recognize those students, with a biological science as their undergraduate major, who excel academically. May it be noted that Rhodes has an array of biological science disciplines, meaning there are $\beta\beta\beta$ members who are not only passionate biology majors, but also neuroscience, environmental science, and biochemistry and molecular biology majors. Regular membership can only be attained through invitation but any student meeting the criteria who is interested in becoming an associate member for the next school year should contact the current president, Pryce Michener (micps-17@rhodes.edu) or vice president, Patrick Leavey (leapj-17@rhodes.edu). Go to www.rhodes.edu/biology/22139.asp for detailed membership criteria. Tri-Beta has some exciting service projects planned for the spring semester. One ongoing project entails hosting monthly meetings with the Springdale Elementary School's Science Club. We will also be volunteering at Springdale Science Saturday events. Additionally, we are selling Rhodes College Biology t-shirts with a graphic version of our recently retired token FJ dinosaur. The shirts are \$10.00 and if you wish to order one please email Piyush Kumar at (kupiy-17@rhodes.edu) with your size and Rhodes box number. Finally, we will be inducting new members this spring semester. We are excited to welcome new individuals into the society and

congratulate them on their commitment to biological excellence. Pictures of $\beta\beta\beta$ events can be seen on the $\beta\beta\beta$ bulletin board outside of the Biology Department office.

Mugs for Majors!

The *Pentaceratops* dinosaur that occupied the FJ Lobby for 20 years was removed in 2013. We now have a mural to mark its passing, along with Dino t-shirts sold by $\beta\beta\beta$ the Biology Honor Society (see above). In addition, we are giving away Biology Dinosaur coffee mugs to all students who declare a Biology major. If you are already declared, stop by the Biology Office (FJ 184) and ask Ms. Dianne Cox for your mug. For sophomores who are just starting this process, your new Biology advisor should have a mug for you when you get their signature on your form, or can direct you to get one.



Get Your Research in Print

After hours of hard work in the lab or field, why not publish your research in the Rhodes Journal of Biological Science? We encourage you to submit papers from your summer research or research conducted during the school year, as

well as commentaries and reviews of biological topics. If you haven't written a paper recently, think about helping out with the journal! Please contact Emily Lichtenberger (licem-17@rhodes.edu) if you are interested in submitting a paper or working with the journal. The deadline for paper submissions will be at the start of Spring semester, so start thinking about your submission now!

\$\$ Biology Research Award \$\$

This spring, the Biology Department will be presenting the "Award for Outstanding Student Research in Biology". Any student who has completed research at Rhodes or elsewhere is eligible for this award. The winner will receive a cash prize, be honored at the awards convocation ceremony, and have their name engraved on the Biology Research Award plaque that is displayed outside of the Biology office. To be considered, a student must submit a three to five page research paper, plus a recommendation from the research supervisor, to Dr. Dougherty, doughertyk@rhodes.edu by Friday, March 31. Announcement of the award winner will be made at spring awards convocation on Friday, April 28th.

Student Presentations | April 2016

Rhodes Undergraduate Research and Creative Activity Symposium

(Rhodes faculty supervisors listed)

Atiq Z BMB '17, Olsen E BIOM '18, Parish PC BMB '18, Hill T and Jackson-Hayes L. PkcA/SepA interactions during fungal cell wall synthesis (Dr. Loretta Jackson-Hayes)

Virk Z, **Buck Q '16** and Salud Bea R. Synthesis of novel, unnatural amino acids and their use in the design of antibiotic peptides (Dr. Roberto de la Salud Bea)

Burman E '18 and Jones E '17. Over-consumption of water by industrial U.S. animal agriculture (Dr. Sarah Boyle)

Carcelen E '17, Rose B ENVS '17 and Ferguson '17. Spatial and interactive data on captive meerkats of the Memphis Zoo (Dr. Sarah Boyle)

Carr C ENVS '17 and Tucker E '17. Measuring active behavior in an aging African elephant in captivity (Dr. Sarah Boyle)

Gibson E, **Cerrito E ENVS '16,** Denham J, Healy M and Teague E. Cultivating literacy through creativity: Memphis Cartonera and Caritas Village (Dr. Elizabeth Pettinaroli)

Conley L '17. An Ethnographic study of Pure Barre Memphis (Dr. Susan Kus)

Crowell M '17, Abdijabar G and Collins M. An Analysis of the Prevalence of plasmodium, *Leucocytozoon* and *Trypanosoma* sp. within raptors of the Mississippi Valley region (Dr. Michael Collins)

Daniels P BMB '18. Placing the *Aspergillus nidulans* Sep A gene under control of an AlcA promoter (Dr. Terry Hill)

Denny M BMB '16. High degree of interest in technology based weight loss intervention in Northeast Arkansans (Dr. Kendra Hotz)

Dishuck C '17, Dewar JL, Peterson L and Cafiero M. DFT design of inhibitors of the LpxC enzyme (Dr. Mauricio Cafiero)

Ebeid M '16 and McIlraith N. Cartonera in Memphis (Dr. Elizabeth Pettinaroli)

Ewel S NEUR '17 and Wohlbold A. To persist or not to persist: The possible benefits of interactive praise (Dr. Jamie Jirout)

Ferguson S '17, Stoneking S and Edge S. Breast cancer care in an urban undeserved setting (Dr. Peter Hossler)

Fratt E NEUR '18, Hatfield J and Potter P. Modified prodrug interactions by carbosylesterase inhibitors from *Salvia przewalskii* (Dr. Mauricio Cafiero)

Guida C BMB '17 and Lindquister G. gB gene shows neurovirulence in clinical and natural strains of herpes simplex virus 1 (Dr. Gary Lindquister)

Hartline J NEUR '16 and **Smith A NEUR '16.** Serotonin activity in the male brown anole after social behavior encounters (Dr. David Kabelik)

Haugen B BMB '17, Hunt L and Demontis F. Using *Drosophila melanogaster* to identify genes regulating muscle wasting (Dr. Gary Lindquister)

Haugen B BMB '17. Visualization and downregulation of SepG, an IQGAP protein in *Aspergillus nidulans* (Dr. Terry Hill)

Haugen B BMB '17, Lindquister G and Hunt L. Using *Drosophila melanogaster* to identify genes regulating muscle wasting (Dr. Terry Hill)

Heyrana AJ NEURO '17, Drummond C NEURO '18, Garcia M and Hatley M. UCP1 does not appear to have a role in Rhabdomyosarcoma tumorigenesis (Dr. Kim Gerecke)

His L BMB '18, Watkins E, **Porter H NEUR '18** and **Glidden N NEUR '17.** Caution ahead: Using anticipatory mechanisms to reduce interference in speech production (Dr. Katie White)

Hughes O '17 and Choudhury B ENVS '18. Phylogenetic characterization of Australian wildflower species in Goodenia Clade B of conservation interest (Dr. Rachel Jabaily)

Kugler J '16, Stewart T, Ogden S. Identifying the cleavage site of *Drosophila* dispatched (Dr. Jonathan Fitz Gerald)

Jelinek S NEUR '18, Morris M NEUR '16, Peterson L and Cafiero M. DFT Study of the selectivity of monoamine oxidase B (MAOB) (Dr. Mauricio Cafiero)

John A BMB '17, Kechejian V, Brenner J and Schedl T. Identification of helicases that promote meiotic entry in *C. elegans* (Dr. Tim Schedl, Washington University School of Medicine)

Jones M '16. Utilizing ultraviolet-visible spectroscopy to characterize transition metal chelation of 2,6-bis-hydrazinopyridine-derived complexes (Dr. Kimberly Brien)

Wilson K, **Lamanilao G BMB '16,** Malkowski S and Cafiero M. Inhibiting Lipid A biosynthesis in gram-negative bacteria: The design, synthesis, and zinc binding analysis of natural substrate analogues of LpxC (Dr. Larry Peterson)

Leavy P '17, Goebel K '17, Patel A, **Howard A '15,** Lipman M, Perez E, Sancha N, and Luque L. Hemoparasitic infection prevalence in small mammals living in forest fragments in Paraguay (Dr. Sarah Boyle)

Lenny B BMB '16 and Hill T. A novel gene shows characteristics of microtubule-based movement in *Aspergillus nidulans* (Dr. Terry Hill)

Lima Hooven J BMB '16, Prodanovich N, Russ J and Dye D Organic analysis of residues from noded vessels from the Lower Mississippi Valley (Dr. Jon Russ)

Limmer A BMB '16, McKeand M and Nichols T. Hitting the ground running: Memphis Cartonera at Latino Memphis, Abriendo Puertas (Dr. Elizabeth Pettinaroli)

Loome J BMB '18. Investigation of a gene governing cell wall integrity in *Aspergillus nidulans* (Dr. Terry Hill)

Mills M, Lowry E NEUR '17, Maloney M NEUR '17, Burkhead C and Cook J. Gender Stereotypes in mid-20th century antidepressant advertisements (Dr. Jonathan Cook)

May X BMB '17, Stoddard S, and Watkins D. Molecular considerations leading to inhibitor specificity of human histone deacetylase (HDAC): Tools for selective HDAC inhibitor development (Dr. Shana Stoddard)

Mazumder R NEUR '17 and Haberman J. Observers misperceive the size of artificial limbs (Dr. Jason Haberman)

McCormick R BMB '16 and Russ J. Method development and proof of concept for separation of bituminous hydrocarbons from rock art (Dr. Jon Russ)

Morris M NEUR '16, Jelinek S NEUR '18, **Hatstat K NEUR '16,** Peterson L and Cafiero M. DFT analysis of water clusters, dopaminergic derivatives, and their desolvation energies (Dr. Mauricio Cafiero)

Ouyang S '16, Giarla A ENVS '16 and **Burman E '18.** Aggressive behaviors between two female hippos in captivity (Dr. Sarah Boyle)

Pinckney C '17, Magee C, Peterson L and Cafiero M. DFT analysis of the selectivity of known bioactive ligands in the sulfotransferase and catechol-o-methyltransferase enzymes (Dr. Mauricio Cafiero)

Rashid S NEUR '17, Wu S, Jia H, Martinot O and Labelle M. The WISP1 Signaling pathway: Effects of SMAD4 and MMP13 knockdowns on tumor metastatic capability (Dr. David Kabelik)

Rogowicz J NEUR '17, Gerecke K, and McVicar K. Fine motor movement in children on the autism spectrum or chromosome 15q11.2-13.1 duplication syndrome compared to typically developing children (Dr. Kim Gerecke)

Rose B ENVS '16. Land cover modification assessment for protected areas containing hippo study sites (Dr. Sarah Boyle)

Schill H NEUR '16. Attending to multiple ensembles across visual domains imposes no cost relative to multiple ensembles within a single visual domain (Dr. Jason Haberman)

Smith P BMB '18. Determining the DNA sequence requirements for heterochromatin formation in *S. pombe* (Dr. Bayly Wheeler)

Sumner C NEUR '16, Baldassarro A NEUR '17 and **Rashid S NEUR '17.** The relationship between acute stress reactivity and motivation for food in chronically stressed women (Dr. Rebecca Klatzkin)

Taghavi O NEUR '17. Synthesis and characterization of cobalt and nickel schiff base complexes for artificial photosynthesis (Dr. Will Eckenhoff)

Ulrich L NEUR '16. Observers perceive the average identity of amodally completed faces (Dr. Jason Haberman)

Williamson M BMB '18. Localization of paxillin B in *Aspergillus nidulans* is affected by separate gene deletions (Dr. Terry Hill)

Wilson D '17, Weems A, Peterson L and Cafiero M. Kinetics of proton transfer for ligands in the SULT1A1 active site (Dr. Mauricio Cafiero)



Rhodes College

—1818—