

# BIOFEEDBACK

THE NEWSLETTER OF THE BIOLOGY DEPARTMENT AT RHODES

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## The Chair's Niche



Diversity matters. In ecology, diversity is one indicator of community health. You may remember catching arthropods with sweep nets in the last lab of BIOL 141, and calculating a diversity index. A higher diversity index means that a community has more species and there is a more even distribution of individuals

per species, compared to a community with lower diversity that may be dominated by many individuals of a single species. Communities with higher diversity are more resilient, and are less likely to be destroyed by major disturbances such as storms. What about human communities? If we have more diversity, does that not make our community healthier and more resilient? Diversity and inclusivity are important, so what is your personal diversity index like these days? We hope you will take the time this semester to introduce yourself to some new people and perhaps increase the diversity index of your own community of friends and acquaintances.

– Carolyn Jaslow, PhD



## HONORS AND AWARDS Congratulations to:

At the Mid-South GIS conference in November, **Maraia Tremarelli ENVS '15** won the \$2,000 scholarship for her presentation. **Sarah Laves BIOL '15** won 1st place in the poster competition and **Brooke Rose ENVS '15** won 3rd place in the poster competition. Details of their presentations are in the "Meetings" section.

**Eliot Blatt BMB '16** received an award from the American Society of Cell Biology to support his travel to the national ASCB Annual Meeting in San Diego. He presented work that he has done with Dr. Miller titled "Activation of DNA Damage Response checkpoint causes pre-anaphase cell cycle arrest in KP1019 dependent manner in *S. cerevisiae*." He did a great job!

## Congratulations! New $\beta\beta\beta$ honor society members:

Safiyya Abdulkadir, Alexandra Baldassaro, Eliot Blatt, Alexandra Boss, Quentin Buck, Erica Carcelen, Shauni Cowan, Mary Crowell, Amanda DellaGrotta, Carolyn Dishuck, Luke Embury, Rejina Fahhoum, Sarena Fernandez, Anna Fiallo, Annette Giarla, Benard Haugen, Rajiv Heda, Olivia Hughes, Caroline Jacobs, Cydney Johnson, Piyush Kumar, Gene Lamanilao, Patrick Leavey, Brian Lenny, Allison Limmer, Cooper Manley, Charles Mansour, Pryce Michener, Myrna Sidarous, Joseph Newman, Spencer Regelson, Alexander Rhodes, Jessica Rogowiec, Miranda Rose, Saniya Rashid, Mikayla Shorten, Alexandra Smith, Lauren Smith, Maraia Tremarelli, Ashley Truong, Albert Vacheron, Danielle Wilson, Taylor Wilson

New  $\beta\beta\beta$  Officers: **Pryce Michener '17** (President), **Patrick Leavey '17** (Vice President), and **Amanda DellaGrotta BMB '17**, (Treasurer), **Piyush Kumar '17** (Secretary).



## Publications

**Boyle S, Roberts B, Pope B '13, Blake M '14, Leavelle S '14, Marshall J ENVS '14,** Smith A, Hadicke A, Falcone J, Knott K, and Kouba A. 2015. Assessment of flooring renovations of African elephant (*Loxodonta africana*) behavior and glucocorticoid response. *Plos One* 10(11): e0141009. DOI: 10.1371/journal.pone.0141009

Trout Fryxell R, Moore J, **Collins M**, Kwon Y, Jean-Philippe S, Schaeffer S, Odoi A, Kennedy M, and Houston A. In press. Habitat and vegetation variables are not enough when predicting tick populations in the southeastern United States. *Plos One* 10(12): e0144092. DOI: 10.1371/journal.pone.0144092

**Gardner A**, Sessa E, **Michener P '17, Johnson E '14**, Shepherd K, Howarth D, and **Jabaily R**. 2016. Utilizing next-generation sequencing to resolve the backbone of the Core Goodeniaceae and inform future taxonomic and floral form studies. *Molecular Phylogenetics & Evolution* 94: 605-17.

**Matthews A ENVS '14**, Ellis V, **Hanson A '15, Roberts J '14**, Ricklefs, R, and **Collins**

**M**. 2015. Avian haemosporidian prevalence and its relationship to host life histories in eastern Tennessee. *Journal of Ornithology*. DOI: 10.1007/s10336-015-1298-y

Connor E, **Collins M**, and Simberloff D. 2015. The checkered history of checkerboard distributions: Reply. *Ecology* 96: 3388-3389.

Crane E, Bian Q, McCord, R, Lajoie B, **Wheeler B**, Ralston E, Uzawa S, Dekker J, and Meyer B. 2015. Condensin-driven remodeling of X chromosome topology during dosage compensation. *Nature* 523: 240-244. DOI:10.1038/nature14450

**Truong A BMB '16**, Mercedes Sayago M, Kutteh W, Ke R. 2016. Subchorionic hematomas are increased in early pregnancy in women taking low-dose aspirin. *Fertility and Sterility*. DOI: <http://dx.doi.org/10.1016/j.fertnstert.2016.01.009>



## Meetings

**Boyle S**. Primate biogeography and conservation. Mid-South GIS Conference, Memphis, Tennessee (November 2015).

**Carcelen E BIOL '17 and ENVS '17**. Analyzing changes in captive meerkat

social dynamics using GIS analysis of exhibit use. Poster presentation at Women in STEM Experience (WiSE) Symposium, University of Alabama (January 2015).

**Jaslow C**. Postgraduate Course Presentations: Recurrent pregnancy loss: Definitions and timing for the work-up (co-authored with D. Schust); Acquired uterine factors and pregnancy loss; Congenital uterine anomalies and pregnancy complications. Annual Meeting of the American Society for Reproductive Medicine, Baltimore, Maryland (October 2015).

**Miller M**. Presented at the 2015 Yeast Cell Biology Meeting, Cold Spring Harbor Laboratories, New York (November 2015).

**Miller M**. RAD9 dependent DDR checkpoint activation drives KP1019 dependent pre-anaphase cell cycle arrest and nuclear position in *S. cerevisiae*. Presented at the 2015 Annual Meeting of the American Society for Cell Biology (December 2015).

### Mid-South GIS conference in Memphis, TN (November, 2015)

#### Oral Presentations:

**Tremarelli M ENVS '15**. Memphis: GIS analysis of health, accessibility and wealth

**Rose B ENVS '16**. Where the wild hippos are: A GIS analysis of the common hippo's geographic range

**Carcelén E BIOL and ENVS '17**. Analyzing changes in captive meerkat social dynamics using GIS analysis of exhibit use

**Ceritto E ENVS '16**. The past, present, and future of Overton Park's old growth forest

#### Poster Presentations:

**Laves S '15**. Food for the soul: An in-depth GIS study of food access in Memphis

**Rose B ENVS '16**. Cat mapping: Spatial analysis of the Memphis Zoo's fishing cats' rest and sleep behaviors



Last semester Dr. Erin Harmon's studio art class produced this biology-themed installation for the halls of Frazier Jelke.

# Curricular Evolution Biology Course Updates

SPRING 2016

## New Courses, More Sections, & Course Inversions

### Course Updates for 2016-2017

Next year we are planning to offer fall and spring sections of Microbiology, Genetics, and Molecular Biology. Because of faculty sabbaticals and leaves, two courses will swap semesters: BIOL 375 Neuroendocrinology will be in the spring, and BIOL 376 Molecular and Cellular Neuroscience will be in the fall. We are in the midst of a job search to bring in someone who can teach an additional organismal biology class, so it is possible we will offer something new next year in the spring. Also next year we are hoping to offer the Namibia Maymester course again.

BIO 307 Cell Biology and BMB 310 Methods in Biochemistry and Molecular Biology will be offered in only the Fall 2016 semester. Be sure to plan your schedules accordingly!

### Other Courses that Count for the Bio Major:

When planning your schedule, keep in mind that Biochemistry (CHEM 414), Mechanisms of Drug Action (CHEM 416), and Neuroscience (NEUR 270), with and without the Neuroscience Methods lab (NEUR 350), may count as upper-level Biology courses, but students may count no more than two of these courses toward their major.

### What's Up for Next Spring?

In the spring of 2017 we expect to offer the following classes: Animal Physiology, Mechanisms of Development, Plant Genetics & Diversity, Microbiology, Mycology, Genetics, Molecular Biology, Neuroendocrinology, Topics in Biomedical Science, and Environmental Issues in Southern Africa. Spring will also likely

include sections of Neuroscience, Biochemistry, and Mechanisms of Drug Action.



### Comparative Vertebrate Morphology/Anatomy

Comparative Vertebrate Morphology and Anatomy (BIOL 350) CVM will again be offered with two 9 AM lectures most weeks and two (unequal) formal lab meetings a week. One lab meets Tuesday from 12:30-3:30. The second lab each week meets Friday for a minimum of 50 minutes, either from 1-1:50, or from 2-2:50. Two additional hours in lab are required, but these hours may be completed at other times during the week. The variable

Friday lab time allows students to pre-register in another class meeting MWF at either 1 or 2. CVM has two course numbers. The first includes the lecture and Tuesday lab. This one must be enrolled from the main tree (A, B, or C). The second number allows you to choose one of the two Friday lab times. Please pick the 1 PM Friday time if you can. This Friday section should be added to the Lab portion of the tree. See Dr. A. Jaslow if you have questions.

## Senior Seminar Choices for '16-'17

### Fall Senior Seminars

**BIOL 485-1 Avian Biology. TuTh 4:00-5:15.**

**Dr. Michael Collins.** This seminar will cover a wide range of topics including urban ecology, wildlife diseases, community ecology, evolution, physiology, and conservation biology of birds. Students will read and present back  
*(Continued on page 4)*

## Senior Seminar Lottery

### Wednesday, March 16th at 4:00 PM in FJ 185

Next year, the Biology Department will offer three sections of Biology Senior Seminar: two in the fall and one in the spring. Rising seniors, please consult the descriptions of these senior seminar courses on pages 3-4.

**All rising Biology seniors must reserve a slot in a fall or spring Biology senior seminar section via a lottery that will be held in the core Bio lab 185 at 4:00PM on Wednesday, March 16th.**

If you cannot attend the lottery, you must send a representative prepared with an ordered list of your choices. Once you have signed up by lottery, you should list your reserved senior seminar section last on the registration tree under the category of "Other Courses" when you register for that particular semester. Biology students will not be allowed to register in a seminar section other than the one which they reserved through the lottery. If you have questions about the lottery, are planning to be abroad for a semester next year, or are planning to graduate in December, contact Dr. C. Jaslow immediately.



# Optimal Foraging

The following courses will be offered next semester

120	Intro to Environmental Sciences*	MWF 10:00-10:50; lab W 1:00-4:00 or Th 12:30-3:30
130	Biology I (5 sections)	TuTh 8:00-9:15, 9:30-10:45, or 11:00-12:15; MWF 8:00-8:50 or 11:00-11:50
131	Biology I Lab (8 sections)	Tu 12:30-3:30, W 1:00-4:00, Th 12:30-3:30, Th 4:00-7:00, or Fri 1:00-4:00
200	Evolution (Jabaily)	TuTh 9:30-10:45, Th lab 12:30-3:30
207	Animal Behavior (Boyle)	MWF 9:00-9:50, W lab 1:00-4:00
301	Microbiology	MWF 11:00-11:50, W lab 1:00-4:00
304	Genetics (Miller)	TuTh 9:30-10:45, Tu lab 12:30-3:30
307	Cell Biology (Hill)	TuTh 8:00-9:15
315	Ecology (Collins)	TuTh 11:00-12:15; M lab 1:00-4:00
325	Molecular Biology (Lindquenter)	MWF 10:00-10:50, Th lab 12:30-3:30
330	Virology/Immunology (Lindquenter)	TuTh 11:00-12:15
350	Comp Vert Morph (A. Jaslow)	MWF 9:00-9:50; T lab 12:30-3:30; F lab 1:00-2:00 or 2:00-3:00
360	Histology (C. Jaslow)	MWF 8:00-8:50; W lab 1:00-4:00
376	Molec & Cell Neuroscience (Dougherty)	TuTh 11:00-12:15
BMB 310	Methods in Cell Biology (Hill)	W 1:00-5:00
CHEM 225	Biochemistry Primer (Horgen)	TuTh 8:00
CHEM 414	Biochemistry (Loprete or Peterson)	MWF 11:00-11:50 or 1:00-1:50
NEUR 270	Neuroscience (Gerecke, Klatzkin)	MWF 10:00-10:50 or 2:00-2:50
NEUR 350	Neuroscience Research Methods (Gerecke, Dougherty, & Haberman)	Th 3:30-4:45, lab M or Tu 1:00-5:00

## Senior Seminar Section

485-01	Avian Biology	TuTh 4:00-5:15
485-02	Genomic Medicine	TuTh 4:00-5:15

*\*Does not count towards Biology major*

ground information from the primary literature. Students will research topics of their own interest that relate to avian biology, summarize their findings to the class, and evaluate the presentations of other students.

**BIOL 485-2 Genomic Medicine. TuTh 4:00-5:15. Dr. Bayly Wheeler.** In this class we will explore human genome variation and its clinical consequences. Students will read and discuss primary literature covering methodologies used to identify links between genetic variants and disease. This class will also delve into the burgeoning field of human genome engineering. As a part of this class, students will be respon-

sible for writing a research proposal on a genomic medicine topic of their choosing.

## Spring Senior Seminar

**BIOL 486-1 Immunity and Infectious Disease. TuTh 3:45-5:00. Dr. Gary Lindquenter.** This senior seminar will be offered in partnership with St. Jude and supervised by Dr. Lindquenter. The overall topic is yet to be determined but will focus in a biomedical area of significance to St. Jude. Students will be teamed with a post-doctoral fellow and a principle investigator from St. Jude to explore their areas of interest in the oral and written presentations typical of senior seminars. For

more information on this seminar, contact Dr. Lindquenter.



Megan Denny BMB '16 and Ally Limmer BMB '16 represent BMB painting the wall surrounding the construction site for Robertson Hall.

# BIOLOGY DEPARTMENT LUMINESCENCE



## Urban Ecology—Forest Regeneration in Overton Park

By Costa S ENVS '16 and Gleeson E '18

This past fall semester, **Dr. Massad** and her research team, including Sophie Costa and Erin Gleeson, began doing research in the Old Growth Forest in Overton Park. This park has played an influential role in the history of Memphis for over 100 years, but more importantly, it is a vital part of nature due to the ecosystem services it provides. There is an interesting phenomenon currently occurring in Overton Park that is creating a large age gap in the forest. As large, mature trees fall they create gaps in the forest canopy. Normally this would allow other juvenile trees to grow and replace the larger tree, but in Overton Park this is not happening. Many seedlings are having a difficult time establishing. What could be the reason for this? That is where Dr. Massad's research team comes in. They focus on the seeds and seedlings found in the forest gaps, trying to see if the problem could be related to poor seed germination or insects feeding on the young seedlings. In order to gain a better understanding of what is occurring, the team has set-up seed traps inside and directly outside of gaps. This has helped them identify the trees that are producing seeds and measure the number of seeds arriving in and out of gaps. Once the seeds are collected, counted, and identified, they will be planted in a greenhouse to test their viability. This will allow the team to see if the recruitment bottleneck problem is due to poor germination of the seeds. The team will also identify and tag seedlings found around the traps themselves, which will help them understand if the recruitment problem is at the seedling rather than the seed stage. This semester, the research team has grown to include **Wilson D ENVS '17** and **Willis A ENVS '16**, and they hope to gain a better understanding of what is occurring in this forest that is so beloved and influential in the Memphis community.



## FJ Art Installation

By Sarah Morris

If you've been in FJ at all this year you've seen the giant renditions of Erlenmeyer flasks, microscopes, and beehives that line the hall in front of the large lecture rooms. Before the cardboard pieces brightened the halls of FJ, they were an introductory project for a paper practicum in Dr. Erin Harmon's studio art class last semester. The class was challenged with creating an installation in a limited space that represented many of the elements falling under the umbrella of biology. As their color palette was limited exclusively to black and white, the artists were forced to display detail by other means. Aware of where the art was going to be placed, they went to great lengths to ensure it was as accurate as possible while still playing extensively with scale. You may also notice that they have managed to squeeze 30 pieces onto the side of a hallway! They managed to do this by studying the techniques used in storefront window displays to make shallow spaces appear deeper. While the pieces are impossible to miss, it's less evident just how much research and design was put into not only the subject of the pieces but the space itself! Next time you stroll down the hallway or wait there for your class to begin, take a renewed look at these incredible pieces!



## FJ Succulents Display

By Sarah Morris

You may have noticed there are a few more plants in FJ than there used to be. The beautiful display of succulents is the design work of **Ethan Jones '17**. After an eye-opening field trip to Dixon Gallery & Gardens with his Plant Genetics and Diversity

class last semester, Ethan was given the opportunity to work with the botanical gardens and nursery. Presented with an outdated accession system, Ethan was tasked with re-vamping the entire data collection. This meant hours spent tracking items in the garden's inventory and getting everything up to date.

After spending the summer as the first Rhodes student to intern at the gallery, Ethan was invited to partake in research under Dr. Rachel Jabaily. His project focuses on Bromeliaceae, a family of showy

monocots with a diverse evolutionary history. Dr. Erin Bodine also leads the project with a group of biomathematics students who will record meticulous data while the bromeliads grow. Eventually they aim to artificially simulate their growth with a computational model. As Rhodes lacks significant greenhouse space, Ethan provided an integral link to the botanical gardens. There he was placed in charge of curating the display of bromeliads set to debut early in 2017. This is tricky work, considering the bromeliads display terminal florescence. In other words, he must manipulate the bromeliads to all bloom at once one year from now for it will be the only time they do so. He is ready to take on the challenge of this living exhibit and feels confident he will have the brilliant display ready in time.

Back in FJ, Ethan has utilized his design skills to create a display of succulents given to him by the Dixon Gallery. It represents only a small part of the collaboration between Rhodes College and the Dixon Gallery & Gardens, facilitated by Ethan. Having learned the backstory to this beautiful exhibit, take time to read the placard he has written detailing the evolutionary history of the plants on display.

# 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). 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 retired token FJ dinosaur. The shirts are \$10.00 and if you wish to order one please email Piyush Kumar at (kupi-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 indi-

viduals 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.

### 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 award 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. Kelly Dougherty by Friday, March 25th. Announcement of the award winner will be made at spring awards convocation on Friday, April 29th.

### TN Academy of Science Meeting

Rhodes College will be hosting the 2016 Western Regional Meeting of the Tennessee Academy of Science (TAS) on Saturday, April 2. This undergraduate meeting is a great experience for students to present their research at a local meeting. If you would like information about presenting at or attending TAS, please contact Dr. Sarah Boyle: [www.rhodes.edu/content/western-collegiate-division-meeting-tennessee-academy-sciences](http://www.rhodes.edu/content/western-collegiate-division-meeting-tennessee-academy-sciences).

### Undergraduate Research & Creative Activities Symposium

The Rhodes Undergraduate Research and Creative Activities Symposium (URCAS) provides you the opportunity to showcase your outstanding work to the entire campus community. You will gain firsthand experience in communicating your research and creative activity, an essential part of professional growth. URCAS will take place on Friday, April 29, 2016.

### Work in the Biology Department

The Biology Department is looking for students to work as lab Teaching Assistants for the core biology classes next year. These TA positions will consist of approximately 8-10 hours per week of work. We prefer students for this job who have an interest in Biology and have taken Bio I and II. Pay and further details concerning being a TA will be discussed on an individual basis. Also, the RSAP position will be available. If you have been a TA for the fall and spring core labs, we encourage you to apply for this upper level position. Please feel free to contact Sarah Hasty at 843-3431 (email: [hastys@rhodes.edu](mailto:hastys@rhodes.edu)) for additional information. Applications for the lab TA job can be found outside FJ 157. The deadline for fall/spring positions is April 29, 2016. Also, if you are interested in working in the Biology Department this summer, please contact Sarah Hasty.



# The Hybridization Zone

## Environmental Studies and Science Program

In addition to the Biology courses that count towards the ENVS majors and minors, we will also offer BIOL 120 Introduction to Environmental Science and ENVS 111 Physical Geology. Students should take these introductory courses as early as possible (preferably as sophomores). INTD 225 GIS will have two fall sections, one taught by Dr. Boyle and one taught by Dr. Lu in Urban Studies. Science students are strongly encouraged to take the section taught by Dr. Boyle, as it will have a greater emphasis on how GIS is used in the sciences.

## Biochemistry and Molecular Biology

Important news for BMB majors! We will be offering BMB 310 (Methods in Biochemistry and Molecular Biology) and BIO 307 (Cell Biology) in the FALL OF 2016 ONLY next year! This is different than last year, so be sure to plan your schedules accordingly, and talk to your BMB advisor about how this might impact your plans for your courses. Molecular Biology and Biochemistry should be offered in both semesters next year, as they were last year. 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!

## Neuroscience Program Announcements:

Neuroscience majors – please note the changes in course offerings for next year! These rearrangements of courses between the fall and spring semesters are temporary, due to faculty teaching sabbaticals and leaves. The Neuroscience courses on offer for Fall 2016 are tentatively scheduled to be two sections of Neur 270 Neuroscience, and one section each of Biol 376 Molecular and Cellular Neuroscience, Psyc 345 Cognitive Neuroscience, Neur 350 Neuroscience Research Methods, and Neur 485 Senior Seminar. The plan for Spring 2017 includes one additional section of Neur 270 Neuroscience, as well as Neur 318 Neuroscience of Brain Disorders, Biol 375 Neuroendocrinology, and two sections of Neur 486 Senior Seminar.

Neuroscience majors are encouraged to take Neur 350 Neuroscience Research Methods in their junior year so as to prepare for senior seminar; in your junior year you do not need to place Neur 350 high on your tree but as seniors you do, just in case it fills up, as this course is required to graduate! Sophomores, please remember to declare your major on time so that we can be sure to provide sufficient course offerings for you if demand is high.

Finally, let's congratulate Dr. Klatzkin, whose daughter Emme was born near the end of last semester. Dr. Klatzkin is on parental leave this semester but will be back in the fall of next year.

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**URCAS will take place on Friday, April 29, 2016.**



# STUDENT RESEARCH 2015-2016

Sponsored by Programs at Rhodes

(Rhodes faculty supervisors listed)

**Abdijabar G '16** and **Crowell M '17** A survey of the prevalence of West Nile Virus within raptors of the Mississippi Valley Region. (Mr. Jackie Denson in collaboration with Dr. Michael Collins)

**Amini A '17** Monitoring the red river hog's reproductive cycles at the Memphis Zoo. Dr. Katrina Knott, Memphis Zoo. (Dr. Sarah Boyle)

**Bittner E '16** Cephalosporin- and aminoglycoside-resistant gram-negative pathogens among pediatric cancer patients with febrile neutropenia, Dr. Rohit Ojha, St. Jude Children's Research Hospital (Dr. Sarah Boyle)

**Blatt E BMB '16** Activation of DNA Damage Response checkpoint causes pre-anaphase cell cycle arrest in KP1019 dependent manner in *S. cerevisiae* (Dr. Mary Miller)

**Brunneau A '18** Behavioral changes in three snake species after exhibit renovation (Dr. Sarah Boyle)

**Buck Q '16** Synthesis of unnatural peptides with antimicrobial activity (Dr. Roberto de la Salud Bea)

**Burman E '18, Giarla A ENVS '16, Ouyang Y '16** Behavioral and spatial patterns of the Nile hippo (Dr. Sarah Boyle)

**Bush C '19** Identification of phylogenetically informative indels in *Goodenia s.l.* (Dr. Rachel Jabaily)

**Carcelen E '17 ENVS '17, Ferguson S '17 ENVS '17, Rose B ENVS '16** Behavioral and spatial patterns of captive meerkats (Dr. Sarah Boyle)

**Carr C ENVS '17, Scoggins P '16, Tucker E '17** Social behavior and spatial movements of captive African elephants (Dr. Sarah Boyle)

**Carwile M '16** Monitoring trends in sex steroid concentrations after changes in husbandry to determine reproductive capacity of a Sumatran tiger (*Panthera tigris sumatrae*) Beth Roberts, Memphis Zoo. (Dr. Sarah Boyle)

**Choudhury B '18** Phylogenetic species delimitation in the *Goodenia pasqua* complex (Dr. Rachel Jabaily)

**Daniels P BMB '18** PCR-confirmation of promoter-replacement and deletion strains in *Aspergillus nidulans* (Dr. Terry Hill)

**DellaGrotta A '17** Functional assays for G1 Cyclin/Cdk activity in *S. cerevisiae* (Dr. Mary Miller)

**Dishuck C '17**, Wilson K, Dewar A, Peterson L and Cafiero M Design and synthesis of inhibitors of the LPXC enzyme (Dr. Mauricio Cafiero)

**Fuller M '16** Genetic screen for alpha 1-antitrypsin deficiency associated emphysema. Dr. Lawrence Reiter, Department of Neurology, University of Tennessee Health Science Center. (Dr. Gary Lindquenter)

**Goebel K '17** Impacts of forest fragmentation on mammals of the Atlantic Forest, Brazil (Dr. Sarah Boyle)

**Guida C BMB '17** Genomic heterogeneity in herpes simplex virus clinical isolates (Dr. Gary Lindquenter)

**Haugen B BMB '17** GFP tagging of the SepG protein in *Aspergillus nidulans* (Dr. Terry Hill)

**Hayward E BMB '16**, Herline K, Finckbeiner S, Guibao C, and Zheng J, Department of Structural Biology, St. Jude Children's Research Hospital, Expression, refolding, and purification of Bone Morphogenetic Protein 4 (BMP4) for potential use as an anticancer therapeutic agent (Dr. Laura Luque de Johnson)

**Hughes O '17** Phylogenetic species delimitation in the *Goodenia pinnatifida* complex (Dr. Rachel Jabaily)

**Johnson C '16** Identifying an astrovirus receptor. Dr. Shauna Marvin, Department of Infectious Diseases, St. Jude Children's Research Hospital. (Dr. Carolyn Jaslow)

**Jones E '17** Vegetative and reproductive allometrics in bromeliads (Dr. Rachel Jabaily)

**Leavey P '17** Quantifying hemoparasites from small mammals living in forest fragments in Paraguay (Dr. Sarah Boyle)

**Lenny B BMB '16** Investigation of microtubule-based motility of novel vesicles in *Aspergillus nidulans* (Dr. Terry Hill)

**Lichtenberger E '17** The effect of CPA and freezing technique on the reactivation of frozen bullsnake (*Pituophis catenifer*) sperm. Dr. Beth Roberts, Memphis Zoo. (Dr. Sarah Boyle)

**Loome J BMB '18** Construction of a calcium reporter plasmid for use in *Aspergillus nidulans* (Dr. Terry Hill)

**Lutat K CHEM '16** Halophiles: a new source for novel antibiotics (Mr. Jackie Denson)

**Michener P '17** Next-generation sequencing and utilization of transposable elements to resolve the backbone phylogeny of Core Goodeniaceae (Dr. Rachel Jabaily)

**Morris M NEURO '17**, Hatstat K, Cafiero M, and Peterson L DFT analysis of water clusters, dopaminergic derivatives, and their desolvation energies (Dr. Mauricio Cafiero)

**Morris S '18** Cyclin/Cdk interactions with the transmembrane protein Thi73. (Dr. Mary Miller)

**Mulder I '17** Developing a mouse model for traumatic brain injury. Dr. Anton Reiner, Anatomy and Neurobiology Department, University of Tennessee Health Science Center (Dr. Gary Lindquenter)

**Patel A '17** The utility of patient characteristics for differentiating Gram-negative and Gram-positive pathogens among pediatric cancer patients with febrile neutropenia. Dr. Rohit P. Ojha, Department of Epidemiology and Cancer Control, St. Jude Children's Research Hospital. (Dr. Carolyn Jaslow)

**Rose B ENVS '16** Land cover change and hippo conservation (Dr. Sarah Boyle)

**Rose B ENVS '16, Tremarelli M '16** Social behavior and spatial movements of captive fishing cats (Dr. Sarah Boyle)

**Singareddy A BMB '16 and Herlong B '16** Development of inexpensive, gesture-based methods to navigate virtual environments (Dr. Betsy Sanders)

**Tews A '16** Analysis of fecal glucocorticoid concentrations in captive brown bears (*Ursus arctos*). Dr. Katrina Knott, Memphis Zoo (Dr. Sarah Boyle)

**Williamson M BMB '18** Investigation of the role of the PaxB protein in growth and morphogenesis in *Aspergillus nidulans* (Dr. Terry Hill)



Rhodes College

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