

# BIOFEEDBACK

THE NEWSLETTER OF THE BIOLOGY DEPARTMENT AT RHODES

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## The Chair's Niche



Time flies. That was the sentiment expressed by Gary Lindquister in his last "Chair's Niche" before I took over the chair responsibilities in 2013. Wow, was he right! Not only does time fly, but when big changes are happening, sometimes life feels like a stop motion movie. Change usually leads

us to new and better ideas, places, and opportunities, but its pace can be intense! In the six years that I have been chair, the Biology Department has changed immensely. On top of the new students arriving each year with great enthusiasm and ambition, we have added new faculty, courses, and even a new building. It has been an exciting time. As I prepare to step back and Mary Miller becomes chair this summer, I would like to thank, first and foremost, the staff who are so essential to running the department. Without their hard work and endless assistance, I'm sure that the department would be in utter chaos. I would also like to express my great appreciation to my faculty colleagues, who are all so passionate about their science and so highly dedicated to providing the best possible courses and experiences for all students. Thank you for your tireless efforts to make the department the best it can be. I am also grateful to the many students who have passed through our doors. Each time someone outside the college has asked me what is the best part of my job, I tell them that it is the students, who are some of the nicest, most conscientious and hard-working people I have known. Thank you for the joy you have given me. Finally, I owe the deepest debt of gratitude to Alan Jaslow (the "other Dr. Jaslow"), whose endless patience, support, and advice kept me going. I am looking forward to resuming my work this fall as just another member of the Biology Department!

**Dr. Carolyn Jaslow, Chair**

## Primary Productivity & Secondary Growth

Honors | Awards | Grants | Publications | Meeting Participation

### HONORS AND AWARDS

#### Congratulations to:

**Colleen Hulsey ENVS/BIOM '19** won 1<sup>st</sup> place in the student poster competition at the Memphis Area Geographic Information Council's annual conference, November 2018

**Tierin Burrow ENVS '19** won 3<sup>rd</sup> place in the student poster competition at the Memphis Area Geographic Information Council's annual conference, November 2018



**Boyle S**, Alho C, Chism J, Defler T, Di Fiore A, Fernandez-Duque E, Palacios E, Santos R, Urbani B, Wallace R, Wright B, Wright K, and Barnett A. 2019. Conservation of primates and their flooded habitats in the Neotropics. In *Primates in Flooded Habitats: Ecology and Conservation*. Barnett, A. A, I. Matsuda, and K. Nowak (eds), Cambridge University Press: Cambridge, UK, pp. 359-73.

**Boyle S**. 2018. Deforestation. In *The International Encyclopedia of Biological Anthropology*. Trevathan, W. (ed.), John Wiley & Sons. DOI: 10.1002/9781118584538.

Fecchio A, Bell J, **Collins M**, Farias I, Trisos C, Tobias J, Tkach V, Weckstein J, Ricklefs R, and Batalha-Filho H. 2018. Diversification by host-switching and dispersal shaped the diversity and distribution of avian malaria parasites in Amazonia. *Oikos* 127:1233-1242. Doi: 10.1111/oik.05115.

Haberman J and **Ulrich L NEUR '16**. 2019. Precise ensemble face representation given incomplete visual input. *I-Perception*. 10:1-15. 204166918819014.

Jackson-Hayes L, **Atiq Z BMB '17**, **Betton B BMB '20**, **Freyaldenhoven T BMB '20**, **Myers L BMB '15**, **Olsen E BIOM '18**, and **Hill T**. 2019. *Aspergillus nidulans* protein kinase C forms a complex with

the formin SepA that is involved in apical growth and septation. *Fungal Genetics and Biology*. 122:21-30.

**Kabelik D**, Weitekamp C, **Choudhury S NEUR '15**, **Hartline J NEUR'16**, and **Smith A NEUR '16**, and Hofmann H. 2018. Neural activity in the social decision-making network of the brown anole during reproductive and agonistic encounters. *Hormones and Behavior*. 106:178-88. <https://doi.org/10.1016/j.yhbeh.2018.06.013>.

**Kabelik D** and Hofmann H. 2018. Comparative neuroendocrinology: A call for more study of reptiles! *Hormones and Behavior*. 106:189-92. <https://doi.org/10.1016/j.yhbeh.2018.10.005>.

Klatzkin R, **Baldassaro A NEUR '17**, and **Rashid S NEUR '18**. 2018. Physiological responses to acute stress and the drive to eat: The impact of perceived life stress. *Appetite*. Doi:10.1016/j.appet.2018.11.019.

Klatzkin R, **Baldassaro A NEUR '17**, and **Hayden E NEUR '18**. 2018. The impact of chronic stress on the predictors of acute stress-induced eating in women. *Appetite*, doi:10.1016/j.appet.2018.01.007.

Ng J, Weaver W, and **Laport R**. 2019. Testing Darwin's naturalization conundrum using phylogenetic relationships: generalizable patterns across disparate communities. *Diversity and Distributions* 25: 361-73. <https://doi.org/10.1111/ddi.12861>.

O'Connor T, **Laport R**, and Whiteman N. 2019. Polyploidy in creosote bush (*Larrea tridentata*) shapes the distribution and diversity gradients of specialist herbivores. *Journal of Biogeography*. <https://doi.org/10.1111/jbi.13490>.

Stoddard S, Welsh C, **Palopoli M BMB '20**, Stoddard S, **Aramandla M '19**, Patel R, and Beck L. 2018. Structure and function insights garnered from in silico modelling of the thrombospondin type-1 domain-containing 7A antigen. *Proteins*. 87:136-45. PMID: 30520531

**ZeeAbrahamsen E NEUR '18** and Haberman J. 2018. Correcting 'Confusability Regions' in face morphs. *Behavior Research Methods*. <https://doi.org/10.3758/s13428-018-103-2>.

## Meetings

**Kabelik D**, Weitekamp C, **Hartline J NEUR '16**, **Smith A NEUR '16**, and Hofmann H. Neural activity in the social decision-making network of the brown anole during reproductive and agonistic encounters. So-

ciety for Neuroscience Meeting, San Diego, CA. (November 2018)

Klatzkin R, **Cattaneo C NEUR '18**, **Warren M NEUR '19**, **Dasani R NEUR '19**, and **Nadel T NEUR '20**. Predictors of stress-eating differ for women displaying stress over-eating versus under-eating. The 26<sup>th</sup> annual meeting of the Society for the Study of Ingestive Behavior. Bonita Springs, FL. (July 2018)

Klatzkin R, **Dasani R NEUR '19**, **Nadel T NEUR '21**, **Cattaneo C NEUR '18**, and **Warren M NEUR '19**. Moderators of the reduction in negative mood following stress-eating. The Annual Meeting of the Obesity Society, Nashville, TN. (November 2018)

**Laport R** and O'Connor T. Whole genome duplication shapes pollinator-mediated assortative mating and herbivore diversity. Plant and Animal Genomes Annual Meeting, San Diego, CA. Invited Talk (January 2019)

**Laport R**. Patterns and Drivers of Biodiversity: Genome duplication shapes pollinator visitation, herbivore specialization, and plant community structure. Portland State University Department of Biology, Invited Seminar (March 2019)

**Laport R**. Patterns and drivers of biodiversity: Genome duplication, pollinators, herbivores, and community structure. Portland State University Department of Biology, Invited Seminar (March 2019)

**Laport R**. Patterns and drivers of biodiversity: Genome duplication shapes pollinator and herbivore communities.

St. Paul's School, Concord, NH, Invited Seminar (April 2019)

**Mysiewicz S NEUR '19** and **Dougherty K**. Local Network Synchronization on the rat dorsal and ventral hippocampus throughout development. Annual Meeting of The Society for Neuroscience. San Diego, CA. (November 2018).

## Mid-South GIS Conference

Colleen Hulsey (Environmental Science and BioMath double major) and Tierin Burrow (Environmental Science major) received awards at the Memphis Area Geographic Information Council's annual conference (November 1 and 2). Colleen won 1<sup>st</sup> place in the student poster competition for her research project "Bee population shift in California from 2001 to 2011," and Tierin won 3<sup>rd</sup> place in the student poster competition for her project "Food source availability in Shelby County, TN." This student competition included entries from undergraduate and graduate students.

## Grants and Fellowships

Casey Z, Horgen D, Seaton C, and **FitzGerald J**. Urban Teacher Partnership for Culturally Relevant STEM Education. The National Science Foundation. \$1,168,344.

Weaver W, Ng J, and **Laport R**. Microsoft Azure AI for Earth Compute Grant. 2019-2020. LeafMachine: Autonomous Trait Data Extraction from Digitized Plant Specimens using Machine Learning. \$10,000.





# Curricular Evolution Biology Course Updates for 2019 -2020

## What to expect next year

Dr. C. Jaslow was granted a one-semester sabbatical leave for '19-'20 and will not be teaching any courses in the spring. In the fall, she will offer Embryology in addition to Histology. After spending this year as an Associate Provost, Dr. Gary Lindquister will be taking a sabbatical next year as well. In spite of his leave, we will be offering Molecular Biology both semesters next year. On the other hand, we do not yet know if Virology/Immunology will be offered. We are searching this spring to bring in two

faculty to help cover courses for the year. One of them will be teaching Molecular Biology and a senior seminar. The other will be contributing to term I core and will offer an upper-level non-lab course in the spring. This may be a course like Virology/Immunology, or it may be another subject in a cellular or molecular field.

## What's up next Spring?

In the spring of 2020 we tentatively plan to offer the following lab courses: Animal Physiology, Conservation Biology, Genetics,

Mechanisms of Development, Microbiology, Molecular Biology, Molecular & Cellular Neuroscience, Mycology, and Ornithology. Courses without lab will include Topics in Biomedical Science and another course in a cellular/molecular topic that will be announced in the fall.

There is also the possibility we will offer a course in Climate Science, but that is still up in the air, so to speak. Spring should include sections of Biochemistry, Mechanisms of Drug Action, and Neuroscience.

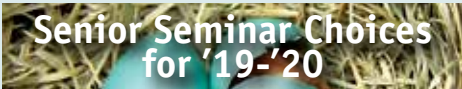
## Senior Seminar Lottery

**Wednesday, March 20 at 4:00 PM in FJ-D**

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

**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 FJ-D at 4:00 PM on Wednesday, March 20.**

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



### Senior Seminar Choices for '19-'20

#### Fall Senior Seminar

**BIOL 485 Insect Microbiomes**  
**Dr. Stephanie Haddad**  
**MWF 11:00-11:50**

Insects are hosts for a remarkable diversity of symbiotic microorganisms that play important roles in insect metabolism, immunity, reproduction, lifespan, and overall evolution. Recent research also suggests that insect microbiomes may be a new source of antibiotics and antifungals for potential use in human medicine. In this senior seminar class, we will explore various aspects of the biology of insect micro-

biomes and discuss its potential implications in the fields of ecology, evolution, conservation, and human medicine. We will critically review published scientific papers and prepare presentations and reports on topics of interest to the class.

#### Spring Senior Seminars

**BIOL 486-01: Topics in Cellular/  
Molecular Biology**  
**TBA**  
**MWF 11:00-11:50**

This senior seminar section will be taught by the person who is hired to teach Molecular Biology next year. As with all of our senior seminars, the specific topic will be determined based upon this person's background and interests.

**BIOL 486-2: The Molecular Basis of  
Cancer**

**Dr. Mary Miller**  
**TR 11:00-12:15**

This seminar will focus on the molecular basis of cancer, including impacts on cancer diagnosis and treatment. Students will read and discuss primary literature on topics including cell cycle regulation, apoptosis and programmed cell death, signal transduction, and metastatic tumors. Students will research a topic of their own interest that is pertinent to cancer biology, provide a summary of their findings in the form of a paper, present this topic to the class, and evaluate the presentations of other students.



# Optimal Foraging

The following courses  
will be offered next semester

Number	Course Title	Hours Offered
120	Intro to Environmental Science	MWF 11:00-11:50 T lab 12:30-3:30
130	Biology I (5 sections)	MWF 8:00-8:50, 9:00-9:50, 10:00-10:50 TR 9:30-10:45, 11:00-12:15
131	Biology I Lab (10 sections)	T 12:30-3:30, 4:00-7:00 W 1:00-4:00, R 12:30-3:30 F 1:00-4:00
200	Evolution (Laport)	TR 9:30-10:45 R lab 12:30-3:30
207	Animal Behavior (Boyle)	MWF 8:00-8:50 W lab 1:00-4:00
209	Embryology (C. Jaslow)	TR 8:00-9:15
301	Microbiology (Frawley)	MWF 9:00-9:50 R lab 12:30-3:30
304	Genetics (Miller)	TR 9:30-10:45 T lab 12:30-3:30
307	Cell Biology (Hill)	TR 8:00-9:15
315	Ecology (Collins)	TR 11:00-12:15 M lab 1:00-4:00
325	Molecular Biology (TBA)	MWF 10:00-10:50 R lab 12:30-3:30
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
375	Neuroendocrinology (Kabelik)	MWF 10:00-10:50 M lab 1:00-5:00
BMB 310	Methods in Cell Biology (Hill)	W 1:00-5:00
CHEM 414†	Biochemistry (Stoddard, Loprete)	MWF 11:00-11:50, TR 11:00-12:15
NEUR 270†	Neuroscience (Pandit, Dougherty)	MWF 9:00-10:00, TR 9:30-10:45
<b>Senior Seminar Sections</b>		
485	Insect Microbiomes (Haddad)	MWF 11:00-11:50

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

## The Rhodes College Herbarium

In a nondescript room in FJ, the Rhodes College Herbarium is marked unassumingly with a door placard engraved "Herbarium." What is an herbarium? What lies behind that mysterious door? In its simplest form, an herbarium is a collection of pressed, dried plant material mounted on archival paper sheets with labels that include information on where and when a specimen was collected, what species it is, and who collected the specimen. Such collections have long been an important historical record for botanists, plant scientists, evolutionary biologists, and ecologists studying patterns of biodiversity, evolutionary relationships, community ecology, and climate change.

The Rhodes College Herbarium (Fig. 1) houses just a little over 5,000 preserved plant specimens in 4 steel cabinets in a cramped windowless closet. Compared to other regional herbaria, such as the Missouri Botanical Garden Herbarium in St. Louis (~7 million specimens), the University of Tennessee-Knoxville Herbarium (~250,000 specimens), and even the University of Memphis Herbarium (~17,000 specimen), the Rhodes College Herbarium represents a modest collection. However, the Rhodes College Herbarium is notable in other important and surprising ways. Despite its small size, the herbarium collection houses specimens from an impressive geographic area. The majority of the collection is from the state of Tennessee and the Midsouth, but significant contributions come from the Pacific Northwest and the southwestern deserts. In fact, the average distance between Rhodes College and the origin of a collection is over 1,000km! This is nearly 3 times the average distance for major herbaria in Tennessee, suggesting past botanists at Rhodes have been active collectors in far-flung locales. In addition to having impressive geographic reach, the herbarium houses some of the oldest collections in the state. The oldest specimen in the herbarium is a small flowering herb known as fringed milkwort or gaywings (*Polygala paucifolia*) that was collected in 1845 in New York State!

The herbarium remains an active repository for plant collections and botanical research, and has become an indispensable resource in the digital age. Recent efforts by a former Rhodes faculty member, Dr. Rachel Jabaily, resulted in a special section of the herbarium comprising collections of nearly all plant species in the Overton Park Old Forest. Dr. Robert Laport is broadening these efforts to enrich collections of the desert southwest as well as western Tennessee flora, a part of the state that has historically been undersampled by botanists. These efforts have already resulted in adding new desert flora to the collection,

and new specimens of the nearly extirpated American Chestnut (*Castanea dentata*). Collected in Fayette County, these American Chestnut specimens (Fig. 2) represent some of the western-most records of this once-widespread species that historically reached its western range limit in the Memphis area. Traditionally, biologists would visit herbaria around the world to physically examine specimens, and nobody dreamed that specimens would be accessible in a digital format or that DNA could be extracted from dried herbarium specimens for conducting genetic analyses. Now, the specimens in many herbaria have been photographed and digitized, making them accessible worldwide through online databases for inclusion in large scale research projects. This includes the Rhodes College Herbarium, which was recently digitized by Dr. Joey Shaw and colleagues at the University of Tennessee-Chattanooga. Moreover, the advent of new DNA extraction and sequencing methods has enabled the use of herbarium specimens to help answer questions about historical patterns of biodiversity and evolutionary relationships. The collections in the Rhodes College Herbarium may someday become part of such efforts.

The wealth of information contained in digitized herbaria presents new challenges to researchers seeking to study plant specimens. For example, having millions of specimens to examine can easily overwhelm time available to sort and process. However, innovations in computer vision and machine learning can be leveraged to autonomously sort through digitized repositories of specimens, as well as to actually identify features associated with specimens (leaves, flowers, text, etc.) and extract information useful for scientific studies. Dr. Laport and colleagues are working on ways to do this in a completely automated way with recent grants from the National Science Foundation and Microsoft Azure AI for Earth, making information on digitized herbarium and natural history collections at other museums useful for researchers around the world. Using the Rhodes College Herbarium as a model, they are training a machine learning algorithm to identify leaves, stems, flowers, labels, and rulers, and to record relevant information (Fig. 3) about those features for ongoing research. Currently, they have made software available that can do these tasks with some human input (<https://github.com/GeneWeaver/LeafMachine>), and it is their hope that as these computational approaches get better at recognizing overlapping and damaged structures, a completely automated software package will be available ([www.LeafMachine.org](http://www.LeafMachine.org)) for use in a myriad of applications.

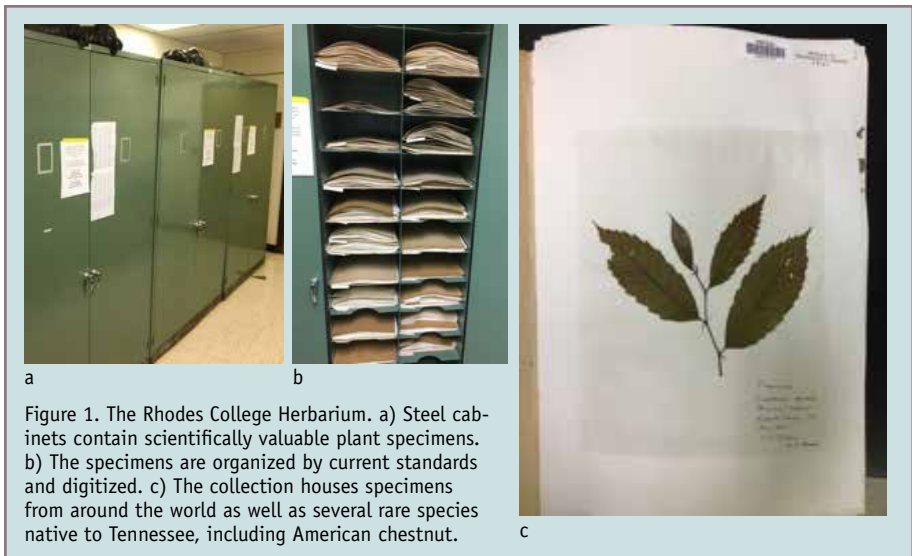


Figure 1. The Rhodes College Herbarium. a) Steel cabinets contain scientifically valuable plant specimens. b) The specimens are organized by current standards and digitized. c) The collection houses specimens from around the world as well as several rare species native to Tennessee, including American chestnut.



Figure 2. a) A voucher specimen of American Chestnut from Fayette Co., Tennessee to be deposited in the Rhodes College Herbarium. b) Dr. Laport with a living specimen of American Chestnut in Fayette Co., Tennessee.

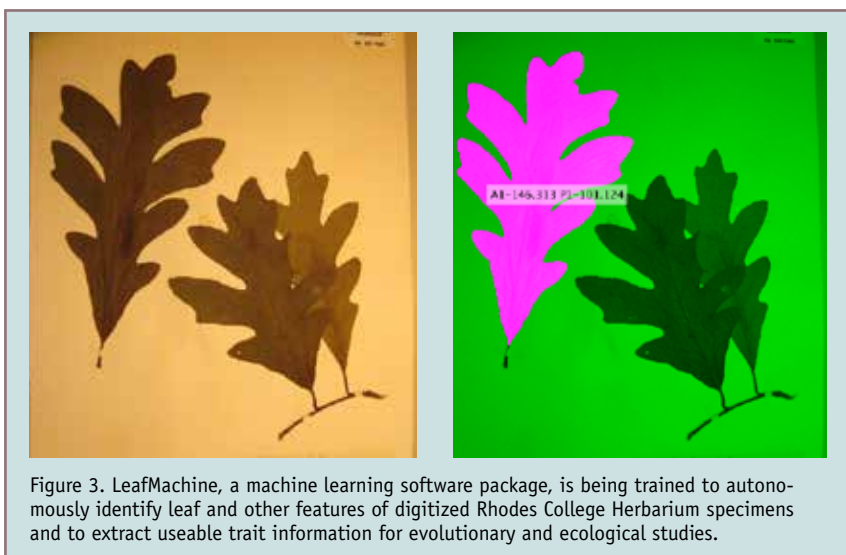


Figure 3. LeafMachine, a machine learning software package, is being trained to autonomously identify leaf and other features of digitized Rhodes College Herbarium specimens and to extract useable trait information for evolutionary and ecological studies.



# 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, Lauren Hamm [hamln-19@rhodes.edu](mailto:hamln-19@rhodes.edu) or vice president, Teia Popsecu [popfi-19@rhodes.edu](mailto:popfi-19@rhodes.edu).



Tri-Beta has some exciting service projects planned for the fall and spring semesters. 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. Finally, we will be inducting new members toward the end of this spring semester. We are excited to welcome new individuals into the society and congratulate them on their commitment to biological excellence.

### \$\$ Biology Research Award \$\$

This spring, the Biology Department will be presenting the "Award for Outstanding Student Research in Biology." Any Biology Major 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. Dougherty, [doughertyk@rhodes.edu](mailto:doughertyk@rhodes.edu) by Friday, March 29th, 2019. Announcement of the award winner will be made at spring awards convocation ceremony.

### Rhodes Symposium

The Rhodes Symposium (formerly known as URCAS) provides you the opportunity to showcase your outstanding work to the entire campus community. You will gain first-hand experience in communicating your research and creative activity, an essential part of professional growth. The Symposium will take place on Friday, April 26, 2019.

### Work in the Biology Department

The Biology Department is looking for students to work during the summer and 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



### Mugs for Majors!

The *Pentaceratops* dinosaur that occupied the FJ Lobby for 20 years was removed during renovations in 2013. We now have a mural and fond memories of its time in FJ, plus we also have Biology Dinosaur coffee mugs for majors! When you complete your declaration of a Biology major, stop by the Biology office (FJ 132, by the Robertson Hall connector) and ask Ms. Dianne Cox for your mug. You can also pick one up if you declared before this year and never got one. Cheers!

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 19, 2019. 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

On behalf of the Environmental Studies and Sciences (ENVS) faculty, here's a big welcome to our new ENVS majors! There is a range of environmentally-focused courses being offered in Fall 2019. Please see the flyers in Rhodes Tower and FJ to see the full list. Some of these courses include ENVS 150 Environment & Society (which will only be offered in Fall 2019, not Spring 2020), BIOL 120 Intro to Environmental Science (Fall only), and ENVS 111 Physical Geology (Fall only). Students who have not yet taken INTD 225 (GIS) should enroll in one of the two Fall 2019 sections. Students with an interest in biological or environmental sciences are encouraged to enroll in the T/R 9:30 am section with Dr. Boyle. If you are considering an ENVS major or minor, please speak with Dr. Boyle so she can make sure you receive important emails.

## Biochemistry and Molecular Biology

**Fall 2019 courses:** All three of the core, upper level, BMB lecture courses will be offered fall 2018: BIO 307 (Cell Biology), BIO 325 and 325L (Molecular Biology and lab), and CHEM 414 (Biochemistry). BMB 310 (Methods) will also be offered this fall. CHEM 416 (Mechanisms of Drug Action) will be offered again in Spring 2020. Please consult the online course schedule for times and other course information as it is made available.

**ASBMB Certification Exam:** This year ASBMB has moved the exam earlier in the semester (mid-March), so graduating seniors can learn about their results prior to graduation.

The BMB Program hosted alumna Kristen Wendt (BMB '14) on Nov. 26, 2018. She is a Ph.D. candidate at Washington University in St. Louis in the Pakrasi Lab. While here, she presented her research on the "Mutational analysis of a fast-growing cyanobacterial strain for biofuel production" and met with students interested in graduate school.

As always, please feel free to contact program chair Dr. Peterson at [petersonl@rhodes.edu](mailto:petersonl@rhodes.edu) if you have questions concerning the BMB program.

## Neuroscience Program Announcements

In fall 2019, we will welcome Dr. Tanushree Pandit to the Neuroscience Program faculty. Dr. Pandit conducts research in Neural Development and will be moving over to Rhodes from a postdoctoral position at St. Jude Children's Research Hospital. She will initially be teaching EUR 270 and the senior seminar course, although we hope to be able to offer a Developmental Neuroscience course at some point in the future.

Speaking of new courses, Dr. Klatzkin will begin teaching her new course, Clinical Neuroscience, starting next fall. We hope to be able to offer this course every year.

We will also be switching the order of the Movement Neuroscience and the Cognitive Neuroscience courses for next year. Cognitive Neuroscience will now be offered in the fall, while Movement Neuroscience will be offered in the spring.

If you are missing our Philosophy breadth courses, this is because Dr. Haas is currently conducting research in sunny Australia – and enjoying their winter temperatures of over 110F! Luckily, she will be back in Spring 2020 when she will offer Philosophy and Neuroscience, and the plan is to then offer Philosophy and Cognitive Science the following year, likely in Fall 2020.

Finally, we will be offering our senior seminar classes only in the spring next year, so please take that into account when scheduling classes. And speaking of senior seminars, if any of you are planning to graduate a semester early, then please contact Dr. Kabelik so that we can plan your schedule and our course offerings accordingly.

**Have other burning Neuroscience questions?** Please email Dr. Kabelik ([kabelikd@rhodes.edu](mailto:kabelikd@rhodes.edu)), the chair of Neuroscience.





# Student Research 2018-2019

## Sponsored by Programs at Rhodes

(Rhodes faculty supervisors listed)

**Alana A BMB '20** and **Betonio M BMB '20**. Synthesis of 3,4-dihydroxyhydrocinnamic acid derivatives to study the kinetic mechanisms of L-DOPA dioxygenase. (Dr. Larryn Peterson)

**Aldana-Proulx J '22, Cheang A ENVS/BIO '21, Cheney C '21, Ferrari G '20, Hernandez J ENVS '21, Hill J '21, Karabell S '21, Lam L ENVS '19, McGuire C ENVS '20, Szuwalski J '19, and Wigman G '22**. Spatial and behavioral analyses of captive African elephants. (Dr. Sarah Boyle)

**Alapati A NEUR '19**, Han J, Peters T, Palmer G, and Reiter L. A medium throughput compound screen for approved drugs that suppress seizures in Dup15q syndrome. Rhodes UT Neuroscience Institute. (Dr. David Kabelik)

**Batschelett M NEUR '21** and **Waddell B NEUR '21**. Baseline neural activity differences between bold and shy male green anoles, *Anolis carolinensis*. (Dr. David Kabelik)

**Betton B BMB '20, Freyaldenhoven T BMB '20, Vanderwall D BMB '20** and **Hameed Y BMB '21**. Determining protein components of protein kinase C complexes involved in septation in filamentous fungi. (Dr. Loretta Jackson-Hayes)

**Brookover Z BIOM '21**. Co-immunoprecipitation of proteins interacting with Sep-GIQGAP in the filamentous fungus *Aspergillus nidulans*. (Dr. Terry Hill)

**Burrow T ENVS '19** and **Bobay M '21**. Amazon forest loss and fragmentation: impacts on mammals. (Dr. Sarah Boyle)

**Candia K ENVS '20**. Behavioral analyses of predator avoidance during parental care in the Hansen's bush frog. Dr. Sinlan Poo, Memphis Zoo. (Dr. Sarah Boyle)

**Christman B ENVS/BIO '21, Cohn M ENVS '21, and DiMartini E '21**. Morphometrics of dusky gopher frog sperm before and after cryopreservation. Kristin Hinkson, Memphis Zoo. (Dr. Sarah Boyle)

**Connor A NEUR '20**, Weatherspoon S, Rezaie R, Holder C, Choudhri A, Ponders A, and Wheless J. Epilepsy surgery outcomes in pediatric patients with tuberous sclerosis complex. Rhodes Le Bonheur Neuroscience Institute Fellowship. (Dr. David Kabelik)

**Dave P NEUR '19, Sabio J NEUR '19, and Mendez Morales G NEUR '20**. Vasopressin receptor (V1aR) expression in green anoles (*Anolis carolinensis*) relative to season (breeding versus non-breeding) and sex (male versus female). (Dr. David Kabelik)

Hersh D, **Dave P NEUR '19**, Weeks M, Hankinson T, Karimian B, Staulcup S, Van Poppel M, Wait S, Vaughn B, and Klimo P. Converting pediatric patients and young adults from a shunt to a third ventriculostomy: a multicenter evaluation. Rhodes Le Bonheur Summer Plus Fellowship. (Dr. David Kabelik)

**Enda S '22, Forehand E '19, Lee W '19, Li K '20, and Zhang Y '20**. Behavioral and spatial patterns of the Nile hippo. (Dr. Sarah Boyle)

**Gasner K '20**. Peroxide sensitivity of *Salmonella* Typhimurium manganese transport mutants. (Dr. Elaine Frawley)

**Giampapa R BMB '19**. DFT analysis of the selectivity of phenylalanine hydroxylase. (Dr. Mauricio Cafiero)

**Heimann R NEUR '20, Baker J NEUR '11, and Hamre K**. Maternal genotype, choline intervention and epigenetics in Fetal Alcohol Syndrome. UTHSC Neuroscience Institute. (Dr. David Kabelik)

**Hill M BMB '19**. Analysis of sulfation of dopamine and related catechol derivatives by SULTaA3. (Dr. Larryn Peterson)

**Ho T BMB '22** and **Nyamkondiwa K BMB '22**. GFP tagging of mutant proteins PaxB and Hof1 in the filamentous fungus *Aspergillus nidulans*. (Dr. Terry Hill)

**Kirkpatrick C BMB '20**. Deletion of the FksA and ChsB genes in the filamentous fungus *Aspergillus nidulans*. (Dr. Terry Hill)

**Larsen M BMB '21**. How loss of the protein NSD1 results in malignant rhabdoid tumors that are resistant to tumor-suppressing drugs. St. Jude Summer Plus, Dr. Charles Roberts and Dr. Yiannis Drosos. (Dr. Elaine Frawley)

**Litten M NEUR '19**, Phillips N, Krull K, Brinkman T, Banerjee P, Mirzaei S, Robison L, and Hudson M. Use of transcranial direct current stimulation of the lateral temporal cortex to improve measures of cognitive function in long-term childhood cancer survivors. Rhodes College St. Jude Summer Plus Fellowship. (Dr. David Kabelik)

**Mazumder R NEUR '19**. Synthesis of L-DOPA derivatives. (Dr. Larryn Peterson)

**Owen C NEUR '20** and **Popescu F BIOL & NEUR '20**. Variability in social boldness among female green anole lizards, *Anolis carolinensis*. (Dr. David Kabelik)

**Ouyang A '20**. The biological role and metal transport specificity of YiiP in *Salmonella* Typhimurium. (Dr. Elaine Frawley)

**Palopoli M BMB '20** and **Galani A BMB '21**. Developing novel therapeutic proteins for the autoimmune disorder primary membranous nephropathy. (Dr. Shana Stoddard)

**Quesada S NEUR '20**, Coca K, Qaddoumi I, Merchant T, and Acharya S. Visual outcomes after radiation therapy for optic pathway gliomas. Rhodes College St. Jude Summer Plus Fellowship. (Dr. David Kabelik)

**Rasasack I BMB '20**. Development of novel therapeutic proteins for the autoimmune disorder systemic lupus erythematosus. (Dr. Shana Stoddard)

**Rowland L BMB '19**. Co-immunoprecipitation of proteins interacting with Protein Kinase C in the filamentous fungus *Aspergillus nidulans*. (Dr. Terry Hill)

**Ryan K NEUR '19**. Multifaceted Comparison of Concussion Rate and Symptomology between Division I and Division II Athletics. LeBonheur Summer Plus Neuroscience Fellowship. (Dr. Jason Haberman)

**Schupp W NEUR '20**, Sakata K, and O'Brien S. Enriched environment and standard cage treatment effects on brain-derived neurotrophic factor levels in the hippocampus, prefrontal cortex, and peripheral regions in wild-type and KIV mice. (Dr. David Kabelik)

**Tiwari A BMB '21**. Comparing distributions of the neural activity markers Fos and pS6. (Dr. David Kabelik)

**Ward R BMB '21**. Co-immunoprecipitation of proteins interacting with PaxB paxillin in *Aspergillus nidulans*. (Dr. Terry Hill)

**Yousuf S BMB '19**. Regulation of manganese transporter expression in response to nitric oxide stress. (Dr. Elaine Frawley)

