

# BIOLOGICAL SCIENCES NEWSLETTER



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## HIGHLIGHTS FOR SPRING 2017

- Dr. Parrish Waters wins external grant.
- Tropical Ecology travels to Panama.
- Graduating seniors admitted to graduate and professional schools.

## ASSISTANT PROFESSOR PARRISH WATERS AWARDED JEFFRESS MEMORIAL TRUST GRANT

Dr. Parrish Waters has won a prestigious Thomas F. and Kate Miller Jeffress Memorial Trust grant to support his research program that explores the relationship between an animal's ability to cope with stress and its social dominance rank. The \$100,000 award will fund one year of research and support the participation of six students over the summer months. The co-investigators for the project are Dr. David Stahlman, Dept. of Psychological Science and Dr. Jennifer Pollack, Dept. of Computer Science. Even among humans, according to Waters, any social encounter, no matter how comfortable, leads to activation of the sympathetic nervous system, causes hormone release, and triggers activity in stress-related brain areas. "In social animals, being constantly ready to respond to social threats and opportunities is adaptive and ultimately is important to reproductive success," said Waters.

Dr. Waters' research system relies on automated equipment that continually monitors the spatial distribution of mice, which naturally form dominance hierarchies, living together in a shared space. Since this equipment will generate huge numbers of data points, the team will develop sophisticated computer algorithms to efficiently identify behaviors that influence social rank. The physiology end of the project investigates the activity of four major neuropeptide systems asso-



Assistant Professor Dr. Parrish Waters

ciated with social rank. Exercise is also known to affect these same neuropeptides. Thus, another intriguing direction for this research will be to further examine the influence of exercise on individuals' ability to achieve and maintain a dominant position.

Dr. Waters is the second Biological Sciences faculty member to win a Jeffress grant. Dr. Deborah Zies won a three-year research grant in 2009 for her project, "The role of PPAR $\gamma$  in the differentiation and function of the kidney cortical collecting duct."

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## JEPSON SCIENCE CENTER WELCOMES NEW ADMINISTRATIVE ASSISTANT

The department is pleased to welcome new Office Manager, **Jessica Murphy**, who joined Jepson Science Center's staff in January. Ms. Murphy joined long-time office manager Wilma Willard in procuring equipment and supplies for Jepson's science departments and providing other invaluable support for delivery of their academic programs. Jessica was previously employed by the university's Office of Public Safety, so she knows her way around campus! "Getting the opportunity to come back and work in Jepson was a great chance to explore new and better opportunities. I have enjoyed learning new things from each department and getting to meet such wonderful people. I have always considered the University of Mary Washington as home and I am so glad I was blessed to come back."



Jessica Murphy, Office Manager for Jepson Science Center.

## BIOLOGY STUDENTS VISIT PANAMA!



Students visit the canopy tower at the Rainforest Discovery Center in Gamboa



Heliconius butterfly at the Rainforest Discovery Center in Gamboa

**Drs. Andrew Dolby and Alan Griffith** led a group of 20 biology and environmental science students on a spring break trip to Panamá as part of BIOL 424-Tropical Ecology. Tour services were provided by Guido Berguido, naturalist and founder of the ecotourism company Advantage Tours Panama and a cloud forest preserve in the Darien region of the country. The class visited five different national parks and snorkeled in both the Pacific Ocean and Caribbean Sea. The tour started in Gamboa with a hike along Pipeline Road. Winding their way through lowland tropical forest, students spotted howler monkeys, a 3-toed sloth, and colorful birds and butterflies. Berguido provided instruction and identified plants and animals along the way. At dawn the next morning, the class climbed the Rainforest Discovery Center's canopy tower to witness the forest waking up as the sun rose. Evening brought a bat seminar and bat mist-netting demonstration by a graduate student studying at the Smithsonian Tropical Research Institute.

The next excursion took the class to the picturesque Pacific coastal village, Pedasí, which served as the staging point for a snorkeling trip to Isla Iguana Wildlife Refuge. Students were treated to sea turtles, Magnificent Frigatebirds, and spectacular parrotfish, angelfish, wrasse, and Moorish idol. A follow-up snorkeling trip on Panama's Caribbean coast provided an opportunity to compare marine communities on both sides of the isthmus.

Back near Gamboa, the class also hiked through the epiphyte blanketed cloud forest in Altos de Campana Biological Reserve.

The tour also included a sampling of Panama's diverse and lively culture, with visits to Panama City's Museum of Biodiversity, Casco Viejo, and the Embera Village in Chagras National Park. The Embera introduced students to their indigenous lifestyle, art and music, and relationship with the rainforest. "This trip was honestly more than I could have ever expected it to be. It was an unexpected journey," said student Peri Smith. Plans are underway for the next trip to Panamá.

*"I arrived not knowing what to expect, but left wanting to learn more!"*  
-Ann Izzard



Isla Iguana Wildlife Refuge.



Heller's broad-nosed bat captured by Smithsonian Tropical Research Institute graduate student.



Zip-lining in Colón.

## GOOD NEWS FOR RECENT GRADUATES AND CLASS OF 2017!



Tom Hudson, pictured with a Peregrine Falcon, is studying Sharp-shinned Hawks in Puerto Rico.

- **Sofia Di Benigno** (Class of 2017) has been admitted to the Biological Sciences Graduate Program at the University of Maryland where she will pursue a Ph.D. in the Dept. of Molecular and Cellular Biology.
- **Julie Choi** (Class of 2016) is now employed as a medical technologist by Quest Diagnostics.
- **Kristina Curry and John Kobuchi** (Class of 2017) will enter UMW's accelerated M.Ed. in Secondary Education in the fall.
- **Tom Hudson** (Class of 2016) is working as a field biologist for the Peregrine Fund in Puerto Rico on a project studying the island's endangered Sharp-shinned Hawk population.
- **Jake Kalkstein** (Class of 2017) has been admitted to Howard University's College of Dentistry.
- **Courtland Lyle** (Class of 2017) will enter Eastern Tennessee State University's Master's in Geoscience program, with a concentration in paleontology.
- **Julianna Procaccini** (Class of 2016) has accepted admission of Virginia Tech's Edward Via College of Osteopathic Medicine.
- **Katherine Qualls** (Class of 2017) has been accepted into the University of Cincinnati's Ph.D. Program in Molecular, Cellular and Biochemical Pharmacology.



## DEPARTMENT COMPLETES ITS 10TH-YEAR PROGRAM REVIEW

As part of the university's institutional analysis and effectiveness program, the department completed its 10th-Year Program Review during the 2016-17 academic year. All departments must complete them to help maintain the university's accreditation with the Southern Association of Colleges and Schools (SACS). The purpose of these reviews is to evaluate progress since the last review and to set priorities for the next 10 years. They provide valuable opportunities for reflection and to initiate program improvements.

The faculty evaluated all aspects of the department's operations, including the biology major curriculum, opportunities for students to conduct independent research, equipment and facilities, and staffing. In addition, two external reviewers, faculty from James Madison University and University of North Carolina-Asheville, visited the department in November and contributed their recommendations. The review process culminated in a day-long faculty retreat at Gari Melchers Home and Studio in January.

The most important and exciting initiative the review produced is to bring the biology major program in line with the American Association for the Advancement of Science's Vision and Change (V&C) report of 2011. This report recommends greater emphases on scientific skill building, inquiry-based learning, and strengthening of connections among biology sub-disciplines. The department was beginning to implement some of V&C's recommendations before the 10-yr review, but now they will become fully embedded in the curriculum and student learning outcomes. "Completing our 10 year plan makes me very excited for the future of UMW biology. Our continued commitment to meeting the national recommendations of Vision & Change will translate into positive changes in our curriculum. In particular, I look forward to working on the integration of authentic research experiences in introductory and upper level core biology courses," said Deborah Zies, a member of the department's Outcomes and Curriculum Committee, which first looked into bringing V&C to the program.

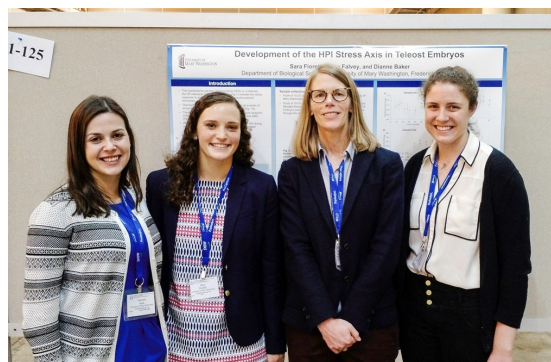
Faculty will also develop new assessment tools to evaluate the biology major's outcomes and improve existing ones.

Student outreach and advising were identified as other important areas for improvement. The department plans to offer group advising sessions for biology majors (and prospective majors) to better prepare them for individual meetings with their advisors, and a new committee will provide supplementary outreach for transfer students, a demographic with unique advising challenges.

Additionally, the faculty will engage each class in carrying out a group service project over their three years as biology majors. The preliminary vision is to charge first-year students enrolled in BIOL 132, the gateway course to the biology major, with identifying a community service project for the class to work on over their subsequent years as biology majors. This program will reinforce the university's commitment to community service and liberal arts education, and strengthen bonds among biology students.

## FACULTY AND STUDENTS PRESENT RESEARCH AT CONFERENCES

- Dianne Baker** was co-author on two posters presented by her research students at the Society of Integrative and Comparative Biology meeting in New Orleans in January: "Embryonic Development of the Stress Axis in Two Model Teleost Species", presented by **Sarah Fioretti** (Class of 2019), and "The Effect of Kisspeptin 1 on Gonadotropin Releasing Hormone Neurons in Embryonic Medaka (*Oryzias latipes*)," presented by **Hannah Kass** (Class of 2017), who is completing a special major in biochemistry. Also in attendance were two UMW biology alums, **Abby Kimmitt** (Class of 2013) and **Michael Carlo** (Class of 2013; see last page), now National Science Foundation-supported Ph.D. candidates at the University of Indiana and Clemson University, respectively.
- Dianne Baker** presented a poster titled "Improving the recruitment, retention, and success of students in STEM disciplines" at The Experimental Biology Meeting in Chicago in April. The poster was co-authored by Kelli Slunt, Dept. of Chemistry.
- Parrish Waters** co-authored two posters presented at the National Conference for Undergraduate Research meeting in April 2017 by his research students: "Neural and hormonal mechanisms of social behavior in mice", by **Hannah Belski** (Class of 2018) and "Developing a novel operant behavior testing chamber using a touchscreen and an Arduino", by **Emily Ferguson** (Class of 2017).
- Deborah Zies** presented a poster titled "Integrating research experiences into introductory biology laboratory to engage undergraduates in STEM learning" at The Experimental Biology Meeting in Chicago in April. The poster was co-authored by **Michael Stebar** and **Dianne Baker**. Dr. Zies also co-authored a poster titled "Examining the effects of aldosterone on putative target genes in mouse collecting duct cells." This poster was presented by her research student **Brandon Nolan**.



SICB Meeting poster session. Pictured from left to right: Hannah Kass (Class of 2017), Sarah Fioretti (Class of 2019), Dianne Baker and Abby Kimmitt (Class of 2013).

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### **SPECIAL THANKS TO OUR RECENT PROGRAM DONORS:**

- Ellen Brown, Fredericksburg, VA
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- Clare Rimnac, Shaker Heights, OH
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The mission of the biology program at the University of Mary Washington is to provide a strong undergraduate education in the fundamental principles of biology and train students in the research methods and techniques used by biologists. The program is designed to prepare undergraduates for future careers in life sciences research, biotechnology, teaching and related professions, conservation, medicine, dentistry, and other allied health fields.

For further information about the biology program, please contact Andrew Dolby, Chair, Department of Biological Sciences, at [adolby@umw.edu](mailto:adolby@umw.edu) or 540-654-1420



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## **UPDATE FROM MICHAEL CARLO, CLASS OF 2013**

I am in my 4th year in Clemson University's biology Ph.D. program. I work in the thermal ecology lab of Dr. Mike Sears studying how organisms respond to changes in the thermal environment and how that affects their biology. My dissertation is focused on how changes in the embryonic environment can shape responses to climate at all life stages. My experiences as a biology undergrad at UMW prepared me for my career as a research scientist with the goal of a professorship position. In fact, I can't imagine being where I am today without UMW. The education I received there has proved invaluable, as well as the mentorship of professors like Andrew Dolby, Rosemary Barra, Deborah O'Dell, and Dianne Baker. The research experiences I had working with Dr. Dolby and Dr. O'Dell inspired me to pursue the track I am now on and provided me a useful head start entering a challenging graduate program. I am fully funded in my Ph.D. studies through a National Science Foundation Gradu-

ate Research Fellowship, which I would not have obtained without those experiences. Also, the writing and presentation skills I gained while at UMW (including a presentation at the Wilson Ornithological Society meeting in 2013 where I shared our research with the famous Peter and Rosemary Grant, and a manuscript published in the Virginia Journal of Science with Dr. O'Dell, Dr. Dolby, and several fellow students) enabled me to hit the ground running. I have traveled around the US presenting my research at national and international conferences, and I have several manuscripts coming out soon. Additionally, I have started science communication and outreach initiatives, such as a crowdfunding campaign to fund work with an undergraduate research assistant, science presentations and book donations at underfunded schools in the Clemson area, and a public exhibit on climate change that is in progress and will be installed in Spring 2018 at several locations in Upstate South Carolina. None of this would be possible without my time at UMW, and for that I am forever grateful.



Michael Carlo, Class of 2013.

*"UMW prepared me for my career as a research scientist. I am fully funded by an NSF fellowship, which I credit to the education & research experiences I was offered as a biology undergrad."*