

National Museum of Natural History, Washington, D.C.



**Biology 502: Biology and Environment**

**ANNOUNCEMENTS**

**Goldwater Scholarship Honorable Mention Awardee**

**Hannah E Ennerfelt** Institution: Salisbury University Major(s): Biology, Psychology Career Goal: I intend to earn my Ph.D. in Neuroscience, and conduct research on neurological disorders such as Alzheimer's disease.

**Lyle Cook** is entering a MS program in Environmental Science and Engineering at Oregon Health & Science University.

**Andrea Korell** has been accepted by George Mason University for a PhD, where she plans to focus on immunotherapy as a cancer treatment.

**Mallory Hagadorn** (Masters in Applied Biology student) has been accepted into Utah State University for their PhD program.

## ANNOUNCEMENTS Cont.

**Nathan Hirtle** has been granted a Maryland Sea Grant Summer Research for Undergraduates Internship at the Chesapeake Biological Laboratory of the MD Center for Environmental Science.

**Marissa Moran** has been accepted into the MS in Applied Biology Graduate Program at Salisbury University. She will be continuing her research on parasite ecology with Dr. Barse.

**Amanda Rocker** was featured in the Thomas E. Bellevance Honors program's newsletter, The Saunterer. "Head Start: Honors Freshmen Pursue Research Early".

**Emily Rossbach** has been accepted into Towson University's Master's of Forensic Science Program for the Fall of 2016.



**Rachel Keuls** (forth from right) was inducted into the ASBMB Honor Society in recognition of her scholarly achievement, research accomplishments, and outreach activities in the molecular life sciences.

## Salisbury University Student Research Conference (SUSRC)

The SUSRC committee announces the 15th annual SUSRC on Friday, April 29, 2016. Presentations are organized into themed sessions for all majors. The conference culminates in a poster reception.

For more information visit <http://www.salisbury.edu/susrc>.

Be A Part Of  
Something...Bigger

16 S Salisbury  
92 U University  
38 Sr Student Research  
6 C Conference

Conference date: Friday, April 29th, 12:30-7:30pm  
Henson Science Hall, and Wicomico Room, Guerrieri Center  
Info at [salisbury.edu/susrc](http://salisbury.edu/susrc)  
Intent to submit: March 15th, 2016

## ANNOUNCEMENTS Cont.

### **American Society for Biochemistry and Molecular Biology (ASBMB)**

The ASBMB student chapter has been very active recently with STEM outreach and meeting presentations. Members offered two hands-on, DNA lab activities last fall and two this spring. Events have included the MD STEM Festival in November at Worcester Technical High School and here at SU during Admitted Students Day. This spring the members traveled twice to WorWic Community College to make DNA necklaces with the Girl Scouts of America and again with the Wicomico County middle school students for STEM Saturday. Participants included Mike Robben, Rachel Keuls, Brittney Lozzi, April DeMell, Khadijah Sampson, Sakina Sheikh, Mariama Diallo, Iffat Sarfraz, Mollie Jewell, and Lauren DeLong.



Khadijah, Iffat, and Mariama



Mollie Jewell

## OPPORTUNITIES

### **Biotechnology & Biological Sciences Research Council:**

#### **Biotechnology Young Entrepreneurs Scheme**

**Website:** <http://www.bbsrc.ac.uk/funding/filter/biotechnology-yes/>

The Biotechnology Young Entrepreneurs Scheme (Biotechnology YES) is an innovative competition for postgraduate and postdoctoral scientists, which raises awareness of the commercialization of ideas from the biosciences. The competition is organized jointly by: The University of Nottingham – The Haydn Green Institute, and the Innovation and Skills Group, BBSRC. Deadline: May 27, 2016.

### **Bermuda Institute of Ocean Sciences: Research Experiences for Undergraduates (REU) Program**

**Website:** <http://www.bios.edu/education/reu/>

BIOS has National Science Foundation Research Experiences for Undergraduates (REU) funding to support 8 undergraduate student researchers at BIOS during the 2016 fall semester. Deadline: May 31, 2016.



# JOIN THE ANNUAL **TERRAPIN SURVEY**

*Taking place in Maryland's coastal bays from  
Tuesday, May 31 through Saturday, June 4th!*



**Survey from land or by kayak or boat!**

Terrapin Survey Trainings will take place  
Thursday, May 19th from 5:30 to 6:30 pm  
and Sunday, May 22nd from 2:00 to 3:00 p.m.  
at 8219 Stephen Decatur Hgwy, Berlin, 21811



To sign up or for more information contact  
Jennifer Rafter at Maryland Coastal Bays Program  
at [jrafter@mdcoastalbays.org](mailto:jrafter@mdcoastalbays.org) or 410-213-2297 x 109

[www.mdcoastalbays.org](http://www.mdcoastalbays.org)

## FEATURED FACULTY

### JEREMY CORFIELD

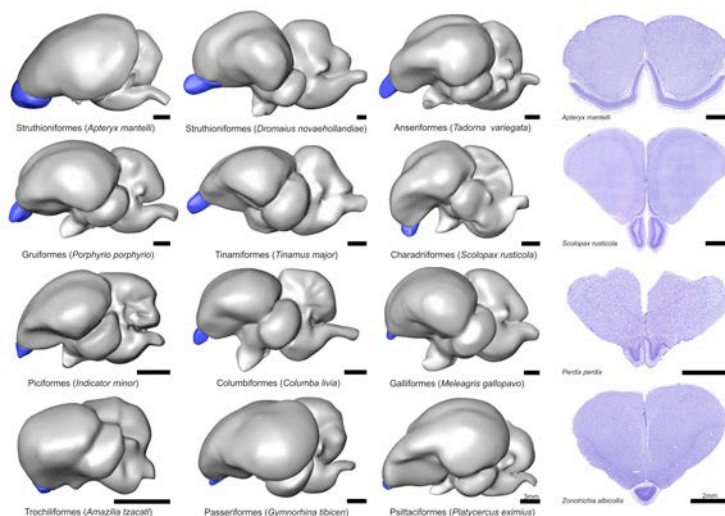
**Courses taught:** I am currently teaching Anatomy and Physiology I (BIOL 215) and Introduction to Evolution (BIOL 375) and will also be teaching an Ecology lab (BIOL310) this coming Fall.

#### Picture of Jeremy with a Kiwi.



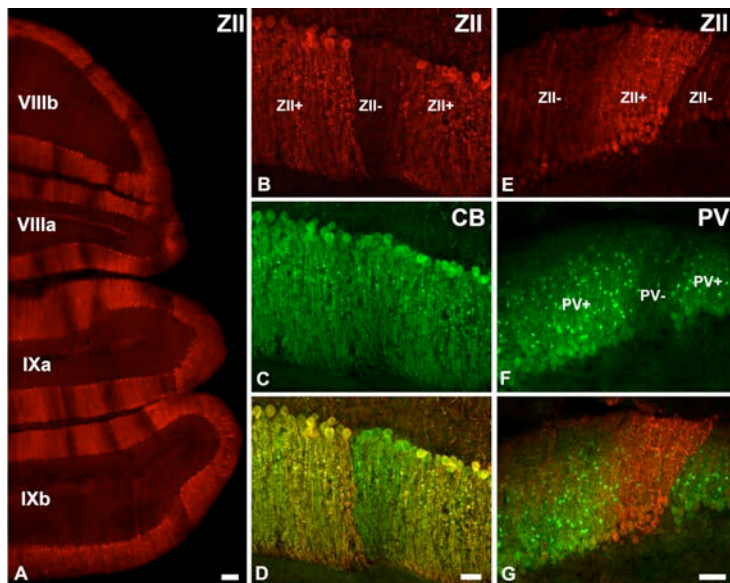
Coming from New Zealand, a country that has many weird and wonderful creatures, I have always had a fascination with animals. The problem with these animals, however, is they have evolved no defenses against the many mammals that were introduced to New Zealand since people found their way there. The only benefit to having all of these mammalian pests is that hunting them is really fun. Most of my childhood was spent eradicating as many of these mammals as I could; there is no better way to spend a Friday night than going out and shooting Australian brush tailed possums, which are literally eating New Zealand.

My early pest eradication endeavors sparked my interest in conservation, thus I enrolled in an Applied Science program at AUT University. This is where I was first introduced to the kiwi (the bird not the fruit). It's probably one of the most unusual birds there is, but unfortunately it is highly endangered and is set to become extinct in the near future. For my master's research, I investigated the vocal behavior of the kiwi and determined that individual kiwi produce distinctive calls. I worked on a system that could be used to identify individual wild kiwi using spectral parameters from their call, which was aimed at monitoring their population size.



**Figure 1:** 3D brain models and histological sections showing the diversity of the olfactory bulb across bird species. The size of the olfactory bulb (blue) correlates with how good their sense of smell is.





**Figure 2:** Immunohistochemical labeling of the kiwi cerebellum, showing the zones associated with visual processing. Zones were greatly altered, corresponding with their highly regressed visual system.

For my PhD, I moved to the University of Auckland and conducted research to gain a better understanding of how kiwi are adapted to function in a nocturnal, ground dwelling niche. To do this, I examined the brain and sensory systems of kiwi using anatomical, histological and medical imaging techniques. My research showed that kiwi have a unique mix of sensory specializations, including an amazing sense of smell, specialized touch sensitive mechanoreceptors in their beak, and an auditory system that is turned to hear the specific sounds produced by their prey. In addition, I showed that kiwi are practically blind, with eyes and visual brain regions that are the smallest relative to their body size of any bird.

I then made the big move to the freezer (Alberta, Canada) where I undertook Postdoctoral research fellowships at the universities of Lethbridge and Alberta. My research focused on understanding the neural basis of a unique courtship display in the ruffed grouse, the neurophysiological basis of visual processing, and the evolutionary origins of the compartmentation of the cerebellar cortex in birds.



**Pictures from our recent winter wedding in Canada and summer wedding in New Zealand.**

### Research interests

My previous research has shown that variations in sensory ecology between bird species leads to large differences in brain anatomy, particularly in the size of specific brain regions. I am interested in determining how these differences emerge during development. To do this we are comparing the brain development of two sensory specialists, ducks and owls, with that of an unspecialized bird, the chicken. Ducks have an amazing sense of smell and a very sensitive beak, whereas owls have an amazing visual and auditory system, leading to each having very distinctive brain anatomy. We expect that differences will come about either through timing of neural growth or by prolonging neural growth.

I also have an interest in avian intelligence. I spent some time in New Caledonia studying the incredible tool making abilities of the New Caledonian crow, and even since then I have wanted to get to the bottom of why they can do such a complicated cognitive task, whereas something like a pigeon cannot. In mammals, the brain center for cognition is called the prefrontal cortex (PFC), and has been implicated in everything from planning complex cognitive behavior to personality expression and moderating social behavior. We think we have found the equivalent brain structure in birds, which is called the nidopallium caudolaterale (NCL). We are currently in the process of determining if the size of the NCL varies across birds and also whether size variations correlate with cognitive capacity. We expect to see enlargements of the NCL in corvids, which are species like crows, raven, magpies and jays.

### Current research students

Jana Wallen, Ojel Nduanya, Joseph DiPeso, Megan Miller and Matthew Miller

### Recent publications

- Corfield JR**, Kolominsky J, Craciun I, Mulvany-Robbins BE, Wylie DR (In Press). Is cerebellar architecture shaped by sensory ecology in the New Zealand kiwi (*Apteryx mantelli*)? Brain, Behavior and Evolution.
- Corfield JR**, Kolominsky J, Marin GJ, Craciun I, Mulvany-Robbins BE, Iwaniuk AN, Wylie DR (2015). Zebrin II expression in the cerebellum of a Paleognathous bird, the Chilean tinamou (*Nothoprocta perdicaria*). Brain, Behavior and Evolution 85(2): 94-106.
- Corfield JR**, Price K, Iwaniuk AN, Gutiérrez-Ibáñez C, Birkhead T, Wylie DR (2015). Diversity in olfactory bulb size in birds reflects allometry, ecology, and phylogeny. Frontiers in Neuroanatomy 9:102.
- Corfield JR**, Long B, Krilow JM, Wylie DR, Iwaniuk AN (2015). A unique cellular scaling rule in the avian auditory system. Brain Structure and Function DOI: 10.1007/s00429-015-1064- 1
- Corfield JR**, Parsons S, Harimoto Y, Acosta ML (2014). Retinal anatomy of the New Zealand kiwi: Structural traits consistent with their nocturnal behavior. The Anatomical Record, Advances in Integrative Anatomy and Evolutionary Biology. DOI:10.1002/ar.23080
- Corfield JR**, Eisthen HL, Iwaniuk AN, Parsons S (2014). Anatomical specializations for enhanced olfactory sensitivity in kiwi, *Apteryx mantelli*. Brain, Behavior and Evolution 84(3): 214-226.

### CONFERENCES and TRAVEL

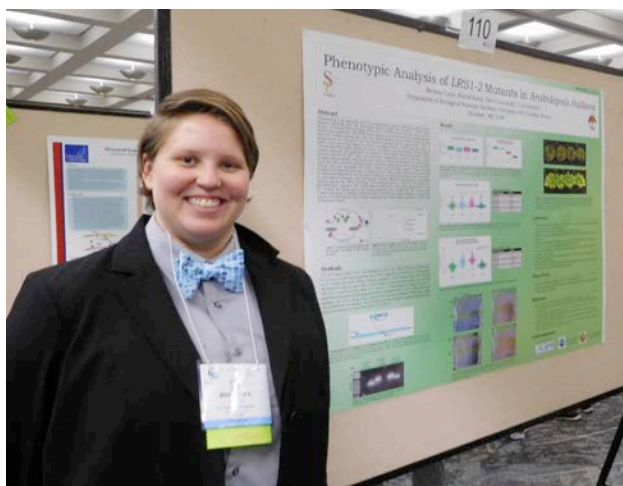
**Hannah Ennerfelt** presented at the Northeast regional honors council honors conference, Boston, MA.

**Ennerfelt HE, Clark JK**. The effect of induced hyperglycemia on the dorsal root ganglion and sensory nerves in zebrafish. Northeast regional honors council honors conference 2016.

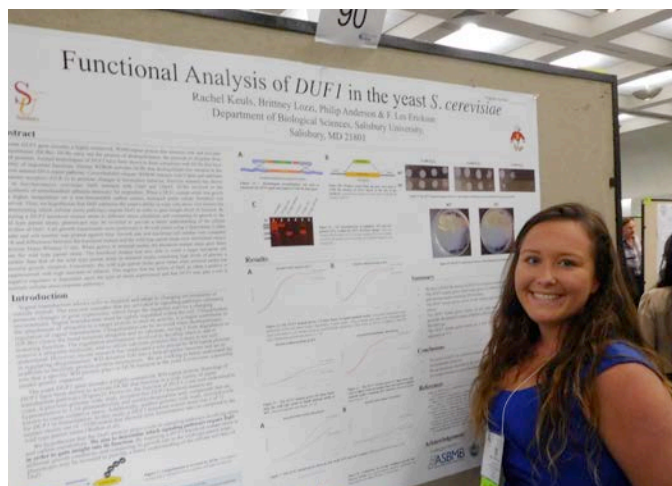
### American Society for Biochemistry and Molecular Biology (ASBMB)

Several students traveled to present their research at the annual ASBMB meeting, which was held at the Experimental Biology conference in San Diego in April. Brittney Lozzi and Rachel Keuls presented their joint results from the Erickson labs and were supported by ASBMB Student Chapter Travel Awards. April DeMell, who works with Dr. Holland, joined Brittney and Rachel in receiving funding from the University Student Academic Research Award (USARA) and the Biology Department to present at the conference. Michael Robben presented results from research done during the summer at a Research Experience for Undergraduates (REU) at South Dakota State University.

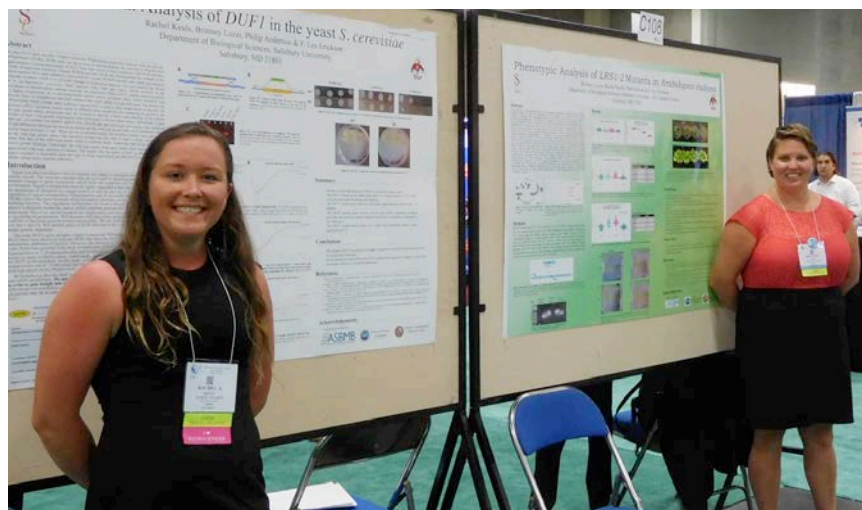
**Out of 228 undergraduates in the ASBMB poster competition, both Brittney and Rachel made the short-list for the “Best in Category” among the cell/developmental biology poster presentations. Ultimately, Brittney was just a few votes short of receiving one of the 20 awards given!**



**Brittney Lozzi** presents her poster “Phenotypic Characterization of *LRS1-2* Knockout Mutants in *Arabidopsis thaliana*” during the ASBMB undergraduate student poster competition.



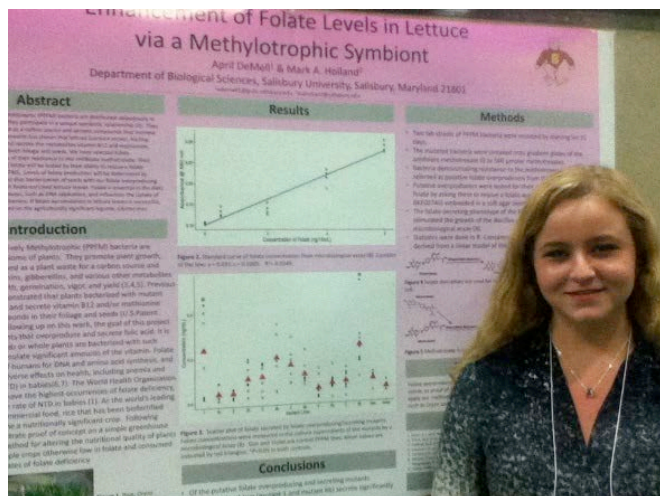
**Rachel Keuls** presents her poster “Functional Analysis of *DUF1* in *Saccharomyces cerevisiae*” during the undergraduate poster competition.



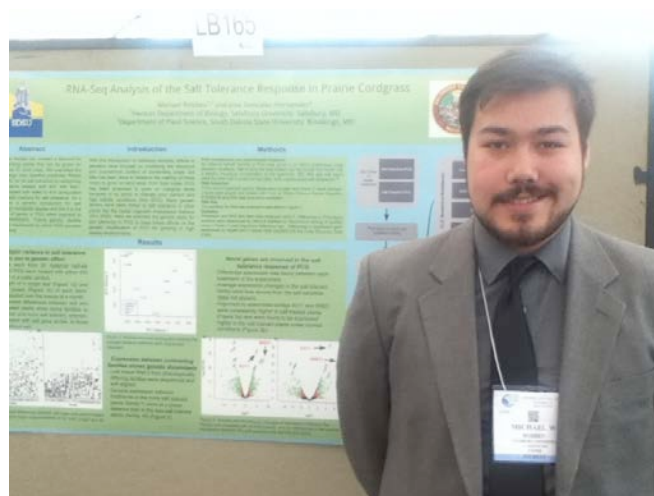
Rachel and Brittney presenting during the general conference session.



**American Society for Biochemistry and Molecular Biology (ASBMB) Cont.**



**April DeMell** presented her poster “Enhancement of Folate Levels in Lettuce via a Methylophilic Symbiont”.



**Michael Robben** presented his research, entitled “RNA-Seq Analysis of the Salt Tolerance Response in Prairie Cordgrass”.



**Left to right:** Mike Robben, Dr. Gene Williams, Rachel Keuls, April DeMell, Dr. Patti Erickson and Brittney Lozzi at the ASBMB/Experimental Biology annual conference.



**Ecological Society of America Mid-Atlantic Chapter in Kutztown, PA, April 2016.**



**Shown above:** Patrick Simons, Brittany Knight, Brett Mann, Caitlin Nicodemi, Mallory Hagadorn and Emily Rowe.

**Mallory Hagadorn** presented a talk titled: 16sRNA community analysis of the gut microbiome in Maryland populations of the dung beetle species *Onthophagus taurus* Schreber.

**Hunter (Brett) Mann** presented a talk titled: Biodiversity of Ants (Hymenoptera: Formicidae) in the E.A. Vaughn Wildlife Management Area.

**Emily Rowe** presented a talk titled: Arboreal Ants of the E.A. Vaughn Wildlife Management Area.

**Patrick Simons** presented a talk titled: Guess who's coming to dinner? Successional patterns and seasonal diversity of dung beetles on Maryland's Eastern Shore.



**Biology 502: Biology and Environment**

**Travel to National Museum of Natural History (Washington, D.C.)**



**PUBLICATIONS**

**Rentz, E. and D.L. Price.** 2016. Species Diversity and Succession of Dung Beetles to Horse Dung on Assateague Island. *Coleopterists Bulletin* 70(1): 95-104.

**ALUMNI NEWS**

**Amber Metallo (2012 graduate)** of the dual degree program of Biology and Marine/Environmental science. Amber graduated from Nova Southeastern University in November 2015 with a dual MS in Marine Biology and Coastal Zone Management. She is now working at the National Aquarium in Baltimore as a Dive Safety Officer Assistant.



**Mercedes Harris (15')** has been accepted into the MS program in Environmental Conservation at the University of Massachusetts, Amherst (UMass Amherst). She will be doing research on the interactions between butterflies and invasive plants.

**Tyler Bowling** (from the Taylor/Hunter Lab) was accepted into the M.Sc. Program at East Carolina University.

**Megan Millen** has been working as a pharmacy technician during the day and then coaching gymnastics in the evenings. She has also been accepted into Duke University School of Medicine, Pathologists Assistant Program.

**Editor:** Dana Price

**Coeditor:** Dr. Judith Stribling

If you have announcements to add or general comments regarding the Newsletter, please email [dlprice@salisbury.edu](mailto:dlprice@salisbury.edu).