# THE OPEN READING FRAME

News and Recent Events from the Biology Graduate Program at the University of Kentucky

### **Thoughts from the DGS**



As usual, in this newsletter we celebrate the accomplishments of BGP graduate students. And as usual, the newsletter provides witness to people making the next important steps in their development as professional scientists. Some of those steps make a fascinating and wonderful loop for our students. This is evident in the array of outreach activities that are either organized or contributed to by members of our program. BioBonanza was the most conspicuous event, but there are many others, both listed below, and some that are not, that we as a program contribute time and energy to do. Such outreach is important in

many ways, not the least in the loop it makes of our journey in science. I'm sure each of us has an intriguing story of how we got into science. For me, the crystallizing moment may have come when I was 11 and a trusting adult allowed me to take a bird out of a net and hold it before it was banded. There were other defining moments that kept me on the path to here. They all involved other, more experienced people taking time to show me how to take the next step. I now recall my 11-year old excitement with birds every time I show younger students a bird in the hand. The wonder on their faces is reaffirmation of why I became interested in science in the first place. It is a powerful antidote to all the other things that daily may seem to get in the way. I hope this affirming loop back to beginnings is apparent to all who do outreach and I encourage others to recreate what got them into science. It helps you find your scientific mojo and may provide some influential moments for those who are just beginning their path into science!

Dave Westneat, Director of Graduate Studies Department of Biology



# **Biology Graduate Student Association (BGSA) News**

#### 2019 BGSA Officers

President: Megan Thomas (Linnen Lab) Vice President: Alex Cones (Westneat Lab) Treasurer: Kinga Graniczkowska (Cassone Lab) Secretary: Mariah Donohue (Weisrock Lab) Seminar Committee Reps: Varun Dwaraka (Voss Lab) and Tim Salzman (Westneat Lab) Graduate Affairs Committee Rep: Sruthi Purushothaman (Seifert Lab)



Graduate Student Congress Reps: Ren Guerriero (O'Hara Lab) and Cody Saraceno (Smith Lab)

Outreach Coordinator: Jeff Chalfant (Pendergast Lab)

# Getting it done!

#### PhD Defenses

**Megan Rhodes** (Osborn Lab) Megan is working as a postdoctoral scholar at the University of Alabama at Birmingham in the Department of Medicine, Division of Nephrology, under Dr. David M. Pollock. Her current research is focused on how BMAL1, a key component of the molecular clock, and reverse feeding regulate circadian changes in blood pressure, hormones, and behavior in rats.





**Brittany Slabach** (Crowley Lab) Brittany resides in the San Gabriel Mountains of Southern California where she is working as a private tutor. She is still actively involved in research including consulting on several projects, and is continuing to explore both teaching and research opportunities in the area.

#### **Masters**

Nick Carrara, MSA (Famulski Lab) employed as a Scientist at Prolong Pharmaceuticals.

James Giordano, MSB

#### Yuxuan Xie, MSB

#### **Qualifying Exams**

Varun Dwaraka (Voss Lab) Kinga Graniczkowska (Cassone Lab) Tim Salzman (Westneat Lab) Sandeep Saxena (Seifert Lab)



#### Congrats to our Graduates and new PhD candidates!

### Awards, Fellowships, Grants and Honors

#### <u>Awards</u>

**Cagney Coomer** (Morris Lab) received the **2018 MOSAIIC Award** (Multicultural Opportunities, Strategies, and Institutional Inclusiveness Conference hosted by BCTC) for her work with NERD Squad.

**Chelsea Weaver** (Osborn Lab) was awarded a Graduate Student Incentive Program renewal for her American Heart Association Predoctoral Fellowship, \$1,342. This award provides a 5% supplemental stipend to students who receive outside funding from a nationally competitive fellowship program.

# Awards, Fellowships, Grants and Honors

#### **Fellowships**

**Biology Merit Fellowship** - The Biology Merit Fellowship is awarded to a PhD student in their 1st or 2nd year who has demonstrated exceptional promise. The fellowship provides a stipend commensurate with a TA salary for a pre-quals student and tuition. This year we awarded a fellowship to:

Jeffrey Chalfant (Pendergast Lab) spring 2019

Kayla Titialii (Morris Lab) spring 2019

Sandeep Saxena (Seifert Lab) spring 2019

**Morgan Graduate Fellowship** - The Morgan Graduate Fellowship is awarded to a PhD student who has passed their qualifying exam, has demonstrated meritorious progress toward their degree, and has clear plans for enhancing their dissertation. The fellowship provides a stipend commensurate with a TA salary and tuition for either 1 or 2 terms. This year we awarded a fellowship to:

Kara Jones (Weisrock Lab) spring 2019

Sruthi Purushothaman (Seifert Lab) fall 2018

Laura Krueger (Morris Lab) was awarded a two-year CCTS TL1 Predoctoral Training Fellowship.

**Chelsea Weaver** (Osborn Lab) received the **2019 Woman's Club Endowed Fellowship** for \$2,000. This fellowship is a one-time payment and recognition provided by generous donations from the members of the University of Kentucky Woman's Club as well as the Research Challenge Trust Fund.

Chelsea also received the **2019 Association of Emeriti Faculty Endowed Fellowship**, \$2,500 from the University Of Kentucky Association Of Emeriti Faculty in conjunction with the Graduate School. (This is a one-time payment in recognition of her achievements as a UK doctoral student.) According to the UK AEF, this award indicates their confidence in her academic potential as a future faculty member at a college or university.



#### <u>Honors</u>

Jeff Chalfant (Pendergast Lab) was accepted into the Omicron Delta Kappa National Leadership Society.

**Kaylynne Glover** (Cassone Lab) was elected **NAGPS Director of Legislative Affairs** and received an award for **NAGPS Board Member of the Year**. Kaylynne had been elected as the director of legislative affairs over the summer to fill a vacancy. At the national conference in November, she was reelected and received a board member of the year award. The **National Association of Graduate-Professional Students** is the largest nonprofit graduate student organization in the country. The Director of Legislative Affairs is responsible for planning two summits in Washington, DC and for monitoring and responding to policy changes that affect graduate education.







### **Presentations and Publications**

#### **Presentations**

**Nour Al Haj Baddar** (Voss Lab) presented a poster titled "Amputation-induced reactive oxygen species signaling is required for axolotl tail regeneration" at the **9th AQMHD (Aquatic models for human diseases) Conference** at Marine Biology Laboratory in Woods Hole, Ma Sep, 29th -Oct, 4th, 2018.

**Jeff Chalfant** (Pendergast Lab) presented a poster titled "Constant light exposure increases atherosclerosis in *ApolipoproteinE*-deficient mice" at the **Saha Cardiovascular Center Research Day** in Lexington, KY.





Varun Dwaraka (Voss Lab) presented a poster titled "Comparative Transcriptomics of Limb Regeneration: Identification of Conserved Expression Changes Among Three Species of Ambystoma" at the **9th Aquatic Models of Human Disease** Conference, hosted at the Marine Biology Laboratory in Woods Hole, MA. He received a travel award by the conference organizers to present this work.



Luc Dunoyer (Van Cleve/Seifert Lab) presented a poster titled "Effects of Limb Loss via Autotomy and Regeneration on Behavior and Reproductive Success in Red Swamp Crayfish" at the Society for Integrative & Comparative Biology (SICB) 2019 in Tampa, FL.

Sruthi Purushothaman (Seifert Lab) presented a poster titled "The limb development program is restricted to the mesenchymal compartment in salamanders" at the Society for Developmental Biology 77<sup>th</sup> Annual Meeting in Portland, Oregon, USA, July 20-24, 2018.





Sandeep Saxena (Seifert Lab) presented a poster titled "Injury-induced senescence during mammalian regeneration in Acomys" at Society for Developmental Biology 77th Annual Meeting in Portland, Oregon- July 20-24, 2018.

**Chelsea Weaver** (Osborn Lab) presented a poster titled "High Stillbirth Rate and Altered Maternal Renal Function and Water Balance are Associated with Spontaneous Gestational Hypertension in Nonhuman Primates" at the **Council on Hypertension Joint Scientific Sessions 2018**, September 6-9, 2018 in Chicago, IL.

Chelsea's abstract "African Green Monkeys Born to Mothers with Hypertensive Pregnancy Disorders have Higher Blood Pressures and Altered Water Balance in Early Adolescence", was selected as a finalist for the Water and Electrolyte Homeostasis Portland Press Predoctoral Research Recognition Award (\$300). She will compete with 2 other students in an oral presentation competition at the Experimental Biology conference in April to win the award. The final award includes another \$300 and one-year membership dues to APS, along with being invited to submit a featured topic to the conference in 2020.



## **Presentations and Publications**

#### Presentations (continued)

Members of the Westneat Lab attended the 2018 meeting of **the International Society for Behavioral Ecology** in Minneapolis, MN August 11-17. **Alex Cones** presented some of her Masters research entitled: "More than temperature: plasticity in avian embryonic development". **Tim Salzman** with coauthor **Allison McLaughlin** gave a talk entitled "Nested trade-offs and feedback between metabolism and behavior influence the structure of pace-of-life syndrome". Allison also showed off her poster



"Behavioral strategies for managing uncertainty in Passer domesticus." Kat Sasser discussed her work on "Individual Differences and Pair Effects in Response to Intraspecific Aggression". Much was learned and many new international friendships were started!

#### **Publications**

Al Haj Baddar, N. W., Chithrala, A. and Voss, S. R. (2019), Amputation-induced reactive oxygen species signaling is required for axolotl tail regeneration. Dev. Dyn., 682: 523-196. doi:10.1002/dvdy.5

**Description:** Salamanders are unparalleled in their ability to regenerate appendages. However, little is known about early signals that initiate regeneration in salamanders. Our paper show that ROS levels increase in response to injury and are required for cellular proliferation and tail and spinal cord regeneration. These findings suggest that ROS signaling provide instructive, if not initiating cues, for salamander tail regeneration.

**Coomer C.E.**, Morris A.C. *Capn5 Expression in the Healthy and Regenerating Zebrafish Retina*. Invest Ophthalmol Vis Sci. 2018 Jul 2;59(8):3643-3654. doi: 10.1167/iovs.18-24278.

**Lay Summary:** Cagney Coomer characterized the expression of Calpain-5, a poorly understood calciumactivated cysteine protease, in the zebrafish retina during development and in response to injury-induced regeneration.

**Jones, K. S.**, & Weisrock, D. W. (2018). "Genomic data reject the hypothesis of sympatric ecological speciation in a clade of Desmognathus salamanders." Evolution, 72(11), 2378–2393.

Lay summary: Two salamanders found in southern Appalachia, *Desmognathus quadramaculatus* and *D. marmoratus,* were thought to represent different species because they have very different morphologies. However, we couldn't find any signatures of genomic differentiation between them. Instead, they appear to represent two morphotypes of the same species. To complicate matters further, we found that *D. quadramaculatus* was split into two highly diverged cryptic species (one in the north and one in the south), both of which have the *quadramaculatus* and *marmoratus* phenotypes. Yep, it's as crazy as it sounds!

**B.L.Slabach**, J.T.Hast, S.Murphy, K.Johannsen, W.E.Bowling, R.D.Crank, G.Jenkins, and J.J.Cox. 2018. Survival and cause-specific mortality of elk (*Cervus canadensis*) in southeastern Kentucky. Wildlife Biology, 2018(1): wlb.00459. **Lay Summary:** During 2011–2015, we conducted a study to investigate survival and cause-specific mortality of male and female elk (*Cervus canadensis*) and the effectiveness of limited hunter access areas to improving male elk survival in southeastern Kentucky. We captured and radio-monitored 237 (F91: M146) elk, of which 155 (65.4%) died by the conclusion of our study; harvest related deaths were the leading causes of mortality for both sexes (85.2%; 132/155). Our results demonstrated that females (< 2 years-of-age) and males ( $\geq$  5 years-of-age) had significantly higher hazards of dying compared to other age classes. Support also existed for variation in female survival by herd. The establishment of areas that limited hunter access did not affect male elk survival, and instead, increased hunter density for female harvest by 647.5%. Our results demonstrate the importance of considering land ownership type, elk density, and sex-specific behavior to inform management decisions in mixed use landscapes.

### **Presentations and Publications**

#### Publications (continued)

**B. L. Slabach** and J. J. Krupa. 2018. Range expansion of the hispid cotton rat (Sigmodon hispidus) into reclaimed surface coal mines in eastern Kentucky. Southeastern Naturalist, 17(4): N84-N89.

Lay Summary: Sigmodon hispidus (Hispid cotton rat) is the most wide-spread species of Sigmodon in North America. In recent year, this species has expanded its range northward and westward due to changes in climate and habitat, and evidence suggests northward expansion is also occurring in Kentucky. Extensive coal mining operations has transformed more than 2300 km2 of hardwood forests on the Cumberland Plateau of eastern Kentucky, into a relatively flat landscape dominated by grasses and forbs suitable for run-making rodents. We report the first record of the Hispid cotton rat from a reclaimed-mine site and predict this species will expand its range north and east through new habitat.

### **Outreach Activities**

Luc Dunoyer (Van Cleve/Seifert Lab): This academic year, Luc is part of the Inclusive Pedagogies Graduate Learning Community. The College is partnering with several other entities on campus to provide training to active TAs in use of Inclusive Pedagogies--that is, ways of improving accessibility to diversity in the classroom. Luc reports that they are working on concrete output (in the form of a package and/or workshop and/or change in the UK teaching guidelines) on inclusive classroom pedagogy on campus. Each cohort of graduate students is working on complementary projects that will lead to the implementation of concrete change on campus for our teaching community. Their cohort is tasked with implementing specific language addressing inclusive teaching to be added to the UK syllabus guidelines across campus. Moreover, they are developing pamphlets that will be widely distributed to all TA's with tools for concrete inclusive teaching in their classrooms. Other cohorts are in charge of pamphlets for faculty, workshop development, *etc.* 



Sruthi Purushothaman (Seifert Lab) performed a Bharatnatyam Dance at the "Festivals around the World" as a

part of the Discovery night conducted by The Living Arts & Science Center, Lexington, Kentucky (December 6<sup>th</sup> 2018) and



at again at Impact week: a Cultural Festival organized by University of Kentucky International Center (September 21<sup>st</sup> 2018)

Alex Stanback (Cooper Lab) as well as a team of undergrads helped to manage and provide 5 full days of biology activities for the UK STEM BLUE camp over a period of 3 weeks this past summer a total of 360 elementary & middle school students participated. It was a joint program with College of Engineering and College of Education, UK. Their topic was Biological modelling -Crayfish, human and medical outreach.

In December 2018 Alex and the Cooper lab conducted outreaching events at Locust Trace High school, Lexington, KY on "Optogenetics and Arduino coding" to 4 different high school classes.



# **Outreach Activities (continued)**

**Chelsea Weaver** (Osborn Lab) gave two talks as part of her position as a **Graduate Student Ambassador for the American Physiological Society**. Chelsea visited Berea College, the first interracial and coeducational college in the south. Berea College provides a tuition-free education to academically promising and financially challenged students. Chelsea spoke about her experiences as a graduate student at UK, careers in physiology, how to pursue a doctoral degree in the sciences (particularly admission at UK), and awards and programs offered through APS that may assist their pursuits. Chelsea also spoke to the **UK Tri-Beta Honors Society Biology Club** and she shared her experiences as a graduate student, how to get involved in research (and the importance of research), as well as programs APS offers for undergraduates in a physiology research lab.

The **3**<sup>rd</sup> **annual BioBonanza Event** was on Saturday, October 13 in the Jacobs Science Building. Over 75 families came to check out what it is like to be a Scientist at UK. The got to see axolotls, put on a bee suit to explore a bee hive, they looked at brains and lots of other hands on activities. The event was sponsored by the Department of Biology, the Biology Graduate Student Association and the UK Graduate School. Labs from the Department of Biology and the College of Medicine participated, with the Biology Tri-Beta Honors Society assisting with the set-up and tear down. It was a fun filled day thanks to the organizational talents of the BioBonanza Committee:

Jeff Chalfant- Biology (Pendergast Lab)

Megan Thomas- Biology (Linnen Lab)

Sandeep Saxena- Biology (Seifert Lab)

Varun Dwaraka- Biology (Voss Lab)

Sepideh Dadkhah- Biology (Harrison Lab)

Lyndsay Young- Molecular and Cellular Biochemistry

Robert (Bobby) Murphy- Molecular and Cellular Biochemistry

#### Video

https://www.as.uky.edu/video/2018-biobanaza

Photos

https://www.as.uky.edu/galleries/2018-biobanaza



### **Graduate Student Life Events**

**Sepideh Dadkhah** (Harrison Lab) and her husband, Ehsan, welcomed their beautiful son Elias Sayed Saghaian on December 6, 2018.





# Where are the now?

Jim Shaffer (Gleeson Lab) has been living in Farmington, Maine working on his thesis and enjoying some unique opportunities such as being a Lecturer teaching an introductory non-majors biology lecture and lab course at the

**University of Maine Farmington** that used the Plant Kingdom to convey basic biological knowledge and principles, "Bio110N--Botany for Humans".

Jim is also serving as an **Associate Member of the Farmington Maine Conservation Commission.** As a member of the commission he helped organize multiple community information events in fall 2018 surrounding an Environmental Protection Agency (EPA) mandated



dam removal for compliance with Endangered Atlantic Salmon (Salmo salar) restoration. The project is ongoing, but their outreach and informational efforts led to the successful passing of a local vote to support accepting \$1.2million dollars from the non-profit Atlantic Salmon Foundation (ASF) to fully fund the dam removal to comply with EPA and US Fish & Wildlife Service (USFWS) mandated Endangered Species Act (ESA) regulations.

https://www.pressherald.com/2018/09/23/farmington-to-host-series-of-public-meetings-on-dam-removal/ https://www.centralmaine.com/2018/11/07/farmington-voters-support-1-2-million-dam-removal-project/



**Dr. Yue-Chen Zhu** (Cooper Lab) is working in Synbio Technologies, as Business Development Manager/ Regional Field Application Scientist. Synbio Technologies is a synthetic biology company devoting for DNA Synthesis automation and nextgeneration oligo synthesis method (Chip-based synthesis)

"Biology is now bigger than physics, as measured by the size of budgets, by the size of the workforce, or by the output of major discoveries; and biology is likely to remain the biggest part of science through the twenty-first century."

-Templeton and Wolf Prize-winning Physicist Freeman Dyson

