

THE OPEN READING FRAME

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

Thoughts from the DGS



I am pleased to introduce our third installment of *The Open Reading Frame*, the Biology Graduate Program's semi-annual newsletter. It seems like the 6 months between July 1 and Dec 31st has zipped by, but a quick glance at this issue reveals something of a time paradox—how could all this stuff be accomplished in such a short period of time? An interesting image came to mind when I read through all the presentations that Biology graduate students have given. I was reminded of those maps in the back of airplane magazines that have all the routes the particular airline flies, with bursts of flight paths heading out from the major hubs to all sorts of destinations. Our students have done the same; over the past 6 months many have headed out from Lexington in all directions—to Bainbridge, WA, Winnipeg, Edmonton, Minneapolis, Chicago, Washington, DC among others. There, at meetings, the work that was done here was explained to others who, having come from other institutions, may have taken bits of what they learned back to their groups. It is harder to visualize the 'travel' that the impressive list of publications have made, but presumably they too have emerged from Lexington and are electronically heading out all over the world to impact others in some way. I find it an exhilarating image—the work that is being done every day throughout the Department eventually emerges and forms linkages with others around the world, influencing in some way their work. Science is increasingly a global endeavor, and the Biology Program is impactful globally both because of the science going outward, but also in the people coming here. For example, our current student body hails from 8 different countries besides the U.S. The program is enriched by this diversity and elevated by having a global presence. This spread of biological thinking also occurs every day in our undergraduate classrooms and labs. Our majors graduate and take with them, mostly throughout Kentucky but also some much farther, an imprint of those aspects of biology our faculty and graduate teaching assistants find important. What we do here is influential. This message often gets lost in the shuffle, but it is important to be reminded of it occasionally. I get reminded of it each time Jacquie and I put together one of these newsletters, and I am happy to use this opportunity to say “good job” to everyone!

Dave Westneat,
Director of Graduate Studies
Department of Biology



BGSA News

In November elections were held to elect the 2016 officers of the **Biology Graduate Student Association**. The BGSA is the organization that represents the graduate students in the Department of Biology. BGSA representatives participate in department activities and advocate for student positions on matters within the department and university. The BGSA organizes events throughout the year, including Graduate Recruitment Day in January.

BGSA Officers for 2016 are:

President: [Scott Hotaling](#)

Vice President: [Melissa Keinath](#)

Treasurer: [Shishir Biswas](#)

Secretary: [Rose Marks](#)

Seminar Committee Member: [Jacqueline Dillard](#)

Graduate Student Congress Representatives: [Kara Jones](#) and [Kaylynne Glover](#)

Graduate Affairs Committee Representative: [Tim Salzman](#)

BGSA Tea-Time with the Seminar Speaker Coordinator: [Stephen Zumdick](#)



Getting it done!

Ph.D. Defenses

Marie Forbes-Osborne (Morris Lab) successfully defended her dissertation and graduated with a Ph.D. in December.

Ye Li (Cassone Lab) successfully defended his PhD, entitled, "Intrinsic and Extrinsic Regulation of Pineal Melatonin Rhythms" in December.

Master's Degrees

Adam Cook (Seifert Lab) successfully defended his MS thesis entitled "*Beryllium nitrate supports fibroblast migration as an essential component of skin and limb regeneration in axolotls*". Adam's work revisited an unusual property of the alkaline earth metal beryllium to inhibit limb regeneration in salamanders. His research showed that beryllium primarily inhibits cell migration which disrupts a key event required for regeneration. A manuscript detailing Adam's work is currently under review at the journal *Development*. Adam has accepted a position as a research technician in the Seifert Lab and will continue working on regeneration in salamanders.

David Moldoff (Westneat Lab) defended his Master's thesis in December. Entitled, "*Context-Dependent Individual Variation in Foraging Behavior and Parental Care in House Sparrows*", it described studies of behavioral syndromes, groups of potentially correlated behaviors that persist across a variety of contexts. One such set that David studied was the reaction of house sparrows to various forms of novelty, including sudden changes in objects near foraging sites and novel cues to the location of hidden food resources. That work was recently submitted for publication. David is currently working in conservation biology in California.

Alexandria Weiser (McLetchie Lab) received her Master's in Biology in December and is currently a Laboratory Technician at Aquatic Resources Management in Lexington.

Qualifying exams

Chanung Wang (O'Hara Lab)

Brittany Slabach (Crowley Lab)

Cole Malloy (Cooper Lab)

Nour Baddar (Voss Lab)

John Terbot, II (Linnen Lab)



Awards, Fellowships, Grants and Honors

Awards

Melissa Keinath (Smith Lab) received a travel award (\$750) from the American Genetics Association to attend AGA2015, "Chromosome Evolution: Molecular Mechanisms and Evolutionary Consequences" in Bainbridge Island, WA August 2015. She presented a poster entitled, "Characterization of a large vertebrate genome using shotgun and laser capture chromosome sequencing."

Fellowships

Kara Jones, Kentucky Opportunity Fellowship (spring 2016)

Tim Salzman, Graduate School Academic Year Fellowship (spring 2016)

Kat Sasser, Lyman T. Johnson Award (spring 2016)

Kim Vertacnik, Lyman T. Johnson Award (spring 2016)



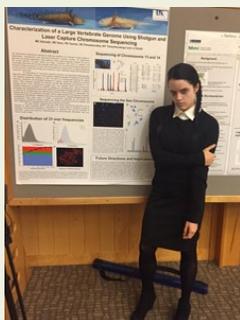
Honors

Stephanie Bryant (Smith Lab) was awarded admittance to the **American Society for Microbiology (ASM) Science Teaching Fellows Program**, a professional development initiative to prepare graduate students, postdoctoral fellows, and early-career scientists for science teaching positions at non-doctoral institutions.



Awards, Fellowships, Grants and Honors (Continued)

Honors (cont.)



Melissa Keinath (Smith Lab) was accepted into a course at **Cold Spring Harbor Laboratories**, entitled **Computational and Comparative Genomics**. The course was October 28th-November 3rd, 2015. She received a travel fellowship through CSHL (\$750) and the Dissertation Enhancement Award (\$3000) to cover registration. She presented a poster at this course, **Initial characterization of a large vertebrate genome and sex chromosomes**. During the course, she performed ChipSeq analyses on data from malnourished and well-nourished children in Bangladesh. (This presentation was on Halloween, extra points if you can name the character Melissa is dressed up as).

Chanung Wang (O'Hara Lab) was the conference chair organizer for the **KSEA-Kentucky Winter Conference** December 19, 2015 at the University of Kentucky. The **Kentucky chapter of Korean-American Scientists and Engineers Association (KSEA)**, created in 2009, has about 50 members. Both scientists and non-scientists seem to enjoy the concept of getting together, exchanging ideas, and learning from one another on December 19 they held a Winter Conference. Three doctoral students at University of Kentucky, Chanung Wang (Vice president, KY chapter), Na-Ra Lee, and Kyung Bo Kim, took leadership roles in organizing this one-day Winter Conference 2015. There were 75 attendees. The program included 11 poster presentations by Post Doctorates, Graduate and Undergraduate, and one high school student, 3 invited lectures, and dinner.



Graduate Student Publications

Franklin, B. M., Xiang, L., Collett, J. A., **Rhoads, M. K.**, & Osborn, J. L. (2015). Open problem-based instruction impacts understanding of physiological concepts differently in undergraduate students. *Advances in physiology education*, 39(8), 761-334.

Keinath M.C., Timoshevskiy V.A., Timoshevskaya N.Y., Tsonis P.A., Voss S.R., Smith, J.J. *Initial characterization of the large genome of the salamander *Ambystoma mexicanum* using shotgun and laser capture chromosome sequencing*. **Scientific reports**. 2015;5:16413. doi: 10.1038/srep16413.

Li Y., Cassone VM. *A simple, specific high-throughput enzyme-linked immunosorbent assay (ELISA) for quantitative determination of melatonin in cell culture medium*. **Int Immunopharmacol**. 2015 Sep;28(1):230-4.

Li Y., Cassone VM. *Clock-Controlled Regulation of the Acute Effects of Norepinephrine on Chick Pineal Melatonin Rhythms*. **J Biol Rhythms**. (2015) Dec;30(6):519-32.

Majeed, Z.R., Ritter, K., Robinson, J., Blümich, S.L.E., Brailoiu, E., and Cooper, R.L. (2015). *New insights into the acute actions from a high dosage of fluoxetine on neuronal and cardiac function: Drosophila, crayfish and rodent models*. **Comparative Biochemistry and Physiology- Part C** 176–177:52–61.

Malloy, C., Ritter, K., Robinson, J., and Cooper, R.L. (2016). *Pharmacological identification of cholinergic receptor subtypes on *Drosophila melanogaster* larval heart*. **Journal of Comparative Physiology – B**. 186 (1):45-57.

Nunziata, S. O., Scott, D. E., & Lance, S. L. (2015). *Temporal genetic and demographic monitoring of pond-breeding amphibians in three contrasting population systems*. **Conservation Genetics**, 16(0), 579-1344.

Shiple, J. R., D. Y. Gu, **T. C. Salzman**, and D. W. Winkler. 2015. *Heterothermic flexibility allows energetic savings in a small tropical swift: The Silver-rumped Spinetail (*Rhaphidura leucopygialis*)*. **Auk** 132:697-703.

Wang, C, Jung, D., Cao, Z., Chung, C.Y. *Adenylyl Cyclase localization to the uropod of aggregating *Dictyostelium* cells requires RacC*. (2015) **Biochemical and Biophysical Research Communications** 465:613-619.

Wilson SG, Wen W, Pillai-Kastoori L, Morris AC. *Tracking the fate of hero-expressing cells in the regenerating retina using her4:Kaede zebrafish*. **Experimental Eye Research**. 2015 Nov 23;145:75-87.

Presentations/Workshops

July 2015



Rose Marks (McLetchie Lab) was invited to talk at the **Botany 2015 Meeting** in Edmonton, Canada. The title of her talk was “*Tradeoffs in Desiccation Tolerance and Reproductive Allocation*”.

Jonathan Moore (McLetchie Lab) also gave a talk at the **Botany 2015 Meeting** in Edmonton, Canada, entitled, “*A test for sex difference in heat and desiccation stress responses in Bryum argenteum*”.

Jacqueline Dillard (Westneat Lab) presented a paper entitled “*Monogamy, ecology, and the evolution of cooperative breeding in birds*” at the 2015 joint meeting of the **American Ornithologists’ Union** and the **Cooper Ornithological Society** in Norman, OK.



Kat Sasser (Westneat Lab) presented a paper entitled “*Unusual patterns of nestling loss in House Sparrows: infanticide or neglect?*” at the 2015 joint meeting of the **American Ornithologists’ Union** and the **Cooper Ornithological Society** in Norman, OK. Kat also was awarded a **Marcia Brady Tucker Travel Award** to attend the meeting.

August 2015



Luc Dunoyer (Crowley Lab) presented at the **Ecological Society of America 2015 Annual Meeting: ESA’s Centennial Celebration**. His talk was titled “*You don’t have to go home, but you can’t stay here: Disease mediated invasions and the collapse of invasive population*” for this talk he received a travel award of \$744 from the Aquatic Section of the **Ecological Society of America**.

Paul Hime (Weisrock Lab) presented his work “*Phylogenomic perspectives on the amphibian tree of life*” at the **Society for the Study of Amphibians and Reptiles (SSAR)** meeting in Lawrence, KS.

October 2015

Jim Shaffer (Gleeson Lab) was an invited speaker at the **Kentucky Botanical Symposium**. The title of his talk was “*Dynamic disturbance: Survival and growth of Kentucky Bluegrass Savanna-Woodland tree seedlings.*” He was invited to present and serve on a panel discussion at the 2nd Annual Kentucky Botanical Symposium, which was held at the ES Good Barn on the UK campus. It was a great forum for researchers and land managers to interact and discuss habitat restoration and conservation in Kentucky.



Brittany Slabach (Crowley Lab) gave an oral presentation at the **Wildlife Society Conference** in Winnipeg, Canada titled “*A matter of taste? Geophagic behavior of a free-ranging ungulate on a human altered landscape*”.



Geophagic behavior (earth eating) is a common phenomenon especially in free ranging ungulates. Natural lick sites typically serve as reservoirs for nutritionally important minerals such as sodium, magnesium, and calcium that organisms may seek during times of nutritional stress. We observed geophagic behavior in a population of free ranging elk (*Cervus canadensis*) that spends approximately 39% of its time on or near disturbed mine lands. Mining operations dramatically alter local soil biogeochemical properties, changing soil-binding affinities and increasing the availability of chemical compounds. We compared total nutrient concentration (ppm) from



mineral licks (N = 2) to control sites (N = 17), in order to investigate differences in chemical composition of soils across the elk home range. Our results suggest that organisms avoid areas high in potentially toxic nutrients; a finding that raises important questions about the indirect effects of mined landscapes on ruminant foraging behavior. In November, Brittany presented a poster version of the talk at the **Tracy Farmer Institute for Sustainability and the Environment Sustainability Forum** receiving the honor of **Best Graduate Student Poster**.

Presentations/Workshops (continued)

Several Biology Graduate Students attended and presented posters at the **Annual Meeting of Society for Neuroscience in Chicago, IL**, including:

Wen Wen (Morris Lab) presented a poster titled: “Generation of *soxoa* mutant zebrafish using CRISPR/Cas9”.

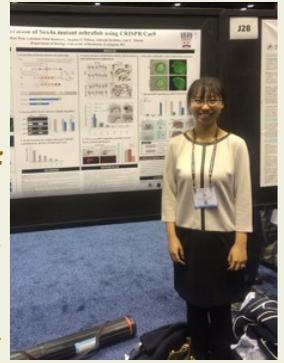
Piedade, W.P., (Cooper Lab) “Sensitivity of presynaptic pH on synaptic transmission: Differences in evoked and spontaneous release.”

Malloy, C., (Cooper Lab) “Cholinergic system regulation of behavior in *Drosophila melanogaster* larvae.”

Malloy, C., (Cooper Lab) “The role of acetylcholine in neural circuit modulation, behavior and development in *Drosophila melanogaster*.”

Zhu, Y.C., (Cooper Lab) “Neuromuscular physiology in chronic and acute cold exposed crayfish”.

D. Mahmood, D., Dabbain, N., Majeed, Z.R., Zhu, Y.-C. (Cooper Lab) “How the inhibitory modulator GABA alters development, behavior and neuronal circuit function in *Drosophila*”.



November 2015

Paul Hime (Weisrock Lab) attended the inaugural **Kentucky Hellbender Working Group Meeting**, held at the Newport Aquarium.

The Linnen Lab attended the **Entomological Society of America 2015** meeting in Minneapolis, MN. **Robin Bagley** presented a talk “History, geography, and host use



shape genome-wide patterns of genetic variation in the redheaded pine sawfly (*Neodiprion lecontei*)” (**Robin Bagley**, Vitor Sousa, Matt Niemiller, and Catherine Linnen), included abstract. **John Terbot** presented a talk “Colony size of pine sawflies (genus *Neodiprion*) is driven by female oviposition behavior rather than larval aggregative tendency” (**John Terbot** and Catherine Linnen). **Kim Vertacnik** presented a poster “Chemosensory annotations in *Neodiprion lecontei*, a plant-feeding hymenopteran, and implications for the relationship between ecology and gene family size”. **Emily Bendall** presented a poster “Divergent selection on oviposition traits generates reproductive isolation between *Neodiprion lecontei* and *Neodiprion pinetum*”. **This poster won first prize in the Student Poster Competition (Evolution category).**



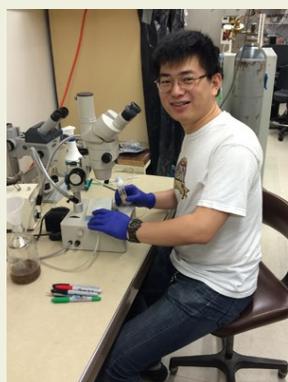
Jacqueline Dillard (Westneat lab) also presented at the ESA meeting in Minneapolis. Her talk was entitled, “Describing parentage and relatedness patterns in the horned passalus (*Odontotaenius disjunctus*) through genotyping-by-sequencing”.



Students from the Cooper Lab attended and presented posters at the **Annual Meeting of the Kentucky Academy of Sciences** held at Northern Kentucky University in November.

Sifers, J., **D.Mahmood, D., Dabbain, N.**, Graff, J., **Majeed, Z.R.** and Cooper, R.L. “GABA’s action modulating development, behavior and survival as well as heart function in *Drosophila*.”

Yocom, E., Sifers, J., Uradu, H., **Zhu, Y.-C.** and Cooper, R.L. “The effect of cold exposure & influence of modulators on the larval *Drosophila* heart”.



deCastro, C., Titlow, J., **Majeed, Z.R., Malloy, C. Zhu, Y.-C.**, Vaughn, M., King, K. and Cooper, R.L. “Maintaining the *Drosophila* larval heart in situ: Modulators and stretch activated channels”.

Zhu, Y.C. deCastro, L., Cooper, R.L. “Neuromuscular physiology in chronic and acute cold exposed crayfish”.

Piedade, W.P., Koch, F. **Majeed, Z.**, Brailoiu, E., Blümich, S.L.E., Putman, R., and Cooper, R.L. “Sensitivity of presynaptic pH on synaptic transmission: Differences in evoked and spontaneous release”.

Malloy, C., English, C., Cooper, R.L. “The role of acetylcholine in neural circuit modulation, behavior and development in *Drosophila melanogaster*.”

