

THE OPEN READING FRAME

News and Recent Events from the Biology Graduate Program



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Thoughts from the DGS

Greetings from the Biology Graduate Program! This is the first newsletter in what we hope will become a tradition for the program. Here we plan to brag about our students (and graduates) and provide some news about the program. Much of this will also be posted on the program's web site (<http://bio.as.uky.edu/grad-program>), but we thought you might like to get info periodically about the ole' BGP through other avenues.

I've been DGS for about 18 months, and it has been both an exciting and challenging beginning. Jacquie Burke took over from long-time BGP Manager Bev Taulbee when I started, and she and I have learned quite a bit on the fly, but thankfully the frequency of panic attacks has diminished. The ship is afloat and perhaps we are steering it someplace useful! I write this just before our annual Recruitment Weekend, which will again be an exciting couple of days as we welcome 24 potential students and get to know them. Long-term, we are engaged in discussions about how to improve graduate training options, and we will begin a coursework Master's program next fall. There are new faculty searches going on and a new building that we will use is going up across Rose St. Most of all, as you will see in these pages, our students are doing some great things!



-Dave Westneat, DGS of Biology

Awards, Honors and Publications



Lakshmi Pillai-Kastoori is the lead author of a paper published in July in *PLoS Genetics* entitled "Sox11 is required to maintain proper levels of Hedgehog signaling during vertebrate ocular morphogenesis." The article is co-authored by fellow graduate students **Wen Wen** and **Stephen Wilson** and advisor Ann Morris, as well as collaborators at the University of Alberta. The authors demonstrate that the transcription factor Sox11 is essential for proper formation of the eye. In zebrafish deficient for Sox11, they see abnormal lens development, reduction in rod photoreceptors, and failure of choroid fissure closure, known as coloboma. Similar defects are associated with aberrant signaling of the Hedgehog pathway and, indeed, Hedgehog signaling is greatly elevated in Sox 11 deficient animals, suggesting that this may be the primary cause of the observed defects. Lastly, the authors identify two novel sequence variants of Sox11 among patients with coloboma or other eye development defects, suggesting that changes in Sox11 activity may contribute to pediatric eye disorders.

Robin Bagley, a graduate student in the lab of Dr. Catherine Linnen, is the recipient of a two year USDA NIFA fellowship for her project "Testing the host-shift speciation hypothesis in the red-headed pine sawfly (*Neodiprion lecontei*) using genomic, ecological and reproductive data". It is thought that shifts and subsequent adaptation to new hosts are main drivers in the speciation of plant-feeding insects. A primary goal of Robin's dissertation is to determine if host plant adaptation contributes to speciation in pine sawflies. She will exploit a local outbreak of the redheaded pine sawfly at the UK Arboretum's Trail of Pines where there are three morphologically and chemically distinct pine host species. The grant, totaling \$73,805, will support examination of sawfly populations from these hosts for evidence of genetic, ecological and reproductive isolation to determine if host shifts do contribute to speciation.



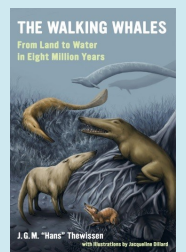
Stephanie Bryant (Third from left in photo; (Smith Lab)) was awarded a travel grant to participate in the prestigious OWECS winter course (<http://groups.ois.jp/owecs>) in December. (**Melissa Keinath**, also of the Smith lab, attended last year). The program is a one week course on "Evolution of complex Systems" conducted at the Okinawa Institute of Technology. The goal of the program, a combination of lectures and workshops, is to provide young biology researchers with the opportunity to meet, and learn about recent advances in evolutionary developmental biology. Course participation is highly competitive, with only 20 slots available for graduate students and postdoctoral researchers.

Tom Gawriluk, who recently defended his dissertation, and Tom's thesis mentor, Dr. Ed Rucker, along with collaborators from the University of Illinois and the University of Kansas Medical Center published an article in the *Proceedings of the National Academy of Sciences, USA* entitled "Beclin-1 deficiency in the murine ovary results in the reduction of progesterone production to promote preterm labor". Using mice with a conditional knockout of Beclin1, a regulator of the autophagy pathway, specifically removed in the granulosa cells of the ovary, they find a defect in production of progesterone. This failure to maintain progesterone leads to premature labor. This conditional knockout mouse represents a new model that can be used for studies of preterm labor.



Jacqueline Dillard (Westneat lab) recently traveled to Barro Colorado Island, a small island in the Panama Canal, on a fellowship from the Smithsonian Tropical Research Institute to study social behavior in beetles. She lived on the island for three months, during which she observed social behavior and measured development time in different species of tropical wood-feeding beetles (Coleoptera: Passalidae) to test if longer lasting resources are correlated with greater and more complex cooperative behavior.

Jacqueline also became a published book illustrator in November with the publication of the book, *The Walking Whales: From Land to Water in Eight Million Years*, by J.G.M. "Hans" Thewissen. Jacqueline produced all the line drawings and the cover illustration.



Awards, Honors and Publications (continued)



Students in the Morris lab, **Wen Wen**, **Lakshmi Pillai-Kastoori**, and **Steven Wilson**, have published a paper with their mentor in *Developmental Biology*. Entitled, "Sox4 regulates choroid fissure closure by limiting Hedgehog signaling during ocular morphogenesis", the paper describes a novel role of the Sox4 transcription factor in regulating early eye morphogenesis by limiting the level of Hedgehog signaling pathway. They demonstrated that successful choroid fissure closure, necessary to prevent debilitating eye defects, requires the activity of Sox4 to limit both the level and extent of expression of the Hh pathway ligand *Ihh*, permitting proper proximo-distal patterning of the optic stalk and vesicle. This discovery contributes to the completion of the coloboma gene-network and also opens up new avenues for potential genetics screening of systematic disorders with coloboma.

Getting it done!

Ph.D. Defenses

Congratulations to Dr. **Jason A. Collett** (Osborn Lab) for successful defense of his Ph.D. dissertation, "Renal Humoral, Genetic and Genomic Mechanisms Underlying Spontaneous Hypertension". Immediately upon completion of his degree, Jason assumed the position of postdoctoral fellow in the Department of Physiology at Indiana University School of Medicine, in Indianapolis, IN. Dr. Collett is continuing his studies in the laboratory of Dr. David Basile, Professor of Physiology and eminent scholar in renal inflammation and its impact on acute and chronic kidney failure leading to end stage renal disease. Jason was recruited to join a dynamic and productive laboratory to continue his academic growth and training based upon his unique combination of expertise in both whole animal and molecular techniques in the study of hypertension.

Congratulations to **Lingfeng Tang** (Harrison Lab) for defense of his Ph.D. dissertation, "The JAK/STAT pathway is reutilized in *Drosophila* spermatogenesis." Lingfeng's work in the Harrison lab set out to examine the role of Unpaired 3, one of a family of fly cytokines, in regulating maintenance of male fertility. Consistent with a previously known role for the JAK/STAT pathway, he found that *Upd3* contributes to maintenance of stem cells in the testis. He also uncovered a novel and unexpected role for the JAK/STAT pathway in regulating late differentiation of spermatids. Lingfeng has accepted a postdoctoral position at Cornell University and will begin in early 2015.

Qualifying exams

Kudos to **Shreyas Joshi** (O'Hara lab), **Schyler Nunziata** (Weisrock lab), and **Megan Rhoads** (Osborn Lab) for passing their qualifying exams this fall and entering the exalted status of Ph.D. candidacy!

Master's Degrees

Dan Ledbetter obtained his M.S. degree.

Alex Palumbo obtained his M.S. in December.

Yuting Zhou passed her M.S. degree exit exam in December and is beginning a Ph.D. program in Biochemistry here at UK in Jan 2015.

News of Graduate Students



Swagata Ghosh and her husband, Daipayan Banerjee, welcomed baby girl Aarini on November 7.

Chanung Wang and his wife, Haessal Oh, welcomed baby boy Roy on December 6.



In Memoriam - Martin Striz

Biology was greatly saddened by the unexpected death of Ph. D. student **Martin Striz** on August 17th, 2014. Martin was born in Bratislava, Slovakia on June 25th, 1978, and came to West Virginia as a youngster with his parents Drs. Stan and Daniela Striz, and sister Susan. He graduated from Marshall University in Huntington, WV with a BS degree in Biology. Martin started work on his Ph.D. in August 2003. After two years, he decided to try medical school, easily scored in the top few percent on his MCATs, and went off to U of L School of Medicine after completing his MS in Biology with us. He eventually decided not to pursue a medical career, and a few years later he returned to the O'Hara lab here at UK. Martin was a huge part of the O'Hara lab. He was a key contributor to many lab projects, especially those that relied on new



technology to monitor sleep and wake in mice non-invasively. He applied this technology to studies of the genetics of sleep and circadian rhythms, sleep and traumatic brain injury, sleep and Alzheimer's Disease, sleep and alcohol use, and even new sleep and wake therapeutics. He was also a critical consultant for the spin-off company Signal Solutions LLC, dedicated to commercialization and dissemination of this technology. Most impressively, Martin was at the heart of several large international efforts to apply this technology to large scale phenotyping projects at Oak Ridge National Laboratory, Oxford University, and the pre-eminent institute for mouse genetics (and the use of mice to understand human disease) – The Jackson Laboratory. In fact, The Jackson Laboratory (or JAX) had already submitted his name for their most prestigious fellowship to support him during his post-doctoral years, as Martin was planning to finish his PhD in December 2014 and move to Bar Harbor, ME. The pictures of Martin shown here were taken during his last visit to JAX, in June 2014, when he won over several of their leading scientists during a full week of day-long interactions. Martin was clearly looking forward to this new challenge. Martin was a rare individual who combined exceptional computer skills, quantitative skills, an understanding of biology, and a real knack for solving problems, to potentially do something very special in science.

Martin was also a wonderful teacher, in many different courses, and received countless compliments and words of appreciation from students, faculty and co-workers. He was also a teacher and true scholar within the lab, not only in his "official" areas of expertise related to our genetic studies, or our technology development, but in many surprising areas as well.



Dr. O'Hara writes of Martin, "We shared many things over these years, and seeing his empty chair in the lab is still very difficult (he chose an unusual tall grey chair many years ago, different from all the other lab chairs, and everyone immediately recognizes this as "Martin's Chair" -- it is now a memorial chair that helps us remember him). Of course, we remember many other things about him too, as he was at the center of virtually all of our lab projects and collaborations. Given his many areas of expertise, and our many years together, I considered him more a colleague and friend than a student, and we probably spent too many hours discussing politics or areas of science unrelated to our work, or simply everyday life. I miss these discussions. Martin also will be missed as a wonderful caring person and friend. In ten years, I never heard him say a negative thing about another person. Everyone who met Martin liked him, and thought highly of him, and he will be missed by everyone who knew him."