

BIOLOGICAL SCIENCES DEPARTMENT 2014 NEWSLETTER



WESTERN MICHIGAN UNIVERSITY
College of Arts and Sciences
Department of Biological Sciences

Note from the Department Chair

INSIDE:

- Faculty Focus
- Alumni Achievement Award
- Faculty/Student Research
- Special Awards
- Student Activities
- Make a Gift/SABRE

This is an annual publication from the Department of Biological Sciences at Western Michigan University.

Department Head:
John Spitsbergen

Editor:
Cindy Linn

Dear Alumni and Friends,

It gives me great pleasure to introduce the Department of Biological Sciences newsletter for 2014. As you will see by reading through the newsletter, we continue to work to enhance our research capabilities, educational opportunities for our students and community outreach and engagement.

The past year was a good one for our department. We were able to hire a new faculty member, Dr. Jian Yao, whose research and teaching interests are in the area of plant pathology. We are currently searching for two new faculty members, one in the area of fish biology, to help with development of an interdisciplinary Freshwater Sciences and Sustainability major offered through the Environmental Studies Program, and the other in the area of anatomy or physiology.

Our undergraduate and graduate programs in Biological Sciences are thriving and have seen steady enrollments over recent years. Our students have received numerous awards from within and outside the university and many students have given research presentations at local, national and international scientific conferences.

I hope you enjoy this update from your department. As you read through this newsletter, do not hesitate to contact me with any comments you may have concerning our successes and failures, and I would greatly appreciate any suggestions for ways we may improve the service we provide to our students, alumni and friends.

Finally, I want to thank you, our alumni and donors, for your generous support of our students and programs. Your generosity enhances the teaching and research mission of our department by providing expanded opportunities for student travel to distant research sites, travel to scientific conferences, and supports fellowships and awards for scholarship and research by our outstanding students.

Go Broncos!

John Spitsbergen, Chair
john.spitsbergen@wmich.edu



Faculty Focus: Dr. Wendy Beane

Dr. Beane joined the Department of Biological Sciences at WMU in August 2013. She received her Ph.D. in 2007 from Duke University in Cellular, Molecular and Developmental Biology. Under the mentorship of Dr. David McClay, her graduate work focused on tissue patterning during gastrulation events and the role of gene regulatory networks in driving cell specification during sea urchin embryogenesis. Subsequently, Dr. Beane completed an NIH (NSRA) Postdoctoral Fellowship with Dr. Michael Levin, first at Harvard's Forsyth Institute and later at Tufts University. Her postdoctoral work focused on the role of bioelectrical signaling during regeneration in planarian flatworms. Planaria possess remarkable regenerative abilities. Thanks to a large population of adult stem cells, they are able to regenerate any and all tissues—including an entirely new brain! Thus an entire planaria will regenerate from just a tiny tissue fragment of the original worm.



At WMU, Dr. Beane's research integrates all her previous training to study how tissue shape is (re)established during planarian regeneration. Despite the importance of tissue shape to many fundamental processes (such as development, aging and disease), very little is known about how shape is established, maintained, and following injury restored. Recent advances have identified stem cell populations and cell fate mechanisms that produce certain tissues. However, these insights still do not explain how changes in individual cells lead to an animal's gross anatomy. The overall question remains—why do regenerating worm fragments always end up with the same stereotypical “planarian” shape (and never look like frogs or fish)? Dr. Beane's work has revealed that communication between cells, coordinated in part by bioelectrical signaling, is essential for regenerative shape establishment. Unlike the gene regulatory networks with which they coordinate, bioelectrical signals are the result of ion transport and membrane voltage changes within cells. Disruption of bioelectrical signaling during regeneration leads to misshapen planaria, resulting in tiny shrunken heads, oversized organs, or even multiple heads! The ultimate goal of Dr. Beane's research is to understand how bioelectrical signaling combines with traditional developmental signaling pathways to determine tissue shape. Go to <http://homepages.wmich.edu/~wfz3840> for more information.

Currently, Dr. Beane's lab is comprised of two Ph.D. students (Michelle Deochand and Taylor Paskin) and four undergraduates (Khoah Duong, Jessica Bacher, Jordan Czajka, and Marine Bolliet). Dr. Beane has received two internal research grants, the Support for Faculty Scholars Award (SFSA) and the Faculty Research and Creative Activities Award (FRACAA), to help support her students' research. In the past year, their efforts have led to four poster abstracts/presentations at society meetings (Michigan Chapter of the Society for Neuroscience and the Midwest Regional Society for Developmental Biology Meetings), and a journal article now in press at *PLoS One* (Paskin TR, Jellies J, Bacher J, Beane WS. Planarian phototactic assay reveals differential behavioral responses based on wavelength). The integrative nature of Dr. Beane's research means that her work is inherently collaborative: she has on-going collaborations at several universities across the country with electrophysiologists, developmental biologists, integrative physiologists, and even electrical engineers. In addition, she is committed to providing quality education here at WMU. Her teaching includes the undergraduate core Cellular and Molecular Biology (BIOS 1610) course and a capstone/graduate level Stem Cells and Regeneration (BIOS 5970) course.



Dr. Maarten Vonhof Title: Test of a Biocompatible, Biodegradable, Widely Available and Inexpensive Anti-Fungal Agent on the Growth of *G. destructans*, the Causative Agent of White-Nose Syndrome, on Experimentally-Infected Bats Under Controlled Laboratory Conditions. Source: U.S. Fish & Wildlife Service, White Nose Syndrome Program

Papers Published in 2014

(**Bold = Biological Sciences Faculty**, underlined = Biological Sciences Graduate Student, *italicized = Biological Sciences Undergraduate Student*)

Paskin TR, **Jellies J**, *Bacher J*, **Beane WS**. (2014) Planarian phototactic assay reveals differential behavioral responses based on wavelength. PLoS ONE 9(12): e114708. doi:10.1371/journal.pone.0114708

White, E.J., *S.K. Kounelis*, and **C.A. Byrd-Jacobs**. (2014). Plasticity of glomeruli and olfactory-mediated behavior in zebrafish following detergent lesioning of the olfactory epithelium. Accepted for publication in Neuroscience.

Adams, C.P., *Walker, K.A.*, *Obare, S.O.*, **Docherty, K.M.** 2014. Inhibitory Properties of Three Novel Palladium-based Nanomaterials to Microbial Growth. PLoS One. 9(1):e85981.

Conrad, S. and **Essani, K.** (2014). Oncoslectivity in oncolytic viruses against colorectal cancer. J. Cancer Therapy.

Gill SA, Job JR, Myers K, Naghshineh K, **Vonhof MJ**. 2014. Towards a broader characterization of anthropogenic noise and its effects on wildlife. Behav Ecol.

Jellies, J. Which way is up? Asymmetric spectral input along the dorsal-ventral axis influences postural responses in an amphibious annelid. J. Comp. Physiol., 2014

Jellies, J. (2014) Detection and selective avoidance of near ultraviolet radiation by an aquatic annelid: the medicinal leech. J. Exp. Biol. 217:974-985.

Landosky, J. and **D. Karowe**. 2014. Will chemical defenses become more effective against specialist herbivores under elevated CO₂? Global Change Biology published online June 2014, doi: 10.1111/gcb.12633.

Homola, JJ, Ruetz, CR, **Kohler, SL** and Thum, RA. 2014. Weak effects of a microsporidian parasite on mottled sculpin in Michigan streams. Canadian Journal of Fisheries and Aquatic Sciences.

Iwamoto K, Birkholtz P, *Schipper A*, Mata D, Linn DM, **Linn CL**. 2014. A nicotinic acetylcholine receptor agonist prevents loss of retinal ganglion cells in a glaucoma model. *IOVS*. 55(2): 1078-1087.

Leo C. Vander Beek Graduate Student Plant Biology Award – Justin Hackett

MPI Outstanding Graduate Research Award – Master's level – Hannah Borton

MPI Outstanding Graduate Research Award – Doctoral level – Amy Gyorkos

Graduate Student Research Award, Graduate College, Western Michigan University -
Jennifer Long, Anja Burk, Darcy Trimpe and Hannah Borton

Travel Award from Midwest Regional Society for Developmental Biology – Michelle Deochand and
Taylor Paskin

Department of Biological Sciences Graduate Student Travel Award – Elizabeth Warburton and Sr.
John-Mary Vianney



WESTERN MICHIGAN UNIVERSITY
College of Arts and Sciences
Department of Biological Sciences

