

Welcome from the chair

It was with great enthusiasm that I joined the Department of Biology as chair in July 2006, and I am pleased to report that my enthusiasm has increased. So many great things are happening in the department. We have launched a new Ph.D. program in integrated bioscience, the Bath Field Station, new biology building and established an External Advisory Board. I am truly impressed with the biology faculty, and have had a chance to meet a number of past faculty, including Walter Sheppe, Warren Stoutamire, John Olive and Scott Orcutt. They have provided me with a real appreciation of their contributions to making the department what it is today.

I have enjoyed interacting with alumni and community members who have generously contributed to the department, including Paul Martin, Rosalie Steiner and Pam Williams (Dr. Gary and Pam Williams sponsor the Williams Lecture Series). You are a large part of what we are and what we will become in the future. Past and present members of the department, faculty, staff and students play a major role in the department. Therefore, we have developed this newsletter to keep you abreast of what's happening in biology at The University of Akron. We value your opinion and I encourage you to visit <http://www.uakron.edu/colleges/artsci/depts/biology/> to read more about the department, and to share your thoughts and comments, as you help us shape the future.

So, please read on and enjoy the newsletter.



◀ M.S. student Sneha Swaminathan, Department of Chemical Engineering, demonstrates spinning of nanofibers for students in a new Integrated Biosciences course.

Ph.D. in Integrated Bioscience

The Department of Biology, together with 11 departments from the Buchtel College of Arts and Sciences, College of Engineering and the College of Polymer Science and Polymer Engineering, is pleased to announce our new Ph.D. in Integrated Biosciences, directed by Dr. Bruce Cushing. The first applicants entered the program in fall 2007.

A new curriculum has been designed to provide the students with rigorous training. We are developing a research framework to mimic that emerging in bioscience-related fields: interdisciplinary interactions among researchers drawn from traditionally isolated research disciplines. All students, regardless of their major research interest, will take three core courses: Research Techniques in Integrated Bioscience; Communicating in Integrated Bioscience; and Problem Solving in Integrated Bioscience, and participate in an Integrated Biosciences Colloquium. These will be supplemented with elective courses in the student's specialty area.

What is integrated bioscience? Most major advances in understanding complex biological systems have been made by interpreting results across levels of biological organization that range from molecular biology to ecosystem levels, and crossing the boundaries of disciplines from mathematics and physics through engineering and materials sciences/processes. The integrated approach to the biosciences combines deep and specific expertise in a bioscience, and a

bioengineering or biotechnology discipline with broad adaptability across related disciplines. This is what the Ph.D. program is designed to achieve. The first six students entered the program in fall 2007 with several more beginning in spring 2008.

This is the first such program in the state of Ohio and will allow us to train our Ph.D. students to be knowledgeable and flexible, conversant with a wide range of disciplines related to biology. For example, this training is ideal for those who will be working in an area such as the applications of materials sciences to living systems in grafts of synthetic materials into blood vessels. Graduates will take their integrative thinking, adaptability and communication skills into Ohio and U.S. job markets, where they will spur economic growth.

As an example of how the new IB program facilitates collaborations, an application was recently submitted to the National Science Foundation, titled "Collaborative Research: Polymeric Drug Delivery Systems and Biofilms in the Lungs," for \$1.4 million. This project is led by Gerald Young in the Department of Theoretical and Applied Mathematics and includes Amy Milsted, Daniel Ely, Stephanie Lopina, Wiley Youngs, Yang Yun, Alper Buldum, Curtis Clemons and J. Patrick Wilber from The University of Akron; J.G. Leid, Northern Arizona University; and C.L. Cannon, Washington University School of Medicine. All UA participants are integrated bioscience faculty. The project includes mathematical modeling of biofilms, drug delivery to biofilms and animal cells, and testing in an animal model, in studies designed to effectively control biofilms in lungs of cystic fibrosis patients.



Field Station

UA Field Station:

Ecology at the Urban-Rural Interface

Established in 1998 as a collaboration between The University of Akron and Bath Township, the mission of the UA Field Station is to serve the needs of Northeast Ohio residents through research, education and service that promotes a better understanding of the relationship we have with our natural environment.

In 2004, the University acquired the use of a building at the Bath Nature Preserve to help accomplish these goals. Now known as the “Dr. Paul E. Martin Center for Field Studies and Environmental Education,” in honor of longtime UA benefactor Dr. Martin, this 6,978-square-foot facility is the base of operations for research and education on the preserve and surrounding landscape.

More than 20 different courses are taught, at least in part, at the UA Field Station, and faculty and students are involved in several ongoing research projects. These include impact studies of fertilization and litter removal on plant biomass and structure, relationships of flowers to their insect pollinators, population dynamics of small mammals, long-term monitoring of spotted salamanders, and behavioral studies of wasps and spiders. Such research endeavors greatly enhance the teaching mission of the field station.

These research and educational activities are featured at the station’s annual open house. “Walks/Talks” also are hosted throughout the year so the community can interact with UA faculty and students and learn about specific topics of interest to them.

The field station is continuing to expand its research and educational activities. Renovation of the headquarters is a major part of this effort, which aided by a \$271,612 grant awarded to Dr. Randy Mitchell, field station director, by the National Science Foundation.

Interaction and cooperation with Bath Township has played an integral part in the success of field station. For more information, visit www.uakron.edu/biology/fieldstation/.

New Field Station Manager

In July 2006, Dr. Gregory Smith joined the Department of Biology as the first manager of The University of Akron Field Station. Smith received a B.S. degree from the University of Florida, an M.S. at Mississippi State University, and Ph.D. at The University of Oklahoma. Smith is a terrestrial ecologist studying birds and mammals to investigate how and why populations and communities are structured across space and time. He is also interested in patterns of biodiversity and how that diversity might be explained and preserved. On campus, he teaches classes in the fields of Conservation Biology and Wildlife Ecology. Smith is married and has two daughters. His wife, Melissa, who is from Geneva, Ohio, also works for The University of Akron. For more information, visit www.uakron.edu/biology/smith/.



Greg Smith
Manager

Faculty Focus

The Department of Biology continues to attract faculty at the top of their fields, including three tenure-track assistant professors who have joined us in the past three years.



Dr. Jessica Hopkins, assistant professor of biology, joined the department in fall 2007 after receiving a Doctor of Arts in Biology in 2007 at Idaho State University. Hopkins has expertise in biology education and stream ecology. She studies streams, rivers and their watersheds. Hopkins’ research is set in the context of addressing the human impact on native stream organisms and ecosystems, and has focused mainly on macroinvertebrate community responses to human-induced changes.



Dr. Rolondo J.J. Ramirez came to UA in the fall of 2006 after postdoctoral work at the University of Pittsburgh from 1997 through 2005. He earned a Ph.D. in 1997 at West Virginia University. His training is in physiology with an emphasis in the cardiovascular system. His research has dealt mainly with changes in the cardiovascular system as a result of pregnancy, and the detrimental changes that can occur during pregnancy.



Dr. Matthew D. Shawkey, assistant professor of biology, earned a Ph.D. at Auburn University in 2005. He did postdoctoral work at the University of California, Berkeley from 2005-2007 and joined UA in spring 2008. He is an integrative biologist interested in the mechanisms and evolution of brightly colored plumage and antimicrobial defenses in birds. For the former, he uses light and electron microscopy to characterize color-producing structures in feathers and phylogenetic comparative approaches to map their evolution. For the latter, he uses culture-free, molecular-based approaches to characterize microbial assemblages on feathers and eggs and experimental approaches in the field and lab to identify defenses against them.

In addition, a new department chair joined us in 2006.



Dr. Bruce Cushing earned a Ph.D. in animal behavior at Michigan State University in 1984 and then completed postdoctoral studies at the University of Hawaii and Indiana University. Cushing has been on the College of Medicine faculty at the University of Illinois at Chicago. An integrated biologist specializing in behavioral neuroscience, Cushing’s research focuses on understanding the mechanisms that regulate social behavior, with an emphasis on the role of neuropeptides and steroids.

Student Profile



John J. Reho's introduction to research began with his Honors College project, under the guidance of Drs. Dan Ely and Rolando Ramirez, two investigators in the Department of Biology. The project connected components of animal behavior, blood pressure, vascular reactivity, and biological markers of inflammation and oxidative stress.

This was truly an integrated physiological project. John designed the study, carried out the majority of experiments and interpreted the data. The results were presented at the 2007 Conference for Undergraduate and Graduate Research here at The University of Akron, and won best undergraduate researcher and best poster presentation.

This work and two other abstracts authored by John were presented at Experimental Biology 2008, an international meeting held in Washington, D.C., in spring 2007.

Reho has become an important part of Ramirez's laboratory, and this is where he will do the majority of his research as a graduate student in the Integrative Biology Ph.D. program.

Dr. Ingi Agnarsson, postdoctoral research associate with Dr. Todd Blackledge, prepares to test the strength and elasticity of spider silk in this newly acquired "Nano Bionix Tensile Tester."



Retired Faculty

Dr. Jerry Stinner, although retired from The University of Akron, is not retired from academia. He has been dean of the College of Science at California State University, Northridge since summer 2006. From 1982 until his retirement, Dr. Stinner had been department chair.

During his tenure, he oversaw tremendous change — including the hiring of many new faculty, the initial stages of what would become the Integrated Bioscience Ph.D. Program and a growth in research efforts that have resulted in the Department of Biology becoming one of the most productive departments at The University of Akron. We thank Dr. Stinner for his service and wish him the best in his new position.

Dr. Walter Macior, who came to The University of Akron in 1967, was awarded the title of distinguished professor in 1993 and retired in 2000. Up until his passing away in 2007, he continued to work on bringing together his lifelong study of the plant genus *Pedicularis*. Before his death, Macior donated his extensive library to the University and has been a gracious contributor to the undergraduate research scholarships awarded each spring by the Department of Biology.

Dr. Scott Orcutt, who retired in summer 2002 as associate professor emeritus, biology, served the department and University for 31 years — 12 of those as assistant chair. Orcutt will always be remembered for his love of birds and his very popular ornithology class. He and his wife, Adie, have been active in the community since their retirement and have shared with the department their continuing adventures as they experience the birds of the world in their native habitats.

Dr. Walter Sheppe, professor emeritus of biology, retired since 1988, is still visible around the department. He maintains an office on campus and often attends various seminars and events. A vertebrate ecologist, Sheppe conducted research on mammal populations in Canada and Africa. He has always shown great concern for conservation efforts and environmental issues. In fact, his generosity established "The Walter A. Sheppe Lectureship in Environmental Biology." Since 1998, the Department of Biology has welcomed six outstanding scientists as Sheppe Lecturers who presented seminars on their research in mammalogy and conservation biology. Sheppe remains active in the community, always a champion for the environment.

Student Research

UA biology faculty take great pride in providing research opportunities at all levels—from high school volunteers to doctoral students and postdoctoral research associates. With the addition of our integrated bioscience program, these opportunities are growing in terms of how many students participate, the research funding we can attract and the types of problems we address. Here are just a few examples that highlight student research in our department:



- ▶ Undergraduates Brittany Heflin, Laura Young, Sarah Young, Sean Santangelo, Shawna Kock and Donald Doyle traveled to Tahiti to conduct research with the Tropical Vertebrate Zoology class in 2007. Their research on geckos (lizards) and blennies (fish) is being prepared for publication. The biology department offers field courses in the Florida Keys, Turks and Caicos Islands, the Bahamas, Tahiti and the Arctic Circle (Churchill). Alumni are invited to participate in these courses. Contact Dr. Richard Londraville at Londraville@uakron.edu for details.
- ▶ Undergraduate Danielle Butto is designing a device to remotely sample blood from whale sharks for her Honors College project.
- ▶ Master's student Colleen Sharp found an effect of algaeicides on developmental rate of wood frog tadpoles (work done at the Martin Field Station).
- ▶ Doctoral student Adam Underwood has been characterizing different versions of a protein implicated in hypertension in males.
- ▶ Doctoral student Cecelia Boutry (pictured) is studying the structural properties of spider silk. Her work includes collaborations with physical scientists (chemistry) and polymer scientists (polymer science).

Donations

As a growing department with large numbers of undergraduates, and as the center of a new doctoral program, we have many needs. For example, we are serious about providing our undergraduates with a research experience. We are able to offer a small amount of money to offset the costs of projects, but additional funds would enable students to engage in more projects.

Additional funds would also allow us to offer travel grants to support faculty to take undergraduates with them to scientific meetings where they may be presenting data that the student(s) helped collect.

There are other ways as well that you can help us provide educational opportunities to students at all levels.

- ▶ I am pleased to support the Department of Biology with my gift of:
\$1,000 \$500 \$250 \$100 \$50 Other \$_____
- ▶ Please identify what your donation should support:
 Undergraduate Research Projects
 Undergraduate Travel Fund
 Department of Biology General Fund
 Biology Colloquium Fund

- ▶ Please cut out and include a check payable to:
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Akron OH 44325-3908

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Alumni Profiles



Dr. Randy Johnson graduated from The University of Akron in 1997 with a B.S. in Biology. He then went on for a master's degree in the lab of Dr. Richard Londraville. Johnson worked in fish leptin, and his paper (published in the *Journal of Experimental Zoology*) has been cited 49 times since 2000. He then went on to graduate from the Medical University of Ohio in 2003. In 2004, he married Valerie Kocsis of Canal Fulton, and on June 17, 2006, their daughter Addison was born. Johnson now works for Emergency Medicine Physicians as a staff emergency room physician for Aultman Hospital in Canton, Ohio. He and his family are relocating to the Fairlawn area.

Glenn Bixler received a Master's of Science in Biology from The University of Akron in 1997. He also is project manager for the San Diego Sector Project Delivery Team. Bixler performs surveys of wildlife and habitat, writes and reviews environmental documents, leads public meetings, negotiates with resource agencies on mitigation measures, develops construction alternatives to reduce environmental impacts, and prepares briefs for congress and the Secretary of Homeland Security.



DEPARTMENT OF BIOLOGY

Where Are You Now? Alumni, we want to find out what you are doing now and we think that others will want to know, too! Please send us your career updates and tell us a bit about what has happened to you since you graduated from UA. We'll include highlights in future issues of this newsletter. Feel free to send us a digital image. Either go to our department alumni page at <http://learn.uakron.edu/biology/guestbook/guestbook.cfm> to fill in our information form, or contact Dr. Joel Duff, associate chair, at rjduff@uakron.edu.

We look forward to hearing from you!

Department Highlights

- ▶ In the past year, biology faculty produced 26 publications in scholarly journals, and 37 presentations at national/international scientific meetings, many of which included student authors (undergraduate and graduate). Faculty have also been involved in more than 50 manuscripts and grant proposal reviews, served on national grant review panels and as journal editors, and participated on departmental, college, University and state committees.
- ▶ Construction of the new building is under way. The opening is scheduled for early 2009. Look for future updates and photos.
- ▶ We wish to thank Dr. Gary and Pam Williams for their generous contributions to continue the outstanding Williams Lecture Series, Dr. Walter Sheppe, professor emeritus of biology and one of our own, for his generous contribution this year to establish the Sheppe Lecture as an annual event. Also, watch for the hardworking Chevy 4x4 at the Field Station donated by Paul Martin.
- ▶ Grant awards — biology faculty brought in the most externally awarded grant dollars of the 18 departments in the Buchtel College of Arts and Sciences on average over the past three years. Thirteen faculty members are working on research sponsored by the National Science Foundation, National Institutes of Health or other nationally awarded grants or contracts. The department has seen an eight-fold increase in annual external funding over the last five years, to a current level of about \$1.6 million.
- ▶ In the last year media profiles of biology faculty appeared in Akron, UA's alumni magazine, Bath Country Journal, BBC Wildlife Magazine, GEO Magazine, Crain's Cleveland Business, Discovery.com, Akron Beacon Journal, The Plain Dealer and the Bath Herald.
- ▶ Dr. Todd Blackledge received a five-year career award from NSF and his third NSF grant since joining the faculty three years ago..
- ▶ Drs. Francisco (Paco) Moore and Brian Bagatto have been promoted to the rank of associate professor.
- ▶ We have added two new faculty members — Dr. Jessica Hopkins and Dr. Matthew Shawkey. Watch for further announcements about them and additional hires in future newsletters.
- ▶ The first official class of Ph.D. students started this year – six very talented graduate students. See the overview of this new program on the first page.