

Fall 2006

## Developing the Zoo Connection



*Biology department graduate students present their research results at the 2006 Annual Case Showcase. From left to right: Dr. Kristen Lukas, PhD candidate Jenni Mueller, Dr. Mark Willis, PhD student Elena Hollein and MS student Poorna Chowdry.*

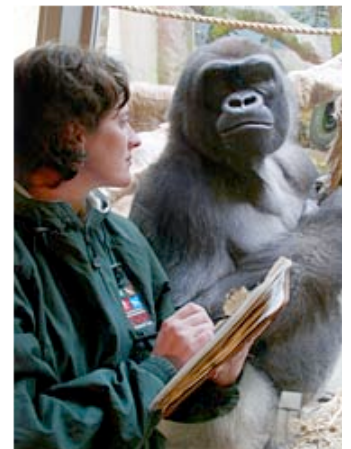
Lions, tigers, and gorillas do not sound like the usual research subjects for the Biology department, however this can now be a choice of study for undergraduate and graduate students. The department's growing connection to Cleveland Metroparks Zoo (CM Zoo) allows students to study the behavior of a wide range of animals captive setting. Biology undergraduates from CWRU have been working at the CM Zoo at interns since 2002 as well as having been involved in summer research and conducting studies as part of Dr. Willis' Animal Behavior class (BIOL. 358).

Dr. Kristen E. Lukas is Curator of Conservation and Science at the CM Zoo. She has also been an adjunct professor of Biology at CWRU since 2002. Her job involves research projects at the CM Zoo, collaborations with researchers at other zoos, and field research projects in South America, Africa and Indonesia. Her own research interests

involve the behavior of gorillas and other non-human primates. She also supervises projects on a diverse array of species including octopus, the endangered south asian batagur turtle, and fossa the largest land predator on the island of Madagascar. Dr. Lukas also studies how the zoo affects the behavior of its human visitors and their attitudes toward wildlife conservation. Dr. Lukas will speak on her work on gorilla and chimpanzee behavior at the CM Zoo on Friday November 3rd. For information on this and other seminars featuring the Biology Department faculty please visit the Biology Dept. web site.

Dr. Lukas advises students involved in many projects at the Zoo. The CM Zoo operates its own program supporting graduate and undergraduate animal behavior research. Typically, graduate students develop their own project, while undergraduates take part in an ongoing project with guidance from Dr. Lukas and the Zoo's research staff including CWRU graduate students. In addition, the Biology department's Howard Hughes Medical Institute-funded Summer Program for Undergraduate Research (a.k.a. SPUR) has supported two undergraduates, Justine Rose and Megan Brady, to conduct research projects under Dr. Lukas' supervision. Ms. Rose studied orangutan social behavior and Ms. Brady studied the behavior of the Pacific octopus. The three Biology graduate students working at the CM Zoo are co-advised by Drs. Lukas and Willis, and are working on projects ranging from gorilla social behavior to elephant and rhino behavior. Students can get funding for research with grants provided by programs such as the Evolutionary Biology program, headed by Cynthia Beall, or SPUR, both which fund a variety of summer research projects on campus and at Cleveland institutions.

The Cleveland Metroparks Zoo is not just a tourist attraction on a lazy summer day but is also a valuable research tool for those interested in studying the biology of animals. The increasing connections between the two world-class institutions enables students to explore this opportunity to study animals that would not be available any other way.



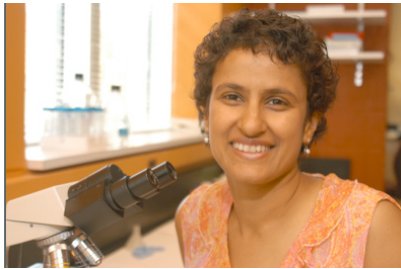
*Dr. Kristen Lukas*

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# Meet The New Faculty

**Dr. Radhika Atit**, arrived in 2005

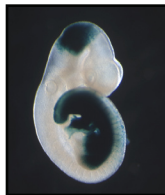


Dr. Atit graduated from Muhlenberg College. She received her Ph.D. in skin cancer biology from the University of Cincinnati, and did her post-doc at the Sloan Kettering Cancer Center and

Case Western Reserve University in Skin Patterning and Fate. She teaches Evo-Devo (Biol. 365) and a primary literature course at the intersection of Genetics, Development, and Evolution (Biol. 366). Her research is focused on embryonic skin cell development. The goal of the work will be to find out how dermal cells in the skin develop their identity. The genetic and environmental pathways leading to the developments of skin cells are a key to understanding skin related diseases.

Outside of work, Dr. Atit enjoys cooking, gardening, tandem bicycling, and visiting New York City as often as possible. She also enjoys doing pottery sabbaticals in Hawaii.

Transgenic Mouse embryo with expression in the belly side of the mouse: Courtesy of Dr. Atit



**Dr. Paul B. Drewa**, arrived in 2002



Dr. Drewa graduated from the University of British Columbia and received his Ph.D. from Louisiana State University in Plant Biology. He teaches Organisms and Ecosystems (BIOL 216), Principles of Ecology (BIOL 351/451), and Seminar in Experimental Ecology (BIOL 531). Dr. Drewa examines the influence of disturbance (e.g., deer activity, fire, ecosystem

fragmentation) on plant responses at population and community levels. His lab studies this specialized area of ecology by conducting field experiments in temperate deciduous forests of northeastern Ohio as well as oak-dominated forests and barrens in southern Ohio. Dr. Drewa and his students not only address questions that are of interest to the scientific community, but they also work closely with private and public land stewards in refining ecosystem conservation and management strategies.

In his spare time, Dr. Drewa does housework and enjoys watching thoroughbreds run around oval tracks.

Prescribed fire in an oak barren of southern Ohio: Courtesy of Dr. Drewa



**Dr. Jennifer O. Liang**, arrived 2002

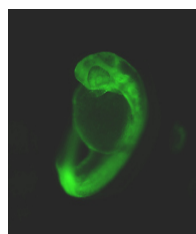


Dr. Jennifer Liang received her bachelor's degree at the University of Wisconsin-Madison and completed her Ph.D in Molecular Cell Biology at Washington University. She teaches Principles of Developmental

Biology (BIOL 362/462) and Experimental Developmental Biology (BIOL 363/463), and is a mentor for several local programs that are designed to encourage minority and female students to pursue a career in science. Her research uses the zebrafish model system to study how secreted signaling molecules pattern the vertebrate nervous system, and how circadian (daily) biological rhythms are initiated during development.

In her free time she enjoys studying Chinese, watching movies, and jogging.

Fluorescent zebrafish larva: Courtesy of Dr. Liang's Biol 363 students



## Honors and Awards 2005-06

**Hillel Chiel** was featured in the ShowCASE publication, *"The value of Research"*, 2006, as well as several other publications. **Christopher Cullis** was on the Fulbright Scholars selection panels in South Africa, February and June of 2006. **Nancy Dilulio** was nominated for the 2006 Carl F. Wittke National Academies Mentor in the Life Sciences and became an NAS Education Fellow in Life Science 2005-2006. **Richard Drushel** was selected Mortar Board's "Top Prof", Lux Chapter, CWRU, in February 2006. **Joseph F. Koonce** became an Education Fellow in Life Sciences 2004-2005. **Jennifer O. Liang** was selected as the 2005 Warren E. Rupp Assistant Professor and the 2006 Service Learning Faculty Fellow. **Roy Ritmann** was awarded the Best Video for the Video Proceeding in the 2005 IEEE International Conference on Robotics and Automation, Barcelona, Spain. **Charles Rozek** was the recipient of the 2006 John S. Diekhoff Award for contributions to Graduate Education and Teaching at CWRU. **Andrew Swanson** was named Research Associate in the Invertebrate Zoology Department at Cleveland Museum of Natural History.

**Dr. Robin E. Snyder**, arrived 2004



Dr. Snyder graduated from Oberlin College and received her PhD in Statistical Physics at the University of California, Santa Barbara. She completed her Post-Doc at University of California, Davis in the Dept. of Evolution and Ecology. She teaches Dynamic of Biological Systems II (BIOL 306) and Read/Write Like and Ecologist (BIOL 384). She uses mathematics to explore how plants adapt to and exploit uncertain environmental conditions. She is especially interested in how spatiotemporal

environmental variation affects species coexistence.

In her free time, Dr. Snyder sings early medieval music with her trio "Briddes Roune".

**Dr. Andrew K. Swanson**, arrived 2003



Dr. Swanson graduated with his MSc from the University of Western Ontario in cliff ecology, and received his PhD from Simon Fraser University in marine ecology. His specialties include Global Change Ecology, Non-Vascular Plant Biology, and Molecular Biology. Dr. Swanson currently teaches Genes and Evolution (BIOL 214), Ecophysiology of Global Change (BIOL 353/453), and Seminar in Disturbance Ecology (BIOL 531). His research is exploring adaptive mechanisms of globally significant seaweed and lichen groups to on-going climatic change, and assessing how their responses impact associated food-webs of aquatic and alpine communities.

**Dr. Mark A. Willis**, arrived 2001

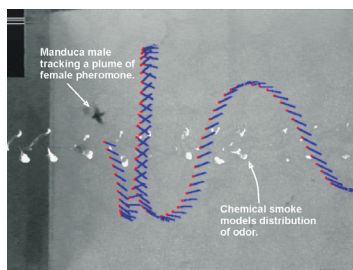


Dr. Willis' undergraduate and graduate degrees are all in Entomology and all from various campuses of the University of California (he's a California native). He teaches Animal Behavior (BIOL 358/458), Seminar in Population Biology (BIOL 387), Undergraduate Research Discussions (BIOL 395), and Seminar in Experimental Biology (BIOL 550C). The main focus of his research is

to learn how animals track odors to locate important resources like mates and food. He studies only insects; the hawkmoth *Manduca sexta* (if you couldn't tell from the picture) and the American cockroach (*Periplaneta americana*). In addition, he is currently funded by the Navy and Air Force to study flight and flight control in insects.

Outside of work Dr. Willis enjoys sleeping, reading and working in the garden, rainy day walks, and puppies. His favorite color is blue.

Example of *M. sexta* male tracking a plume of female sex pheromone in the Willis lab wind tunnel. [Red dots = moth position every 1/30sec, blue line = moth's body orientation.]  
Courtesy of Dr. Willis



Pictures Courtesy of Dr. Swanson

Outside of work Dr. Swanson enjoys camping and hikes with his family.

**Dr. Debra Wood**, arrived Jan. 2002



Dr. Wood teaches Neurobiology Laboratory (BIOL 376/476) and Drugs, Brain and Behavior (BIOL 382/482). Dr. Wood is a neuroscientist whose research examines how the properties of rhythmic networks of neurons can change to allow variations in rhythmic behaviors. The animal used for study is a crab and the neuronal network studied controls rhythmic feeding behaviors such

as chewing. More complex nervous systems such as in mammals contain rhythmic neural networks that serve many different functions. This part of the crab nervous system serves as a good model for other animals because it contains many fewer neurons whose activity may be easily monitored.

Outside of work in her spare time, Dr. Wood enjoys all kinds of other rhythmic behaviors as a jazz drummer, a bicyclist, a kick boxer, and in modern dance.



Crab (*Cancer borealis*): Courtesy of Dr. Wood

## Letter From the Chair

Dear Alumni and Friends,

Biology continues to be the largest major in the College of Arts and Science. On average since 2000, undergraduates have earned 50 B.A. and 13 B.S. degrees each year. Over the past four years, total credit-hours taught to all undergraduates have increased about 10% per year.

As indicated by the profiles in this newsletter, the Biology faculty has also changed dramatically. Dr. Rushforth stepped down as Chair of Biology in June 2000 after leading the department for almost thirty years. He recently joined Dr. Darhl Foreman as an Emeritus Professor of Biology, and Dr. Marty Rosenberg has retired this year after thirty-five years of service as Executive Officer and Senior Instructor of Biology. New tenure-track faculty joining the Department include Dr. Radhika Atit, Dr. Paul Drewa, Dr. Jennifer Liang, Dr. Robin Snyder, Dr. Andrew Swanson, Dr. Mark Willis, and Dr. Debra Wood. The faculty has also been enriched with two new Instructors, Dr. Nancy DiIulio and Dr. Rich Drushel, who has replaced Marty's role as Executive Officer of Biology, and two lecturers, Dr. Valerie Haywood and Dr. Dmitri Kourennyi.

With these new faculty, we have been able to grow our graduate program, revise curricula, launch new programs, and increase funding for research and teaching initiatives. Graduate student enrollment this fall has increased to 53 students (20 PhD and 33 MS). Research areas of the faculty occur in three broad

areas Cell and Developmental Biology, Neurobiology and Neuromechanical Systems, and Plant Dynamics and Disturbance Ecology. Linking these areas has been a continuing emphasis on building theoretical and computational competency of the faculty. As a result of this emphasis on Systems Biology, we will launch the first B.S. in Systems Biology in the country this spring and have obtained an NSF grant from the Undergraduate Biology/Mathematics Program to support students in the program.

Revision of our former Biology core curriculum of five courses and three labs has proven very popular, and the enrollment in the introductory sequence more than doubled in the past four years. With the new SAGES curriculum, we expect an even larger fraction of Biology majors to pursue undergraduate research. A \$1.5 million grant from the Howard Hughes Medical Institute's Undergraduate Science Education Program was given to fund both curriculum development and our Summer Program for Undergraduate Research.

As the programs in the Department of Biology grow, we have needs for additional support in areas that fall outside normal funding mechanisms. We have continuing need for additional support for outside speakers, travel grants for graduate students, and support for undergraduate research projects. As a private university, we rely on gifts from alumni and friends to help us build on our tradition of excellence. In the interim, we hope that you will consider appropriate ways to support your department.

Sincerely,  
Joseph F. Koonce  
Chair

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