



SCHOOL OF

# BIOLOGICAL SCIENCES

NEWS

SPRING 2014

## Students study millipede mating habits, other mysteries of rain forest during immersion trip

by Kevin Bersett

A group of mating millipedes set off a scramble the afternoon of November 29 just off a trail in a Costa Rican rain forest. A half-dozen Illinois State biology students dug through muddy leaves to gather the squirming arthropods for graduate student Kristin Duffield's research project.

It was a messy job made messier by the millipedes defecating as they coiled in the students' hands. But no harm, no foul. The millipedes don't bite, and though they release cyanide when they coil in a defensive posture, it is not in an amount that harms humans, Distinguished Biology Professor Steven Juliano explained.

Duffield was collecting pairs of millipedes in order to study their mating habits.

"I'm interested in mate choice and natural selection," she said.

Duffield and her 11 classmates in the School of Biological Sciences' Rain Forest Ecology course had to complete research projects during their trip to La Selva Biological Station in northeastern Costa Rica. They arrived November 28 and presented their findings after they returned to Illinois State December 2.

Duffield was fortunate that there were so many millipedes. One of the challenges the students faced when doing their research projects was that they had to pick their project before they came to the unfamiliar tropical environment, Juliano said. The organisms that they planned to study were not as abundant as they had thought, which forced students to change their plans.

That had originally happened to Duffield and to junior biology major Sarah Kluk, both of whom had hoped to study golden silk orb-weaver spiders. Kluk had planned to look into the potential of females to eat their much smaller male counterparts and whether the amount of food a female had, put a potential mate in lesser or greater risk. Though Kluk found 12 orb-weaver webs in the forest, she could not find any mature females.

But finding the organisms is only part of the challenge.



Doctoral student Kristin Duffield proudly holds the millipedes that she and her classmates collected for her research project.

### Director's message

The 2013-2014 academic year initiated some significant changes in the School



Director Craig Gatto

of Biological Sciences, which we believe will provide students with more options to pursue and excel at their specific biological passions. Namely, students now have the option of

focusing their studies on all of biology or a particular subdiscipline, e.g., molecular and cellular biology (MCB); zoology (zoo), plant biology (PB); conservation biology; physiology, neuroscience, and behavior (PNB); and biology teacher education (BTE). We have also used this restructuring to attract several new and talented professors to the school: Wolfgang Stein, PNB; Thomas Hammond, MCB; Rebekka Gougis, general education and BTE; Victoria Borowicz, PB; and Benjamin Sadd, zoo.

In addition to dynamic and modern classroom instruction, our faculty members engage students in the process of scientific discovery in their laboratories. Our school is a leader in providing research experiences for undergraduates, which make them extremely competitive for postbaccalaureate programs. Here are a few: Jennifer Parker '04-Gatto lab, completed her M.D./Ph.D. at Stanford University and is a Fellow at Yale University; Katie Molohon '09-Edwards lab, finishing her Ph.D. at the University of Illinois; Brad Johnson '11-Larson lab, in medical school

at the University of Illinois; Amelia Gould '09 and Ashley Sawa '12-Bowden lab, in veterinary school at the University of Illinois; and Kevin Kocot '06-Juliano lab, received his Ph.D. from Auburn University.

The school is proud of all our graduates, and we would love to hear from you and reconnect. Please drop me an email or like us on Facebook, and let us know what you're doing. Certainly if you are ever in the area, please stop into the school and say hello.

Wishing you much success,



Craig Gatto  
Director, School of Biological Sciences



Our faculty and graduate students fall 2013

### School of Biological Sciences News

Issue 1/number 1

Editor: Diane Byers

Assistant editors: Barbara Cox, Kevin Edwards, Rebekka Darner Gougis, Brian Grebliunas, and Wolfgang Stein

Contributors: Jacob Birlingmair, Kris McIntire, and Joe Powers

bio.IllinoisState.edu



Biology Professor Steven Juliano works with undergraduate Taylor Zarifis on her research project at La Selva Biological Station.

“You want to have a novel idea,” said graduate teaching assistant Molly Schumacher.

Juliano said this isn't always easy for students who sometimes choose a species before asking a question that may have been previously studied.

“It's best to think of good questions first,” Juliano said.

The students had only 10 days for their projects and were allowed to conduct research only on plants and invertebrates at La Selva, in order to put less strain on the rarer vertebrate species. Several students were studying the abundant leafcutter ants, which march single file in seemingly endless lines across the jungle floor carrying a leaf particle larger than themselves.

For most of the undergraduate students the trip was their first opportunity to conduct field research. That goes for junior Taylor Zarifis who worked with Juliano one morning to extract water samples from the pools formed by the overlapping leaves of bromeliads. She was studying how much nitrogen was in the water and the relationship between the number of dead insects in the water and the amount of nitrogen, which benefits the plant.

Juliano said that in a wider context, Zarifis was trying to draw a connection between carnivorous plants and bromeliads.

“It's interesting being in the rain forest and seeing all the different species and doing my own research project,” Zarifis said.

Biology Professor Joseph Armstrong said what is important is the research process, and not a focus so much on the outcomes.

“You can either learn about science (passively) or you can do science, engage in science,” he said.

### Waiting game

By 9 a.m. November 30 Duffield and her millipedes were out of the forest and inside a darkened cabin as hot as a sauna. She was using a red-lit head lamp to inspect pairs of millipedes separated into individual plastic containers. She used the red light because the millipedes don't see red; consequently, she saw them but they didn't see her.

Duffield was investigating whether female millipedes prefer to mate with a male with whom they had previously mated or with a new mate. She suspected the latter because females can store sperm for a long time, which benefits their offspring if one of the previous mates is a dud.

“You can tell when a female has mated,” she said. “The male will just ride on her back for days.”

This practice, called guarding, allows the male to make sure the female uses his sperm to fertilize her eggs.

The going was slow that Saturday morning as Duffield waited for the millipedes to mate. This was new ground for Duffield, who normally studies the sexual selection of crickets as part of her Ph.D. studies, but she was prepared to wait it out.

“However long it takes,” she said. “I do a lot of mating trials. You have to be patient.”

*Each student paid about \$1,900 to go on the rain forest immersion trip. If you would like to support students who participate in future rain forest explorations, contact Stephanie Sellers, director of Development for the College of Arts and Sciences, at (309) 438-7725 or seselle@IllinoisState.edu; or Craig Gatto, director of the School of Biological Sciences, at (309) 438-3669 or cgatto@IllinoisState.edu.*

# An ecologist looks at mosquitoes

by Steven Juliano, Distinguished Professor of Biology

To an ecologist, any organism can embody multiple fascinating aspects of natural history, a legion of unanswered questions about its adaptations to its environments, the ebb and flow



Collaborators in Brazil set up a mosquito experiment.

of its populations, and the effects it has on other organisms. How much more interesting is the ecology of a group of organisms when we consider those that have a huge impact on the lives and well-being of people? Mosquitoes are a worldwide nuisance, carriers of major human and animal diseases that annually kill or sicken millions of people. Mosquitoes are also a diverse group of ecologically varied organisms whose ecology is of immense practical and intellectual interest. My graduate and undergraduate students of the School of Biological Sciences and I are pursuing two coordinated projects on how the ecology of the aquatic larvae of mosquitoes determines the abundances of the adults that we all know and despise. These projects attempt to test similar hypotheses in two very different environments with different ecological communities of mosquitoes: the Midwestern United States and Minas Gerais state, Brazil.

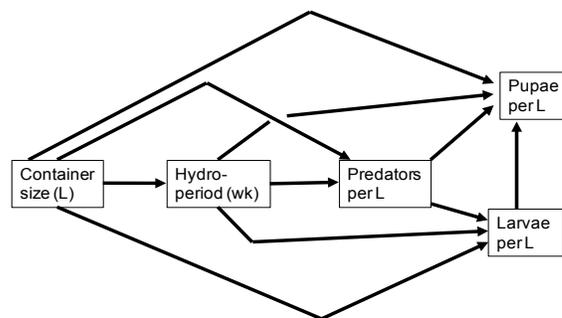
In Brazil and the Midwest many mosquitoes that transmit viruses to humans, such as dengue in Brazil and West Nile and La Crosse encephalitis in the U.S., develop as larvae in man-made containers ranging in size from small cups to large rain barrels. General theory of ecology of aquatic habitats suggests that **habitat size**, **drying**, and **predation** interact to influence success of aquatic species, such as the mosquitoes that are the focus of my research. Smaller habitats are predicted to be more prone to drying, to have few predators, and to have high densities of highly competitive mosquitoes that are easy prey for aquatic predators. In contrast larger habitats are predicted to be less prone to drying, to have greater numbers and types of predators, and to have lower densities of predator-resistant but weakly competitive mosquitoes.

This project takes an experimental approach to investigating how these three aspects of the aquatic habitat determine production of adult vectors, and therefore influence risk of these viral diseases.

Containers at both sites are black plastic vessels of similar shape, filled about three-quarters full to produce water volumes of 0.035 liters, 0.350 liters, 3.5 liters, 35 liters, and 175 liters. In different years there will be additional manipulations of drying or of predation to test hypotheses about the independent effects of these factors on the mosquito community

of its populations, and the effects it has on other organisms. How much more interesting is the ecology of a group of organisms when we consider those that have a huge impact on the lives and well-being of people?

Mosquitoes are a worldwide nuisance, carriers of major human and animal diseases that annually kill or sicken millions of people. Mosquitoes are also a diverse group of ecologically varied organisms whose



**Fig. 1.** Path model for production of one mosquito species as a function of container volume, hydroperiod, and predators. Arrows show postulated direct causal effects that can be tested as predictors of downstream variables. Indirect effects can be quantified using methods of structural equation modeling (Hatcher 1994, Shipley 2000, Mitchell 2001).

## Alumni Seminar Series in Genetics

Upon Professor Herman Brockman's retirement, a group of his former students organized a symposium April 17, 1998, to honor and celebrate him. These students generously established a fund to support a new seminar series of alumni speakers. Since then others have contributed to this fund. The purpose of the Alumni Seminar Series in Genetics is to have an alum spend the day interacting with faculty and students. The series has been a very positive experience for alumni and students.

The next speaker will be John Gustafson '87, M.S. '90, who is a professor and department head at Oklahoma State University. He is scheduled for May 1 at 4 p.m. in 210 Moulton Hall. All alumni are invited to attend.

Recent speakers have included Jan Hoh '83, associate professor at John Hopkins School of Medicine, who spoke on "A Quantitative View on Information in Biological Systems"; Anthony Frankino '90, M.S., '93, assistant professor at the University



Jan Hoh

of Houston, who spoke on "Shape Up: The Evolution of Morphological Scaling"; Ira Blitz '85, senior scientist at the University of California-Irvine, who spoke on "Cell Signaling and Transcriptional Regulation of Vertebrate Early Development"; Peter Angeletti, M.S. '92, associate professor at the University of Nebraska, who spoke on "Novel Insights in Papillomavirus Replication"; David Kranz '75, professor at the University of Illinois, who spoke on "Engineering the Immune System for Improved Targeting of Cancer and Viral Diseases"; and Thomas Guilfoyle '68, professor at the University of Missouri, who spoke on "Sticking With Auxin."

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Jan Marino Ramirez, Ph.D., spoke March 20, 2014.

## R. Omar and Evelyn Rilett Family Life Sciences Lecture Series

The R. Omar and Evelyn Rilett Family Life Sciences Lecture Series was re-established in April 2007, thanks to a generous gift by Evelyn Rilett to honor the Rilett family who supported Omar Rilett's contributions. It recognizes Rilett's vision and leadership, which built a department (now school) of Biological Sciences at Illinois State University that has advanced education in the natural sciences, fostered scholarly endeavors, and nurtured the development of research to the benefit of all who chose to teach and learn at this institution. The purpose of the series is to bring outstanding life scientists to Illinois State University to benefit academic and local communities.

This year's Rilett speaker, Jan Marino Ramirez, was a professor of neurological surgery at the University of Washington and the director of the Center for Integrative Brain Research at Seattle Children's Hospital. Ramirez's seminar was titled "Neurobiology to the Bedside: How Basic Sciences Influence our Understanding of Human Diseases" and was held March 2014.

Ramirez received his Ph.D. *summa cum laude* from the University of Regensburg in 1986. After postdoctoral positions at the Universities of Alberta and Toronto, he returned to Germany as a junior faculty member at the Universities of Kaiserslautern and Goettingen.

Ramirez's efforts have generated more than 80 peer-reviewed publications. These research efforts have in turn garnered an impressive list of honors.

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*Mosquitos continued from Page 3*

and adult production. Because mosquito production from these man-made containers is a worldwide phenomenon, the research is relevant to questions concerning how best to target man-made containers to minimize production of specific vectors.

The work in the Midwest, at the Tyson Research Center of Washington University in St. Louis, is funded by a grant from the National Institutes of Health. The parallel work in Brazil is done in collaboration with investigators and students at Universidad Federal de Viçosa and Universidad Federal de Florianopolis, and is funded by a grant from the Brazilian government's Science Without Borders Program, which has as its goal the fostering of greater scientific collaboration between scientists from Brazil and the United States. The Brazilian project will fund my visit to Brazil during my sabbatical in 2014–2015 and a visit to Illinois State University by a Brazilian graduate student.



Mosquito at larvae stage



Drawing of predatory mosquito by Ebony Murrell, M.S. '07, Ph.D. '12

## Fish, mosquitoes, and microbial mutants

### Students perform original research, prepare for careers

**Jacob Birlingmair** is a biological sciences major and chemistry minor from Normal. As a student at Illinois State, Birlingmair has participated in community volunteer opportunities, has belonged to the Biological Sciences Student Association, has been a Julia N. Visor Academic Center tutor, and has worked part time off campus. During the summer of 2012 Birlingmair worked as an intern at the Community Cancer Center in Normal. The internship allowed him to interact daily with medical and radiation oncologists as well as the clinical trial coordinator. Birlingmair was one of 14 seniors to receive the Robert G. Bone Scholarship, the highest honor Illinois State University confers on its students, during the 2013–2014 school year. He also received the University Club Scholarship this school year. Birlingmair will begin medical school in fall 2014.



Jacob Birlingmair checks DNA density.

Birlingmair began assisting a graduate student in the laboratory of Distinguished Professor R. K. Jayaswal during his junior year. The focus of their research has been the "Role of the Twin-Arginine Translocase Pathway in the Pathogenesis of *Listeria Monocytogenes*." Birlingmair has participated in the construction of various mutant strains, the biochemical and genetic analysis of the mutants, as well as studied the effect of mutations on various aspects of listerial growth. During the project, he conducted the analysis of the constructed mutants, which was further confirmed by polymerase chain reaction (PCR) technique and gel electrophoresis.

Birlingmair takes great pride in his education from Illinois State University and attributes his success to the supportive and competent faculty members he has encountered as an undergraduate student. He looks forward to using the knowledge he has gained at the University as he pursues a career in medicine.



Kristina McIntire works as the predator on mosquitos.

is to create a better understanding of the mechanisms regulating this phenomenon, which could prove important in targeting larval populations of mosquitoes (or other organisms) for control.

McIntire also works as an emergency veterinary technician, a rewarding position that allows for educational outreach through the canine blood bank and client interaction. When she is not busy torturing mosquitoes or nursing sick pets, McIntire can be found roughhousing or reading with her son, rock climbing, or trying out new baking recipes.

After his freshman-year biology courses and a summer shadowing dentists, **Joe Powers**, now a senior biology student, knew that he wanted to pursue a career in dentistry. During his years at Illinois State University, Powers has taken opportunities to enjoy his education while working with diverse populations and focusing on the importance of service.

With a priority on serving his community, Powers has planned and led mission trips, led organizations aimed at the integration of individuals with disabilities, and worked with children in foster care over his summers. Through this work, Powers has recognized underserved and indigent populations that are in need of improved oral health care, and it is his mission to be involved with that improvement.

Aside from his work with the community, Powers has found great enjoyment from his education at Illinois State. Being involved with research with Associate Professor David Rubin in molecular endocrinology has strengthened Powers' educational experience. His thesis will be on the developmental origins of parathyroid hormone 2 receptor-B. To accomplish this, *in situ* hybridization on zebrafish embryos is performed using cRNA probes. Powers received the Summer Research Fellowship through the Honors Program, allowing him to spend the summer of 2013 in the lab.

Additionally this past year, Powers received the Robert G. Bone Scholarship. Next year, Powers will attend the University of Illinois at Chicago College of Dentistry and plans on eventually becoming a pediatric dentist.

Senior **Kris McIntire** was the 2013 recipient of the Borst Scholarship and a two-time recipient of the Illinois State University Research and Sponsored Programs Undergraduate Research Fellowship. Her research is focused on mechanisms causing overcompensation in *Aedes* mosquito species, which are important vectors of human disease. In population ecology, overcompensation is the response to an external source of mortality, such as a predator, that results in increased production of adults due to reduction of population density. Overcompensation is explored through behavioral and environmental manipulation of the mosquito larvae. McIntire's goal



Joe Powers with his jar of zebrafish

Ramirez used awards from the Alberta Heritage Foundation for Medical Research and the Medical Research Council of Canada to pursue postdoctoral research, and his return to Germany was funded by a Helmholtz Scholarship from the Germany Ministry of Science and Technology and a Heisenberg Scholarship from the German Science Foundation.

Ramirez has a general research interest in the neural control of rhythmic activity with particular emphasis on studying neural mechanisms involved in the generation of respiratory rhythms, neocortical activity, and epilepsy. His current work is focused on hypoxic effects on mammalian respiratory neural networks, where he studies the neuronal basis of a variety of brain functions to find novel ways to treat and cure neurological disorders in children, including pediatric epilepsy, Rett syndrome, brain tumors, and sudden infant death syndrome (SIDS). Ramirez's laboratory is particularly interested in understanding developmental alterations of cellular properties involved in the response of the respiratory network to hypoxia. His work is supported by multiple National Institutes of Health (NIH) awards.

His website can be found at [depts.washington.edu/chdd/iddrc/res\\_aff/ramirez.html](http://depts.washington.edu/chdd/iddrc/res_aff/ramirez.html) and a list of publications can be found at [goo.gl/8sEYt6](http://goo.gl/8sEYt6).

## Supporting the School of Biological Sciences

By Charles F. Thompson,  
professor emeritus

Alumni and other friends of the School of Biological Sciences have a long history of providing the critical financial support that makes it possible to create an environment in which students are challenged to develop to their full potential so that they can achieve their career and academic goals. The school and the Illinois State University Foundation have partnered to create a range of funds that support the diverse activities of students and faculty. These funds are grouped into three main categories: general funds; student and faculty research funds; and student scholarships, fellowships, and awards funds.

General funds provide much-needed support for a variety of activities and, because of their flexibility, allow the school to respond to those inevitable, unforeseen circumstances that arise each year. Student and faculty research funds support students involved in specific research and training programs that have been developed by school faculty. Student scholarships, fellowships, and awards funds support a myriad of targeted needs- and area-based awards, including scholarships for students in the teacher-education, pre-medicine, ecology and evolutionary biology, and neurosciences programs and areas. One such fund, the Robert D. Weigel Fund, was established by the Beta Lambda Chapter of the Phi Sigma Biological Honors Society to honor Weigel, upon his retirement in 1983. Since then, the fund has provided direct research funding to hundreds of the school's students, and by 2010, because of annual contributions by the Beta Lambda chapter, the fund's endowment had reached more than \$250,000. Weigel passed away in 2010, and his will included a contribution that more than doubled that endowment, thereby ensuring that future students will always have access to the funds they need for learning science by doing science in collaboration with faculty and

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# Phi Sigma Biological Sciences Honor Society news

by Chris Goldsmith, president, Beta Lambda Chapter of the Phi Sigma Biological Sciences Honor Society



research group's principal investigator. However, since students are typically working on individual projects as partial fulfillment of their degree requirements, most benefit from additional funding sources. In 2013 Phi Sigma funded 34 grants for biology students, totaling more than \$24,000 in awards for the fiscal period. The financial granting opportunities that Phi Sigma provides target all Illinois State biology students who conduct research, both undergraduate and graduate students.

The first of these opportunities, the E. L. Mockford and C. F. Thompson Summer Research Fellowship, began in 1984 and currently awards up to three summer-stipend opportunities for graduate students (generally two M.S. students and one Ph.D. student). The fellowships are awarded on a competitive basis. The purpose of this fellowship is for students to be unencumbered by other responsibilities during a summer research period.

The R. D. Weigel Research Grants are awarded on a competitive basis for students enrolled in degree programs at Illinois State University who conduct biological research. These grants typically support more specific research needs of the applicant, rather than providing a source of income.

Phi Sigma supports the School of Biological Sciences as a partial sponsor of the school's weekly seminar series. The 2013 seminar series brought another fantastic group of scientists to the University, their expertise extending across all subdisciplines of biology and other non-biology fields associated with their research. Seminar speakers included infectious disease ecologist Ben Sadd, one of the School of Biological Science's newest faculty members. Welcome to Illinois State University, Ben!

One of the initiatives of this seminar series is to expose the community to research con-

The Phi Sigma Biological Sciences Honor Society is a national organization devoted to the promotion of research and academic excellence in the biological sciences. Illinois State University's Beta Lambda Chapter of Phi Sigma recruits graduate students in the School of Biological Sciences in good academic standing to become active members and recognizes exemplary undergraduate biology students as honorary members. In 2013 the society admitted 16 new graduate students and four new undergraduate students. Besides expecting members to maintain a successful academic career throughout their membership, Phi Sigma also promotes excellence in biological research.

To aid students conducting biological research, Phi Sigma provides annual opportunities for students to receive funding through competitive grants. Most students conducting research already receive aid through grants earned by their



Master's student Molly Schumacher '12 presents her research to attendees at the 14th Annual Phi Sigma Research Symposium.

ducted by biologists outside of the University, as well as providing a period for Illinois State biologists to share their research with external researchers. Phi Sigma continues to support this seminar series as a means of outreach among scientists in varying fields and institutions, and as a way for recent scientific explorations to be communicated to the nonscientific community.

Phi Sigma will host the 15th annual Research Symposium April 4, 2014. This is an opportunity for Illinois State undergraduate and graduate students to present the research they have conducted over the past year. The symposium consists of sessions for both poster presentations and oral presentations. Besides providing a great opportunity for scientific outreach to the University community, the symposium provides presenters with the option of having their presentations judged and may potentially win prizes in the form of research/travel grants.

Each year, the symposium is concluded with a keynote presentation by an outstanding researcher in the biological sciences. Last year, we were very pleased to have Tony D. Williams, professor of biological sciences at Simon Fraser University, as keynote speaker, who gave a very interesting talk on avian reproduction and why it is still valuable science that needs further investigation.

We are pleased to have Illinois State Anthropology Professor Fred Smith, the chair of the Sociology and Anthropology Department, as this year's keynote speaker. Smith will talk about his work on human evolution in a presentation titled "Something Old, Something New: Neandertals Revisited."

In conclusion, Phi Sigma would like to thank all who contribute to research and promote education in the biological sciences. We will continue to encourage and support advances in biology. Here's to another year of fine academic research!

## Report from the Biological Sciences Student Association

by Rachel Knight

The Biological Sciences Student Association (BSSA), which is open to all biology majors and minors, works to help members learn more about the field of biology, interact with other students who share common interests and a field of study, as well as help members get more involved on campus by either doing volunteer work or working in a research lab. BSSA also provides members with information that can help them find internships, volunteer work, and research opportunities on campus. At our meetings we invite professors from the School of Biological Sciences to present their research and to talk about their lab work. This is great for our members because this helps them to determine if they would like to work alongside these professors as well as making it easier for members to find a lab that interests them the most. Volunteer opportunities are provided to members at Advocate BroMenn Medical Center, animal shelters, and the Children's Discovery Museum. BSSA also participates in the Expanding Your Horizons Conference each year. At the conference BSSA provides science-related displays for the children to increase their interest in biology.

BSSA members make cards for hospital patients for various occasions, like Valentine's Day and Halloween. BSSA also participates in the Relay for Life fundraising event each year. We also encourage members to get to know each other by helping members to form study groups and go on field trips together. We have gone to Miller Park Zoo and the Normal Theater. The next big trip BSSA has planned is to go to a cadaver lab!



BSSA students with their advisor, Assistant Professor Wolfgang Stein

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other students in the school's laboratories and field sites.

More information about each of the funds can be found by clicking on the "Make A Gift" button at [bio.IllinoisState.edu](http://bio.IllinoisState.edu).



Some of the recent Weigel grant recipients

### Upcoming events

We have three seminar series in the school. The School of Biological Sciences Seminars feature mostly invited speakers from other universities presenting their current research. The other series are mostly presentations by students. All of these are listed at [bio.IllinoisState.edu](http://bio.IllinoisState.edu). Everyone is welcome to attend these events. Here are some of the upcoming speakers for these series and other events. Unless otherwise noted, the speakers are students.

#### April

- 4 8 a.m.-5 p.m.**  
Phi Sigma Research Symposium
- 4-5 p.m.**  
Professor Fred Smith  
Department of Sociology and Anthropology chair  
"Something Old, Something New: Neandertals Revisited"
- 8 Noon-1 p.m.**  
Ashley Hembrough  
Master's thesis proposal
- 9 Noon-1 p.m.**  
Hazel Ozuna-Vazquez  
"The Immune Response of B1 Cells and the Effect of Aging in B2 Cell Function"
- 15 Noon-1 p.m.**  
Kristin Duffield  
"Testing the Terminal Investment Hypothesis in Male and Female Decorate Crickets"

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## April

16 Noon-1 p.m.

Samantha Atkinson  
"Genetic Analysis of Ton2 Dependent Processes in Microtubule Organization in *Arabidopsis*"

17 4-5 p.m.

Professor James Goodson  
Indiana University  
"Neuroendocrine Mechanisms of Gregariousness and Territoriality in Birds"

22 Noon-1 p.m.

Molly Schumacher  
Mockford-Thompson Fellowship presentation

23 Noon-1 p.m.

Sarah Marrochello and  
Shawn Sternisha  
"Maternal Antibody Transfer in the Red Eared Slider and Effects of Rose Bengal on *Leishmania* Cells"

24 4-5 p.m.

Dr. Murat Bastepe  
Harvard Medical School  
"Human Pathologies Associated With GsD Mutations"

25 2-4 p.m.

Integrative Plant Biology and Bioenergy Poster Session and Social

29 Noon-1 p.m.

Meghan Strange  
"Effects of Pre- and Post-natal Corticosterone on Fitness-related Traits in Nestling House Wrens"

## May

1 4-5 p.m.

Professor John E. Gustafson  
Oklahoma State University  
Alumni Seminar in Genetics: "My Journey With an Antimicrobial-Resistant Clone of *Staphylococcus Aureus*"

6 Noon-1 p.m.

Keith Bowers  
"Maternal Immune Stimulation and Terminal Investment in the House Wren"

9 7-9 p.m.

College of Arts and Sciences commencement

# Faculty news

by Emma Lipka from CASNews

In fall 2013 two tenure-track faculty members joined the School of Biological Sciences:

## Victoria Borowicz

The College of Arts and Sciences welcomes Victoria Borowicz as a new assistant professor in the School of Biological Sciences. This semester she is teaching a graduate course, Population Ecology. In fall 2014 she will teach Economic Botany. She holds a B.S. in science and environmental change-biology from the University of Wisconsin-Green Bay, and an M.S. in zoology and a Ph.D. in ecology from Pennsylvania State University.

Borowicz has published more than 25 articles in numerous journals, including *Ecology*, *Oecologia*, and the *Journal of Sustainable Agriculture*. As an adjunct professor at Illinois State, she guided the research of four M.S. students. Her current research focuses on the effects of parasitic plants on prairie communities.

In her spare time, Borowicz plays French horn and enjoys kayaking and traveling with family.



Victoria Borowicz joined the faculty in fall 2013.

## Ben M. Sadd

The College of Arts and Sciences welcomes Ben M. Sadd as an assistant professor of infectious disease ecology in the School of Biological Sciences. This semester Sadd is teaching Ecology and will teach the graduate course Evolutionary Ecology of Infectious Disease in fall 2014. He graduated with honors and a M.Sc. in zoology from the University of Sheffield in the United Kingdom. Sadd received his Ph.D. from the Swiss Federal Institute of Technology in Zurich (ETH).



Ben Sadd joined the faculty in fall 2013.

Sadd's research focuses on the ecology and the evolution of host-parasite relationships, specifically in bumblebees and other insects; host immune defense evolution; and ecological immunology. In addition Sadd is interested in questions related to pollinator health. He has been published in *Current Biology*, the *Journal of Applied Ecology*, *Evolution*, and the *Proceedings of the Royal Society: Biological Sciences*, among others.

Sadd was a Junior Fellow at the Wissenschaftskolleg zu Berlin, Germany, having received a fellowship at a Wissenschaftskolleg zu Berlin (WIKO), presented by the European Society for Evolutionary Biology. After his time in Germany, Sadd worked as a senior researcher and assistant

professor from 2011–2013 at the ETH Zurich in Switzerland.

Sadd is an avid naturalist having grown up in a rural area of the United Kingdom. In addition to a purely scientific perspective, Sadd enjoys capturing images of beauty and interactions in the natural world through his hobby of wildlife photography.

# Changes in biology teacher education

by Cynthia Moore, associate professor

The School of Biological Sciences has a long-standing tradition in preparing students for teaching careers. The program has changed over the past decade, driven by our desire to provide the best possible training for future science teachers.

In 1998 I joined the department faculty as the director of biology teacher education. My previous experience as a liaison between St. Louis-area K-12 teachers and Washington



Students in teaching laboratory class

Darner Gougis, to the school. The number of students in our program has more than doubled since 2001 and now includes about one-quarter of all biology majors.

Our biology teacher education students complete a rigorous program that emphasizes laboratory-intensive biology course work as well as classroom experience. We have added

specialized biology courses, including the Introduction to Teaching Science sophomore-level course and the hands-on Laboratory Methods in Teaching Science course that provides students with a chance to design and perform scientific experiments as well as practice the skills necessary to provide active learning experiences for their future students. Students gain classroom experience starting in their sophomore year and many also serve as undergraduate teaching assistants. Our graduates are now certified to teach all high school science courses—biology, physics, chemistry, and earth science—including Advanced Placement and honors biology.



Our students are in high demand in area schools, and we have nearly a 100 percent job placement rate before graduation. We are excited to continue our work with students and local schools to develop successful science teachers who will motivate their own students to learn and grow.

University resources provided important insights into the unique challenges and rewards of being a science teacher.

In 2004 the program added a new teacher education advisor, a position filled by Elisa Palmer and, more recently, by Margaret Parker, both former high school biology teachers. We have also added another science education faculty member, Rebekka

## Dr. David Borst Memorial Scholarship Fund

The Dr. David W. Borst Jr. Memorial Fund was established in 2010 to provide scholarships for academically outstanding



Professor Emeritus David W. Borst Jr.

undergraduate students in the School of Biological Sciences who are pursuing research projects supervised by faculty in the School of Biological Sciences. These scholarships serve as

a lasting memorial to the late David W. Borst Jr., a member of the faculty in Biological Sciences from 1985–2005, who was committed to training undergraduates in research in the biological sciences. His research in arthropod endocrinology involved many Illinois State University undergraduates, some of whom worked on marine crustacean endocrinology during summers at the Marine Biological Laboratory in Woods Hole, Massachusetts, and some of whom worked on collaborative research on endocrine control of grasshopper life history plasticity in his laboratory at Illinois State University.

The scholarship fund has grown rapidly since its inception in late-2010 through generous donations from faculty, Borst's family, and former students, with matching funds from the School of Biological Sciences. The fund is now endowed, so that the Dr. David W. Borst Jr. Scholarship is an ongoing scholarship awarded to students in Biological Sciences. If you would like to make a donation to the Dr. David W. Borst Jr. Memorial Fund, you may do so at [bio.IllinoisState.edu/Giving/Info/Borst.shtml](http://bio.IllinoisState.edu/Giving/Info/Borst.shtml), or contact Stephanie Sellers, director of Development for the College of Arts and Sciences, at (309) 438-7725 or [seselle@IllinoisState.edu](mailto:seselle@IllinoisState.edu); or Craig Gatto, director of the School of Biological Sciences, at (309) 438-3669 or [cgatto@IllinoisState.edu](mailto:cgatto@IllinoisState.edu).

# Our alumni: Where have you been and where are you now?

This fall we sent out a survey requesting information. We received more than 300 responses! We have printed the responses that contained a bit more news. Once we have an interactive online version of this newsletter, all of the responses will be listed. This will be an annual newsletter, so watch for our call for alumni news in your inbox.

**Kara Babrowski '99**  
**General biology**  
**Economic officer, U.S.**  
**Department of State**

As a Foreign Service Officer with the U.S. Department of State, I have served in Nairobi, Kenya; Karachi, Pakistan; and Abidjan, Ivory Coast. I obtained my M.A. and Ph.D. in anthropology from the University of Illinois at Chicago.

**David Baker '78**  
**General biology**  
**Retired**

I worked for 34 years for the Illinois Department of Public Health in Peoria in the long-term care program. I was one of the supervisors of this program that does regulatory inspections of nursing homes, child and adult day care facilities, hospitals, and correctional facilities. I am enjoying my retirement in Morton with my wife, Janet, who is a retired high school librarian and teacher. My son David is in his second year at Illinois State University in the Mennonite College of Nursing.

**Lisa M. (Sienknecht) Botts '77**  
**General biology**  
**Associate, ALCO**

I have been retired from the laboratory sciences since 1998. I had worked in various hospital labs, pharmaceutical labs, and a research lab at the University of Minnesota. I now live the quiet life in a rural area in northern Minnesota, in a country home on wooded acreage. I am surrounded by nature and I love every minute of it!

**Rita A. Brenden, M.S. '80, Ph.D. '84**  
**Biological sciences**  
**Section chief for clinical and environmental bacterial diseases, California Public Health Department**

I participate in ham radio public service activities in the East Bay and Marin County, do container gardening, and enjoy flat walks along Bay Area trails. I'm looking forward to setting a retirement date so I can visit friends outside California more.

**Darrell Cooper '84**  
**General biology**  
**Oncology pharmacist,**  
**San Antonio Military**  
**Medical Center**

I received my Doctor of Pharmacy degree from the University of Illinois at Chicago in 1989. I enjoy traveling with my partner of 23 years. My main hobby is photography.

**Dr. Courtney E. (Russell) De Jesso '01**  
**General biology**  
**Physician-Neonatology**  
**Fellow, MedStar Georgetown**  
**University Hospital**

I proudly served in the U.S. Navy for six years. I am married to Marine husband Mike, and we have three children: James (4), Lucas (3), and Victoria (infant).

**Carol (Fredenrich) Dodge '87**  
**General biology**  
**Molecular pathology manager,**  
**University of Illinois Hospital**

We are very excited that our oldest daughter is a freshman majoring in biology at Illinois state University! We had a lot of fun going to the Homecoming Parade and game this year. We especially enjoyed taking the family to see *Young Frankenstein* at the Normal Theater on Family Weekend—very cool!

**Dr. Christine Dunham '86**  
**General biology**  
**Dentist**

I have a general dentistry office in Joliet. I love my job and enjoy traveling, singing in Sweet Adeline's barbershop chorus, golfing, and spending time with family.

**Julie Elzanati, M.S. '02**  
**Conservation biology**  
**Dean of continuing education,**  
**Heartland Community College**

Julie was the assistant director at the Ecology Action Center from 2003-2006. In 2008 Julie helped Heartland Community College establish the Illinois Green Economy Network (IGEN) and served as the IGEN executive director from 2011-2013. IGEN is a consortium of all Illinois community colleges working together to implement sustain-

ability practices and advance green economic development across the state. Currently, Julie serves on the board of directors for the Parklands Foundation.

**Dr. Shaun Fauley '00**  
**General biology**  
**Veterinarian and founding**  
**owner, Care Animal Clinic in**  
**Naperville**

Illinois State University really taught me to appreciate biology and planted the seed for a career in veterinary medicine. After graduation I went to the University of Illinois' vet school and graduated with a D.V.M. degree in 1988. I started Care Animal Clinic in 1996 and all has been well since then. If I had it to do all over again, I would still make the same choice.

**Sally (Hargis) Fedrigo '90**  
**General biology**

I am currently a stay-at-home mom. I have worked in a diagnostic microbiology lab for veterinary medicine and have taught high school biology and chemistry.

**Mark Finke, Ph.D. '84**  
**Behavior, ecology,**  
**evolution, and systematics**  
**Senior project manager, Cen-**  
**tral New York Technology De-**  
**velopment Organization**

I relish the time I am able to spend at my camp in the Adirondacks on Lake George.

**Patti (Pienta) Hoffert '89**  
**Teacher education**  
**High school biology, anatomy,**  
**and physiology teacher, Metea**  
**Valley High School**

Patti lives with her husband, son, and daughter in Aurora. She is a Key Club advisor and band booster parent.

**Brian Horn '02**  
**General biology**  
**Patient care coordinator**  
**for IV patients, Orsini**  
**Healthcare**

I'm happily married to my wife, Lauren (Cottingham) Horn, and the proud stepdad of Zachary Cottingham.

**Stephen Idowu '08**  
**General biology**  
**Consultant/application**  
**architect, U.S. Department of**  
**the Interior in Denver, con-**  
**tracted through Accenture**  
**Federal Services**

I went on to receive an M.B.A. from University of Illinois in May 2012. I enjoy going to different mountains in Colorado and spending time with my family.

**Dr. Sarah Janssen '91**  
**General biology**  
**Physician, The Permanente**  
**Medical Group**

Janssen lives in San Francisco with her family and enjoys taking long walks on the beach, collecting sand dollars. She serves on the board of San Francisco Bay Area Physicians for Social Responsibility.

**Dianne M. Jedlicka, M.S. '84**  
**Zoology**  
**Liberal sciences biologist and**  
**biology professor, School of**  
**the Art Institute of Chicago**

I have worked for various universities as well as The Field Museum. I developed numerous biology, chemistry, and physics courses for DeVry University (online with virtual labs and blended). I still love the eastern chipmunks that I researched for my master's at Illinois State University and have continued working on them at the community level, including predator risk evaluations.

**James A. Marsh '69**  
**General biology**  
**Professor emeritus of**  
**immunology, Cornell**  
**University**

I was on the faculty of Cornell for 28 years, first for 14 years in the college of agriculture and life sciences, then for 14 years in the college of veterinary medicine. I taught immunology and researched avian immunology throughout that time. After completion of my B.S. from Illinois State, I taught high school biology for five years while completing my M.S. in biology from Northeastern Illinois University. I returned to graduate school at Northwestern University and completed my Ph.D. in biologi-

cal sciences in 1978 after which I took a faculty position at Cornell. I live in New Bern, North Carolina, where my wife and I moved when we retired.

**Sheila McCormick '73**  
**General biology**  
**Principal investigator and adjunct professor, Plant Gene Expression Center of the U.S. Department of Agriculture and University of California-Berkeley.**

My research focuses on pollen molecular biology, mostly in the model plant *Arabidopsis*. I teach grant writing at the University of California-Berkeley. I have seven chickens in my backyard.

**Julie (Fehrenbacher) McCoy '04, M.S. '06**  
**General biology**  
**School nutrition director, Bloomington School District 87**

After completion of my B.S. in biology, I went on to earn my master's degree in family and consumer sciences at Illinois State in the nutrition sequence. I completed a dietetic internship at the Veteran Affairs San Diego Healthcare System in La Jolla, California. I passed the registered dietitian exam and became a licensed dietitian in Illinois. I worked for three years at Methodist Medical Center in Peoria, where I worked with pediatric and women inpatients and general outpatient dietary counseling, and assisted in the weight loss and surgery center and with many other wellness initiatives. I then took the position at District 87 as the school nutrition director and I love it. I get to work with the food service staff on healthy meals for our students and the entire district on wellness initiatives! It is great to be a permanent resident of Bloomington-Normal!

**Denis M Medeiros, M.S. '76**  
**Physiology, neuroscience, and behavior**  
**Vice provost of faculty affairs and dean of the school of graduate studies, University of Missouri-Kansas City,**

I retired from Kansas State University in 2011 where I was head of the department of human nutrition for 11 years. Previous to that, I spent 11 years on the faculty at The Ohio State University, five years at the University of Wyoming, and three years at Mississippi State University. I am currently dean of the school of

graduate studies and vice provost at the University of Missouri-Kansas City. I have published more than 120 articles on human nutrition and have authored several books in nutrition.

**Dennis Oakland, M.S. '82**  
**General biology**  
**Retired**

I am a grandpa to three fantastic grandchildren. I retired after 38 years of teaching science for Prairie Central Junior High School.

**Joe O'Shea '80**  
**General biology**  
**Anatomy and physics teacher, Evanston Township High School**

I am married to Laura (Krass) with four children. The youngest is currently at Illinois State University!

**Laura (Krass) O'Shea '80**  
**Teacher education**  
**Retired**

I volunteer in the pediatric department at Lutheran General Hospital several days a week. I am enjoying being retired and being able to spend time with family and friends.

**Sheryll (Renken) Rockway '71**  
**General biology**  
**Retired**

I am retired after teaching high school sciences, including biology, in the Aurora and Naperville area. I supervise science and math intern teachers for Benedictine University part time.

**Janet Sinn-Hanlon '83**  
**Molecular and cellular biology**  
**Medical illustrator/biomedical visualization specialist, University of Illinois at Urbana-Champaign College of Veterinary Medicine**

After graduating from Illinois State University, I earned ASCP certification in medical laboratory sciences and worked for a number of years in clinical and research laboratories. In 1994 I earned a master's degree in biomedical visualization from the University of Illinois at Chicago. I worked for many years as a biomedical visualization specialist for the Imaging Technology Group at the Beckman Institute, acting as a consultant for researchers and graduate students using the facility to image, analyze, and visualize their scientific data. I collaborated in various research projects, as well

as produced images for presentation and publications, including numerous journal covers. I recently took a position at the veterinary school, where my main focus is providing illustrations, animations, and 3-D models for teaching purposes.

**Jeffrey Stout '82**  
**General biology**  
**P.C., Stout Chiropractic Clinic**

I am the owner of a chiropractic clinic that employs two chiropractors, two massage and rehab therapists, and three office staff in Normal. The office is a 10-minute walk from the University's campus. I enjoy going to Illinois State sports with my wife (especially basketball and volleyball). When not working, I enjoy running, anything outdoors, and being with family and friends.

**John D. Styrsky, M.S. '99**  
**Behavior, ecology, evolution and systematics**  
**Associate professor of biology, Lynchburg College**

I currently study ecological interactions involving ants in Virginia and Panama. I enjoy hiking and birding in the Blue Ridge Mountains of Virginia.

**Susan Taylor, M.S. '77, M.S. '88**  
**General biology**  
**Retired**

My degrees in biology served me well as I changed to related careers that continued to build on the excellent foundation in biology I received from Illinois State University. I obtained a second M.S. in counseling and became a nationally certified registered dietitian. My work experience ranged from a highly regarded Florida spa to an internship in the genetic metabolic unit of the department of pediatrics at the University of Miami. Also in Florida, I counseled elementary students and worked in the inner city. I returned to Illinois to collect state retirement years by counseling in middle schools and a high school. I continue my education while retired and work with the city of Champaign on a citizens committee to reduce flood water. There are so many things to do and so many ways to get involved in helping others in Champaign; I feel booked up for the rest of my natural life!

**Jim Wingfield, M.S. '76**  
**Physiology, neuroscience, and behavior**  
**Microbiology laboratory technician, city of Decatur Illinois South Water Treatment Plant**

I enjoyed teaching human anatomy, cellular physiology, and chemistry from 1976-1988 while employed as an instructor at Decatur Memorial Hospital's school for nurse anesthetists. I have been working in public water supply for the past 25 years doing biological and chemical research to maintain water quality.

**Stephen P. Wolf '78**  
**General biology**  
**Manager of safety, health, and security for the Americas; Akzo Nobel Inc.**

I am currently out on Long Term Disability (LTD) while fighting multiple myeloma, a white blood cell cancer that attacks the bones. I was diagnosed with it in May 2009. The cancer has stabilized, but I am still taking chemo to keep things in check. I married the love of my life, Terry, in June 2006, and we currently live in Allison Park, Pennsylvania, just outside of Pittsburgh. I volunteer at the local food bank a couple of times a month.

**Douglas Wright '87**  
**General biology**  
**Professor and vice chair of the department of anatomy and cell biology, University of Kansas Medical Center**

I received my Ph.D. in biology at the University of Kentucky in 1992. I then performed postdoctoral studies in neurology at the Washington University School of Medicine. I've been a professor at the University of Kansas Medical Center since 1997.



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