Greetings from the Chair

Department News

Graduate Student Feature

On the cover

EEB graduate students and faculty pose for a group photo during a recent field trip to the north woods. Photo credit: John Pleasants
Greetings, former Students, Friends and Alumni! It is a pleasure to share with you a bit of news from the department, and provide a few snapshots of our many ongoing activities. Our newsletter, BioSpheres, represents a wonderful opportunity for us to reconnect with our widely dispersed alumni and friends and share a little bit about our many activities in learning and discovery. In each issue, we try to highlight a different dimension of our daily lives in the hopes that this provides a richer portrait of what we are trying to achieve. In previous issues we highlighted how EEOB “reaches out across the nation” to serve the public at large; showed how EEOB “is going places” with national and international research activities; and showcased our recent successes in growing Ecology.

This year, I thought it might be informative to bring to center stage our graduate students, who collectively comprise an integral part of who we are. Our Doctoral and Masters students are our “academic children”, whom we lovingly mentor not only from the time they are accepted into the program until they graduate several years later, but also often for many years thereafter. Our many wonderful graduate students are not only critical to our teaching and research missions, but they are the teachers, scholars, and leaders of the next generation, not just in academia, but in many walks of life. For these reasons our department places a high priority on active mentoring and meaningful engagement with our graduate students, doing all that we can to facilitate their professional growth and encourage their focus on excellence in all that they do.

As you will see as you explore the pages of this issue of BioSpheres, our students’ areas of expertise, study subjects, and geographical foci vary impressively, spanning most conceptual areas in ecology and evolutionary biology. In this issue, we take the opportunity to introduce you to some of the teaching and outreach activities of our graduate students, as well as some of the field trip opportunities available to them for their own educational enhancement. Perhaps some of these pictures, and their associated stories, will bring back memories of your own experience here at ISU or later in your own careers. We would welcome your stories in this regard.

Some of you may be aware that we have experienced some challenging budget cuts at Iowa State University during the recent economic downturn. While these cuts have forced all of us to prioritize and do more with less, be assured that EEOB maintains its focus on excellence in teaching and research. When you explore our website (www.eeob.iastate.edu) or read our newsletters, I hope you will feel, as do we, that the Department of Ecology, Evolution and Organismal Biology at ISU is among the best such departments in the nation, where world-class research is being conducted and conveyed, and where students at all levels, from undergraduate through post-doctoral, are provided first-rate education and training. It is a privilege to be a part of this scientific beehive. Yet we can use your support! There are many ways in which you can help us succeed, and toward this end we have included for your use a form on the last page of this issue of BioSpheres. I thank you in advance for your commitment to the future of the Department.

I hope you enjoy this issue of BioSpheres. Until next issue, please stay in touch!

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Jurik named Program Chair for 2011 annual meeting of the Ecological Society of America

Associate Professor Tom Jurik currently serves as the Program Chair for the 2011 Annual Meeting of the Ecological Society of America (ESA). Established in 1915, ESA is the world’s largest scientific society of ecologists, with a membership of over 10,000.

As Program Chair, Jurik developed the theme for the meeting and helped create artwork and logo for meeting materials. He is coordinating the scientific program for the meeting and is involved in all other aspects of planning the meeting.

The theme for the annual meeting, to be held in Austin, TX on August 7-12, 2011, is “Earth stewardship: Preserving and enhancing earth’s life-support systems.” The meeting is expected to attract over 3500 scientists, researchers, students, and educators from around the world and will be covered by local and national media.

The meeting’s scientific program typically includes more than 2000 presentations organized into symposia, oral sessions, poster sessions, special sessions, and workshops. Jurik is in charge of screening and selecting presentations for the meeting and organizing related presentations into coherent sessions. He also chooses high-profile speakers for plenary sessions. Jurik said that organizing the meeting is a huge challenge, but he has greatly appreciated the opportunity to help focus attention on some of the key issues facing the world.

Downing elected President of American Society of Limnology and Oceanography

John Downing’s six-year term will include two years each as president-elect, president and past-president. He previously served on ASLO’s board of directors.

ASLO is the world’s largest professional scientific organization dedicated to the study of aquatic systems, covering the full spectrum from freshwater to the marine sciences. Its 4,000 members come from around the globe, with 40 percent of the membership residing outside of the United States in more than 20 countries.

“ASLO is especially notable now because of major environmental issues in the Gulf of Mexico,” Downing said. “ASLO members are the principal source of independent scientific expertise on understanding and repairing damage in the Gulf, as we supply experts and information to government through our Washington policy office.”
EEOB faculty member strives to keep women in science

As director of the ISU Advance Program, Bonnie Bowen spearheads a campaign to keep women in the field of science at Iowa State. The program looks at university policies and programs to determine needs for change or improvement to try to bring women into the sciences and engineering. The ISU Advance Program received a $3 million grant from the National Science Foundation to conduct its five-year program. Due to her efforts, Bowen is one of the 12 women to be featured on the 2011 Women Impacting ISU Calendar.

Downing honored with ASLO Award

John Downing will be honored with the American Society of Limnology and Oceanography’s Ruth Patrick Award for enhancing scientific and popular understanding of the economic and environmental impact of agriculturally-driven eutrophication through his outstanding contributions in aquatic ecology, eutrophication research, and environmental education”.

Serb Honored with the CALS Early Achievement in Teaching Award

Dr. Jeanne Serb was awarded the College of Agriculture and Life Science’s Early Achievement in Teaching Award in January of 2010. The purpose of the award is to recognize faculty members who have demonstrated outstanding teaching performance early in their professional careers as documents by students and peers. The same year, Serb also received the Teacher Award of Merit from the North American Colleges and Teachers of Agriculture.

Serb has taught in a range of settings, including large introductory undergraduate courses, graduate courses, small field-based courses and one-on-one mentoring. Her educational goals, regardless of setting, are to share science-based knowledge and to facilitate discovery by engaging students through an open student-instructor relationship.
A special gift to the Skunk River Navy

The Skunk River Navy recently received a generous donation of $10,000 from an anonymous donor. The Skunk River Navy was formed in 1998 by Dr. Jim Colbert. Since its inception, the Skunk River Navy has removed over 60 tons of trash from the South Skunk River and its tributaries, and contributed numerous sets of water quality data to the Iowa Department of Natural Resources IOWATER Program. Through the years, many others have been instrumental in keeping the Navy afloat through support and volunteering. This latest donation represents the largest monetary contribution to the SRN, which also has attracted the volunteer efforts of over one thousand ISU students, dozens of Ames and Story County citizens and many ISU faculty, staff, and graduate students.

Three students receive Charles Drewes Memorial Scholarship

During Spring 2010 we made the first awards of the Charles Drewes Memorial Scholarship. This is an annual scholarship for undergraduate or graduate students at ISU actively pursuing secondary education licensure in biology. The first three recipients were Adam Kent and Shelly Lampman, both of whom entered the ISU Masters of Arts in Teaching program last summer upon completion of their undergraduate biology degrees, and Spencer Mesick who will graduate in May 2011 with undergraduate majors in biology and secondary education.

PhD Student receives Lois H. Tiffany Scholarship

The Lois H. Tiffany Scholarship is awarded to graduate students to support research, either field or lab, work in the fields of evolution, systematics or ecology. Lakshmi Attigala will use this award to study the natural hybridization and potential use of low copy nuclear markers in phylogenetic inference of native Sri Lankan woody bamboos with an emphasis on Arundinaria. According to Attigala, "the data obtained can be used to answer questions related to historical biogeography as biogeographic patterns in this region provide an ideal model for testing the long-lasting debate between Gondwanan vicariance and long dispersal explanation and also in conservation of Sri Lankan native bamboo diversity." For more information see page 10.
Graduate Students Spotlight

*Education is not filling a pail but the lighting of a fire.*
~William Butler Yeats

With more than 50 active graduate students, the Department of Ecology, Evolution and Organismal Biology acts as home base for a host of exceptional young scholars.

The department offers graduate work leading to both a Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. EEOB graduate students major in one of several interdepartmental majors, including but not limited to, Bioinformatics and Computational Biology, Ecology and Evolutionary Biology, Environmental Science, Genetics, and Microbiology.

During the 2010-2011 academic year, 8 new graduate students joined the ranks of the many accomplished senior students. It is anticipated that the department will welcome new students during the 2011-2012 academic year. These new students will find themselves among EPA Star Fellows, NSF Graduate Research Fellows, NSF Doctoral Dissertation Grant recipients, award winning teaching assistants, and high school mentors, dedicated researchers, and adventure seekers.

The opportunities for EEOB graduate students are only limited by their imagination and ambition. Please sit back and enjoy the many accomplishments and antics of the graduate students of 2010-2011.
Students receive EPA STAR Fellowships

Leanne Martin’s research will attempt to understand how relative abundances of exotic and native species in grasslands influence multiple ecosystem service tradeoffs between plant species diversity, carbon storage, productivity, and bee pollinator abundances at a landscape scale. To do this, she plans to compare paired exotic- and native-dominated grasslands and tradeoffs among their ecosystem services in a latitudinal gradient across a model landscape, the Eastern Great Plains tallgrass prairie region. Martin hopes her research results in recommendations for managing multiple ecosystem services at a landscape scale.

Rory Telemeco’s research will attempt to determine the probable effects of impending climate change on reptiles using alligator lizards (genus *Elgaria*) as model systems. Telemeco will combine field and laboratory experimental techniques with cutting edge molecular phylogeographic techniques and bioclimatic modeling. Many aspects of alligator lizard biology ranging from embryonic development to behavior are impacted by the thermal environment. Telemeco hopes to use his research to build models that will predict how threatened Anguid species will likely be impacted by climate change.

Berns receives Rosemary Grant Graduate Student Research Award

Chelsea Berns received this first annual award through the Society for the Study of Evolution. The award is intended to assist students in the early stages of their Ph.D. programs by enabling them to collect preliminary data or to enhance the scope of their research beyond current funding limits. This award allowed Berns to visit museums across the US to collect data regarding morphological variations in hummingbirds.

Schwartz receives NSF GK-12 Fellowship

As an NSF GK-12 Fellow, Tonia Schwartz partnered with a Des Moines area middle school teacher to improve science education. Over the summer and throughout the school year Schwartz worked with the teacher and ISU faculty to develop inquiry-based learning projects, some of which will be directly related to her research. She will spend one day a week in the middle school working with the students to implement these hands-on research projects.
Sullivan receives NSF Graduate Research Fellowship

Lauren Sullivan's work focuses on the ways in which plant species utilize space in order to coexist. Space is an important aspect of biodiversity maintenance that is frequently modeled theoretically but has rarely been tested in the field. Sullivan plans to manipulate the dispersal of three phylogenetically constrained plant species with different life history strategies (annual, perennial without strong vegetative reproduction, and perennial clonal) in different nutrient environments in order to monitor invasion and demonstrate coexistence or exclusion.

Students receive NSF Doctoral Dissertation Improvement Grant

Landscape Characteristics and Bobcat Gene Flow

The overall goal of Dawn Reding's dissertation research is to identify if and how landscape characteristics mediate gene flow over three spatial scales (local, regional, and continental) in a mobile carnivore, the bobcat (*Lynx rufus*). Can a common mechanism, or set of mechanisms, explain local differentiation as well as deeper divergences? This NSF support allows Reding to explore the intriguing patterns emerging from regional and fine-scale work. This project will lead to significant improvements in the understanding of how landscape characteristics may influence evolutionary and ecological processes in mobile species like bobcats. The findings will also aide in the conservation and management of this ecologically and economically important carnivore.

Responses to Environmental Stress in Natural Snake Populations

How an individual responds to environmental stress affects how that individual acts, its ability to reproduce, and its lifespan. Therefore, it is important to understand how the genetic make-up of an individual determines how it responds to stress; and how populations evolve in response to their environmental conditions. Tonia Schwartz is addressing these questions snake populations that consist of either slow-living (low reproduction, extended lifespan) or fast-living (high reproduction, shortened lifespan) individuals who respond to environmental stresses in different ways, but only slightly differ in genetic make-up.
Students flock to Nebraska
Graduate Student Field Trip to View Sandhill Crane Migration

The EEOB Graduate Student Organization (EEOB GSO) organized a student-led field trip to a regional site of biological interest in the Spring of 2010. For this trip, the graduate students elected to travel to an area near Grand Island, NE to view the annual Sandhill Crane migration.

Each year, hundreds of thousands of Sandhill Cranes flock to the Platte River in early March to fuel up on invertebrates and waste corn before continuing on to their breeding grounds in Canada and Alaska. The crane migration also coincides with the arrival of millions of waterfowl to Nebraska’s rain water basin network, combining for one of the most impressive migration events in the country.

The field trip was attended by ten graduate students from a wide diversity of disciplines and was organized by EEOB GSO officers Adam Heathcote and Leanne Martin. EEOB GSO covered most of the transportation costs through membership dues and their annual VEISHEA Prairie Plant Sale. Dr. Bill Clark, a professor in EEOB, provided valuable guidance in planning and donating spotting scopes and binoculars for use by the students. The Nature Conservancy (TNC) in Nebraska generously agreed to host the group at their Derr House preserve near Wood River, NE. In addition to lodging, The Nature Conservancy also gave the students exclusive access to their private blinds along the Platte River, one of the best viewing locations in the area.

While at the preserve, TNC program director Chris Helzer gave the students a personal tour of the property, which included portions of restored and remnant prairie sites as well as an ongoing wetland mitigation project. The students were also treated to two seminars, one on the history of Sandhill and Whooping Crane conservation, and the other on the history and science behind the ongoing prairie restorations on site. The students were able to view thousands of cranes coming in from the fields to roost in the river the first evening and then depart again the following morning.

A group of Sandhill Cranes settle in for the evening along the Platte River near Wood River, NE. Photo credit: Adam Heathcote

EEOB Graduate Students (from left to right) Leanne Martin, Lauren Sullivan, and Forest Isbell identifying prairie plants at The Nature Conservancy’s Derr House preserve near Wood River, NE. Photo credit: Adam Heathcote

(continued on page 13)
Navigating the north woods
EEB grads explore ecosystems around the Great Lakes

Eleven EEB graduate students and 2 brave faculty (James Raich and John Pleasants) headed to the Great Lakes for a sixteen day adventure last June. They explored a variety of beaches, dunes, forests, bogs, and lakes, identifying flora and fauna across several states and learning about the ecology of region.

Throughout the trip, the group observed herptiles, a variety of threatened and endangered plants, old growth trees, carnivorous plants, and a bear! James Raich reflected on the trip, saying, “I really enjoyed spending time in so many lovely places with such a great group of students who gave me a much deeper appreciation of the quality of our EEB program and the people it attracts.”

The group ventured from Door County, WI, where they learned about dune succession and the geology of the Niagara Escarpments to the University of Michigan Biological Station (UMBS). The group kicked off their stay at UMBS by exploring Douglas Lake. They observed the numerous beds of invasive zebra mussels, dominating nearly every hard surface on the lake’s bottom. While at the station, students also completed a small-group research project, focusing on some aspect of biology at the station. Students spent a day collecting and analyzing data, then presented to the group at the end of the day. Projects included the work on the distribution of mussels in Douglas Lake to phenotypic variability in bracken ferns.

By traveling together, students and advisors could share their expertise with one another, discussing relevant issues in evolutionary biology and ecology while bonding with their peers.
In search of hidden bamboo biodiversity

Ph.D student Lakshmi Attigala is trying to place the native Sri Lankan bamboos in the appropriate evolutionary context, and update their classification. Also, the population level studies that she is going to conduct will enable her to assess species level questions, particularly in the temperate woody bamboo genus *Arundinaria*, to determine how much variation exists in these species and to make recommendations for their conservation.

Last summer she carried out field work in the high altitude montane forests and mountainous open grasslands in south central and central Sri Lanka, where she was able to collect most of the native Sri Lankan bamboo species.

Attigala says that accessibility to these still intact bamboo resources expanded her systematics and phylogenetic curiosity and increased her desire to untangle questions relating to phylogenetic relationships and biogeography in the temperate bamboo group.

The field experience she had last summer was “thrilling and fascinating” in her own words. “I never thought collecting bamboos in the tropics was this much fun. Within a very short period of time (nearly 20 days) I was able to collect all the Sri Lankan native woody bamboos including at least one new species. Also, it was the rainy season in Sri Lanka so most of the days we got soaked in rain and got special treats such as leech bites,” Attigala shared her experience with a laugh.

During this trip she was also able to collect one of the highly threatened and extremely rare native bamboo species known as *Arundinaria scandens*.

“*Arundinaria scandens* is only found in the summit of Pidurutalagala, which is the highest mountain of Sri Lanka, and this bamboo species occurs from about 2100m to the summit (2500m). This is the only known location of this species and if something happens to this habitat, *Arundinaria scandens* will become extinct forever.” Attigala said.
Teaching with turtles

Much of the research by Dr. Fred Janzen’s graduate students focuses on reptiles with temperature-dependent sex-determination (TSD). In species with TSD, the temperature at which eggs incubate determines the sex of the offspring. The Janzen lab is currently conducting a variety of studies to understand the potential effects of climate change on reptiles with TSD, as well as how reptiles with TSD may be able to adapt to climate change.

Many of these studies are conducted at Dr. Janzen’s long-term study site, Turtle Camp, which is located on an island in the Mississippi River. Each summer, graduate students from Dr. Janzen’s lab spend 6 weeks at Turtle Camp collecting data on nesting ecology of the painted turtle.

The graduate students are not only involved in research, but also volunteer to provide an important research experience to younger students. Through the innovative Turtle Camp Research and Education in Ecology (TREE) program, a diverse group of undergraduate and high-school students are included in the fun. For two weeks every June, high-school students from Iowa and Illinois join the research team at Turtle Camp. Graduate and undergraduate mentors lead small teams of high school students as they develop research projects for which they collect data and ultimately present results to the public and scientific community.

The high-school students are exposed to the challenges and rewards of gathering hard-earned data and answering the biological questions that they develop. The TREE program has certainly made a positive impact on its participants, as many of these students are now pursuing science degrees, and some even come back as undergraduate mentors. The great service provided by the TREE program has been made possible by the countless hours of volunteering of a diverse group of EEOB graduate students as well as many other current and former affiliates of the Janzen lab. The summer 2011 field season will mark the 24th season of research at Turtle Camp, and 5th year of the TREE program, both of which have been supported by the National Science Foundation.
Writing a prairie, reading the land:
Interdepartmental collaboration inspires research and writing

In an effort to help developing writers capture the “values as yet uncaptured by language,” graduate students and faculty in Iowa State University’s EEOB and Creative Writing and Environment programs have teamed up to couple outdoor experience with greater ecological understanding.

The collaborative effort between the two programs is focused on reconstructing seven acres of tallgrass prairie at the Everett Casey Nature Center and Reserve. The Casey Reserve, located near Ogden, IA, includes 76 acres that were recently donated for English Department students and faculty to study natural communities. “This [reserve] is really vital for us,” said Steve Pett, an associate professor of English who oversees the Casey Reserve, “yet we can only introduce students to that landscape in certain limited ways. People from other disciplines bring additional knowledge and understanding to enrich our students' education.”

The interdisciplinary goal of the Casey Reserve was ideal for EEOB graduate students Lauren Sullivan and Brent Mortensen who needed a place they could collect long-term data on plant traits to supplement their studies in Iowa’s tallgrass prairie. In their first meeting with Pett, Sullivan and Mortensen inquired about the English department’s goals for the land, suggesting that their research could help educate visitors about the reserve’s ecology.

They were surprised when Pett’s answer included a hope to restore seven acres of corn in the heart of the reserve to tallgrass prairie. The two PhD students, along with their graduate advisor Dr. Stan Harpole and fellow EEOB students Paul Frater and Elizabeth Bach, jumped at the opportunity to assist in the reconstruction.

In addition to providing English students access to the plant community that once dominated the Iowa landscape, the reconstruction allows EEOB students to study questions that have long baffled ecologists, such as why are there so many plant species, particularly in tallgrass prairies which may hold as many as 200 species in a landscape?

EEOB researchers hope that their efforts to reconstruct and study tallgrass prairie at the Casey Reserve will, in the words of Leopold, unlock the “successive stages of the beautiful” in nature for Creative Writing students and faculty. In so doing, EEOB research will extend beyond the realm of science through the works of writers at ISU.
Graduate students granted a wealth of teaching experiences

The core of the EEOB student teaching experience continues to be the 211L/212L class series. Within this framework, graduate students taught nearly two thousand undergraduates. Fellowships and programs continue to serve graduate students seeking an additional level of teaching experience. Preparing Future Faculty and the Knaphus Fellowship are important components of this advanced training. Students are even finding ways to create their own unique experiences.

Undergraduate Biology students have a team of graduate students prepared to facilitate their learning. One of the best, Jim Church, has been teaching labs for six semesters, and in 2010 won “Graduate Student Teaching Assistant of the Year”. Teachers like Jim make the learning experience more efficient and rewarding. All of the graduates are gaining experience in the art of teaching, but are also learning about learning, gleaning daily feedback from the students to improve their future prospects.

The university provides more intensive opportunities for students seeking to expand their capabilities through structured programs such as Preparing Future Faculty (PFF) and the Knaphus Fellowship. Jeanine Refsnider participated in PFF in 2010, helping to organize a workshop for new faculty and teaching assistants. In 2010 John Doudna was chosen as the 2011 Knaphus fellow, giving him the opportunity to design, implement and evaluate an intensive 4-week Introductory Biology course during the summer. Graduate student teaching experiences are not limited to campus. For example, Tonia Schwartz is participating in the GK-12 program where she works with 7th and 8th grade science classes.

Students are also finding opportunities for advancement outside of the typical structure of teaching experiences. Within the department, a few select students have been given the opportunity to teach advanced courses in anatomy and physiology, advanced physiology, ecology and aquatic ecology. Students have also assisted in the teaching of graduate courses on ecosystem services, molecular phylogenetics, and aquatic ecology. Students have even developed their own seminars for the Honors program, where they have the opportunity to interact with the cream of the undergrad crop, teaching topics as diverse as wildlife in agriculture to evolutionary principles.

Students Flock to Nebraska (continued from page 8)

This trip offered students a unique chance to travel together and witness this spectacular event, while at the same time learning about restoration and conservation efforts from researchers in the field. The EEOB GSO hopes to continue this tradition and offer similar field trips in the future.
Making a Difference

The Department of Ecology, Evolution and Organismal Biology at Iowa State University is committed to providing outstanding opportunities for the university community. In order to have the resources necessary to take these programs into the future, support for the department is essential. Funding is required to aid the program in developing new opportunities in technology, continuing and advancing outreach activities, maintaining and expanding current performance and educational opportunities, and supporting students and faculty. These services are crucial as the Department of Ecology, Evolution and Organismal Biology strives to keep up with the student demand for these experiences. To help make a difference, simply fill out the form, drop it in the mail (ISU Foundation, 2505 University Blvd, Ames, Iowa 50010-8644) and check our next newsletter.

For more information about making a gift to the Department of Ecology, Evolution and Organismal Biology or including ISU in your estate plans, please contact the College of Liberal Arts and Sciences Development Office at 515-294-3607 or Erin Steinkamp at estein@iastate.edu. www.foundation.iastate.edu/las_gift

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