SPICE Up Your Graduate Education

By Elisa Livengood, PhD Candidate in Interdisciplinary Ecology

As graduate students in the fast-paced world of research, classes, seminars, presentations, writing, and more research, we might not take the time to think about reaching out to the greater public. Many graduate students never peak their heads out the lab door, or in other instances we may spend our time researching in remote places of relative solitude. However, the need remains that despite what research situation we are in, lab or field, we need to be able to communicate our research and our passion for our chosen science to a much wider audience. This ability to communicate and inspire people with science is essential in order for them to see the value of such science. The SPICE program of the University of Florida seeks to train graduate students in their ability to communicate science to both teachers and students in the middle school setting by partnering graduate students in the STEM (science, technology, engineering, and math) disciplines with teachers.

The SPICE Program of the University of Florida was funded in 2003 by the National Science Foundation as part of GK-12 program for NSF’s Division of Graduate Education. Part of the mission for NSF GK-12 programs revolves around the world of science education in addition to helping graduate students gain the ability and skills to make them successful in their academic careers. Ultimately, this often involves some sort of outreach to local schools such as graduate students teaching in public schools or an informal setting.

SPICE, which stands for Science Partners in Inquiry-based Collaborative Education, works best when graduate students are incorporated into a co-teaching environment. Graduate students fellows are paired with teachers who apply for the program. The teacher and SPICE fellow then work together to plan lessons, and focus on teaching students everything from the scientific method to ecosystem health. Ecosystem Health and Sustainability are the main themes of the SPICE program and are often incorporated into the lesson plans and modules for the students.

As a participant in the SPICE program for the past 6 months, I worked with students in 7th grade life science. While I hope that I have had some influence on them in learning science, I think that I have been the one to learn and improve the most. There is nothing more challenging then standing before a classroom of 7th graders with 30 pairs of eyes on you.
waiting for you to answer their questions and deliver your knowledge. They ask the best questions, ones that require you to really think, and are constantly enthusiastic whether we are participating in a lab or working on understanding a difficult concept.

Since I am in the aquatic science field, much of my background knowledge of science I relate to the aquatic environment. My students are often fascinated by what I do as a scientist. Field experiences and concepts I have taken for granted are often the subject of a lot of interest to these students in life sciences. Just talking about my experiences in the field or lab as helped me to communicate science on their level. It also makes their experience with a scientist more "real" and tangible.

Recently, my students took a field trip to my lab to participate in the "Fishing for Success" program. Here the students were able to see science in action and experience the aquatic environment first hand. Parts of the field trip, students were able to see aquaculture research first hand through my lab, which is part of an Aquaculture and Sturgeon Research Facility. They also were able to practice identifying aquatic invertebrates and fishing for various fish in the catch and release ponds.

Several students had never had the opportunity to fish or enjoy their natural environment. Establishing this connection with the environment was important and was reflected on their faces as pure uninhibited wonder. One student approached me and whispered after successfully catching a fish that “this was the first fish I caught, ever!” Prior to our field trip we had studied scientific classification methods using dichotomous keys and the students really seemed to have a sense of accomplishment when they correctly identified an organism for the first time.

Whether you are considering applying for the SPICE Program or other similar program, take the time and think about how you can apply your expertise and communicate it students or the general public. Most teachers welcome the opportunity to have researchers and graduate students in their classrooms whether it is simply speaking to the students about your work or teaching a lesson you designed. The experience could help broaden the student’s perspective on a topic or aid in their understanding, but most of all it will help YOU learn and reconnect with your passion for science.
Additional Information
Get involved in the SPICE Program
http://www.spice.centers.ufl.edu/

Alachua County School Volunteer Program
http://www.sbac.edu/~volprog/volsbaccollege.htm

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Students Experience Bioenergy from the Ground Up

By Yelena Granovskaya and Kyle Fricker, Environmental Science

Last summer, a unique group of undergraduate students gathered everyday under the hot sun at the Energy Research and Education Park. They worked hard, flexing their intellectual and physical muscles, striving to learn everything they could under the mentorship of bioenergy expert Dr. Ann C. Wilkie. The students came from diverse backgrounds and enhanced their knowledge with cross-disciplinary learning in the BioEnergy Summer School (BESS).

The school was launched in the summer of 2006 when Dr. Wilkie recognized the lack of undergraduate programs addressing bioenergy on campus. The field of bioenergy has evolved to become a prominent area of research, driven by an increasing awareness of sustainability and the need for renewable fuels. Being a strong believer in experiential, hands-on, outside-of-the-classroom learning, Dr. Wilkie has spearheaded this bioenergy program with sponsorship from the Office of the IFAS Dean for Research.

Throughout the summer, the bioenergy interns not only gained scientific knowledge but also met with experts in the field, reviewed literature pertaining to bioenergy and sustainability, and made several field trips to bioenergy sites and conferences. The interns also had the opportunity to work on individual and group projects. These projects spotlighted innovative and practical applications of bioenergy research and the experiences gained by the interns were invaluable.

The field trips included visits to a local biodiesel co-op (Alachua Biodiesel Company), Dr. Wilkie's fixed-film anaerobic biodigester at the UF/IFAS Dairy Unit, UF’s Motor Pool, and the Gum Slough spring system. The interns also had the opportunity to attend the 2008 Florida Farm to Fuel Summit and the GRU Annual Green Building Symposium hearing speakers like Governor Charlie Crist and Gainesville Mayor Pegeen Hanrahan discuss biofuels and energy efficiency. All day trips, guest speakers, and conferences were followed with reflections and debates on sustainability and bioenergy issues.

With the focus of the research on bioenergy, the interns wanted to apply their academic and theoretical knowledge of sustainability in practical projects. Working together, the interns planted and maintained an energy garden. By growing bioenergy crops, the interns were able
to educate themselves on the viability and versatility of biomass available for fuel production. The energy garden was divided into plots for oil, sugar and fiber crops, to be used for biodiesel, bioethanol and syngas (gasification), respectively.

The students experimented with unique energy crops such as Sweet Potatoes, Napiergrass and Jatropha curcas. A few interns were fortunate enough to spend a day with a sweet potato breeder, Dr. Janice Ryan-Bohac, who is currently working on developing a highly productive energy sweet potato for ethanol production. Sweet potatoes, being perennials, are low maintenance and extremely productive. The breeders' goals are to develop a sweet potato cultivar that is rich in carbohydrates, potentially making sweet potatoes the most productive and efficient choice for ethanol production. Napiergrass, Pennisetum purpureum, is a highly productive perennial grass that grows to about five meters tall. Napiergrass yields thirty tons per hectare and can be harvested as a feedstock for cellulosic ethanol production or for gasification into syngas. The interns were especially interested in Jatropha curcas, a perennial plant that thrives in arid areas and has a seed oil content of up to forty percent. Unfortunately, the students faced a challenge in getting the seeds to sprout and throughout the summer they experimented with several germination methods, but were not able to grow any plants.

The interns also collectively cultivated an organic food garden juxtaposed to the energy garden, and pondered the debate of "food versus fuel". Gardening offered a demonstration of the relative ease with which people can live more sustainably and efficiently. "Locavores", the Oxford Dictionary's word of the year for 2007, are people committed to eating foods grown locally. In today's global markets, many foods purchased from supermarkets are packed and shipped from around the world at a high natural resource expense. Eating local foods is much more sustainable; communities need to work together to reduce their dependence on imported goods and the associated strain on natural resources. The interns grew tomatoes, zucchini, sweet potatoes, okra, cucumbers, green peppers, and squash over the summer months using organic methods. The experience gained from growing an organic garden opened the interns' minds to small-scale gardening, and the importance of implementing local, seasonal agriculture into sustainable community living. The interns donated nearly all of their harvested produce to the St. Francis House, a shelter for the homeless, in downtown Gainesville.
Each intern was also assigned an individual project that involved methods of creating biofuels. One of the interns, Kyle Fricker, a chemical engineering senior, was eager to learn about brewing biodiesel as well as experimenting with different methods for biodiesel production. Kyle spent numerous days in the lab experimenting with biodiesel formation using ethanol as an alternative transesterification reagent. Currently, methanol is the commonly used reagent in biodiesel production. Methanol is produced industrially from natural gas; thus biodiesel produced using it is not entirely renewable or "green". In the end, Kyle successfully made biodiesel batches from various grades of ethanol, a remarkable success. Kyle was further involved with different projects ranging from an energy balance on the biodiesel production process to a rainwater irrigation system for the food garden.

From day one, Jon Alldridge, an agricultural and biological engineering senior, was keen to learn as much as he could about algae. Jon's experimentation aimed to find optimal algae growing conditions. His project focused on testing different conditions for surfaces on which algae can grow, and showed the converging effects of surface angle and water stream velocity on algae growth and productivity. His interests went beyond the growth of algae to bioprospecting indigenous algae strains for their biofuel potential. Jon led the interns on a trip to the Gum Slough spring system where they sampled several native algal strains and later analyzed them in the lab.

Yelena Granovskaya, an environmental science junior, was interested in all aspects of sustainability. Her focus in the BioEnergy School consisted of experimenting with energy crops and designing a small-scale oil press. Small-scale oil extraction for biofuel operations is uncommon but, if implemented in a local, practical manner, it may become a key to community biodiesel operations. Yelena focused her energy on designing an oil press which would be easy to build and economic in material cost. Her design uses minimal materials, consisting of a metal frame with a hydraulic bottle jack attached, a wooden piston operated by the jack, and a perforated plastic cylinder.

The third annual BioEnergy Summer School has been more than a success. This group of young individuals ended their summer knowing that they had become a conduit for change by exploring sustainability in their lives and becoming a model for others. Through the failures and successes of experimentation, the interns learned how to create real-world solutions for broad and complex problems, leaving the school a little more "biofueled", than "biofooled".

For information regarding the 2009 UF/IFAS Bioenergy Research Summer Internship Contact:
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For more information regarding the 2008 experience, visit the Bioenergy Internship website at http://biogas.ifas.ufl.edu/Internship, or contact Yelena Granovskaya, (yelena@ufl.edu) or Kyle Fricker (kylfri@ufl.edu).
Tracking Florida's Rarest Plants

By Amy Jenkins, M.S. Alumna '03

Being interested in the environment and the ecology of Florida’s natural communities, I graduated with a Master’s in Interdisciplinary Ecology in December 2003 from SNRE. My research focused on restoration of pinewoods and pastures in central Florida. I investigated soil relationships between the seeds that accumulate in the soil waiting to germinate in the seed bank and mycorrhizal fungi in natural sites occupied by mesic pine flatwoods and sites undergoing restoration.

After graduating, I accepted a job as a field biologist with the Florida Natural Areas Inventory (FNAI) in Tallahassee, FL. This organization is the natural heritage program for the state, and is part of FSU’s Florida Resources and Environmental Center. FNAI is most known for tracking rare flora and fauna in the state, maintaining a rare species database that has approximately 30,000 records, but we also do a wide array of biological inventories of federal, state, and local lands in Florida, as well as serve as a model to other states for our GIS modeling of rare species habitat. I started at FNAI as a field biologist conducting vegetation monitoring, rare species surveys, and developing GIS-based natural community maps for property managers to aid in their land management activities. In 2005 I became the Senior Botanist and am primarily responsible for the 471 rare plant species that FNAI tracks within Florida. I add and remove species to our tracking list, process rare plant occurrence information into our database, rank species for rarity on a global and state level using NatureServe methodology, perform rare species surveys, develop natural community maps for properties around the state from the Florida Keys to the panhandle, and evaluate properties for inclusion into the State of Florida’s land acquisition program, Florida Forever. I also work closely with the state and federal governments to aid them in their regulatory authority over state and federally-listed plants. I have conducted surveys of several federally endangered plants such as fringed campion (*Silene polypetala*) and gentian pinkroot (*Spigelia gentianoides*) as well as several state-listed species. Our recent survey of gentian pinkroot revealed a previously undiscovered population of this critically imperiled plant that was thriving and protected on a federally-owned property.

My position has brought me to all corners of Florida where I have been fortunate to learn its diverse species and natural communities. I have worked in some of the most diverse and
beautiful of Florida’s natural places, seen its rarest of rare plants, and worked with some of the State’s premier botanists, including some of my former professors. The interdisciplinary nature of my degree at UF grounded me not only with a good foundation in botany and ecology but also further developed my thinking about forest management practices, history of fire policy in the United States, historical land-use around the world, and environmental policy in the U.S. and Florida. This has come in extremely helpful in my current position as I balance the needs of rare plant species with the ever increasing pressures on their survival. The courses I took and experiences I had in SNRE gave me a broad foundation for a career in rare species conservation and land management.

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Look out Darwin: SNRE Students Help Host Annual Conferences

By Corrie Pieterson, M.S. in Interdisciplinary Ecology

This event has already occurred. For more details email Corrie at cpieterson@ufl.edu.

The SNRE Student Council is proud to announce the 6th annual Southeastern Ecology and Evolution Conference (SEEC), which will be held March 27-29, 2009 at the Paramount Plaza Conference Center, one mile south of the University of Florida campus. SEEC is hosted by a different southeastern university each year, and is coming to Gainesville for the first time in 2009.

All presentations at SEEC are by graduate students, undergraduate students, and new postdoctoral researchers from southeastern schools, or from schools outside the region but conducting their research in the southeast. In 2008, SEEC attendees came from 29 colleges and universities from fourteen states.

The conference provides a forum for graduate and undergraduate students, as well as new postdoctoral researchers, to present their research and network with colleagues from throughout the region. Under the umbrella of ecology and evolution, presentations cover a variety of research topics including marine ecology, conservation, phylogenetics, biodiversity, plant ecology, and animal behavior.

SEEC is organized entirely by students and was started at Georgia Tech in 2004. It was initially modeled after a similar regional conference in the Midwest (the Midwestern Ecology and Evolution Conference, or MEEC). In March 2008, SEEC organizers at Florida State University hosted several members of the 2009 SEEC Organizing Committee to assist them in starting to plan the 2009 conference.

In addition to research presentations, the conference will feature keynote talks by two outstanding University of Florida faculty members: Dr. Leda Kobziar from the School of Forest
Resources and Conservation, and Dr. Todd Palmer from the Department of Zoology. The conference also includes social events and optional field trips to local natural areas—a hiking trip at Paynes Prairie Preserve State Park, a paddling trip at Ichetucknee Springs State Park, and a spelunking trip in a local cave.

While the audience is primarily composed of students with an interest in ecology or evolution, anyone is welcome to attend. In particular, undergraduate students who plan to attend graduate school will benefit from interacting with graduate students and learning about their programs at the University of Florida and elsewhere.

This year, SEEC will be held concurrently with the 32nd annual Herpetology Conference, which is held in Gainesville every year. A joint poster session will feature research from SEEC and Herpetology presenters. The Herpetology Conference will also feature a special session dedicated to Dr. Archie Carr.

For more information on both conferences and to register, visit the conference websites at http://snre.ufl.edu/seec.

SEEC 2009 has received generous support from a number of departments across campus including: School of Natural Resources and Environment; Department of Microbiology and Cell Science; School of Forest Resources and Conservation; Department of Wildlife Ecology and Conservation; Department of Entomology and Nematology; Departments of Botany and Zoology; Forest Ecology and Ecosystem Restoration (FEER) lab; Institute of Food and Agricultural Sciences; Vice President for Research; and Classic Fare Catering.

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Student Spotlight: Dana Ehret

Dana, a current SNRE doctoral student in the Florida Museum of Natural History, recently published his research in the *Journal of Vertebrate Paleontology*. His findings made a big splash in the science community and have received attention from National Geographic, NPR and the Discovery Channel Canada.

According to the press release, Dana (and co-author Gordon Hubbell) analyzed a well-preserved 4- to 5-million-year-old fossil from Peru of an early white shark species. The fossil included a complete jaw with 222 teeth and 45 vertebrate intact. The study concluded that the modern great white shark is not a descendent of the megalodon, the world’s largest shark species. But rather, is more closely related to the mako shark, the megalodon’s ugly cousin.

According to other scholars, Dana has helped strengthen the link between the extinct mako species and the modern great white! Originally, megalodon and the great white were classified together because of the similarity of their tooth shape and tooth serration (specialized for eating marine mammals). Mako sharks have no serrations because they feed primarily on fish.

In an interview, Dana suggests the shark fossil’s coarse serrations are evidence of a transition between broad-toothed mako sharks and modern white sharks.

“Here we have a shark that’s gaining serrations,” he said. “It’s becoming a white shark, but it’s not quite there yet.”

Read about David Ehret’s Research:
The National Geographic News Article
UF Press Release
Offering Some Good Advice: Get Involved!

By Mira Mishkin

One prominent theme in this issue of the SNRE Source is student involvement. From internships and fellowships to conference management, SNRE graduates and undergraduates have found unique avenues to share their experiences and build upon their interests.

UF’s campus is filled with opportunities to get involved. There are countless discussions, seminars and conferences to present one’s own research. The variety of clubs and social events should be able to suit every interest on campus. Many of our fellow students are already active and we encourage those who haven’t ventured into the flurry to do so soon! For those who may be unfamiliar with the opportunities available, below are some of the recent activities in which our fellow students have been involved.

Recently, six members of the SNRE Student Council attended Powershift 2009 in Washington, D.C., a national grassroots advocacy conference. We were joined by 11,000 other students from around the country to learn about clean energy and to raise awareness about climate change. We took the message to Capitol Hill and encouraged Congress to pass energy and climate policies the country truly needs.

In addition to the SNRE Seminar Series, held every Tuesday in 112 Newins-Ziegler at 1:55 p.m., SNRE students have presented their research in venues such as the TCD program’s Tropilunch discussions and the relatively new Conservation and Development Forum; both of which are student-coordinated and seeking members to take an active role presenting their research.

To help encourage SNRE students to follow their passion, the SNRE Council conducted two fundraising drives this past year with the proceeds going to travel and research grants for SNRE students. In the fall students sold Sweetwater Coffee “Sustainability” Blends roasted and ground custom to order. This past month, the Council revived the famous SNRE t-shirt treasured by students, alumni, staff, and faculty alike. The sale of these t-shirts has been so positive, that we extended the sale through the end of March. Click here to order yours today!
These fundraisers help support students present papers and attend out-of-town conferences. Coupled with IFAS travel grants, ten students attended (or are planning to attend) the following conferences this year:

- 69th Annual Meeting of The Society for Applied Anthropology (Santa Fe, NM)
- 2009 American Association of Geographers Annual Meeting (Las Vegas, NV)
- Meeting and Presentation of Research Findings from Summer 2008 and Future Implications (San Martin Region, Peru)

Still looking to get involved: Join the SNRE Student Council

The SNRE Student Council will be having its annual elections for all positions in the near future. Keep an eye out for an email with details (coming soon!). The Council has also been coordinating logistics to start a graduate/undergraduate mentoring program and is looking for participants to join, email the Council if you are interested in either becoming a mentor or looking for one in your academic interest area. There are many opportunities to become involved. Your life at UF will be as rewarding as the effort you put in. Join the SNRE community and become involved today!!