



Preparing People to Lead Extraordinary Lives

LOYOLA
UNIVERSITY
CHICAGO

DEPARTMENT
OF BIOLOGY

NEWSLETTER

No. 7: March/April 2006

**Eyesh Vipers, Caimans and
Howler Monkeys, Oh My!
Biology Goes to Costa Rica**



Photo by Dr. Robert Hamilton

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A Note from the Chair

Dear Friends,

The end of the semester was, as usual, a very busy time in the department. Field classes were in the Florida Keys and in the tropical rain forest of Costa Rica. A number of our students presented their research at symposia both on and off campus. There was outreach to students in local schools. New faculty research was undertaken and grants received. This high level of activity in many areas is typical of the department and continues to make it a very exciting environment for students, faculty and staff.



Jeffrey Doering, PhD.
Professor and Chair
O: 773-508-3620

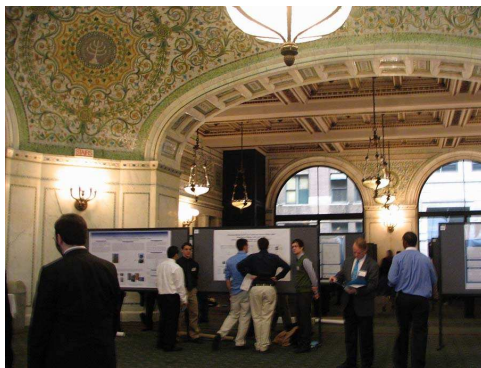
I very much appreciate everything you all do to make all aspects of the department's mission thrive. Thanks again to all of you who regularly respond to the special requests for help that I make. So much of what we do would not be possible without your good-natured willingness to contribute your time to special projects.

It's been another highly successful academic year. Best wishes for a productive and enjoyable summer.

Jeff Doering

Chicago Area Undergraduate Research Symposium (CAURS)

On April 1st, 2006, students and faculty from six area universities involved in research got together at the Chicago Cultural Center for the 2nd Annual Chicago Area Undergraduate Research Symposium. The symposium is designed to promote research at the undergraduate level and to foster interaction between all of the Chicago area universities. The organization was entirely student run and included poster sessions, lectures, oral presentations and an awards ceremony



Loyola Biology showed quite well in its second year participating. Graduating Seniors **Nick Angeloni** and **Emily Miller** (of the Kelly and Doering labs, respectively) served on the Interschool Advisory Committee in addition to presenting posters. **Kimberly Lekwa** of the Williamson lab won the award for Best Biology Poster. Faculty member **Dr. Hunter O'Reilly** presented the keynote address and **Dr. John Kelly** received the Faculty Research Award.

Following are the students who presented posters based on research completed in Biology at Loyola:



Nicholas Angeloni, *Effects of an Invasive Cattail Species on Sediment Microbial Communities in a Wetland Ecosystem* (Kelly)

Joubin Bavarian, *Organization of a Specific Satellite III Sequence on Human Chromosome 21* (Doering)

Daniel Eckroth, *Using Second-to-Fourth digit Ratios in Rats as a Fast and Easy Method to Assay Sexual Dimorphisms and Hormone Activity* (Suter)



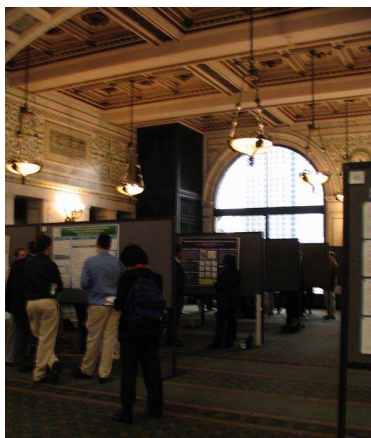
Amina Egweikhor and **Phillip Vetterott**, *BDNF and NT3 Attract Trigeminal Neurites*
Emmanuel Favila, *Assessment of Soil Microbial Communities in Surface Applied River Sediment/Biosolids Mixtures* (Rochlin)

Rachel Hettinger, *Organization and Characterization of a Satellite III Sequence on Human Chromosome 21* (Doering)

Matthew Kolinski, *Analysis of the Arrested Development/expression using Promoter Reporter Analysis of the Arabidopsis*. (Pickett)

Kimberly Lekwa, *Plasmodium Falciparum: Determining Protein Expression Patterns*. (Williamson)

Patrick McGill, *The Search for Siderophore Degradation Gene* (Castignetti)



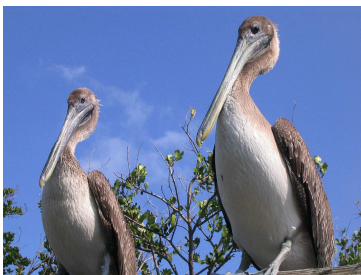
Marine Biology in Florida

For the second year in a row, Dr. Jan Savitz takes his Marine Biology Lab students on a successful research trip to Key West. Photos by Janelle Morano.



Nine undergraduates experienced a unique Spring Break in Key Largo, Florida. Dr. Jan Savitz and graduate student, Janelle Morano, led the marine biology class on an exploration of the coral reefs of the Florida Keys through a series of activities that included snorkeling and kayaking. Additionally, the group explored the land by visiting a geological park, a bird sanctuary, and points along the entire Keys to Key West.

The students were not necessarily interested in pursuing marine biology in their future, but the course offered the students a chance to become a “well-rounded scientist,” says Liz Panek, a senior majoring in biology with a pre-pharmacy concentration. Liz continued by explaining, “The class benefited me greatly, not only intellectually but also personally...I actually think it is one of the most thought-stimulating courses I have



taken from Loyola overall, and Dr. Savitz is a fantastic teacher with such a wealth of knowledge. I find Marine Biology to be of great interest to me, and the Key Largo field trip was a wonderful hands-on approach to learning. In fact, what better way to learn about marine biology than to observe the aquatic environment first-hand? I loved the course and the trip, and would highly recommend it to others in the future! My friends and I on the trip would joke with Dr. Savitz that he was

“tricking” us into learning on the trip, because we had such a laid-back learning experience and the learning was actually so much fun!”

Harpreet Ghuman echoed the sentiment about the educational experience. “I was surprised how we were able to apply material [from the trip’s activities] to topics we covered in class.” Harpreet summarized the experience best with, “This is a great lab course that Loyola has incorporated into the Biology department, and I would definitely recommend it to other students.”



Natural Resource Conservation in Costa Rica

Dr. Robert Hamilton takes his Natural Resource Conservation class to the rain forest in Costa Rica.

Dr. Robert Hamilton (Entomologist) and Dr. Robert Morgan (Ornithologist) led a class of 12 Loyola students to the La Selva Biological Station in Northeastern Costa Rica over the spring break. La Selva is a 1600 hectare rain forest preserve near the small town of Puerto Viejo. It is 50-150 meters above sea level and gets about 4-5 meters of rain each year. Approximately 70 % of the preserve is primary old growth forest. The station is owned and operated by the Organization of Tropical Studies (OTS). OTS is a consortium of Universities from the U.S., Europe and Central America with the main office located at Duke University in Durham, N.C. La Selva is a well known teaching and research facility visited by hundreds of tourists, students and researchers each year.



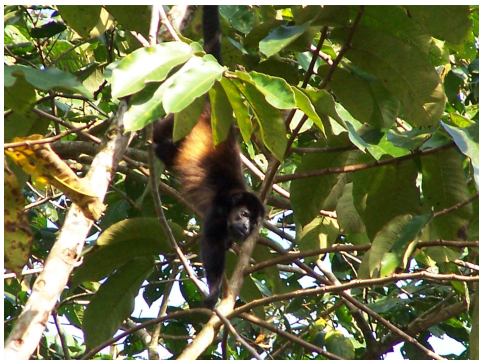
Students had to pay extra for the spring break trip associated with this course (approximately \$1000). Airfare and station fees (housing, three meals a day and access to all trails and facilities) constituted most of the cost. The meals were exceptionally good this year and especially if you like beans and rice. The juices were difficult to identify but refreshing. We even had a outside beef burger barbeque one night for dinner.

The objective of the trip was to observe the valuable "living resources" of Costa Rica's rain forests. Costa Rica is a country about the size of West Virginia and is one of the most biologically diverse countries in the world. The Costa Rican government has set aside about 30% of the country as nature preserves and ecotourism ranks 3rd behind coffee and bananas in importance to the economy.



Each student selected a rain forest organism to concentrate on while at La Selva. Niche aspects were studied on site for their specific organisms with an oral presentation and a paper due after returning to the class room at Loyola. Organisms studied included Monkeys, Peccaries, Agoutis, Coatis, Toucans, Iguanas, Poison Arrow Frogs, Caimans, Leaf Cutter Ants, Spiders, Fungi, etc.

On the way down the mountains from San Jose our group stopped at the Teliférico (Aerial Tram) to take a ride through the rain forest canopy. The canopy or upper stratum of the rain forest is complex and full of life. Many trees were in bloom and epiphytes (including many orchids), birds and insects were abundant. These things are not seen from the ground and this aerial view enhances the appreciation of the most diverse biome on earth.



Two side trips were taken from La Selva. One was a short bus ride to a Dole banana plantation. Our host, Carlos Gamboa, talked to our group about all aspects of operating a large banana plantation. He stressed that his plantation was an environmentally friendly and sustainable operation that uses integrated pest management, extensive recycling and parthenocarpy. Parthenocarpy (asexual development from the corm) is used to produce new banana plants in the laboratory with the desired characteristics.

While we were listening to his presentation a plane was spraying fungicide on the plantation around us. He explained that due to the high water needs of the banana plants, fungus growth is a serious problem and is regular spraying is necessary. Indeed, monoculture has its problems. We came away with an appreciation of what it takes to get high quality bananas to U. S. consumers at the Jewel and Dominicks. The U.S., according to Carlos, is not the number one importer of bananas. We are second behind Germany. Sauerkraut and bananas anyone?



The second side trip from La Selva was a trip to Puerto Viejo for a boat tour of the Sarapique river. The driver (Willie) was an excellent guide and pointed out many animals that would have been missed by most of us. We saw many large aquatic birds (Anhingas, Herons, Egrets etc.) as well as Howler and White Faced Capuchin monkeys, alligators and caimans. Willie helped us all to see a basilisk lizard (Jesus Christ lizard) well camouflaged in the riparian vegetation and sleeping bats under a large tree branch sticking out of the middle of the river

On the final day in Costa Rica, the entire group traveled by taxi to downtown San Jose. Gifts and souvenirs for the family and friends are an important part of any trip. Also, to feel the beat of a large Central American City is culturally rewarding. All have returned safe and sound to Chicago and will have a picture swapping session soon. We all miss the weather (best it has ever been according to Dr. Hamilton) ...sunshine and 80s with most of the rain at night...ahh....the rain on the roof made for a good nights sleep!

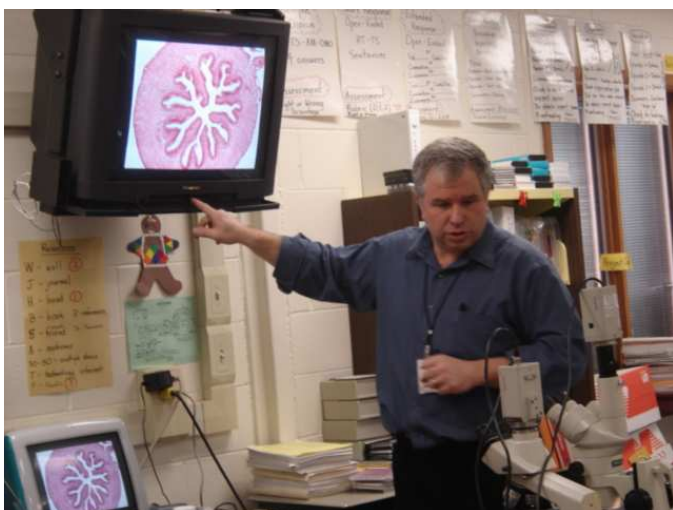
Microscopy for Kids

Our own Electron Microscope Technologist, **Joseph Schluep**, recently spent a Monday afternoon with the students of Mrs. Anne Pasieka's 4th grade class, at Admiral Byrd School in Elk Grove Village, Illinois.

After giving them a short introduction to the history and operation of microscopes, the student got a chance to actual uses them. In addition to viewing various prepared slides, pond scum and blood (fresh from Joe's finger), they all got a chance to look at something from home.



Their weekend homework assignment was to "bring in something interesting to look at under a microscope." Most brought flowers and leaves, while a few of the more inquisitive ones brought items such as strawberries and pet hair.



Along with talking about the light microscopes he brought with him, Joe gave a brief talk about the electron microscopes, the Biology Department, and the university in general. Maybe we will see some of them as students in the class of 2016.

In the Lab with: Jillian Pokelsek

Our profiles of graduate students continues with Jillian Pokelsek, of Dr. Emma Rosi-Marshall's lab. Jillian, who has just taken over as president of the Biology Graduate Student Association, shares a little with us about that work that she's currently taking part in.

I came to Loyola in June 2005, and work with Dr. Emma Rosi-Marshall on the DITCH project. I study the effect of transgenic corn byproducts on the growth and mortality of caddisfly larvae in Indiana agricultural streams.

Bt corn has been genetically modified with genes from the bacterium *Bacillus thuringiensis*. It expresses these genes throughout the growing season, producing δ -endotoxins throughout all tissues. The δ -endotoxin increases the plant's resistance to agricultural pests such as the lepidopteran European corn borer.



The risk of Bt δ -endotoxin to non-target species, such as stream invertebrates, has not been studied extensively. I have been measuring the ingestion rates of corn pollen by *Helicopsyche* and hydropsychid caddisflies, the effects of consumption on growth rates in situ, and the effects of differing concentrations of Bt and non-Bt pollen in the laboratory on a scraping caddisfly.

Also, I have been examining the effects on caddisflies because species in this order are close relatives of Lepidopteran target species. I predict that caddisfly growth rate will decrease and/or mortality rate will increase when exposed to Bt corn as opposed to unmodified corn.

Helicopsyche and hydropsychid caddisflies are in the order Trichoptera. These insects are closely related to Lepidopteran species, the main target of Bt genetic modification, and may be affected by this toxin. If corn detritus or pollen is present in the stream, there is a possibility that the caddisflies will consume it. If there are consequences due to consumption of Bt δ -endotoxin, these changes may significantly affect the food webs.

In addition, agricultural streams lead to larger rivers, transporting corn byproducts downstream, therefore Bt δ -endotoxin may travel beyond agricultural headwater streams into the wider landscape and affect food web dynamics on a larger scale.

Geddes Research Fellowship

Post-doc Pamela Geddes, of the Tuchman Lab, recently received a National Science Foundation Minority Post-Doctoral Research Fellowship, awarded for two years with a possible extension to three. Below, she tells us more about it.

The fellowship will be conducted under the mentorship of Nancy Tuchman and John Kelly. The proposed study was motivated by research conducted by the Tuchman lab, including Kathi Jo Jankowski and Monika Freyman, and collaborative work with John Kelly and Nick Angeloni. The study will be conducted in Cowles Bog at Indiana Dunes National Lakeshore, and will nicely complement work that the Tuchman lab is currently conducting at Cheboygan Marsh in Michigan.

Title of the proposed project: Exploring mechanisms behind biological invasions: Do microbes mediate plant invasion success by altering nutrient dynamics?



Although the impacts of invasive species have been relatively well known, the mechanisms that result in those impacts have not. Soil microbial function could mediate the effect of invasive plants on ecosystems because microbes play key roles in plant nutrient uptake, particularly concerning the nitrogen cycle. However, such plant-microbe interactions have rarely been explored in the context of invasive species. Invasive plants produce large amounts of litter that can fuel microbes and thus affect the ecosystem functions they undertake. Furthermore, several invasive plants hybridize yielding genotypes that are more aggressive invaders than either parent. Yet correlations between different invasive genotypes and their effects on ecosystem processes have not been explored. In this project, I address the effect of *Typha*, an invasive plant capable of hybridizing, on the relationship between plant invasion success and nutrient dynamics. Specifically, I explore if the identity and diversity of soil microbial communities in areas with native vegetation are different from the ones in *Typha*-invaded zones, and if these microbial differences in turn mediate nitrogen cycling. Lastly, I address how the genetic makeup of the invading plant species affects soil microbial communities and the nutrient cycling functions they perform. Linking an invasive species with its impact and the mechanisms behind such impact will improve our understanding of ecological systems and also aid in generating better-informed management practices in more applied scenarios.

Talk

Announcements, greetings and miscellaneous news bits

It's a Boy!

Graduate student **Monika Freyman** welcomed her new son Oliver Stanislaw into the world on April 22nd. Oliver weighed in at 8lbs 2oz and was 21 inches long. Parents Monika and Miguel are doing well.



Farewell

Best of luck to post-doc **Dr. Yoseph Haile-Zeleke** as he leaves to take a new position in Toronto, Ontario. Good wishes also go out to graduate student **Kathi-Jo Jankowski** in her new move to Vermont.

Promotion

Congratulations to **Dr. Kim Williamson**, who recently made the move from Associate Professor to full Professor.

Grants and Awards

Dr. Bill Rochlin recently received a new grant from NIH.

Trivia

Dr. Bill Wasserman shares some interesting facts with us about the construction of the Life Science Building:

Construction of the Michael R. and Marilyn Quinlan Life Sciences Center required 20,347,200 pounds of concrete, 168,500 pounds of sheet metal ductwork, 258,840 feet of electrical conduit, 1,230,000 feet of power wire, 312,000 feet of low voltage wire, and 26,000 wire nuts to complete.

Helping Out

Thanks to **Pat Duffie, Barb Haas, Bob Morgan** and **Diane Suter** for staffing the department table at the Loyola Sunday event for prospective new students

Of Interest: Ryerson Woods

Michael Masellis, a student in Dr. Roberta Lammers-Campbell's Plant Ecology class writes about the group's recent visit to Ryerson Woods.

The Ryerson Conservation Area is part of the Lake County Forest Preserve. It may come as a surprise to some that the Chicago-land area has rare and valuable habitats. The Ryerson Conservation Area is a vital preserve for northern flatwoods forest. Ryerson Woods contain nearly 500 species of flowering plants, so it was a natural choice of a site for Dr. Lammers' Plant Ecology class to visit.



We met Ryerson Woods steward Joan Palincsar who explained the morning mission of removing buckthorn trees. The buckthorn (*Rhamnus cathartica*) is a tenacious invasive Eurasian species. The buckthorn reproduces profusely and can shade out native plants species, disrupting the entire community structure. It took the combined efforts of the class several hours to clear a relatively small area of buckthorn. Although the area was small, it was definitely satisfying to know that the native plants that would soon be emerging would have the space and light they need to succeed.

After our restoration work we did some work on assessing the plant community. We utilized a point-quarter technique to sample to the community and give us an estimate of the density and diversity of the forest's trees.

Overall the experience was highly valuable. It allowed us to look at some of the conservation challenges facing local wild areas. We were also able to learn and apply a community sampling technique. With the first of our three trips a success we can definitely look forward to learning a lot on our next excursions.



Submission Guidelines

- The newsletter will be used to promote and be devoted to covering the activities, seminars and events; initiatives and developments; faculty, student and staff awards. Creative works by our Departmental members, announcements and profiles will be covered.
- **The newsletter is circulated within the department and will be made available on the Internet via the Biology website. Our goal is to publish online on a bimonthly basis throughout the year.**
- Authors/contributors should keep in mind that readers may not specialize in their particular area of work.
- Articles vary in length between about 50 and 600 words.
- We welcome photographs and images to accompany articles; please provide captions when submitting the photographs/images. Either hard copy or digital formats of the images are acceptable.
- Articles may be submitted by any method; however, the preferred transmittal is electronic format via e-mail.

Questions? Contact Us.

Should you have any questions, please do not hesitate to contact us at biologydept@luc.edu .

The Department of Biology newsletter is prepared and edited by Audrey Berry, Pam Bradley, Nancy McVittie and Jeff Doering.

Hard copies of articles, images, etc. may be forwarded to us at LSC, LSB, Rm. 317, Attn: Newsletter.

**Submittal Deadline for
Newsletter No. 8:**

Friday, 06/23/06

**E-mail:
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