



THE BIOLOGUE

Department of Biology, Spring 2005

A Chair's Notes

In continuing with the “oldies, but goodies” theme of the last two years’ Chair’s Notes, perhaps this year’s notes should feature another Bob Dylan song – “Blowin’ in the Wind.” This certainly was an appropriate theme for September 2004, the first full month of the academic year. You may recall that last September Florida made history by being hit by four hurricanes – Charley, Frances, Ivan, and Jeanne. Although Miami-Dade County didn’t suffer a direct hit, we lost two weekends and a couple of class days waiting for Frances and Jeanne, both coy ladies, to make up their minds about where they would strike land. Fortunately for us, they both chose Jupiter rather than Coral Gables. Hurricanes are fearsome reminders of the power of nature and of the importance of natural disturbances for life on earth.

In addition to wreaking havoc on human lives and possessions, hurricanes play an important role in the ecology and evolution of natural ecosystems. Those of us living in Florida are especially well-situated to study these effects. Shortly after the September onslaught of storms, National Public Radio contacted several UM scientists and featured their hurricane-related research in two broadcasts. Daniel Wang and Mike Gaines talked about the effects of Hurricane Andrew on populations of Dade County pine, and Carol Horvitz discussed her research on the invasion of Dade County hardwood hammocks by



Dr. Fleming and a Bahamas boa at the entrance of a bat cave on Exuma. The boa was looking for a meal of fast food!

exotic vines and shrubs after that storm. Along the same lines, I was awarded an ‘emergency’ grant from the National Science Foundation to study the genetic consequences of Hurricanes Frances, Ivan, and Jeanne on bat populations in the Cayman Islands and Bahamas. My colleagues tell me that bird and bat populations on Grand Cayman were reduced by at least 75% in size by Ivan, and it’s likely that genetic diversity in these animals took a similar hit. But this has never been documented before. Hurricanes are a regular feature of life in the Caribbean, but we don’t really know what role they have played in the evolution of island life. Thus, these storms present a unique research opportunity for some of us.

While it didn’t suffer a direct hit from hurricanes last year, Cox Science Building is currently undergoing a significant amount of ‘disturbance’ in the form of new construction and renovation. Over winter break, two new laboratories for

experimental studies were added to the first floor of Cox. These beautiful new labs were funded by the Howard Hughes Medical Institute and, as described elsewhere in *Biologue*, will usher in a new era of undergraduate science education in our department. This summer the two large lecture halls in Cox (Who can forget dingy rooms 126 and 145?) will be completely renovated and brought up to 21st century teaching (and comfort) standards. This work represents the first phase of what is planned to be a thorough renovation of all labs, classrooms, and offices in Cox. The dust will really start flying in summer 2006. Renovation will temporarily displace us from our labs and offices, but the results will be worth the inconvenience.

In addition to physical renovation, the department is in the midst of major changes in personnel as old faculty retires and new faculty is hired. Recent or impending retirements include Drs. Bill Evoy, Ron Hofstetter, Julian Lee, and Peter Luykx. Collectively, these men devoted well over 100 years to this department. We are currently conducting national searches for a quantitative ecologist, an evolutionary geneticist, and (most importantly for me) a permanent chairperson. With luck, a new chairperson will be writing this column next year to tell you about exciting new directions in the department as we continue to hire bright new biologists in a variety of research disciplines.

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Faculty Notes

Many of our retired faculty choose to leave Miami and put down new roots elsewhere. Significantly, though, they do not lose contact with the department and often choose to further support our educational mission with generous annual donations. Ironically, in the case of Drs. Evoy and Hoffstetter, they didn't leave the threat of hurricanes behind by moving out of south Florida either. Last year, Hurricane Charley passed close to the Evoy's property in south-central Florida, and Hurricane Frances wreaked havoc in the mountains of North Carolina where the Hofstetters now live. For all of the Caribbean and a significant portion the eastern United States, hurricanes are simply a fact of life. That's the price we all pay for living in paradise.

Theodore H. Fleming

Welcome Distinguished Visiting Professor, Dr. Peter Narins

Dr. Peter Narins was this year's Distinguished Visiting Professor (DVP). Dr. Narins, who is a professor in the Department of Physiological Science at the University of California at Los Angeles, visited our department for a two-week period in March of 2005. While visiting our department, Peter gave a series of six lectures on the neuroethology of auditory communication. He also gave a departmental seminar entitled: "Multimodal communication in the frog: mechanisms and behavior".

Faculty Notes

Dr. Carol Horvitz traveled to the Max Planck Institute for Demographic



Dr. Peter Narins

Research in Rostock Germany last October where she presented a talk on "Estimating age-specific demographic rates from stage-based models in variable environments." On the way to the meeting, she stopped off in France to work on a paper with former grad student **Josiane LeCorff** (Ph.D. 1992). Their paper, "Population growth vs. population spread of an ant-dispersed neotropical herb with a mixed reproductive strategy," has been accepted for publication in *Ecological Modeling*.

In January 2005, Dr. Horvitz spoke at the kick-off conference for UM's new Institute for Theoretical and Mathematical Ecology. Her paper, co-authored with recent grad student **Anthony Koop** (Ph.D. 2003), was entitled "How do different dispersal vectors affect population spread of an invasive subtropical shrub?" Dr. Horvitz, along with Math Department and RSMAS colleagues, organized a Workshop on Spatial Ecology. The four-day meeting, held at RSMAS, attracted distinguished researchers from all over the world. An impromptu, early morning field trip to the Everglades added a bit of nature to the intense, equation-filled days.

Dr. Peter Luykx, along with Dr. Ivan Baji of the Department of Electrical and Computer Engineering, presented "DNA sequence and histone affinity" at the International Conference on Bioinformatics and its Applications (ICBA'04), December 16-19, 2004, at Nova Southeastern University in Ft. Lauderdale, Florida. The DNA sequence analysis indicated that genes used for the general basic functions of cells are regulated differently from the genes used for highly specialized functions.

Jay M. Savage, Emeritus Professor of Biology, received the Outstanding Service Award for Contributions to Biological Sciences from the American Institute of Biological Sciences in May, 2005. He received the award primarily for his part in founding the Organization for Tropical Studies and sticking with it through thick and thin for 43 years.

Notes From Retiring Faculty

Dr. William Evoy

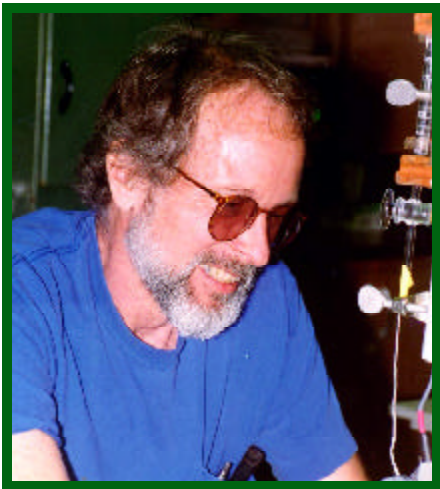
I had thought that retirement was going to be a combination of scholarship, relaxation, and pursuit of the things I never had time to get into in 37 years at U.M. A move to southwestern Florida was going to give us a chance to get workspace built onto our former weekend home, enjoy living in southeastern U.S. forest, and to begin some new projects lurking in my imagination for many years.

An almost direct hit by Hurricane Charley on August 13, 2004 changed much of that, although our house was spared. The workspace



Faculty Notes

was delayed 6 months and is just now finished enough to be usable. It resembles a very small field station/laboratory on dock pilings. Charley and two subsequent floods caused by his sisters Frances and Jeanne changed our biological focus to experimental forest recovery from wind and flood damage and a major invasion of several nasty exotic plants. Eight months of clearing brush, broken trees, vines and exotics has made our 9 acres look as if recovery is going to be partially successful, although the loss of oak and pine canopy is having an effect on the plant and animal communities. Our tractor and chainsaw skills are significantly improved. Deer, wild turkeys, wading birds, and Fox Squirrels are still here and seem to be adapting.



Dr. William Evoy

There are plenty of interesting biological questions right at our door for the future. I have been observing the population structure and behavior of the Fox Squirrel (*Sciurus niger shermani*), which differ significantly from those of the Gray

Squirrel with which it is at least partially sympatric. Quite a change of study for an old electrode poker!

Dr. Ronald Hofstetter

From 1968 until 2004 I served as the academic advisor to hundreds of Biology and Environmental Science students, taught a variety of ecology and environmental science courses and served on many committees while at the University of Miami. My research centered on understanding, managing and protecting wetlands. It was a rich and fulfilling experience. While no longer an instructor, I continue to be a student of science and work toward protection of fresh-water wetlands globally.



Dr. Ronald Hofstetter

In August, '04, my wife, Peggy, and I moved to a rural setting in the deciduous forest of the Blue Ridge Mountains of northwestern North Carolina. The forests, old fields and streams provide habitat to diverse species and we are surrounded by some of the best autumn color you could find anywhere. We were surprised to find how much we have missed and enjoy the sensory pleasures of the four seasons of our youth.

Most of the past year has been spent in researching, designing and participating in the construction of a modern, energy efficient, “healthy”, “green” house. Indirect passive-solar design, hydronic solar panels and ICF and SIP walls will capture and store solar energy. An energy efficient, sealed, wood-burning fireplace will provide back-up heat and atmosphere. We plan to develop further our organic garden and a variety of fruit- and nut-bearing shrubs and trees. This house and environs are a personal manifestation of many concepts that I taught for decades. We look forward to many happy years here.

We miss and hope to stay in touch with our friends we left.

Dr. Julian Lee

I received my B.S. degree from the University of California, Davis in 1966, my M.S. from San Diego State University in 1973, and my Ph.D. from the University of Kansas in 1977, where I wrote a dissertation entitled *An Ecogeographic Analysis of the Amphibians and Reptiles of the Yucatán Peninsula*. I joined the faculty of the Department of Biology at the University of Miami in August of 1977, was promoted to Associate Professor in 1982, tenured the following year, and promoted to Full Professor in 1997.

Much of my scholarly activity has been conducted in southeastern Mexico and northern Central America. Appearance in 1996 of my book entitled *The Amphibians and Reptiles of the Yucatán Peninsula*,



published by Cornell University Press, marked the culmination of some 25 years of work in that area. Four years later my *Field Guide to the Amphibians of the Lowland Maya Area* was published, also by Cornell University Press. In addition to my faunal studies, I have conducted studies on microevolutionary differentiation in colonizing Florida lizards, and on the morphological basis of male mating success in frogs and toads.



Dr. Julian Lee and friend

My teaching has included lecture and laboratory courses in vertebrate biology, evolution and biodiversity, and herpetology, as well as a variety of readings courses and directed research projects. In 1995 I was voted Outstanding Biology Educator (OBE) by graduating biology majors, and in that same year was selected Professor of the Year by the

College of Arts and Sciences Alumni Association.

Among my many societal activities, I have served as Secretary of The Herpetologists' League, Section Editor for *Copeia* (the publication of the American Society of Ichthyologists and Herpetologists), Associate Editor for *The Journal of Herpetology*, and President of The Society for the Study of Amphibians and Reptiles. I was member of the Species Survival Commission, International Union for the Conservation of Nature (IUCN), and scientific advisor to MAYAMON, an amphibian monitoring program in the tri-national forests of Mexico, Guatemala, and Belize.

I intend to relocate to southwestern New Mexico, and from there expect to explore the biota of northern and central Mexico and to indulge my interests in bird watching and Meso-American archeology.



Dr. Peter Luykx

So here I am retiring, officially, after 38 years and over 8000 lectures in the areas of Genetics and Cell Biology at the University of Miami. I have appreciated the home the Biology Department has given me for teaching and research over the years, with teaching as an opportunity to meet the challenges of students' questions and to keep in touch with the broader aspects of



Dr. Peter Luykx

biology, and research as a chance to contribute something in the way of new knowledge. In the research I followed the winds of my changing interests. I discovered how spindle fibers act to line up the chromosomes in preparation for mitosis, found out something about what happens to centrioles during fertilization, described the details of colony organization, discovered some unusual sex chromosomes in termites (and along the way discovered a new termite species, now known as *Neotermes luykxi*), and provided the first good description of contractile vacuole behavior in *Chlamydomonas*. Fun!

Scientific research and talking about it is not just a job, but a way of life. Now I am interested in computer analyses of DNA sequences for what they can tell us about how human cells use their genes. And I have a book to write. I'll continue these things and see where they lead me. "And having been baptized he came up out of the water and went on his way rejoicing."



Ongoing Research

Genetics of Dade County Slash Pine

If you were listening to “All Things Considered” on National Public Radio this past November 4, 2004, you may have heard our own **Dr. Yunqiu Wang** being interviewed by **Ari Shapiro** about his research on native Florida Slash Pine. The Slash Pine (*Pinus elliottii* var. *densa*) is the keystone species of the Pine Rockland community—one of the most endangered forest types in the world—in southern Florida.



The magnificent Dade County Slash Pine

The Pine Rocklands contain over 225 species of native plants (including Slash Pine) and more than 20% of these species are endemic to this community. Pine Rocklands covered approximately 180,000 acres in southeastern



Dr. Yunqiu (“Daniel”) Wang and NPR’s Ari Shapiro visit the Pine Rocklands of southern Florida

Florida in presettlement times (USDA 1947). Because of deforestation for housing developments, severe damage by Hurricane Andrew in 1992, and predation by bark beetles after Hurricane Andrew that weakened the trees, less than 1% of the original pine forest remains. If Hurricanes Charley, Frances or Evan had made a direct landfall in southern Florida in September 2004, much of the remaining Pine Rocklands might have been lost. Not surprisingly, southern Florida Pine Rocklands have been officially designated a globally imperiled habitat.

Since Hurricane Andrew in 1992, restoration efforts have been underway to restore native Pine Rockland. Characterizing the genetic relationships among the remaining pineland populations and identifying genetically diverse seed sources are critical steps in the race to restore Pine Rocklands before the next major hurricane hits southeastern Florida.

In collaboration with the Department of Environmental Resource Management (DERM) of Miami-Dade County, Dr. Yunqiu Wang, **Dr. Dean Williams**, and **Dr. Michael Gaines** have initiated a study of the genetic structure of southern Florida Slash Pine populations using polymorphic microsatellite DNA markers. Their study will provide much-needed information to maximize the probability that reforestation efforts utilize genetically diverse stocks and prioritize the efforts aimed at protecting remaining Pine Rockland.



Dr. Daniel Wang instructs undergraduates in the finer points of Slash Pine ecology



News from the John C. Gifford Arboretum

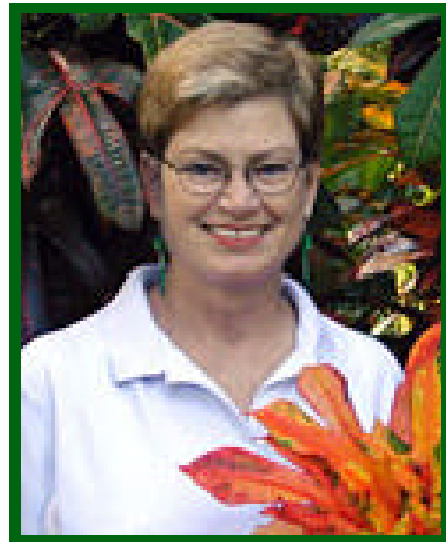
The annual picnic and plant sale, “A Celebration of Tropical Flowering Trees” had a great turnout and hosted a successful auction. Members of the Tropical Flowering Tree Society donated plants, and **Dr. P.B. Tomlinson** donated a signed copy of his book, *The Biology of Trees Native to Tropical Florida*.



Graduate student Floria Mora-Kepler models the latest in Arboretum fashions at the annual picnic

Together with the National Tropical Botanical Garden, the Gifford Arboretum hosted a lecture by **Dr. Thomas Croat**, recipient of the David Fairchild Medal for Plant Exploration. His lecture was held in the Kampong, original residence of the late explorer David Fairchild.

The 17th Annual John C. Gifford Arboretum Lecture continued the series' tradition of excellence with a talk by **Georgia Tasker**, Garden Writer for The Miami Herald, who spoke on “The People, Pleasures and Politics of Orchids”. The lecture was followed by a reception featuring an art exhibit of antique, orchid-themed porcelain from the



Distinguished lecturer Georgia Tasker

collection of Robert Fuchs, curated by **Professor Christine Federighi**.

As always, community outreach was an important part of the year's activities. Friends of the Arboretum and UM graduate students visited the orchid collection of world-renowned orchid grower **Robert Fuchs**. As usual, the Arboretum had a booth at the Fairchild Tropical Botanical Garden's Ramble in the fall and at Native Plant Day in the spring. The Horticulture Study Society was led on a tour by Carol Horvitz. The Dadeland Garden Club was treated to a tour of the arboretum by its new Aldridge Curator, **Carlos Garcia-Robledo**, and followed the tour with their meeting in the arboretum itself. In March, the arboretum hosted the annual fundraising picnic of H.A.R.E. (Houserabbit Adoption, Rescue and Education), a local branch of the national House Rabbit Society. Rescued rabbits, showing off for potential adopters, romped under the trees and enjoyed the beauty of the gardens as much as the human visitors did.





News from the John C. Gifford Arboretum

Momentum in the Arboretum

This spring the “Momentum in the Arboretum” Committee held three informational cocktail receptions to illuminate the future of tropical plant sciences at U.M. The Department of Biology thanks **Carlton and Andrea Cole, Dean and Valerie Klevan, and John and Kathy Gaubatz** for hosting these receptions in their homes. The group seeks to endow a Chair in the Department of Biology who will be the director of the living botanical collections of the University of Miami. Increasing the number of endowed professorships at U.M. is a central goal of the university’s “Momentum” campaign. The distinguished scholar to occupy this chair will (1) make U.M.’s program in tropical plant science program the nation’s premiere among those offered by degree-granting institutions, (2) optimize the use of our living collections in research and education, and (3) strengthen our ties with Fairchild Tropical Botanical Garden, the Kampong of he National Tropical Botanical Garden, the Montgomery Botanical Center, and the USDA Plant Introduction Center at Chapman Field.

Naming opportunities at a variety of levels are associated with this fund-raising project. For more information, please contact Ms. **Neysa Rosario**, Vice President of University Advancement, at (305) 284-8219. For a tour of campus collections or for a presentation, please contact **Dr. Carol Horvitz** at (305) 284-5364.



Shaving Brush in the John C. Gifford Arboretum

More information about Gifford Arboretum activities can be found at <http://www.bio.miami.edu/arboretum/> and a copy of this year’s beautiful newsletter, featuring research by undergraduates and other news, can be downloaded at [http://www.bio.miami.edu/arboretum/Newsletter%20\(7\).html](http://www.bio.miami.edu/arboretum/Newsletter%20(7).html)



Geiger Tree in the John C. Gifford Arboretum





Graduate Program

Graduate Student News

Rindy Anderson was the recipient of a Dissertation Improvement Grant from the National Science Foundation. The January 2005 issue of *Animal Behavior* included her most recent publication on song fights between male birds, and her research also was featured in the December 2004 issue of *Science News*.

For the second time, **Carlos Garcia-Robledo** traveled to Peru to serve as a TA for the Organization for Tropical Studies (OTS) course "Amazonic Ecosystems." Course participants work in two sites: at Madre Selva Biological Station in the northern Amazon near the Brazilian and Colombian borders, and in the central Amazon, at Estacion Los Amigos, on the Madre de dios River. Carlos also won the Al Gentry Award at the Association for Tropical Biology meetings for his work in Costa Rica on pollen flow in distylous flowers, its implications in gender differentiation, and the origin of sex in plants. Carlos published a paper in the *Journal of Tropical Biology* on the effects on female reproductive success of inflorescences in *Xanthosoma* (Araceae) in attracting pollinators, and seed predators. He has four other papers in press. We're not sure how he finds the time to do the fantastic job he does, but Carlos *also* is the new Aldridge Curator for the John C. Gifford Arboretum. Someone please bring Carlos a big cup of Cuban coffee.

Who says we're nothing but a bunch of science nerds? Our own **Mark Mandica** played the part of Older Berger in UM's production of HAIR (which ran at the Ring Theater through November 2004). The show was great, and Mark was incredible. Twelve graduate students attended the play on opening night last night, and had a lot of fun watching Mark act and play the harmonica. In the words of fellow grad student **Lisa Ganser**, "It was awesome!"

The University of Miami's Research and Creativity Forum was held in early April, and the Department of Biology was heavily featured with a whopping 21 entries, 18 from undergraduates and three from graduate students (**Summer Scobell**, **Seth Tomchik** and **Rindy Anderson**). Rindy won the prize for best poster in her section (which included \$100!) and her photo was featured in E-veritas, the university's electronic newsletter.



2005 New Graduate Students. Top Row (from left to right): Dante Fenolio, Amartya Saha, Maria Camilla Pinzon, Floria Mora-Kepler. Bottom Row (from left to right): Sherry Constantine, Tiffany Plantan, Karen Ladd.

New Graduate Students

Carlos Garcia-Robledo, Universidad de los Andes (B.S.)

Advisor: Dr. Carol Horvitz

Gabriel Gartner, Cornell University (B.S.)

Advisor: Dr. James O'Reilly

Ana Ibarra-Macias, University of Miami (M.S.)

Advisor: Dr. Colin Hughes

Jane Indorf, Boston University (B.A.)

Advisor: Dr. Michael Gaines

Ju Shu, Nanjing Forestry University (M.S.)

Advisor: Dr. Donald DeAngelis

Kristine Kaiser, Cleveland State University (M.S.)

Advisor: Dr. Julian Lee

Khan Protiti, Tougaloo College (B.S.)

Advisor: Dr. James Wyche

Aaron Kortenhoven, Michigan State University (B.S.)

Advisor: Dr. Steven Green

Erin Kuprewicz, University of California, Santa Barbara (B.S.)

Advisor: Dr. Michael Gaines

Mark Mandica, University of Massachusetts (B.S.)

Advisor: Dr. James O'Reilly

Ana Salazar, Pontificia Universidad Javeriana (B.S.)

Advisor: Dr. Guillermo Goldstein

Lucero Sevillano, National Autonomous University of Mexico (B.S.)

Advisor: Dr. Carol Horvitz

Barry Stephenson, Washington State University (M.S.)

Advisor: Dr. Richard Tokarz

Randol Villalobos-Vega (B.S.), Universidad de Costa Rica

Advisor: Dr. Guillermo Goldstein



Graduate Program

Graduate Student Research Awards

The Department's Fellowships and Awards Committee, headed by **Dr. Julian Lee**, met in early April to identify those graduate students who were to receive awards from the Curtis, Evoy, and Savage Funds, and to award the Tropical Biology Fellowship for Academic Year 05-06.

Catalina Aristizabal received the **J. Gerry Curtis Plant Scholarship** for her proposal entitled "Do arbuscular mycorrhizal fungi enhance host nitrogen acquisition from decomposing leaves of different quality?"

The recipients of awards from the **William Evoy Fund** were: **Frans Joula**, for his proposal entitled "Female mate choice, offspring fitness, and the major histocompatibility complex MHC in Great Frigatebirds (*Frigata minor*)," and **Kevin Murray**, for his proposal entitled "Genetic consequences of a lek mating system in the endemic Buffy Flower Bat (*Erophylla sezekorni*)."

Recipients of awards from the **Jay M. Savage Fund** are: **Ron Rozar** for his proposal "Locomotor performance trade-offs associated with the evolution of arboreality in snakes," and **Barry Stephenson**, for his proposal entitled "Intrasexual signaling, aggressive interactions and sensory exploitation in a lizard."

The **Tropical Biology Fellowship** goes to **Hugo Romero-Saltos** for his proposal entitled "Lianas as major agents of water and nutrient movement in lowland tropical rainforests."

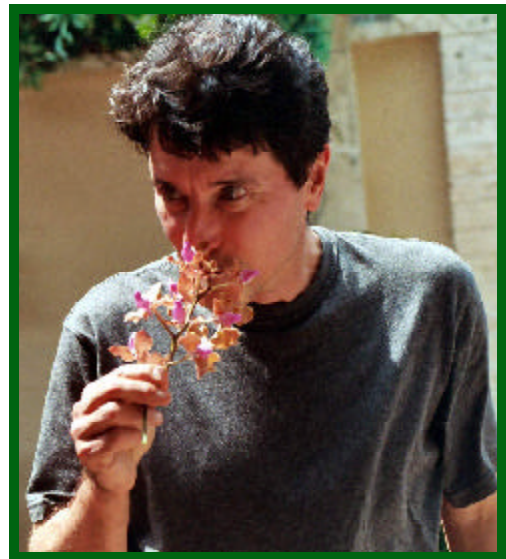
Congratulations to all!

ATBC Meets in Miami in July 2004

Annual meetings are the lifeblood of scientific societies. This is where researchers, including faculty, graduate students, and sometimes undergraduate students, present new data, interact with colleagues, and generally have a good time. Last July 12-16, the Association for Tropical Biology and Conservation (ATBC) held its annual meeting at the Knight Convention Center in downtown Miami. Sponsored by CETroB, the Miami-based Coalition for Excellence in Tropical Biology, and co-organized by Dr. Theodore Fleming (UM) and Dr. David Lee (FIU), the meeting was attended by over 300 scientists from 40 different countries. A total of fourteen symposia and

280 papers and posters were presented at the 4-day meeting. Eighteen UM faculty and grad students presented papers or posters, and two UM faculty (Theodore Fleming and Guillermo Goldstein) organized symposia. Social events at the meeting included a beautiful pre-meeting mixer held on the River Terrace of the Hyatt Regency Hotel, evening receptions at the Wolfsonian Museum on Miami Beach and at Fairchild Tropical Botanic Garden, and a banquet featuring a salsa band at the Museum of Science.

ATBC annually presents the Alwyn Gentry Awards to students for the best oral presentation and best poster. Competition for these awards is always keen, and UM students swept the field in 2004 (No, the judges weren't from UM!). **Nathan Muchhala** won the award for best oral presentation for his paper "The role of pollinators in the evolution of floral morphology: bats, birds, and *Burmeistera*." **Carlos Garcia-Robledo** and **Floria Mora-Kepfer** won the award for the best poster for their paper "Asymmetric pollen flow and morph reproductive function in the distylous herb *Arcytophyllum lavrum* (Rubiaceae)." Award winners receive a year's subscription to ATBC's journal *Biotropica*, a cash award from ATBC, a book grant from the University of Chicago Press, and an honorarium to recognize their efforts. Congratulations to these fine grad students!



Graduate student John Cozza enjoys some orchids at the Arboretum Committee's tour of RF Orchids, the nursery of world-famous orchid breeder Robert Fuchs.



Undergraduate Program

A New Way of Teaching Introductory Biology Laboratories

The University of Miami Department of Biology has received three successive four-year grants from the Howard Hughes Medical Institute (HHMI) to stimulate undergraduate interest in research careers. The Institute seeks to foster our next generation of biomedical researchers who will enter M.D./Ph.D. and Ph.D. programs. One aspect of our current program is designed to address this goal at its very foundation – the laboratories associated with Introductory Biology.

Most other universities around the nation teach introductory biology laboratories with a “cookbook” approach. Students are exposed to as many as twelve different biological topics, one each week, throughout the course of a semester. Each is illustrated by a set of prescriptive laboratory exercises. Too often, students wish only to complete the list of prescribed manipulations as quickly as possible. No departure from the prescription by asking “what would happen if I did this differently” is elicited.

But the essence of scientific research is asking “What will happen if I do this?” when the answer is not known, and sometimes is not expected. So, to make our already inquiry-based introductory biology laboratories even more consistent with what practicing scientists actually do, we have implemented a radical new way of teaching the labs.

Each semester during their year of introductory biology, students in our new HHMI labs are introduced to two dif-



ferent topics by faculty who are actively engaged in research on those topics (see box). The faculty member in each lab is assisted by a graduate student teaching assistant and an undergraduate student peer leader (often an honor student who is conducting research for a senior thesis). Each week for half a semester, four groups of five or six students each in each lab section are provided background information on the topic and are trained in analytical methods useful for investigating it. Then each group is asked to formulate its own research question and to devise and follow a protocol for answering it.

Not only do student lab groups conduct investigations of their own devise, but they also must report their work –

an integral part of the scientific process. Weekly, a member of each group presents a digital slide show to the class to explain what was accomplished during the preceding lab session. Each student submits an independently-written abstract of their project with tables and figures for constructive critique and grading by the instruction team. Collectively, each student group prepares a printed poster to portray their results at a scientific poster session held in the Cox Science Center lobby at the end of the semester. Each of these reporting activities is consistent with what practicing scientists do professionally.

After half a semester, when student teams have completed their first project, they switch labs and instructors to a con-



2004-2005 HHMI Laboratory Instructors and Topics

- ◆ Dr. **Daniel DiResta** – Soft coral responses to pollutants.
- ◆ Dr. **Zhiyong Han** – Anti-cancer properties of plant extracts.*
- ◆ Dr. **David Janos** – Glycoprotein production by mutualistic fungi.*
- ◆ Dr. **James O'Reilly** – High speed video analysis of polypedality in invertebrates.
- ◆ Dr. **Jeff Prince** – Analysis of cell ultrastructure by transmission electron microscopy.
- ◆ Dr. **Leo Sternberg** – Respiration and metabolism.
- ◆ Dr. **Daniel Wang** – Molecular conservation genetics of Dade County pine.
- ◆ Dr. **Dean Williams** – Molecular genetics of an invasive plant species.

* These two topics involved extensive student use of the **Gifford Arboretum** directed by Dr. **Carol Horvitz**.



Undergraduate Program

current section, and they do it all over again! Thus, over the course of the full year introductory biology sequence, students will have investigated four different topics. Whether or not this in-depth exposure to research will prepare them for subsequent, advanced biology courses and for careers in biomedical research better than the traditional acquaintance with many topics, each for a single day, remains to be seen. But so far, student response to the labs has been favorable. Although they regard the HHMI labs as requiring more work – and more thought – than the traditional labs, students have found setting their own agendas for lab work more interesting than following a “cookbook”.

Adding to the attraction of our new approach to teaching introductory biology laboratories are two freshly constructed laboratories on the front veranda of the Cox Science Center that were specifically designed for the HHMI labs. These were constructed with matching funds from Provost **Luis Glaser**, and have been outfitted with HHMI funds and through a generous gift from Department of Biology friend and benefactor Dr. **Eddie Dauer**. The labs feature custom built, octagonal work tables for four student teams, comfortable upholstered chairs on casters, full internet connectivity, two portable laptop computers for each team, a ceiling-mounted computer projector, and both standard and electronic whiteboards. A continuously available computer projector greatly facilitates the required student presentations, and at-hand laptops and the electronic whiteboard encourage an emphasis on quantitative methods.

Overall, student reactions to the new labs have been highly positive as evi-

denced by the following quotes from student course evaluations.

“I liked the hands-on approach rather than just following directions out of a book.”

“The labs were interesting and taught us the value of independent thinking.”

“We received a first hand glimpse into life as a scientist.”

Our real challenge for the future will be to offer additional HHMI lab sections as excitement about scientific discovery in them spreads among our students. This novel approach to teaching introductory biology laboratories underscores an adage to which we strongly ascribe that the best way to learn science is by doing science.

David Janos and Michael Gaines

Spring 2004 Senior Thesis Research

Maureen Mendoza, *Role of NF-KB in the Central Nervous System: Baseline Sensorimotor Evaluation and Response to Traumatic Brain Injury in NF-kB Mutant Mice* [Edward J. Green, Psychology]

Brian Husta, *Human Marrow-Isolated Adult Multilineage Inducible (MIAMI) Cells as a Potential Vector System for Brain Tumors* [Paul Schiller, Medicine]

Estrella Malca Luza, *Age-Growth Student of the Gulf Toadfish *Opsanus beta**. [Patrick Walsh, Marine Biology and Fisheries]

Melissa Franco, *Trends of Triglycerides and High Density Lipoprotein Levels in South Florida High School Students, Ages 15-17* [Patrice Saab, Psychology]

Carol Majal Villamaria, *Reduction of Apoptosis Induced by β -Amyloid₁₋₄₂ in Macrophage and Neuronal Lineage Cells using Z-IETD-FMK Inhibitor* [Paul Shapshak, Psychiatry and Behavioral Sciences]

Caronia Wallace, *Determining the Geographical Origin of Florida Populations of Air Potato, *Dioscorea bulbifera* using Chloroplast DNA* [Colin Hughes, Biology]

Lynh-Diem Bui, *Glomalin Dynamics* [David Janos, Biology]

Kevin Bettencourt, *Mendelian Inheritance of Genetic Markers in Hatchery-reared *Aplysia californica** [Lynn Fieber, Marine Biology]

Kerry-Ann Miller, *Method for making a distinction between wild-type (wt) and pf *Chlamydomonas reinhardtii* cells on a plate* [Peter Luykx, Biology]

Gema Crespo, *Effective Biosensor Assembly by Immobilization of Quantum Dots via Layer-by-layer Adsorption* [Roger Leblanc, Chemistry]

Lisa Ramsay, *A Rapid and Economical Method to Isolate DNA from Cultured Mammalian Cells* [Subbarayan Pachi, Hematology and Oncology]

Leina Persaud, *Linker-insertion mutagenesis of *yscN* of *Yersinia pestis* and analysis of the *UscN-YscL* interaction* [Gregory Plano, Microbiology and Immunology]

O'Rese Knight, *The Development of Auditory Evoked Potentials and Auditory Processing in Young Adults and School-aged Children: Stage I* [Robert Fifer, Pediatrics]

Ana G, Cristancho, *Prolines do not introduce major perturbations in the F-helix of bacteriorhodopsin* [George Turner, Physiology and Biophysics]

Andrea Escobar, *Induced beta-amyloid fibril formation by means of Langmuir monolayers* [Roger Leblanc, Chemistry]

Philip DePaola, *The effect of zinc chloride on beta-amyloid (β A) peptide aggregates and a novel deposition method of imaging by environmental scanning electron microscopy* [Roger Leblanc, Chemistry]



Our Alumni Make us Proud

Gary Bremen (B.S., 1987) is working as a ranger in Biscayne National Park. He recently was awarded the Freeman Tilden Award for Excellence in Interpretation, the National Park Service's highest honor in this field. Though the Freeman-Tilden Award is usually given for lifetime achievement, Gary was awarded the honor for specifically for developing Biscayne National Park's Family Fun Fest Program, an annual series of hands-on science and art activities that exposes local, national, and international visitors to the wonders of one of southern Florida's premiere natural areas.

Brandon Lee Cycholl (B.S., 1996) completed medical school at the University of Illinois in 2000, and finished his residency at the University of Illinois, Peoria in 2003. He is currently practicing family medicine at Clay Medical Center in Flora, IL. In July 2004, he married Tyra Hold, who practices law in Flora.

Tiffany M. Doan (B.S., 1993) received her Ph.D. in Quantitative Biology from the University of Texas at Arlington in 2002. This year she is starting a tenure-track position as assistant professor of biological sciences at Central Connecticut State University. She also teaches field courses in Peru and Costa Rica every summer.

Ron Grassi (B.S., M.S. 1977) has a niece, Nicole Grassi, who is now a pre-med in her sophomore year at U.M. Dr. Ron was appointed to the editorial review board of www.spineuniverse.com and authored the chapter entitled "Save Your Aching Back and Neck: A Patient's Guide."



Cannonball Tree in the John C. Gifford Arboretum

Cynthia Pie (B.S., 1999) is currently attending CEBU Doctor's College of Medicine in the Philippines. She is looking forward to her wedding, planned for January 2006.

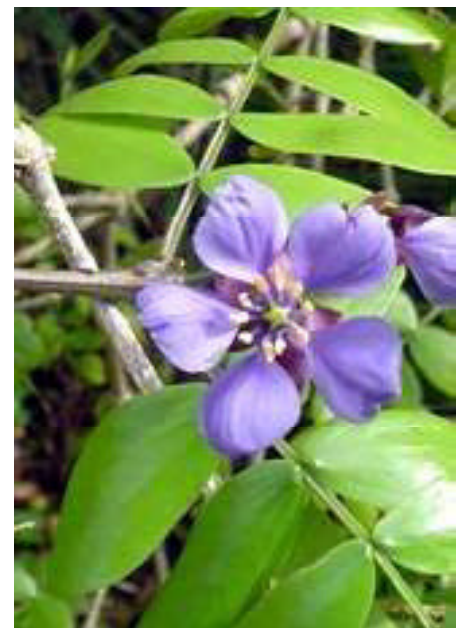
David Powell (B.S., 1993) finished four years studying Giant Pandas as a postdoctoral researcher at the Smithsonian's National Zoo. He recently has accepted a position as curator in the mammal department at the Wildlife Conservation Society's Bronx Zoo.

Fernando "Fritz" Riveron (B.S., M.D. 1979) is serving as Director of Cardiovascular and Thoracic Surgery at the Wausau Heart Institute, Wausau Wisconsin. His program was named one of the nation's "Top 50" programs for cardiac services.

Nicholas Shor (B.S., 1995) just completed his residency training in Psychiatry at Johns Hopkins Hospi-

tal, and has opened a private practice in Bethesda, Maryland.

Robert B. Stevenson (B.S. 1972) returned to his native Ohio after receiving his degree from U.M., and went on to earn his D.D.S. in 1975, an M.S. (Dental Surgery) in 1980, and an M.A. (Journalism) in 1980, all from Ohio State University. As a dentist, Dr. Stevenson has been committed to providing dental services to underserved populations, and to raising public awareness and recognition of oral health risks. He has received national and statewide recognition from the dental profession for his humanitarian efforts. In 2004, he won the William R. Butler Award. Named in recognition of retired University vice president William R. Butler, the award honors distinguished University of Miami alumni who have demonstrated unparalleled dedication to volunteerism.



Lignum vitae Tree in the John C. Gifford Arboretum



Departmental Seminars, Fall 2004- Spring 2005

Fall 2004

- ♦ **Dr. Ron Mumme**, Biology Department, Allegheny College. “Scare tactics in a neotropical warbler: plumage pattern as foraging adaptation in the slate-throated redstart.”
- ♦ **Dr. Robert B. Jackson**, Department of Biology, Duke University. “Vegetation change and the functioning of ecosystems.”
- ♦ **Dr. Mike Heithaus**, Department of Biology, Florida International University. “Predator-prey interactions in a seagrass ecosystem: influence of tiger shark predation risk on antipredator behavior of dolphins and sea turtles.”
- ♦ **Dr. Pedro Quintana-Ascencio**, Department of Biology, University of Central Florida. “Fire and demography of nine Florida scrub plant species.”
- ♦ **Dr. Phillip Stoddard**, Department of Biological Sciences, Florida International University. “Integrative study of electric communication: from ecology to molecules.”
- ♦ **Dr. Robert Warner**, Ecology, Evolution & Marine Biology, University of California, Santa Barbara. “Dispersal scales and connectivity among marine populations.”
- ♦ **Dr. Harvey Lilliwite**, Department of Zoology, University of Florida. “Ecology of snake and bird associations on islands.”

Spring 2005

- ♦ **Dr. Jonathan Wendel**, Department of Ecology, Evolution and Organismal Biology, Iowa State University. “Genes, Jeans and Genomes: Exploring the Mysteries of Polyploidy in Cotton.”
- ♦ **Dr. Michael Neubert**, Biology Department, Woods Hole Oceanographic Institution. “Demography and Dispersal: Stage-structured Models for Ecological Invasions.”
- ♦ **Dr. Richard Condit**, Center for Tropical Forest Science, Smithsonian Tropical Research Institute. “Geographic Ranges and Their Causes in Tropical Trees.”
- ♦ **Dr. Matthew Potts**, Institute of Global Conflict and Cooperation, University of California, San Diego. “The Spatial Patterning of Tropical Trees: Causes and Implications of Aggregation.”
- Dr. Masami Fujiwara**, Department of Ecology, Evolution and Marine Biology, University of California, Santa Barbara. “Who Grows and Who Dies? Stage-structured Demography of Estuarine Fish.”
- Dr. Peter Narins**, Department of Physiological Science, University of California Los Angeles. “Multimodal communication in the frog: mechanisms and behavior.”
- Dr. Daniel DiResta**, Department of Biology, University of Miami. “A Tale of Two Fisheries: Conservation Management in Biscayne National Park.”
- Dr. Douglas Soltis**, Department of Botany, University of Florida.
- Dr. Michael Schmale**, Marine Biology and Fisheries, Rosenstiel School of Marine and Atmospheric Science, University of Miami.
- Dr. Christopher Willett**, “Postzygotic isolation and genomic coadaptation in the copepod *Tigriopus californicus*”
- Dr. Alex C. C. Wilson**, University of California at Davis. “The consequences of asexuality in the evolution of aphid populations and genomes.”





Departmental Honors and Awards in 2004

Faculty Awards

Outstanding Biology Educator: Michael Gaines

Graduate Student Awards

Outstanding Teaching Assistant, Department of Biology: Venetia Briggs

Outstanding Teaching Assistant, College of Arts & Sciences: Terry Krueger and Michael Robinson

Undergraduate Student Awards

Outstanding Biology Senior: Lynh-Diem Bui

Best Honors Thesis Award: Maureen Mendoza

The Biology Development Fund

Please consider contributing to the following developmental opportunities in the Biology Department.

For further information, contact:

Linda Scott
Director of External Affairs
at (305) 284-2398

or

Dr. Theodore Fleming
Chair
at (305) 284-3973

- **Research Experiences for Undergraduates:** Support for students working in faculty members' research laboratories.
- **Scholarships for Minorities:** Scholarships for minorities that are underrepresented in the sciences.
- **Faculty Development:** Travel to laboratories, meetings, and workshops to promote excellence in teaching, and acquisition of new research skills.
- **Graduate Education:** Graduate student stipends, fellowships, and support to attend outside meetings.
- **Outreach Activities:** Programs for elementary, middle school, high school, community college students, and teachers.
- **Equipment:** Computer hardware and software for biology courses and equipment for updating teaching laboratories.
- **Gifford Arboretum:** Plants for the collection, support for public lectures and publication costs related to annual checklist.
- **Earl Rich Scholarship Fund:** A scholarship established for undergraduates in memory of Earl.



2004 Biology Degrees

Biology Majors

Stephanie Abbott
Eric Ackerman
Karim Alarankhia
Michael Alvarez
Alexander Barnett, Jr.
Christine Bauer
Kevin Bettencourt
Anand Bhatt
Jessica Blair
Nicolas Brador
Robert Brown
Lynhdiem Bui
Melissa Burger
Harlee Ann Bustamante
Sarah Cabral
Michael Cammarata
Kara Cavuoto
Kenneth Ceragno
Prateek Chapalamadugu
Susie Chen
Sonia Chopra
Allyson Collado
Gema Crespo
Brooke Crider
Ana Cristancho
Daphnie Csendes
Tyler Cyronak
Philip De Paola
Nathan Deckard
Armaghan Dehbozorgi
Christian Delgadillo
Daniel Dodard
Christopher Dy
Andrea Escobar
Alberto Figueroa
Ramy Gali
Roberto Garcia, Jr.
Deborah Glaser
Maria Glenn
America Gonzalez
Jason Guercio
Joel Gurerrero
Chantal Hewitson
Heather Higham
Andrew Huang
Jennifer Hunt
Bryan Husta
Kimberly Jacobs

Nasima Jafferjee
Natalie Jean-Pierre
Tanya Kanarek
Maria Kassab
Shaila Kirpalani
O'Rese Knight
Stephanie Kolar
Philip Lee
Maria Levasseur
Jason Levine
Angel Llanio
Michelle Londono
Catherine Lucero
Estrella Malca
Shandey Malcolm
Carmen Marimon
Eduardo Maristany
Alexander Martinez
Jacqueline Mataja
Nicola McLean
Maureen Mendoza
Maikel Millares
Amy Miyake
Venusha Moodley
Zarina Motorwala
Marium Mukati
Erick Nasser
Grodonoff Nelson
Maureen Parker
Asha Patel
Leina Persaud
Marco Peterson
Florence Pierre-Louis
Andrea Plant
Tania Prado
Ambreen Rahman
Shilpa Rajendra
Lisa Ramsay
Ashvin Reddy
Yordanka Reyna
John Rivas
Stefanie Roche
Geraldine Rodriguez
Maylin Rodriguez
Kunal Saigal
Vanessa Samaniego
Frank Schlaff
Kristin Seese
Jessica Serrano

Marc Shiman
Nicole Simon
Edward Singh
Iliana Soto
Asha Sunkersett
Christina Swanson
Sybil Thebaud
Daniel Thimann
Christie Toledo
Rebecca Torres-Lara
John Tyson
Ashish Udeshi
Beth Van Boening
Erin Vayo
Carole Villamaria
Sejal Vora
Caronia Wallace
John Warfield
Antoinette Williams
Dawnn Winge
Jacqueline Wood
Christine Yon
Jennifer Zuccarelli

Marine Science/Biology

Andrew Anderson	Barry Baker
Karen Breitlow	Ryan Brown
Carl D' Amore	Colin Foord
Ashley Foster	Phillip Gillette
Jessica Greenwell	Rachael Himelberg
Barbara Juncosa	Donnie Kim
Jonathan Mark	Kelsi Mercado
Julie Pearson	Mary Radlinski
Megan Reiger	Cristina Roubik
Lisa Saladin	Akihiro Shiroza
Ian Zink	

Psychobiology Majors

Nicholas Anthony	Honeylit Cueco
Megha Karkera	Adriana Martinez
Daniel Roque	Latisha Rowe
Sarah Syed	

Doctor of Philosophy

Douglas Scofield	Sarah Stai
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