

## CICS Positioned to Become World Leader in Climate Science

The Cooperative Institute for Climate Science will be celebrating its first anniversary this fall. CICS was created as an outgrowth of 40 years of collaboration between Princeton University and the Princeton-based Geophysical Fluid Dynamics Laboratory (GFDL). CICS is a dual-pronged institute with research managed by the Princeton Climate Center (PCC) of PEI and by the Atmospheric and Oceanic Sciences Program (AOS). One of the activities in AOS is the Visiting Scientist Program, which funds postdoctoral researchers at all levels who spend time at GFDL learning about numerical modeling and interacting with the GFDL staff on problems of importance to the lab.

PEI News spoke with Jorge Sarmiento, who directs both CICS and PCC, about the research goals of the year-old institute, and the benefits it will bring to PEI and the University. Sarmiento is also a faculty member in both the AOS Program and the Geosciences Department.

The PCC, which incorporates the research of the former Carbon Modeling Consortium, is the fourth major research center housed in PEI.

***Please describe the history of the development of CICS.***

The set of circumstances that led to the forming of the joint institute began in the early 1950's at the Institute for Advanced Study where von Neumann pioneered the development of a three-dimensional general circulation model of the atmosphere with Jule Charney. At his and John von Neumann's instigation, the U.S. Weather Bureau created the General Circulation Research Section in 1955 under the direction of Joseph Smagorinsky, who had been part of the group at Princeton. This section, located in Suitland, Maryland, became the Geophysical Fluid



*Professor Jorge Sarmiento*

*(continued next page)*

## CEBIC Summer Institute 2004

While some middle school teachers enjoyed the fieldwork at the Plainsboro Preserve and others favored the unit on the environment and the human body, by the conclusion of this year's CEBIC (Center for Environmental Bioinorganic Chemistry) Summer Institute, all of the participants were unanimous in their support of the program.



*Dr. Eileen Zerba (center) with two middle school teachers participating in this year's CEBIC Summer Institute.*

The three-year-old CEBIC Summer Institute is a professional development program in science for middle school teachers from Princeton and surrounding communities. Among its goals is to help local teachers learn how to apply science content knowledge in their classrooms. Funded by the National Science Foundation (NSF), the Summer Institute was established by François Morel, Professor of Geosciences and Director of PEI, as part of the outreach program of the Center for Environmental Bioinorganic Chemistry (CEBIC), which he also directs.

This year, 20 teachers from middle schools in Princeton, Burlington City, Ewing, Hillsborough, Lawrence, Montgomery, South Brunswick, Trenton, Washington Township and the West Windsor-Plainsboro Regional School Districts attended the workshop programs which were held July 19-23. Content areas included chemistry and the human body, and environmental sciences.

Each CEBIC workshop is conducted by a three-member team: a content specialist, a lead teacher, and a student enrolled in Princeton University's Program for Teacher Preparation. This year's content specialists were Dr. Eileen

*(continued page 4)*



*(CICS, continued from page 1)*

Dynamics Laboratory in 1963 and returned to its intellectual home in Princeton in 1968, still under the direction of Smagorinsky. From that time, GFDL's primary relationship has been with the Geosciences Department through the AOS Program.

The AOS Program admits its own graduate students and awards its own degrees. The director of the AOS Program is George Philander, a professor in the Geosciences Department, but the majority of AOS faculty members are GFDL scientists who hold positions at Princeton University as lecturers with a professorial rank. Most of the graduate students and postdocs in the AOS Program are supported by a grant from GFDL to Princeton.

However, over the past decade, particularly with the founding of PEI and its associated faculty appointments, the Princeton faculty interest in GFDL research began to grow rapidly and spread widely across many different departments. Two major examples of research projects within PEI that have had a strong link to GFDL are the Carbon Modeling Consortium (CMC), which Steve Pacala (Professor of Ecology and Evolutionary Biology) and I co-directed; and the Carbon Mitigation Initiative, co-directed by Pacala and Rob Socolow (Professor of Mechanical and Aerospace Engineering).

With the handing off of the GFDL directorship from Jerry Mahlman to Ants Leetmaa in 2001, many of us began to consider how Princeton and GFDL might strengthen their relationship in order to take best advantage of the new focus of Princeton on environmental issues. CICS, which builds onto the AOS Program a strong research component in PCC and provides a new framework for more readily transferring research funds from NOAA to Princeton, is the direct outcome of those discussions.

#### ***How does the University benefit from the formation of CICS?***

GFDL is one of the premier research institutions in the world in modeling the atmosphere, oceans, weather, and climate. With its numerous faculty additions and shift in focus, Princeton now has great strength in many areas that make direct use of such models and is able to make major contributions to their future development. These include fields such as biogeochemistry, physical oceanography, paleoclimate, hydrology, ecosystem ecology, climate change mitigation technology, economics, and policy. The formation of CICS provides a focal point for bringing together the research in PCC and the education of graduate students and postdocs in AOS to make us, in the words of the CICS vision statement, "a world leader in understanding and predicting climate and the co-evolution of society and the environment – integrating physical, chemical, biological, technological, economical,

social, and ethical dimensions in educating the next generations to deal with the increasing complexity of these issues." The additional benefit for the University is that it creates a long-term cooperative agreement that simplifies NOAA's funding of Princeton research.

#### ***Please describe the structure of the joint institute.***

Under the joint institute, there are two separate units, AOS and the Princeton Climate Center under PEI. Education and cooperative research involving GFDL staff fall under AOS, and the research of Princeton faculty supported by NOAA grants falls under PCC.

The joint institute has identified four major research themes. These include the development of improved earth system models for the study of future climate changes and their impacts and the confrontation of these models with observations; the development of land and ocean biogeochemistry components for the earth system model; improving our understanding of the causes of climate change in the past, including confronting the models with observations; and the development of a new initiative on coastal ocean processes and the impacts of human beings on these.

#### ***How will the formation of CICS impact the University's research goals?***

The formation of CICS has propelled a complete rethinking of how the University and GFDL can work together to achieve important research and educational goals. This will take place through keeping the original program in AOS, and combining it with PEI to take full advantage of the University's extraordinary expertise. Much of the work of CICS will focus on global warming. As the evidence of global warming accumulates, there is widespread recognition that the impacts are likely to be significant. Princeton as an institution is better placed than any other institution anywhere to become the world leader in combining the practical nuts and bolts of running models along with broad, deep knowledge and scientific expertise. We work on climate models, but we also have the expertise to analyze them. This joint institute is about taking on the mantle of responsibility we have because we are in such a unique position to do so.

#### ***What makes CICS a world leader in climate research?***

GFDL is a world-class climate modeling center that pioneered the field and continues to have a highly active research program in this area with the computational facilities to support it. Princeton is a world leader in the modeling and observational analysis of terrestrial and oceanic biogeochemistry as well as hydrology, and has a broad range of faculty in policy and other areas of relevance. Our combined expertise and facilities are unmatched at any academic institution in the world and competitive with, or better than, all the governmental facilities here or anywhere else. With assistance from CICS, GFDL is nearing completion of a major new earth system model development effort. We look forward to exciting years ahead as we work together to use these models and observations to understand what the future climate has in store for us. ❁

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# Princeton Garden Designer Beatrix Farrand's Legacy Lives on in Campus Plantings

As Princeton's consulting landscape gardener from 1915 to 1941, Beatrix Jones Farrand designed gardens and grounds around the campus with her signature mix of indigenous plants and alien in the English Romantic, or naturalistic, tradition. Last January, the Beatrix Farrand Society purchased Farrand's last-owned property and brought renewed attention to her distinguished career. Now Garland Farm on Mount Desert Island, Maine joins Princeton University, the White House, Dumbarton Oaks, and the New York Botanical Garden as places where examples of her work are available for the general public to enjoy.

Although Farrand's (1872-1959) last plantings on campus were put in the ground more than 60 years ago, many still survive. The willow trees adjacent to Lake Carnegie, the trumpet vines that climb courtyard walls, white magnolias, retaining walls, site steps, and the bluestone footpaths that create square and triangular lawn panels provide a glimpse of how she helped the campus environment develop. That they survive is a testament to the success of her vision of a sustainable landscape. She chose plants for the University primarily based on aesthetics, hardiness, and a limited budget. Her decisions were also governed by the fact that other career obligations required her to be away from the campus for long periods of time: she wanted plants that needed minimal care.

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***"We all know that education is by no means a mere matter of books, and that esthetic environment contributes as much to mental growth as facts assimilated from a printed page. No life is well rounded without the subtle inspiration of beauty, and, no matter how prosaic and full of drudgery it may be, beauty brings to it refreshment and renewal."***

—Beatrix Farrand, *Princeton Alumni Weekly*, June 9, 1926

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As Professor Henry Horn of the Ecology and Evolutionary Biology Department states, "In today's climate of recommending planting of native species for ecological reasons, it is hard to appreciate how pioneering Farrand was in using them for aesthetic reasons."

Farrand explained her work in the June 9, 1926 issue of the *Princeton Alumni Weekly*. "After careful study of the soil and climate, it was decided to use evergreen trees for the heavy accents of the various groups. They were chosen of proven hardiness and from the kinds which would endure the heat of the summer as well as the fertility of the soil, both so unlike their usual habitat...large plantations of the native flowering dogwood were made and some of the well-tried aliens, such as forsythia, were employed to give considerable splashes of color at their several seasons."

Jim Consolloy, the University's grounds manager, is an enthusiast of Farrand's work on campus. It was here that Farrand, a founding member of the American Society of Landscape Architects, developed her style. The Princeton commission occurred early in her career, he says. Her first work on campus dates from 1912 and can be found at the Graduate College. Her plantings grace the Old Tower, the graduate dorms in the courtyard, Wyman Cottage, and Wyman Garden. "She liked plants that bloomed in the spring and fall, since in those days the campus was used much less in the summer and plants would be in bloom when students were on campus," reports Consolloy.



*Beatrix Farrand designed the sunken garden at McCosh Infirmary, above.*

Other evidence of Farrand's successful use of indigenous plants are the American beech; red, scarlet, and pin oaks; white pine; fir; and yews still growing on campus. One of her last projects was Patton Hall. Around it can be found exotic species such as horse chestnut, climbing hydrangea, winter jasmine, and western tamarisk.

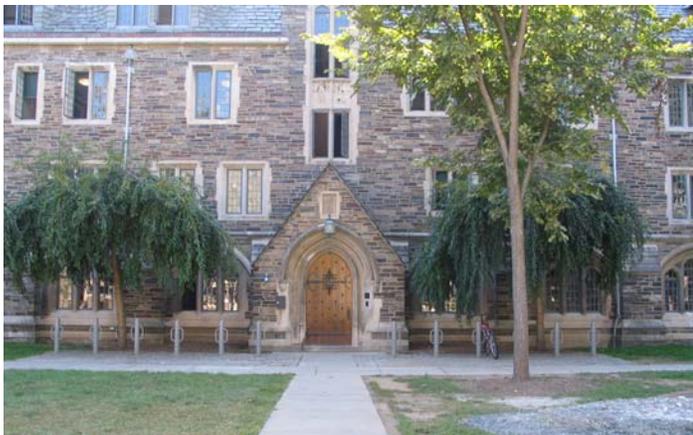
Farrand also had an eye for exotic specimens. "She was always experimenting," says Consolloy, "to see which rare species would thrive here." The weeping hemlock that guards the Graduate College's entranceway is a specimen she acquired from Harvard's Arnold Arboretum. The two cedar of Lebanon trees that occupy the Graduate College's courtyard were given to the University in 1913 by one of Farrand's associates. She planted the Amur cork trees and yellow willows by Lake Carnegie.

"Beatrix was known as the 'bush lady,'" Consolloy offers, "because she liked to arrange the bushes herself before they were planted. I know the men did not joke with her. She was very serious. She was an only child and probably got her way her whole life. This worked well when she had to face the old boys here and stand up to them. She asked them to move the club house for the golf course—and they did."

*(continued on page 4)*

*(Farrand, continued from page 3)*

Farrand was responsible for hiring Jim Clark, Princeton's first grounds manager. Clark, who was born and trained in Scotland, was hired by Farrand to start the University's nursery operation and supervise the installation and maintenance of all of her plantings. Establishing the nursery was "wonderful for Princeton," Consolloy says.



*Weeping cherries originally planted here by Beatrix Farrand, and photographed by her in the 1920s. Jim Consolloy replaced them in 1990.*

"There were only a handful of nurseries at the time. ... Penn, Yale, and Harvard all had nurseries and they liked to share plants." The nursery stood in the area of the campus that is now the maintenance area. "You can still see rows of trees in back of the lacrosse field that were being grown by the nursery. There are some very rare species there." In an effort to maintain Farrand's imprint on campus, Consolloy says that when one of her plants dies, he replaces it with the same variety.

In *Beatrix: The Gardening Life of Beatrix Jones Farrand, 1872-1959*, (Viking 1995), author Jane Brown writes that Farrand's initial contact with the University was made through connections her wealthy and established New York family had with the Roosevelts (a paternal aunt was Edith Wharton). A Roosevelt introduced her to Mrs. Moses Taylor Pyne, whose husband was chairman of the Princeton Trustees Building Committee. In addition, Princeton's Dean Andrew Flemming West, who had spearheaded the idea of a graduate college, was a friend of Professor Charles Sprague Sargent, who headed Harvard's Arnold Arboretum and under whom Farrand had studied. Incidentally, in 1913 Farrand met her husband, Yale historian Max Farrand (Princeton '1892), while dining at Prospect House with Princeton President John Grier Hibben.

Her tenure ended in 1941 when the onset of World War II meant funding for landscaping was temporarily placed on hold. ❁

*(CEBIC, continued from page 1)*

Zerba, lab manager for PEI's Environmental Studies Program, and Professor Andrew Bocarsly from Princeton's Chemistry Department.

Teachers chose between Dr. Zerba's workshop on the biological, chemical, and physical parameters of aquatic environments or the chemistry and the human body unit taught by Professor Bocarsly. The lead teacher working with Dr. Zerba was Kerry McQuarrie from the Chapin School in Lawrence. Gene Buck from Grover Middle School in West Windsor was the lead teacher working with Professor Bocarsly. Student teachers from the University's Teacher Prep Program, T.J. Pray ('03) and Edward Hilton, Princeton Theological Seminary ('05), worked under Dr. Zerba and Professor Bocarsly, respectively.

Dr. Zerba has been a part of the CEBIC Summer Institute faculty since 2002. This year, her workshop focused on the impact of agronomic and urban land use on the aquatic environment. Part of the curriculum incorporated research with fresh water from the Plainsboro Nature Preserve in Plainsboro, New Jersey, and with salt water, which included a trip to Sedge Island off the New Jersey shore. In the lab, Dr. Zerba taught the teachers how to assess the ecological effects of land use, such as the impact of fertilization in agriculture on ecosystem dynamics. The teachers also participated in hands-on exercises to further their understanding of the physical, chemical, and biological parameters of a healthy aquatic environment.

Professor Bocarsly, who taught at the CEBIC Summer Institute for the first time this year, developed a new unit that focused on the effects of the environment on the human body and humans on the environment. As part of this workshop, teachers experimented with pH buffers to combat acid rain, and enzymes. They also learned about the role of trace metals in aquatic systems. Chemistry Professor Jay Groves, demonstrated how oxygen is used by the human body.

Dr. Zerba plans to offer the inquiry-based exercises she developed for CEBIC to the Plainsboro Nature Preserve as part of a partnership between Princeton University and the New Jersey Audubon Society. These exercises will be used for future educational programs with local schools. The work T.J. Pray completed over the summer at CEBIC will also contribute to this goal.

For more information about CEBIC Outreach Programs, please contact Anne Catena, PEI Outreach Coordinator, at 609-258-6615 or [acatena@princeton.edu](mailto:acatena@princeton.edu). ❁

## Defender of Wise GM Technology to Publish New Book and Organize Conference

Lee Silver, Professor of Molecular Biology and Public Affairs at the Woodrow Wilson School, wants to understand how science and beliefs intersect and is at the forefront of a revolution: the use of biotechnology to modify plants. He has written a new book, *Challenging Mother Nature: Biotechnology in a Spiritual World*, which addresses some of the political issues surrounding this controversial science, and is planning a program that will bring groups polarized by their opinions together in a working environment.

Professor Silver is a proponent of wise uses of genetic engineering of plants that can benefit humankind. He believes that biotechnology has the potential to make agriculture more productive in developing countries and to help preserve the environment at the same time. His research examines current public views on the subject, such as how concepts of “nature” and “natural” affect a person’s attitude toward biotechnology. It also touches on spirituality—specifically, why spiritual views, overt and hidden, have such a profound impact on what people think of biotechnology. The book, to be published in the spring by Ecco Press, is an attempt to educate readers and clarify these issues, he says.

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***“There are so many people who still believe that rice was given to them by God. Humans invented these crops—and in the last 30 years they have been completely changed by human intervention.”***

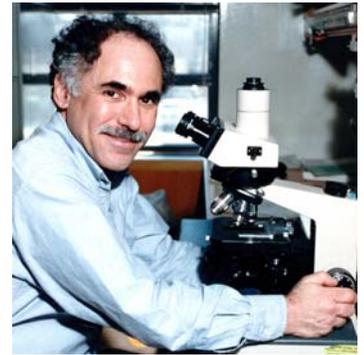
**—Lee Silver, Professor of Molecular Biology and Public Affairs**

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The public has an underlying fear that this technology will harm human health, Silver explains. “But there are a million ways it can be used that are positive for both humans and the environment. Currently approved genetically modified (GM) products have not harmed a single one of the hundreds of millions Americans who have eaten them unknowingly. I find it so strange how people are willing to accept ‘natural dietary’ supplements full of all kinds of potentially dangerous chemicals. They are thinking that Mother Nature is good and any interference with the natural world is bad. The truth is all crops are unnatural. Corn did not exist until Native Americans invented it through trial and error. It started as a weed and the Native

Americans who recognized primitive principles of genetics and mutation changed the weed into something much more nourishing.”

Professor Silver’s hope for the future use of biotechnology in wise ways that benefit humanity lies in large part with nongovernmental organizations (an NGO is any non-profit, voluntary citizens group which is organized on a local, national, or international level). Professor Silver explains, “If NGOs were willing to look at genetic engineering of crops and take over, not reject the technology...and see how it can be used responsibly, it would be greatly beneficial to all people. The same amount of food could be grown on less land, in less hospitable climates, with greater nutritional and preventive health value, without the need for chemical sprays, and with less overall ecological disturbance.”



Professor Lee Silver

To address this hope, Silver will be working with Frank Von Hippel, Professor of Public and International Affairs at the Woodrow Wilson School, to develop a program that will bring together NGO leaders and academic scientists. Still in the planning stage, the program will give the two groups an opportunity to work together and balance benefits and risks to people, ecosystems and societies. Bringing the two together is no small hurdle. NGOs as a whole are opposed to the technology. “There has been a gut reaction against all of the technology,” says Silver. “So [biotechnology] has been left to the corporations to use for profit.”

Professor Silver believes that while there are legitimate objections to the genetic engineering of crops, “they have nothing to do with human health.” Europeans, he says, “don’t want to be overwhelmed with American culture... The concern is that genetic modification technology is so optimal it could eliminate the uniqueness of certain cultures and cuisines” because it would no longer be profitable to grow traditional crops.

“It’s true,” Silver says, “that it’s not possible to replicate French cuisine [with GM seeds] and that U.S. [corporations] only care about profits.” He observes, however, that “traditional agriculture long ago destroyed most of our planet’s ‘pristine’ forests and other pre-human ecosystems.”

Silver is optimistic about the future use of biotechnology for crops. “The most critical component of this issue is to understand the science well, not just reject new ideas. Biotechnology can help society, so we need to take control of it and use it for the advantage of people and the planet.” ❁

*ENV Program Alumni Chat*

## Stephanie Tatham '04 Plans to Pursue Career in Environmental Law

*Stephanie Tatham, who graduated in June 2004, was awarded the Environmental Studies Thesis Prize by the ENV Selection Committee. PEI News spoke with Stephanie a few weeks before her graduation about the ENV Program, her thesis, and her future.*

### **What is your major at Princeton?**

My major is politics with an ENV certificate. While getting my certificate, I became interested in studying the issue of groundwater protection in New Jersey. The nation's groundwater is generally protected by state and federal safe drinking water acts. However, these laws leave room for ambiguity in the determination of what tools are available to state and local governments to protect their water. I found New Jersey municipalities are allowed to enact local ordinances, or regulations, to protect water. I studied the question: how can municipalities pass laws to protect their groundwater and what types of laws should they pass? I researched the procedures municipalities need to go through to have a law passed without facing legal challenge.

I wrote my thesis, "Groundwater Protection in New Jersey: Significance, Current Governance, and the Potential for Further Protection," in conjunction with a class offered through the Community-Based Learning initiative. The course was ENV 306, Environmental Law and Moot Court, and was taught by Professor George Hawkins. (Hawkins, '83, is a graduate of Harvard Law School and is currently director of the Stony Brook-Millstone Watershed Association in Pennington, NJ.) I first met Professor Hawkins in ENV 306, and the following summer the Community-Based Learning Initiative generously funded an internship for me at the Stony Brook-Millstone Watershed Association. One of the conditions of the internship was that I devote some of my time to thesis research and, given my interest in water resources, it seemed intuitive to ask Professor Hawkins to be my thesis advisor. We met several times over the course of my internship to discuss ideas and research for my thesis.

### **How did the ENV Program inspire you?**

When I came to Princeton I was already fairly certain I wanted to pursue a law degree. What I didn't know was that I would want to focus on the environment. If I hadn't loved all the classes I took through the ENV program I probably would not have chosen environmental law as a career.

The most valuable part of the ENV program for me was

doing independent work. The environmental research I did for my junior papers (JPs) made me truly believe that work in the environmental field is important and necessary. For instance, one JP I wrote was on the Doba Basin Oil Project. I was so enthusiastic about this research that the paper ended up being 54 pages long! This pipeline begins in Chad and makes

seventeen major river crossings as it carries oil to Cameroon's Atlantic coastal port, Kribi. I sought to identify the threats posed by the pipeline breaking down, and discovered that the building of the pipeline has already negatively affected the environment in both countries. The pipeline goes through preserved, natural habitat in both countries, land that is home to many endangered species.

Additionally, I identified many other negative social and economic consequences stemming from the building of the pipeline. To give just one of many examples, the governments of both Chad and Cameroon have been identified by objective third parties as among the most corrupt in the world, and the first \$4 million given to the Chadian government by the World Bank for the pipeline project was pocketed by one of the leaders and used to buy guns.

### **What are your plans following graduation?**

For the first few weeks after graduation, I will work at PEI on a report assessing Princeton's transportation options and what improvements might be made in this area. I will be reviewing suggestions from the ENV 201 course and formulating ideas for implementation. Then, at the beginning of August, I will work for Environmental Defense (ED) on a year-long fellowship with the Living Cities Program. I discovered this opportunity through the Princeton Project '55 Fellowship program, which matches students with non-profit organizations.

At ED I will be working with Andy Darrel, an environmental attorney, on three projects: 1) Researching congestion pricing for tolls on four, currently untolled, East River bridges. We will be looking at different pricing schemes that vary based on the amount of congestion in the area. 2) Helping contractors in New York City to become more environmentally friendly. New York's government is generally legally obliged to preference contractors who come in with the lowest bids. So municipalities are usually bound to accept the lowest bid. Now, a new law states that contractors don't have to make the lowest bid if they are willing to retrofit their construction technology to emit less pollution. We will be working to get laws like this one passed in major cities across the country. 3) Trying to persuade New York to switch from trucks to freight rail for distribution. Rail is a much cleaner and safer technology.



*Stephanie Tatham measuring stream velocity at Stony Brook Millstone River for an ENV 201 lab exercise.*

*(continued next page)*

After the fellowship I plan to go to law school and concentrate on environmental law.

**Can you offer any advice to incoming ENV students?**

In terms of the ENV Program, I would advise anyone to try and identify his or her interests early on.

For example, the classes I took directed me toward environmental regulation. As I learned through the ENV Program, environmental regulation is very relevant to environmental policy. Laws either bind people or they don't – though there will always be some voluntary action to help the environment, regulations are meant to ensure environmental protection. In spite of this, sometimes regulations don't even help. A good example is the 1972 Clean Water Act. Despite the fact that the regulation required New Jersey and the rest of the states to take certain actions to improve its water quality, many of these provisions were not enacted or enforced until the late 1990s, when several states were sued by environmental groups. The environmental groups won, but New Jersey has yet to fully implement the provisions of the more than 20-year old Clean Water Act.

I would also advise every student to take advantage of the faculty resources here. Professor George Hawkins gave me access to a great deal of information I might never have known to look for. The Princeton faculty have so much to offer, take advantage of their great minds while you are here! ❁

## PEI Associated Faculty Earn Awards



**Simon Levin, Professor of Ecology and Evolutionary Biology**, was awarded the Dr. A.H. Heineken Prize for Environmental Sciences, Royal Netherlands Academy of Arts and Sciences (2004). He was also awarded an Honorary Doctor of Humane Letters from Whittier College.



**George Philander, Professor of Geosciences**, was elected to the U.S. National Academy of Sciences in April.



**Daniel Sigman, Assistant Professor of Geosciences**, has been named by the American Geophysical Union as a 2004 Macelwane Medalist.



**Thomas Spiro, Professor of Chemistry**, will receive the 2005 Founders Award for outstanding achievement in biophysics from the Biophysical Society.



**Bess B. Ward, Professor of Geosciences**, was elected a Fellow of the American Academy of Arts and Sciences in April. ❁

## 2004 Environmental Studies Prizes

**The Peter W. Stroh '51 Environmental Senior Thesis Prize** was established in 2003 as a memorial to Peter Stroh, who was an active and effective member of PEI's Advisory Council and a strong supporter of the Environmental Studies Program. This year both the winner and honorable mention recipients are from outside the Environmental Studies Program.



*Celia Riechel, recipient of The 2004 Peter W. Stroh '51 Environmental Senior Thesis Prize.*

**Winner:**

Celia Riechel '04, Anthropology  
 Advisor: John Borneman  
 "Perspectives on Logging in Oregon's National Forests"

**Honorable Mention:**

Kristin L. Thanavaro '04, Ecology and Evolutionary Biology  
 Advisor: Simon A. Levin  
 "Severe Acute Respiratory Syndrome (SARS): Analysis of Uneven Spread Dynamics and Prospects for a Future Outbreak"

**Environmental Studies Program Thesis Prize Class of 2004**

**Winner:**

Stephanie Tatham '04, Politics  
 Advisor: George Hawkins  
 "Groundwater Protection in New Jersey: Significance, Current Governance, and the Potential for Further Protection"



*Stephanie Tatham, winner of the Environmental Thesis Prize, with her thesis advisor, Professor George Hawkins.*

**Honorable Mention:**

Aniece L. Gerrard '04, Ecology and Evolutionary Biology  
 Advisor: Rosemary Grant  
 "Fishing Impacts and Management Policy of the English Sole Population in Hecate Strait, British Columbia"

**Environmental Leadership Prize**

**Winner:**

Jennifer Brudno '04, Ecology and Evolutionary Biology  
 Advisor: Lars Hedin

**The Becky Colvin '95 Field Research Award**

**Co-recipients:**

Wenfei Tong '05, Ecology and Evolutionary Biology  
 Olympia L. Moy '05, Ecology and Evolutionary Biology ❁

PEI Tenth Anniversary Celebration  
1994-2004  
Monday, October 4, 2004



**2:00 – 4:00 p.m. PEI 10<sup>th</sup> Anniversary Faculty Seminars**  
101 Friend Center

*“Environmental Values and the Moral Status of Animals”*

**Peter Singer**, Ira W. Decamp Professor of Bioethics, University Center for Human Values

*“Does the Whale Diminish? The Art and Science of Moby-Dick”*

**William L. Howarth**, Professor of English

*“Global Warming: Minimizing Long-Term Risk”*

**Michael Oppenheimer**, Albert G. Milbank Professor of Geosciences and International Affairs

*“PEI and the Social Contract: Solving the Problem of Global Warming”*

**Stephen W. Pacala**, Frederick D. Petrie Professor of Ecology and Evolutionary Biology

**4:30 p.m. 10th Anniversary Taplin Environmental Lecture**  
McCosh 50

*“Powers and Responsibilities — the Role of Corporations in Human Progress”*

**John Browne**, Group Chief Executive, BP p.l.c.

**5:45 p.m. Reception**  
McCosh Courtyard

**PEI  
NEWS**  
Fall  
2004

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Additional information about the Institute and the Undergraduate Program in Environmental Studies is available on the Internet:  
<http://web.princeton.edu/sites/PEI/>

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