

Sigma Xi Today

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2002 Common Wealth Award Honors Climate Researchers

Lonnie Thompson and Ellen Mosley-Thompson have spent the past 25 years studying Earth's climate changes and global warming. The husband-and-wife collaborators are senior scientists with the Byrd Polar Research Center at Ohio State University.

Thompson has led some 40 international expeditions to collect ice cores from the mountains of Africa, South America and Asia. Mosley-Thompson has led similar field programs to the ice fields of Greenland and Antarctica.

Their ice-core research has yielded a remarkable and priceless archive of Earth's ancient climate. Moreover, their findings offer some of the most convincing evidence yet that global warming is real and that human activity is a contributing factor.

In April, the Thompsons received the 2002 Common Wealth Award for Science and Invention, which carries a prize of \$50,000.

The award is one of six given by the PNC Financial Services Group. Sigma Xi nominates recipients in the science and invention category.

To understand Earth's past and present climate, the Thompsons and their research team decipher the chemical and physical properties preserved in ice cores.

With data from the polar ice sheets, Mosley-Thompson has contributed to the global reconstruction of the Little Ice Age (A.D. 1450-1880) and reconstruction of the Earth's volcanic history.

A 1,000-foot-long ice core, drilled on one of Thompson's expeditions to



Lonnie Thompson and Ellen Mosley-Thompson

the Tibetan Plateau, recounts China's climate history for the past 130,000 years.

An ice-core record of this length from the sub-tropics is unprecedented, and new cores from two sites in central and southern Tibet reveal that the past 50 years have been the warmest in the past 10,000 years in this part of the world.

Lonnie Thompson believes the hottest part of the globe is crucial to understanding global warming.

Tropical glaciers, he says, are "the most sensitive spots on Earth" and serve as "an indicator of the massive changes taking place" in today's global climate. "These glaciers are very much like the canaries once used in coal mines," he says. "They're an indicator of massive changes taking place and a response to the changes in climate in the tropics."

Using two decades of ice-core data and aerial mapping, the Thompsons have documented that the world's ancient tropical glaciers and ice caps

are melting away, most notably during the past half-century.

"Most of the evidence for warming that we see in these high alpine ice caps is in regions that are already water stressed," Mosley-Thompson says. "These tropical areas are where most of the planet's population lives and where subsistence agriculture is incapable of feeding the population. And in the future, the greatest increase in population will occur here."

Based on this evidence, Lonnie Thompson predicts that the snowcaps of Africa's

Mount Kilimanjaro will be gone by 2020, as will other mountain ice caps in Peru and around the world.

These vanishing glaciers "will have a massive effect on humanity," he says, posing an urgent natural and economic threat. The Thompsons warn that it may be too late to save the tropical glaciers, and they now race against time, gathering more core samples before Earth's frozen history is lost forever.

Other 2002 Common Wealth Award winners were Mexican novelist Carlos Fuentes, former U.S. Senate majority leader George Mitchell, performer Julie Andrews and children's television icon Fred Rogers.

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2002 Sigma Xi Forum ■ November 14-15 ■ Moody Gardens Hotel, Galveston, Texas

Changing the Face of Science and Engineering

IN CONJUNCTION WITH SIGMA XI'S ANNUAL MEETING NOVEMBER 15-17, 2002

Visit www.sigmaxi.org for program details and updates.

Nobel laureate **Mario Jose Molina** will present the annual John P. McGovern Science and Society Lecture on November 15 in Galveston, Texas, at the 2002 Sigma Xi Forum *Changing the Face of Science and Engineering*.

Molina is Institute Professor at the Massachusetts Institute of Technology. He shared the 1995 Nobel Prize for his work on atmospheric chemistry.

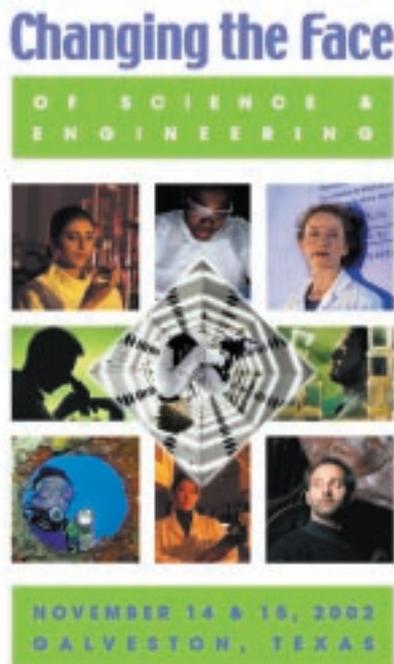
This year's Sigma Xi Forum will address a variety of topics related to the scientific workforce of the future, including critical human resource issues and the need for an inclusive workforce.

Also on the program will be **Charlotte Kuh**, executive director of the National Research Council's Office of Scientific and Engineering Personnel, and **Willie Pearson, Jr.**, chair of the School of History, Science and Technology at the Georgia Institute of Technology.

Student Conference Deadline October 4

October 4 is the deadline for undergraduate and high school poster proposals for the 2002 Sigma Xi Student Research Conference, to be held November 16 at Moody Gardens Hotel in Galveston, Texas. Cash prizes will be awarded for the best posters.

Held in conjunction with the Society's annual meeting, the conference provides an excellent opportunity to meet students from across the country and present original research at a national meeting. Register online at www.sigmaxi.org.



Other speakers include **Paula Stephan** of Georgia State University, co-author of *Striking the Mother Lode in Science*, and **Dorothy Shore Zinberg** of Harvard University, author of *The Changing University: How the Need for Scientists and Technology Is Transforming Universities Internationally*.

Engineers and scientists have always mastered change, exploring new ways of understanding the world and then harnessing the power of their discoveries to change the way people live. Advances in science and technology have accelerated the pace of change at an unprecedented rate.

At the same time, Western societies have experienced dramatic social change—becoming more and more diverse. In the U.S., women and underrepresented minorities comprise nearly 60 percent of the labor force. Yet they represent only about 26 percent of workers in science, engineering and technology.

A continuing decline in enthusiasm for science among college-age students leads to the urgent question—who will do science in the future?

Through the 2002 Forum, Sigma Xi will engage its members with the public policy, education and business communities in stimulating debate, dialogue and collaboration across disciplines to meet this challenge.

The larger policy issues will be addressed in plenary sessions by panels of experts. Model programs in industry, academia, government and professional associations will be highlighted. Breakout sessions will explore specific programs and issues related to plenary topics.

Plenary Session Topics

Examining the Health of the Research Enterprise

An overview of major challenges confronting the research enterprise, such as labor force demands and demographics in science and technology.

Science, Engineering and Technology Across Borders

Reviewing current data on the participation of international science students in graduate education in North America and approaches to immigration policy that will support the scientific enterprise.

Who Will Do Science?

Educational policy initiatives that will prepare women and underrepresented minority science students and sustain their interest.

Creating Environments for Change

Featuring exemplary programs in educational institutions, industry, government and within professional societies.

Call for Presentations

September 2 is the deadline for poster abstracts on the forum theme. Submit abstracts online at www.sigmaxi.org.

Where Have All the Rainforest Flycatchers Gone—and Why?

This is part of an ongoing series profiling recent Grant-in-Aid of Research recipients.

An encounter with a mixed flock of colorful insect-eating birds in a Costa Rican rainforest is a memorable experience. Warblers, foliage gleaners, woodcreepers, flycatchers, wrens and antbirds forage together in a feeding frenzy hardly equaled in any other part of the world.

But Sigma Xi Grant-in-Aid recipient Cagan H. Sekercioglu says it's becoming harder to observe these birds in action because they're among the species most sensitive to habitat disturbance and forest fragmentation.

"Most of these species have lower population densities in forest fragments, and many are completely absent in such areas," says Sekercioglu, a doctoral candidate in ecology and evolution at the Stanford University Center for Conservation Biology.



Stanford University ecologist Cagan Sekercioglu, with assistant Parker VanValkenburgh (left) and bat researcher Margo Stoddard, on top of Costa Rica's highest peak.

"Although their disappearance has been well-documented," he says, "the reasons are not well known." Discovering the key to their vulnerability may help explain the disappearance of other small, specialized birds that comprise the majority of threatened bird species around the world.

Sekercioglu's field research on insectivorous birds, supported in part by a Sigma Xi grant from the Simons-Monroe Fund, led to a publication earlier this year in the *Proceedings of the National Academy of Sciences*.

An accomplished wildlife and travel photographer (see www.naturalphotos.com), the Turkish-born ecologist has written for a variety of newspapers and magazines. In 2001, *Aktuel* news magazine named him one of Turkey's top 100 scientists.

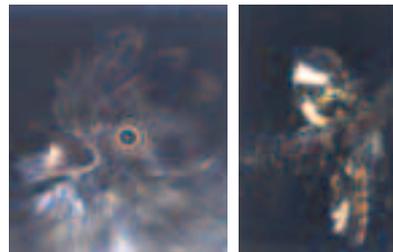
Sekercioglu's research suggests insectivorous birds have difficulty re-colonizing rainforest fragments where they have gone extinct. These findings imply it's important to establish vegetation corridors between forest fragments and improve the hospitality of open agricultural countryside to these birds.

"This was the first study to examine the effects of forest fragmentation on a bird community along with its diet and prey community," he says. "The loss of these birds may lead to the rise of damaging insect swarms in forests and surrounding croplands."

Sekercioglu has enjoyed working with local people to solve this mystery. "Even though my Costa Rican assistants were initially coffee farmers, they are now competent field assistants."

He feels it's important that they get involved in and profit from ecological research and eco-tourism so that they gain an understanding of their biological heritage and have a financial incentive to protect it.

"This research experience helped shape my career plans," Sekercioglu says. "With a project of this scale,



A flycatcher known as the scale-crested pygmy-tyrant (left) and a rufous-tailed jacamar.

there were bound to be problems and frustrations, but the fact that we were able to overcome them and turn the results into a good publication convinced me that this kind of ecological research, with a bit more emphasis on applied conservation, is what I really want to do."

The Grants-in-Aid program has been important at two critical stages in his career. While Sekercioglu was an undergraduate at Harvard University, a Sigma Xi grant helped finance an honors thesis field trip to research the effects of selective logging on forest birds of the Kibale Forest in Uganda.

"After that experience," he says, "I decided to go to grad school. The Kibale Forest project convinced my advisor I was capable of conducting good ecological research. The results were published in the June issue of *Biological Conservation*.

"Sigma Xi's Grant-in-Aid of Research also helped me get the necessary equipment to study the insectivorous birds and insects of Las Cruces. I knew it would be a challenging project, but Sigma Xi's support convinced me it was important to do it."

Support Student Research Grants

Voluntary donations are the largest source of support for Sigma Xi's Grants-in-Aid of Research program, which represents an important investment in the future of science and engineering.

Sigma Xi News Roundup

Ferguson Celebrates 20 Years

On May 1, Sigma Xi Deputy Executive Director Evan R. Ferguson celebrated 20 years on the Society staff. He was honored during a ceremony at the Society's offices in Research Triangle Park, North Carolina.

Known far and wide as "Mr. Sigma Xi," Ferguson was lauded as "the glue holding our organization together." A grateful staff presented him various tokens of appreciation.

Incoming Executive Director Patrick D. Sculley noted that Ferguson is regarded as the lynchpin in Sigma Xi. "You are highly esteemed by the membership and staff alike," Sculley went on to say in a commemorative letter, "and I am delighted that you will be at Sigma Xi to be my right hand."

A native of Nebraska, Ferguson came to Sigma Xi in 1982 from the University of Texas Health Science Center at Dallas, where he was a research assistant professor of medicine and director of the Cell Physiology Laboratories at the Veterans Administration Medical Center. His career also has included serving as a research scientist at Warner-Lambert Research Institute in New Jersey.

NAS Honors Ahearne

The National Academy of Sciences has named Sigma Xi Ethics Program Director John F. Ahearne a National Associate. The National Associates program recognizes extraordinary contributions to the National Academies through pro-bono service to the National Research Council and the Institute of Medicine. Ahearne is a member of the National Academy of Engineering.

A Run on the Databank

The power of the Internet was demonstrated in April when the news site *Slashdot*, proudly billed as "News for nerds," featured a May/June *American Scientist* computing science column by Brian Hayes as an article of the day.



Evan and Carol Ferguson outside Sigma Xi's administrative offices.

More than 55,000 visitors descended on the magazine's Web site, a five-fold increase in normal daily traffic, to peruse "Terabyte Territory," his historical review of hard drive technology.

Interest in the column was likely fueled by an announcement from IBM that day that it was exiting the highly competitive hard drive market. This was the fourth time Hayes's computing column has been "Slashdotted."

Russian Group Receives Award

This spring, the Research and Education Center at Novosibirsk State University in Russia received a Sigma Xi Packard International Networking Initiative award for efforts to build a scientific Web site and multi-institutional Internet information exchange.

Sigma Xi International Program Coordinator Christine Piggee represented the Society at a conference in Krasnodar, Russia, as part of a cooperative effort with the U.S. Civilian Research and Development Foundation (CRDF). The CRDF promotes scientific and technical collaboration between the United States and the countries of the former Soviet Union.

International Resources Online

A wealth of information on international research and education is available through the "International" link under "Programs" on the Sigma Xi Web site at www.sigmaxi.org. Resources include book/journal donation programs, collaboration databases, full-text online publications, scientific databases and equipment donation programs, among other areas.

Ambassador Program Expands

The Sigma Xi Ambassador Program will sponsor an extra day for members traveling to developing countries so that they can promote Sigma Xi and the Packard Initiative. For more information, see the "International" link under "Programs" at www.sigmaxi.org or contact Christine Piggee at cpiggee@sigmaxi.org or 800-243-6534.

International News Group

A new Sigma Xi International News Group is being formed. Subscribers receive a brief monthly e-letter with updates from groups involved in the Sigma Xi Packard Initiative, as well as other information. To subscribe, see the "International" link under "Programs" at www.sigmaxi.org or contact cpiggee@sigmaxi.org.

Explore Exotic Places

Sigma Xi Expeditions give members an insider's view of exotic locales. Tour guides are scholars whose knowledge of cultural and natural history helps make each journey an uncommonly enriching experience. Upcoming expeditions include Greenland and Iceland, Backroads China, New Zealand and Tasmania. For details, visit Betchart Expeditions online through the "Membership" link at www.sigmaxi.org.

