

# Sigma Xi Today

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## Workshops, Talks Highlight 2004 Sigma Xi Annual Meeting

Workshops and panel discussions on leadership and career development, grant writing, and science and society issues will be a highlight of the 2004 Sigma Xi Annual Meeting and Student Research Conference in Montreal on November 11-14.

Attendees will also hear talks by Nobel laureate Murray Gell-Mann, renowned Canadian scientist and broadcaster David Suzuki and innovative computer scientist Jason Nieh of Columbia University, winner of Sigma Xi's Young Investigator Award.

Held in conjunction with the annual meeting, the Student Research Conference on November 12-13 will give hundreds of student researchers an opportunity to showcase their work and network with Sigma Xi delegates.

In addition, two pre-conference events, a symposium celebrating the Rutherford-Soddy Centennial and a daylong session on career options in science and engineering, are also planned (See article on page 582).

Visit [www.sigmaxi.org](http://www.sigmaxi.org) for the complete schedule of events, workshops and online registration.

Participants often say that Sigma Xi annual meeting workshops are the most valuable portion of the program. The following workshops will be offered:

### Communicating Science

The ancient human tradition of storytelling with pictures has helped ideas leap across boundaries of language,

culture and time. How can you use pictures to tell the stories of science to unfamiliar audiences? This session will feature examples from the history of scientific illustration and show how illustration is developed for Sigma Xi's award-winning magazine, *American Scientist*.

als. The focus will be on communicating and marketing elements of good proposals, not the science. This session promises important insights into grant proposal writing and will inform chapter officers about how they can host longer workshops at their institutions.

## SIGMA XI



MONTREAL, QUEBEC, CANADA  NOVEMBER 11-14, 2004

### Sigma Xi Postdoc Survey

Supported by a grant from the Alfred P. Sloan Foundation, Sigma Xi has surveyed tens of thousands of postdoctoral researchers over the past 18 months to provide a better understanding of the factors that contribute to productive postdoc experiences. The survey will also enable institutions to benchmark their postdoc policies and practices against those of peer institutions. This session will cover plans for Sigma Xi's future involvement with these issues.

### Grant Writing

Sigma Xi has piloted a five-day program on preparing grant proposals, designed for early career researchers. This session will condense five days of training into one hour and present the key elements of effective propos-

### Access to Literature

New economic models of scientific publishing raise questions about the future of science. How will disciplinary societies carry on their roles as custodians of knowledge? Under "author pays," "government pays" and self-archiving publishing models, who wins and who loses? Is open access to primary literature the best way to

provide research information to the public? *American Scientist* Editor Rosalind Reid and guests will lead an open discussion on behalf of the Sigma Xi Committee on Publications.

### Marketing Yourself

Many scientists pursue their work through a steady stream of grant applications and renewals. Funding agencies look not only at the proposed work, but the proposed

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## 2004 Sigma Xi Annual Meeting

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"worker." Effective career development includes doing the kinds of things that look good on a curriculum vitae and then doing a good job of writing about those experiences. This session will give participants some essential insights into the art of promoting yourself and your work.

### Diversity Programs

Post 9/11 sensitivities combined with a technology-facilitated mobility for scientists and engineers have led to a dramatic drop in the number of foreign students and science, technology and engineering professionals in the West, particularly in the U.S. Young minority and women students represent a relatively untapped potential pool for the science and technology workforce. This workshop will be an open forum in which interested members can hear about exemplary chapter diversity programs and other supportive initiatives in which their chapter might participate.

### Chapter Support

Sigma Xi administers various programs that support chapters. This session will review some of the long-standing programs such as Distinguished Lectures; Science, Math, Engineering Education grants; and Grants-in-Aid of Research, and also introduce newer programs such as TOYchallenge, the Grantsmanship Course and Career Pathways.

### Chapter Programs

Here's a chance to borrow good ideas from other chapters. This session will highlight outstanding chapter programs in a variety of areas. Details on how to organize similar programs will be distributed in handouts and on the Sigma Xi Web site.

## Montreal Symposium and Career Workshop

A symposium celebrating the centennial of Sir Ernest Rutherford and Frederick Soddy's historic work at McGill University on radioactivity will be held at the Musée McCord in Montreal on November 11.

The symposium is open to the public as well as Sigma Xi 2004 Annual Meeting and Student Research Conference registrants. There will be a separate registration fee for this event. Visit [www.sigmaxi.org](http://www.sigmaxi.org) for the complete schedule and online registration.

This special event has been organized by M.A. Whitehead of McGill University and Christopher Lange of the State University of New York Downstate Medical Center, who are directors of Sigma Xi's Canadian/International Constituency and Northeast Region, respectively.

Among other advances, Rutherford and Soddy identified the phenomenon of radioactive half-life. They also formulated the still-accepted explanation of radioactivity, which holds that each decay of the atoms of radioactive materials signifies the transmutation of a parent element into a daughter, with each type of atom having its own transformation period.

Symposium topics include advances in nuclear medicine with regard to cardiac imaging, magnetic resonance imaging and the quest for a body scanner to detect cancer and the use of ionizing radiation in biology and radiation oncology.

In the afternoon, Arthur McDonald and George T. Ewan of Queen's University, along with David Sinclair of Carleton University and Walter Davidson of the National Research Council of Canada, will receive the Sigma Xi Fund of Canada Award for Scientific Achievement to celebrate their solar neutrino discovery.

Sinclair and Davidson will give talks about this important work, and Zachary Jacobson will present a lecture on "Physics and the Rest of the World." Jacobson is president of the Sigma Xi Fund of Canada.

### Exploring Career Pathways

Early career research scientists and engineers have many options other than academia, but there are few opportunities to explore them.

Raymond J. Clark of the National Postdoctoral Association will moderate a special daylong discussion of "Professional Career Pathways" in Le Centre Sheraton in Montreal on November 11, prior to the 2004 Sigma Xi Student Research Conference there on November 12-13.

The program will feature speakers with wide-ranging career experiences, including industry, education, government, writing/media, technology transfer/patent law, business and finance, and science policy.

There is a separate registration fee for this workshop, which is open to everyone. Sigma Xi 2004 Annual Meeting and Student Research Conference participants are eligible for a discounted registration fee. Visit [www.sigmaxi.org](http://www.sigmaxi.org) for details.

## Studying Nature's Delicate Balance in the Peruvian Desert

This is part of a series on recent Sigma Xi grant recipients. Application deadlines are March 15 and October 15 annually. Visit [www.sigmaxi.org](http://www.sigmaxi.org) for details.

The Peruvian coastal desert is one of the driest places on Earth, with annual rainfall averaging less than 5 millimeters. But it faces one of the most productive marine ecosystems on the planet, the Humboldt upwelling associated with the Peru-Chile cold current.

Huge amounts of phytoplankton support large stocks of anchovy and sardines, which are the main food source of seabirds and marine mammals. But how can terrestrial animals survive in such a harsh environment?

"The transfer of energy and nutrients from sea to land has been shown to have strong impacts on desert consumer communities in Baja California," Alessandro Catenazzi says. "I therefore expected to find a similar dependence in Peru."

The Florida International University doctoral candidate is doing fieldwork in Paracas National Reserve in southern Peru, a protected area that conserves a rich marine fauna and a barren desert in a complex geological landscape of peninsulas, islands and beaches.

"I've been investigating how the distribution of geckos is influenced by the input of marine resources,"



Most geckos, such as the one shown here hunting among colorful sponges on a beach, prefer to live near shore where prey are more abundant.

Catenazzi says. "These nocturnal lizards are fairly common in Paracas and occupy a wide range of desert habitats."

He notes that geckos (*Phyllodactylus spp.*) are important predators of desert darkling beetles, silverfish and arachnids, but also feed on a variety of intertidal invertebrates such as crustaceans, millipedes, solifugids, and beetles that graze, scavenge or hunt in algal mats and the carcasses of dead marine mammals and seabirds that wash ashore.

Catenazzi uses several methods to study how geckos are influenced by marine subsidies, such as population monitoring based on mark-recapture data, measuring body size and condition, mapping the spatial distribution of geckos, and washing gecko stomachs to obtain diet data.

These data will demonstrate whether geckos obtain most of their energy and nutrients from invertebrates that forage on marine resources. The results will be coupled to stable isotope analyses to evaluate the influence of marine subsidies on gecko diet and distribution.

Numerous studies have shown that stable isotope analyses are a powerful tool to identify the contribution of marine productivity to terrestrial communities.

"I am measuring the carbon and nitrogen stable isotope values of marine subsidies, terrestrial producers and consumers (geckos and their prey), and determining whether carbon and/or nitrogen stable isotopes are a useful tool to trace the movement of energy and nutrients from sea to land."

Preliminary results show that stable isotopes will greatly enhance the quality of his research, by helping to resolve which types of marine resources contribute to support abundant gecko populations in Paracas. These analyses are supported by a grant from Sigma Xi.



Alessandro Catenazzi takes digital pictures of desert soil on La Vieja island, Paracas National Reserve, southern Peru. Digital pictures were used to quantify the amount of variation in soil characteristics, such as rock and lichen cover, and the availability of retreats for geckos.

"For example, the largest gecko population I have studied is found at Sangayan Island, where geckos mainly feed on scavenger beetles and flies," he says. "Stable isotope data show that geckos depend almost exclusively on a resident colony of more than 15,000 sea lions for their diet."

Sea lions feed on crustaceans and fish, and the hundreds of sea lions that die every year provide a continuous source of marine-derived energy and nutrients to invertebrate scavengers and the fauna feeding on them, including geckos, lizards and arachnids.

"My study is identifying several other biotic or abiotic vectors that help move marine resources from sea to land, therefore revealing species or ecological processes that are key for maintaining abundant populations of terrestrial animals."

## Honoring Mentors: Bugliarello, Silberman and Straub

This is part of a series on people whom donors to the Sigma Xi Center building fund have honored with their gifts. Visit [www.sigmaxi.org](http://www.sigmaxi.org) for more information.

When George Bugliarello came to the United States in 1951 on a Fulbright Fellowship after graduating from the University of Padua, he found an amiable mentor in civil engineering professor Edward Silberman at the University of Minnesota.



George Bugliarello

"The reputation of the St. Anthony Falls Hydraulics Laboratory brought me to Minnesota," Bugliarello explains. "It was well known in Europe through the work of its director, Lorenz G. Straub. Professor Silberman became my graduate school advisor there."

In Edward Silberman, he found a striking combination of theoretical mathematical knowledge and the ability to translate it into practice.

"He was so open and accessible and so modest," Bugliarello says. "He had a great influence on my career, and that is why I chose to honor him with my gift to the new Sigma Xi Center."

After receiving his master's degree, Bugliarello went on to earn his doctorate in hydrodynamics at the Massachusetts Institute of Technology. His distinguished career as an engineer and educator has included serving as chancellor and president of Polytechnic University in New York.

In 1975, he spearheaded the creation of Metrotech, the largest urban university-industry park in the country, which surrounds Polytechnic and helped revitalize Brooklyn. He is Foreign Secretary of the National Academy of Engineering and a Founding Fellow of

the American Institute for Medical and Biological Engineering.

A past president of Sigma Xi (1992-93), Bugliarello chaired the Society's successful 1993 forum *Ethics, Values and the Promise of Science*. He has also been active on a number of Society committees over the years, chairing the Committee on Development and on Long-Range Planning.

When he is home in Minneapolis, Edward Silberman can usually be found either in his office at the St. Anthony Falls Laboratory, of which he was director, succeeding Straub, from 1963-74, or in a seminar or on the tennis court. He became an emeritus professor in 1982.

Silberman was an early student of Straub who later joined the laboratory. Among other things, Silberman played a prominent role in the production of educational motion pictures that the laboratory sold and rented worldwide.

Inducted into Sigma Xi in 1957, Silberman is a past president of the Minnesota Section of the American Society of Civil Engineers and became the section's fifth Honorary Member in 1991. He is a Fellow and past president of the American Water Resources Association.

The University of Minnesota's Water Resources Center recognized him for his important contributions "in training and mentoring new aquatic scientists in the application of fluid mechanics to water engineering."

It seems only appropriate that Silberman chose to honor his mentor, Lorenz G. Straub, with a gift to the Sigma Xi Center. Straub was the founder and director, until his death in 1963, of the hydraulics laboratory.

"During the year that he was a Freeman Fellow, Professor Straub visited several laboratories in Germany that made a deep impression on him," Silberman says. "He came to the University of Minnesota in 1930 and set about establishing a laboratory of his own."



Lorenz Straub (left) and Edward Silberman work on the 1947 film *Some Phenomena of Open Channel Flow*. Photograph courtesy of the University of Minnesota.

Straub came to be known as "The River Doctor" for his prolific research on various aspects of river engineering.

The laboratory building lies on the Falls of St. Anthony in Minneapolis, where there is a drop of about 15 meters. Up to nearly nine cubic meters per second of river water can be drawn through the building and distributed to flumes for experimental research.

Although the laboratory continues to conduct cutting edge studies on river engineering, a current description of its activities is summarized by the terms engineering, environmental and geophysical fluid dynamics. The laboratory is the headquarters of the National Center for Earth-surface Dynamics, sponsored by the National Science Foundation.

"Professor Straub's real legacy," Silberman says, "is his vision of a university laboratory as a leader in the advancement of pioneering methods in water resources engineering and as an educational tool to train the research leaders of tomorrow."

"The legacy of Straub, Silberman and Bugliarello is the quintessence of the ethics and honor of science being passed from one generation to the next," says Sigma Xi Executive Director Patrick D. Sculley. "It's highly appropriate that their names should be linked together in the plaza of the Sigma Xi Center."