

## Critical Issues In Science: Year of Energy

Sigma Xi's Critical Issues in Science series continues in 2009 with a focus on the scientific, environmental and public policy aspects of energy.

The growing worldwide demand for energy poses many challenges, and public awareness and interest in energy issues are high.

From the development of alternative and renewable energy to increased fuel efficiency and reduced carbon emissions, science and engineering have enormous roles to play.

As the multidisciplinary honor society of research scientists and engineers, Sigma Xi is in a unique position to be a leader in helping to inform and guide government and industry as they work together to promote affordable, reliable energy.

Our plans throughout the year include white papers, blogs, podcasts, a student film competition and Science Cafés.

Sigma Xi's Year of Energy 2009 will culminate in a themed Annual Meeting in November in Houston, Texas.

A panel of experts will convene at the meeting for a discussion of various aspects of the issue, followed by breakout groups that will formulate recommendations for action.

Visit [www.sigmaxi.org](http://www.sigmaxi.org) often for updates on activities and events. •



## From the President

### Water and a Challenge to Chapters



Sigma Xi's Year of Water ( $H_2O_{08}$ ) successfully focused the attention of the Society's 109th Annual Meeting on the scientific, environmental, ethical, public policy and humanitarian facets of this precious and dwindling natural resource. But, unlike the calendar, our  $H_2O_{08}$  will not end on December 31st. In fact, the very important next phase of outreach to our colleagues and the general public must begin immediately.

As suggested by many groups, including the U.S. Agency for International Development, the world needs a Blue Revolution to conserve and manage freshwater in the face of growing demand, and will require coordinated responses to problems at local, national and international levels. Sigma Xi should, can and will be a continuing part of this revolution.

Just as our forbearers from Cornell University began what became Sigma Xi with conversations, our  $H_2O_{08}$  began with conversations—and a call to the chapters for white papers on water issues. The request for submissions of 1,000 words or less on topics including water conservation, water and global poverty, water supply safety, the impact of global warming on coastlines and technological advances in water purification, among others, resulted in the selection of 15 papers that provide a fine starting point for conversations among chapter members to continue this revolution. The papers are posted online at [www.sigmaxi.org](http://www.sigmaxi.org).

During the Annual Meeting and Student Research Conference in Washington, D.C., we continued our conversations by viewing *FLOW: For Love of Water*, Irena Salina's award-winning documentary that asks the question, "Can anyone really own water?" A Global Water Crisis Panel (GWCP) with discussants Peter H. Gleick, president of the Pacific Institute; András Szöllösi-Nagy, director of UNESCO's Division of Water Sciences; Peter Thum, founder of Ethos Water; Thomas G. Mattia, senior vice president of the Coca-Cola Company; and moderator Michael Crosby, executive director of the National Science Board and interim vice chancellor for research at the University of Hawaii at Hilo, called for Sigma Xi to extend our conversations to others outside of the annual meeting.

Finally, four additional science sessions, led by Jon C. Cooper, Vernon Masayesva, Colin Walker, Mark A. Shannon and Fedro S. Zazueta on international water issues and technologies of the 21st Century, helped focus us on solutions and alternative strategies. These activities not only provided much insight but also, since, at least in the United States, one of the principal uses of water is for the production of energy, set the stage for the focus of the 110th Annual Meeting in Houston, Texas, in 2009—Energy.

The members of the GWCP recognized that the Society has a unique relationship with our academic and research institutions and the public and called for Sigma Xi to use these relationships to turn the focus from the academic to the political. And so, with excerpts of their presentations found in this issue of *Sigma Xi Today*, we need to move toward the next step in the process—member involvement and chapter outreach.

Each chapter will have its own interests and unique means of engaging in this process, whether through Science Cafés, seminars, Web sites or lunch discussions. You also have the opportunity to involve your entire surrounding academic and political communities, as we have been challenged by our GWCP presenters, to provide education and outreach to at least 100,000 people worldwide with the message that access to clean drinking water is a basic human right. We, as members of Sigma Xi, have the power and the privilege to make a difference, and we can do so with each member involved in ways small to grand.

Ann H. Williams

## 2009 Sigma Xi Awards Honor Leading Scientists

**A**tomic Physicist Deborah S. Jin at the National Institute of Standards and Technology (NIST) will receive Sigma Xi's 2009 William Procter Prize for Scientific Achievement, the Society's highest honor.

The Procter Prize and other top annual awards will be presented at the Sigma Xi Annual Meeting and Student Research Conference next November 12-15 in Houston, Texas.

The 2009 John P. McGovern Science and Society Award will go to epidemiologist David Michaels at George Washington University. And food safety scientist Timothy K. Phillips at Texas A&M University will receive the Walston Chubb Award for Innovation.

Biochemist Brandt F. Eichman at Vanderbilt University will be honored with Sigma Xi's Young Investigator Award.

Procter Prize winner **Deborah Jin** is a fellow of JILA, a joint institute of NIST and the University of Colorado at Boulder. Her technical innovations in the field of ultra cold Fermionic (atomic) gases have led to discoveries that define this new area of physics research.



Her research has been described as the crucial first step in developing

superconductors that work at room temperature, which could lead to faster computers and other advances. A MacArthur Fellow, Jin is one of only a handful of women physicists elected to the National Academy of Sciences. The Procter Prize has been presented annually since 1950 to an outstanding scientist or engineer who is known for effective communication of complex ideas.

McGovern Award winner **David Michaels** heads the Project on Scientific Knowledge and Public Policy (SKAPP) and is professor and interim chairman of environmental and occupational health in the George Washington University School of Public Health and Health Services. His work focuses on the use of science in public policy. He is the author of the book *Doubt is Their Product: How Industry's Assault on Science Threatens Your Health*.



As an assistant secretary at the U.S. Department of Energy from 1998-2001, Michaels advocated on behalf of workers who developed cancer or lung disease in the manufacture or testing of nuclear weapons. The McGovern Award has been presented annually since 1984.

Chubb Award winner **Timothy Phillips** is a professor of toxicology and food science at Texas A&M University. His research has increased the safety of food and livestock feed in the U.S., China and many developing countries.



He developed a simple, inexpensive way to remediate aflatoxin in staple foods such as corn, peanuts and rice, thereby preventing a variety of health problems associated with aflatoxicosis. The Chubb Award is designed to honor and promote creativity among scientists and engineers.

Young Investigator Award winner **Brandt Eichman** is an assistant professor of biology and biochemistry at Vanderbilt University. He received his Ph.D. in biochemistry and biophysics from Oregon State University in 2000 and was a National Institutes of Health postdoctoral fellow at Harvard Medical School.



A Sigma Xi member, Eichman is recognized as a leader in research into the structural biology of cellular mechanisms that maintain DNA fidelity.

Profiles of award winners will appear in upcoming issues of *Sigma Xi Today*. •

## Conversations with Sigma Xi's Executive Director

Join Sigma Xi Executive Director **Jerry Baker** for a series of monthly online conversations. Topics focus on a variety of issues of importance to Sigma Xi and the science and engineering community it serves.

"I cannot think of a better time than right now for us to work together to enhance the health of the research enterprise, foster integrity in science and engineering and promote the public's understanding of science for the purpose of improving the human condition," Baker said.

"Daily, a pessimist can very easily find examples of decay in the research

enterprise and ethical standards," he continued. "We, however, as zealous companions in research, should daily see opportunities to promote and reward excellence in our scientific endeavors, to mentor and encourage cooperation among scientists in all fields."

Three online sessions are scheduled each month at times we hope will allow as many members as possible to participate. Each session is planned for 45 minutes with an option to extend if necessary.

To participate, you must register by creating an account with our Web-based service provider WiZiQ. Registering is

simple and free. Registering in advance will help us gauge the size of the audience. Visit [www.sigmaxi.org](http://www.sigmaxi.org) for details.

We have also created a new e-mail address, [conversations@sigmaxi.org](mailto:conversations@sigmaxi.org), to be used during these virtual conversations. This e-mail address will be monitored during the sessions, and as time permits, questions and comments will be shared with those participating.

Those experiencing problems during the online sessions may e-mail for assistance. The sessions will be recorded and the written comments archived for later viewing by those registered. •

## Sigma Xi's Year of Water 2008

**H**ow can science best inform government policy, both at home and abroad? As the multidisciplinary honor society of research scientists and engineers, Sigma Xi is in a unique position to be a leader in the science of science policy.

That is the motivation behind Sigma Xi's Critical Issues in Science series, inaugurated in 2008 with a year-long focus on the global water crisis. Access to clean water has been deemed by many to be one of the most pressing issues the human community faces.

Activities during the Year of Water culminated in a panel discussion at the Society's Annual Meeting and Student Research Conference in Washington, D.C., on November 22.

The panel was moderated by **Michael Crosby**, executive director of the National Science Board and interim vice chancellor for research at the University of Hawaii at Hilo. Following the discussion, breakout groups developed recommendations for action.

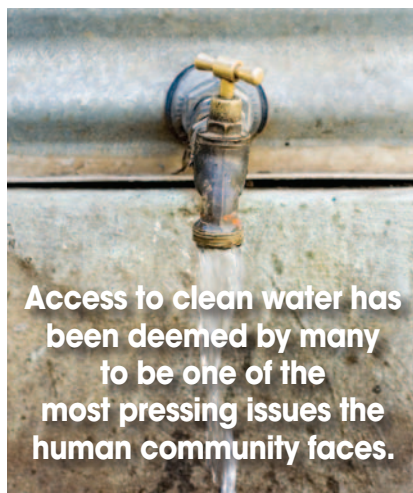
The four panelists came to the topic from widely differing perspectives, but they unanimously pointed to the need for education and decisive government action in water management. Sigma Xi, they said, should take a leading role in these crucial educational efforts.

**Andras Szollosi-Nagy**, director of the Division of Water and secretary of the International Hydrological Programme of the United Nations Educational Scientific and Cultural Organization (UNESCO), emphasized the role of human population growth in the water crisis. Per capita water availability is now less than half what it was 40 years ago—not because there's less water, he said, but because there are ever more people.

What's more, half of that growing and thirsty population dwells on basins or aquifers that are divided by political boundaries, suggesting the eerie possibility of a future fraught with water-wars. The difficult-to-predict effects of climate change will likely rearrange the distribution of water, compounding access issues—although, Szollosi-Nagy added, new earth observation networks and technologies are needed to improve climate-water predictions.

The upshot? "If humanity can avoid

nuclear holocaust in 21st century, then water is going to be the most important issue to deal with," he said. And doing so will require "education, education, education," especially of politicians. If scientists educate and persuade policymakers that water is the top issue of the era, solutions are within reach. He called upon Sigma Xi as a diverse and credible scientific



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community that could make an important contribution to educating both policymakers and the public.

**Peter Gleick**, co-founder and president of the Pacific Institute, researches and writes about issues at the interface of water, climate change and society. He, too, reviewed the global crisis, but reminded the session that "all water is ultimately local." Even though the problem is global in its impact, "we need to look at local water solutions," he said.

This could mean changing the way water relief efforts, such as those of the United Nations, distribute their funds. "Maybe what we need to do is spend a thousand dollars in a million places, rather than a billion dollars in one place," he said.

The U.S., on the other hand, would benefit from some consolidation, Gleick added, noting that 20 different federal agencies all deal with different aspects of the water supply. In keeping with his local emphasis, however, Gleick suggested that Sigma Xi's greatest impact should come from its chapters, through Science Cafés and education at the local level.

**Peter Thum**, founder of the bottled water company Ethos Water, presented what he calls the "street level perspective" on water.

As an entrepreneur, he didn't think about the water crisis until 2001, when he spent six months consulting for a winery in the South African countryside.

After seeing poverty, lack of clean water and poor sanitation first-hand, it occurred to him to capitalize upon Westerners' demand for bottled water to remind them of the global crisis. "People look at [the problem] and then they get a phone call and... a text message, or someone twitters them. The attention span is very short," he said. "When presented with problems, the average person doesn't digest them and think about what they can do."

Bottles of Ethos Water are meant to keep the attention of Westerners on water for a little longer, and the company donates to nonprofit organizations that work toward improving clean water access. The direct impact is small, Thum said, but again it comes back to politics: If the indirect impact is a more mindful public that tells policymakers to make water a priority, then there will be progress.

**Tom Mattia**, senior vice president of the Coca-Cola Company, wrapped up the panel's comments with his own experiences handling his company's interactions with the public, the media and governments. The interface of government, civil society and business is the "pivot point where solutions come from," he said.

He told stories of how Coca-Cola was forced to invest in local clean-water infrastructure in some Third World communities; without clean water, it's impossible to make Coke, and without healthy customers, it's impossible to sell it. The resulting improvements exemplify the business-public interaction, Mattia said.

But he, too, identified government as the weak link—saying that it is least helpful and least stable in the regions that most urgently need better infrastructure and services to deliver clean water. Because of public assumptions about corporate greed in the for-profit community, Mattia says science is in the best position to bring government into the interface. "What scientists and engineers can do that businesspeople cannot is have the credibility to move society," he concluded. •

## Thirty-Four Receive Medals at Student Research Conference

Thirty-four student researchers received medals and cash awards for their poster presentations at the 2008 Sigma Xi Student Research Conference in Washington, D.C., November 21-22.

The Society also awarded certificates and cash prizes to the top three finalists of its inaugural **Student Short Film Competition**, which focused on the global water crisis.

The first place winner was **Anthony Reisinger**, Texas A&M University Corpus Christi, for his film *The Dead Zone*. Second place went to **Robert Champ Williams**, California State University-Northridge, for *The Secret Weapon*, and third place went to **Preston Brown**, Virginia Polytechnic Institute and State University, for his short film *Hydroelectric Power...The Shocking Truth!*

More than 230 students presented research posters at this year's conference, representing nearly 100 academic institutions. Each year, the Sigma Xi Student Research Conference, held in conjunction with the Society's Annual Meeting, showcases some of the premier student research in the world, and connects senior researchers with students.

In addition to the research competition, the two-day conference featured a variety of networking and career advancement opportunities. Participants also had a

chance to hear talks by leading scientists and engineers, including Sigma Xi award winners. Medalists are as follows:

### Behavioral Sciences

**Tianna Clarke**, Harlem Children Society; **Philip Leclerc**, Christopher Newport University; **Stephen Short**, Christopher Newport University; and **John Risetto**, University of New Mexico

### Biochemistry

**Shawn Davidson**, Providence College, and **Steven Youssef**, Widener University

### Cellular and Molecular Biology

**Sumaiya Tasneem**, Harlem Children Society; **Tetyana Forostyan**, SUNY, Purchase College; **Rick Sando**, Rider University; **Corina Antal**, University of Miami; and **Hatim Thaker**, Northwestern University

### Chemistry

**Raihen Selah**, Harlem Children Society; **Konrad Sawicki**, University of Michigan; **Tomoyasu Mani**, University of Texas at Dallas; and **Tim Beck**, American University

### Ecology and Evolutionary Biology

**Katherine Burke**, University of Virginia, and **Susan Tsang**, Skidmore College

### Engineering

**Ronald Carrasquillo**, University of Puerto Rico, Mayaguez; **Shiv Gaglani**, Harvard University; and **Faisal Reza**, Duke University

### Environmental Science

**Brittany Lob** and **Gillian Joy**, Baker University, and **Evan Ellicott**, University of Maryland

### Geosciences

**Sara Summers**, Weber State University

### Interdisciplinary Research

**Amanda Rios** and **Elena Feldman**, Harlem Children Society; **Shawn Dowling**, Kirksville College of Osteopathic Medicine; **Sarahi Ramirez**, University of Idaho; and **Nishank Bhatta**, SUNY, Plattsburgh

### Math and Computer Science

**Jesse Hertz**, Fox Lane High School, and **Ali Rathore**, University of California, Berkeley

### Physics and Astronomy

**James Kally**, Ventura College

### Physiology and Immunology

**Steven Maler**, University of California, Irvine, and **Catharine Culjis**, Boston University Medical School •

## Call for Nominations

April 1 is the nomination deadline for Sigma Xi president-elect and regional and constituency group elections at the 2009 Assembly of Delegates in Houston, Texas, next November.

Candidates are being sought for directors in the North Central and Southwest regions, as well as for the Area Groups, Industries, State and Federal Laboratories Constituency Group and Comprehensive Colleges and Universities Constituency Group.

Associate directors will be elected for the Northeast Region and for the Canadian/International Constituency Group.

Nominations should be sent to Renee Wilkins at Sigma Xi headquarters, [rwilkins@sigmaxi.org](mailto:rwilkins@sigmaxi.org). •

## Society Directors Elected

During the 2008 Sigma Xi Annual Meeting in Washington, D.C., chapter delegates elected members to the Society's Board of Directors.

The following directors of geographic regions and constituency groups will serve three years beginning July 1, 2009.

*Baccalaureate Colleges Constituency Group:*  
**David Lever**, Ohio Wesleyan University

*Canadian/International Constituency Group:* **Antonio Pita**, Swiss  
*Northwest Geographic Region:* **Linda Mantel**, Columbia-Willamette

*Southeast Geographic Region:*  
**John Knesel**, University of Louisiana at Monroe

The following associate directors will also serve three years beginning July 1, 2009.

*North Central Geographic Region:* **Lynn E. Elfner**, Ohio State University

*Research and Doctoral Constituency Group:*  
**Robert Zand**, University of Michigan-Ann Arbor