January-February 2017
Volume 26
Number 1

Sigma Xi Today
A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH HONOR SOCIETY

Announcing the Chapter Award Winners

Chapter of Excellence Awards have been bestowed on the following Sigma Xi chapters for exceptional chapter activity, innovative programming, and true community leadership during 2015–2016. Nominees for chapter awards were chosen by the regional and constituency directors based on chapter annual reports and winners were selected by the Committee on Qualifications and Membership.

1. University of Michigan
2. Rice University
3. A tie between Southern Illinois University-Carbondale and General Motors R & D Center

Chapter Program of Excellence Awards have been bestowed on the following chapters for organizing and/or hosting an outstanding program during 2015–2016.

1. Mayo Foundation for programs that promote STEM education and recognize STEM teachers
2. University of Maryland for the tour of the James Webb Space Telescope at NASA's Goddard Space Flight Center
3. University of Florida for a group visit to a special presentation at the Kika Silva Pla Planetarium at Santa Fe College

The following chapters are recognized for **initiating the most new members** in 2015–2016: Brown University, Washington University, Princeton, Ohio State University, Fordham University, Georgetown University, Worcester Polytechnic Institute, University of Michigan, University of California-Berkeley, Texas A & M University, Cornell University, Lehigh University, North Carolina State University, Harvard University, and Vanderbilt University.

From the President

How Science Should Affect Public Policy

President Tee L. Guidotti

Interpreting science to address social needs is one of Sigma Xi's most challenging functions, and our role in informing public policy, in particular, is growing. We aim to improve and go beyond the stereotypes of the science guru or the "horse whisperer" who speaks in special, interspecies language.

Decision makers, such as representatives in Congress and Parliament, expect to receive in context the technical knowledge that makes for better decisions. The context about which decision makers are concerned is not scientific: It is political and economic.

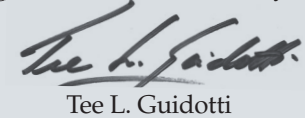
Contemporary studies of science policy begin with Roger A. Pielke Jr.'s book *The Honest Broker* (Cambridge University Press, 2007). The "honest broker" is expected to provide accurate, neutral, and contextualized knowledge in a way that the decision maker can understand without having a technical education or background. The Science and Technology Policy Fellowships from the American Association for the Advancement of Science (AAAS) are based on this concept. The honest broker must always guard against abusing trust by insinuating personal opinion and conviction under the guise of strict objectivity, thereby becoming a "stealth advocate."

Even so, there is nothing wrong with science advocacy, as long as motives and opinions are not concealed and the debate is grounded in evidence. (Pielke does not make this clear in the book.) Advocacy informs the public sphere in policy development, expert legal testimony, program design, budget priorities, and risk management. Indeed, advocacy for a position or interpretation is how science itself moves forward.

Pielke mentions two other models, but they are theoretical and have essentially no viable role. The "pure scientist" model does not work in policy, because scientific knowledge for policy requires contextualization. The "science arbiter" model, which limits the role of the scientist to advising on questions already asked and resolving disputes, assumes that the relevant questions are already formed and articulated.

Scientists don't hold expertise in the form of only facts. Just as important are conceptual frameworks, limitations of method used, interpolation in missing evidence, correcting for known biases, and the ineffable sense of skepticism when a finding or conclusion is implausible. These intangibles, which belong to what Michael Polanyi called "tacit knowledge," are reflected in the depth and experience the science expert brings to giving advice.

Science informing public policy involves a complicated and often fraught relationship between the scientist and the decision maker based on trust, communication, reciprocal comprehension, and skepticism. That is what makes the ability to effectively articulate and advise on science for policy a special skill distinct from research skills and technical scientific communication. Being an effective science advisor requires skills that have to be learned. Leadership in Sigma Xi is an excellent way to develop these skills.



Tee L. Guidotti

Professional and Student Researchers Gather in Atlanta

The 2016 Sigma Xi Annual Meeting and Student Research Conference, held November 10–13 in Atlanta, Georgia, was an energizing gathering for Sigma Xi chapter leaders, teachers, science supporters, and students.

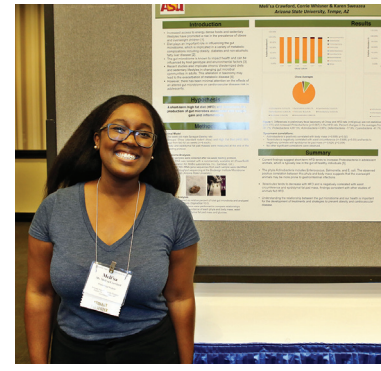
The Annual Meeting featured leadership workshops for chapter delegates. Delegates voted on changes to the Society's constitution, most notably to add the word "honor" to the Society's name: Sigma Xi, The Scientific Research Honor Society. They also voted to create the opportunity for kindergarten through 12th grade students who have presented a local science fair project and received a letter of recommendation from a science, technology, engineering, or math teacher to become Sigma Xi explorers. Sigma Xi explorers may form Sigma Xi explorer clubs, to be mentored and led by members of a Sigma Xi chapter in compliance with local school jurisdiction policies. Sigma Xi explorers will be affiliated with a local Sigma Xi chapter that is in good standing where possible in person or virtually. Delegates also voted to allow the Assembly of Delegates to be convened every other year if warranted at the Board of Directors' discretion, instead of every year per the previous policy.

The agenda included professional development sessions on critical issues in research. Participants heard keynote lectures from Sigma Xi's 2016 award winners, including the first Gold Key Award recipient, Norman Augustine, the former chairman and CEO of Lockheed Martin Corporation. A new component was the STEM Mixer, a networking session.

Approximately 115 students presented research posters in the Student Research Conference. Top presenters in each research area within the high school, undergraduate, and graduate divisions were awarded a medal, a $130 prize in honor of Sigma Xi's 130th year, and nominations to join Sigma Xi with their first year of membership dues provided by the Society. All presenting students received nominations to join Sigma Xi, and induction ceremonies were held for 18 students. The District of Columbia Chapter continued its tradition of sponsoring the Student Choice Awards. The first place $200 award went to Amara Thind of University of California, Irvine. John Nemeth selected Shambhavi Badi, a high school student from Plano East Senior High School in Plano, Texas, for his Executive Director's Special Award for her excellent science and science communication skills.

Photos by Robb Cohen Photography & Video and Cristina Gouin-Paul.

From left: Asegun Henry of Georgia Institute of Technology, Mohammad Khan at Emory University School of Medicine, Brion Bob with the U.S. Department of Energy, Suzanne Ffolkes with Research!America, Lisa C. Richardson of the Centers for Disease Control and Prevention, and Randall Guensler of Georgia Institute of Technology led a panel discussion about how policy decisions made at the federal level affect scientists. Other sessions focused on science communication, mentorship, STEM career options, entrepreneurship, and diversity in research.



From top left: Jan Achenbach of Northwestern University, on right, selected Matt Ford, a Northwestern PhD student, to share $10,000 that comes with Achenbach's Sigma Xi William Procter Prize for Scientific Achievement. Each received $5,000. Ford's money comes in the form of a Grant-in-Aid of Research.

Meli'sa Crawford, a graduate student from Arizona State University, presented a research poster during the Student Research Conference about her study on changes in male rats' intestinal microbiota induced by high fat diets.

Delegate for the SUNY at Purchase Chapter Susan Letcher, Membership-at-Large Director Vijay Kowtha, and Chair of the Committee on Qualifications and Membership Emma Perry at the Annual Meeting.

Adam Kunesh, an undergraduate student at the University of North Carolina at Chapel Hill, discusses his research poster with Walston Chubb Award for Innovation winner Akhlesh Lakhtakia of Pennsylvania State University. Both have done research involving nanotechnology.

Registration Now Open for the 2017 Student Research Showcase

Researchers often find it difficult to talk about their projects with friends and relatives who are not in the same research field. Those who are able to effectively communicate their work to a broader audience are at an advantage in terms of communicating the value of what they do to the public, to superiors at school or on the job, and to organizations that could provide funding to support a project. Sigma Xi's Student Research Showcase is a unique opportunity for high school, undergraduate, and graduate students to develop their communication skills through multimedia. Held annually, this online science communication competition allows students to showcase their research on a website they build. The competition is open to all research disciplines.

Presentation websites contain three main components: an abstract, a technical slideshow, and a video to introduce the project and its relevance to the research community and society. The video component challenges participants to present their research to a general audience. During the review period, more than sixty Sigma Xi members volunteer as judges to evaluate students' submissions and engage in digital conversations with presenters through their websites.

Participants find discussion with the judges and the public helpful in better understanding their research. "I'm really excited about trying to bridge the gap between the scientific community and a broader audience," said Luka Negoita, the 2015 graduate division winner, when asked about his motivation to participate in the showcase. Participants compete for awards of up to $500 in high school, undergraduate, and graduate divisions. The winner of the People's Choice Award is selected based on a public vote and receives a $250 award.

Student Research SHOWCASE

Key deadlines for the 2017 Student Research Showcase:

- Project description approval and registration deadline: **February 22, 2017**
- Project submission deadline: **March 22, 2017**
- Evaluation period: **April 3–10, 2017**

Sigma Xi members are encouraged to volunteer as judges.

For more information on the Student Research Showcase, visit https://www.sigmaxi.org/meetings-events/student-research-showcase.

Sigma Xi Today is edited by Heather Thorstensen and designed by Spring Davis.

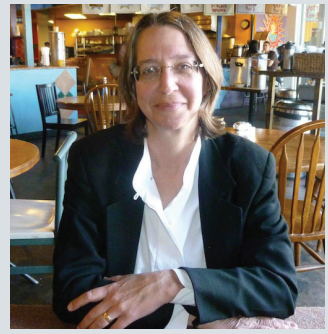
Watch Live Science Talks on YouTube

Sigma Xi Distinguished Lecturers are sharing their research through broadcasts on YouTube Live. Watch the live events online, and log in with your Google, Gmail, or YouTube account to ask questions during the broadcasts. Mark your calendar for this upcoming session.

What's on the Front Lines of Discovery for Particle Physics?

January 10, 3:30–4:15 PM EST

Distinguished Lecturer **Sally C. Seidel** is a faculty member of the University of New Mexico's Collider Physics Group, whose primary goal is an improved understanding of heavy quark bound states. These studies increase understanding of the strong force, one of the four fundamental forces of nature. The group's work requires that they collect and analyze data at the Large Hadron Collider and other experimental facilities.



Sally C. Seidel

For the link to watch this live broadcast, visit http://community.sigmaxi.org/events/calendar. Recent broadcasts have covered nuclear power, sleep's role in well-being, wetlands, and how math can be applied to predicting crime. For recordings of these broadcasts, visit https://www.youtube.com/user/AmSciMagazine/videos.

Sigma Xi Welcomes Returning Chapters

Sigma Xi is happy to report that some chapters that had lost their good standing status are starting to return to the Society. Since January of 2016, approximately 10 chapters have begun the process to return to good standing and some have already completed it. Four representatives of such chapters attended the Sigma Xi Annual Meeting in Atlanta in November. They shared why they are interested in reactivating their chapters.

Lauber Martins of the Andrews-Whirlpool Chapter in Michigan said that a major reason he and others were interested in revitalizing their chapter was to be able to take advantage of the networking opportunities that Sigma Xi can provide to students.

"We have the focus of preparing these students for grad school," said Martins. "And if you involve them in research and involve them in a network, their work will be better and it will be a plus on their application for grad school. It's very important that they have good, quality research and are involved with people who do the same thing."

Sarosh Patel of the University of Bridgeport Chapter in Connecticut also named networking as a critical reason to bring Sigma Xi back to campus.

"We wanted to give our students an opportunity to network," he said, "and also to get them into the process of grant writing and getting seed grants so that they can establish their work and apply for higher levels of funding." He also mentioned that membership is an honor.

Katharine Cammack, representing the University of the South Chapter in Tennessee, noted that networking through Sigma Xi is particularly valuable because it brings researchers from various backgrounds together.

"You get a lot of different types of researchers doing a lot of different types of things. And it's one of the only times when you're in a particular discipline that you get to branch out," she said.

According to Daniel Gleason of Georgia Southern University, the goal of the chapter there is not to compete as the sole research society on campus, but rather to lend more funding and support to research initiatives.

"We wanted to reactivate our Sigma Xi chapter because we wanted to augment and advance existing programs within our institution that are involved with undergraduate research," he said.

Sarosh Patel of the University of Bridgeport Chapter , on left, became a Sigma Xi member during the Annual Meeting. He is helping to return the chapter to good standing status.

Call for Grant Applications

Undergraduate and graduate students are invited to apply to Sigma Xi's Gants-in-Aid of Research (GIAR) program by March 15. The application will be available by January 15 on Sigma Xi's website at https://www.sigmaxi.org/programs/grants-in-aid/apply.

The program provides up to $1,000 each to students in most areas of science and engineering. Designated funds from the National Academy of Sciences allow for more funding in certain research areas. Astronomy research projects can receive up to $5,000, and vision-related projects may receive up to $2,500.

The grants may be used to pay for travel expenses to or from a research site or to purchase non-standard laboratory equipment that is needed for a specific research project.

U.S. citizenship and Sigma Xi membership are not required to apply. Approximately 75 percent of the funds, however, are restricted for use by Sigma Xi's dues-paying members or by students whose project advisor is an active member.

In last year's spring grant cycle, 124 students in 10 countries received grants totaling $108,038.

Support the Grants-in-Aid of Research Centennial Campaign

The Grants-in-Aid of Research program will reach its centennial year in 2022, thanks to donors and funds from the National Academy of Sciences. A five-year countdown kicked off at the recent Sigma Xi Annual Meeting in Atlanta, Georgia. If you would like to support student research by donating to the program, go to https://ecommerce.sigmaxi.org/ecom/#Donate.