

Sigma Xi Today

A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH HONOR SOCIETY

Barry University Chapter Celebrates 20th Anniversary

Two decades ago, founding members of the Barry University Sigma Xi Chapter in Miami, Florida, signed their charter. It was the same year that Google was incorporated and assembly began for the International Space Station.

The chapter marked their 20th anniversary in the spring with a dinner, induction ceremony of two new members, recognition of nine of their 30 founding members who are still involved in the chapter, and a presentation by Andres Pena, a graduate student at Florida International University, who discussed bioethics and his neurotechnology research.

In a video message, Sigma Xi Executive Director and CEO Jamie Vernon congratulated the chapter on inducting nearly 200 members over 20 years.

"You've strengthened the research community at your university by sponsoring symposia, and judging at science fairs, as well as celebrating a number of significant science holidays, including Darwin Day and DNA Day," Vernon said.

Chapter president Stephanie Bingham plans to encourage more collaborations among members.

"It is my hope that we will build a collaborative science culture within our chapter by increasing opportunities for dialogue and sharing of ideas," she said.

See more chapter achievements on page on 255.

Sigma Xi Today is edited by Heather Thorstensen and designed by Justin Storms.

From the President

I am excited to serve as president of Sigma Xi. Our highest priorities are promoting the value of research, science education and outreach, and the importance of fact-based decision making. Education in science and technology at all levels needs to be improved to produce the next generation of knowledgeable citizens as well as future scientists and engineers.

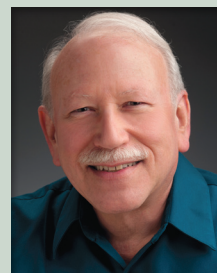
I want Sigma Xi to pursue two new initiatives, which I have been developing as president-elect with help from Sigma Xi Chief Executive Officer Jamie Vernon and others. Both initiatives will require new funding sources, and both could involve collaborations with like-minded organizations such as the American Association for the Advancement of Science (AAAS).

First, we propose to host dialogues about important policy questions for which scientific information is crucial. Each dialogue will start by identifying the key areas of agreement and disagreement—and for each disagreement the participants will be challenged to explain why they disagree. This may be not only because the underlying science is partly uncertain, but also because the participants have different assumptions about nonscientific aspects of the policy issue. By making this transparent, these dialogues can model how to inform policy decisions despite scientific uncertainty and other disagreements. We aim to make these dialogues educational and attractive to a large audience by sometimes using celebrity scientists and engineers as participants or by inviting celebrities as moderators. An ideal example might be a dialogue between Elon Musk and Neil deGrasse Tyson on the priority of sending many people to Mars, moderated by Matt Damon (star of *The Martian* movie). Other possible topics include human germline modifications, biosafety, robotics vs. jobs, universal preschool, coastal responses to sea-level rise, and the future of nuclear power.

Secondly, we propose to expand the Distinguished Lectureships Program to include younger and more diverse scientists, who are chosen for being especially effective at reaching broad public audiences. Sigma Xi could create a speakers bureau to help find audiences and media opportunities for these lecturers and curate high-quality science videos for a broad audience.

We welcome volunteers to help design both programs and assist with developing sustainable business models. We would also like to see a robust and active network of local chapters facilitate these initiatives, and we will continue our efforts to rejuvenate those chapters that have become inactive.

The **2018 Sigma Xi Annual Meeting** near San Francisco on October 25–28 will bring together researchers from many fields to collaborate, provide mentorship, share best practices, and discuss the societal benefits of their work. This year's theme is Big Data and the Future of Research, featuring outstanding keynote speakers and Sigma Xi award winners. I encourage you to submit an abstract and attend this informative event.



Joel Primack

Joel Primack
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Asking, Receiving, and Giving Back

One member's full-circle journey in grant-writing

In 1993, when Madhusudan Katti was a PhD candidate, he asked Sigma Xi for help. He proposed that the Society's Grants-in-Aid of Research (GIAR) program give him a grant to help pay for his research on factors that influenced winter survival of migrating birds in southern India.

Sigma Xi members gathered later that year to review grant proposals, and picked Katti's request as one that deserved support.

He doesn't remember exactly what he used the grant money for—probably equipment—and he doesn't remember if it was his third or fourth grant. What does stick out in his memory is that receiving the money helped build his confidence in his grant-writing skills early in his career.

Today, Katti is an associate professor at North Carolina State University who



Madhusudan Katti received a Sigma Xi grant 25 years ago as a PhD student. Today he is volunteering for the grant program.

studies how human actions interact with the success of other species in cities. He was among the Sigma Xi members who gathered this spring to review grant proposals. He wanted to add helpful comments for the students who applied.

"It's useful to give as much constructive feedback as possible," Katti said, so the students can develop

their own grant-writing skills.

GIAR proposals require students to be precise and to clearly explain why their project stands out in crowded research categories. The program funds less than 20 percent of applications.

"It's also important to show the broader impacts," Katti said. Applicants must answer the question: Why should anyone care?

It's a question that re-

searchers are constantly facing, and one that Katti helps to address in his role on the steering committee of the Urban Biodiversity Research and Coordination Network (UrBioNet), a collaborative research network that is studying global urban biodiversity and seeking to increase the public's involvement with science.

Annual Meeting to Address Big Data and the Future of Research

If only Galileo Galilei could see us now. The 17th-century Italian astronomer, who was the first to point a telescope at the stars, shook the prevailing view of the nearby universe. Imagine if he could see today's telescopes, which can look deeper into space than ever before and produce terabytes of image data in a single night, and the ability of people to access those images. Today, data—and the technology to gather and use astonishingly large sets of it—are changing the process of discovery.

Sigma Xi's 2018 Annual Meeting and Student Research Conference on October 25–28 at the Hyatt Regency San Francisco Airport in California includes a three-day intensive program that will prepare researchers who want to stay at the forefront of

science for this new era. In sessions, attendees will discuss the opportunities and challenges—including ethical considerations—facing scientists as we advance toward a scientific enterprise that runs on big data.

The meeting's speakers include renowned computer scientist Jeff Dean, head of Artificial Intelligence at Google, and physics professor Steve Ritz, a subsystem scientist for the Large Synoptic Survey Telescope's 3.2 gigapixel camera. Three symposia during the meeting will focus on big data in biology and medicine, physics and astronomy, and energy, climate, and the environment.

"There is a need for in-depth conversations about the ethics of data collection, analysis, and usage; how we will communicate discoveries

when the process is largely computer-driven; and how the current scientific infrastructure system will need to adapt to accommodate big data-based research initiatives," said Sigma Xi Executive Director and CEO Jamie Vernon.

Students in high school through graduate school are invited to the meeting's Student Research Conference to participate in sessions and compete in a poster presentation competition. In addition to Sigma Xi's traditional multidisciplinary poster competition, this year there will be a special section for big data research projects.

Visit www.sigmaxi.org/amsrc for more information.

Sigma Xi Awards Grants for Chapter Programs

In communities around the world, scientists and engineers who have been inducted into a century-old society gather to learn from one another, support students, and reach out to the public to help them learn about research. They gather in their local chapters of Sigma Xi, The Scientific Research Honor Society. Sigma Xi's Committee on Qualifications and Membership selected three chapters to receive grants to improve their programming.

Diversity Grant

Diversity Grants provide up to \$1,000 in seed money for chapters to create innovative diversity programs that encourage participation by individuals from underrepresented groups within the science and engineering communities. Diversity may reflect gender, sexual orientation, race, ethnicity, disability (mental or physical), and/or socioeconomic status.

The **Rush University Chapter** in Chicago, Illinois, will receive \$500 to provide awards that will encourage minority research doctoral students to participate in an annual research presentation event. This is the second consecutive year that the Rush University Chapter received a Diversity Grant.

Science, Math, and Engineering Education (SMEE) Grants

SMEE Grants provide up to \$2,000 for chapters to fund innovative educational programs.

The **Southern Illinois University–Carbondale (SIUC) Chapter** in Carbondale, Illinois, will receive \$2,000 for its proposal “Building Big Data Research and Teaching Synergy at SIUC.” The chapter will use the funding to develop a two-semester program that brings big data experts to the SIU campus to deliver public talks, roundtable discussions, and research workshops for in-depth training in big data applications.

The **State University College at Plattsburgh Chapter** in Plattsburgh, New York, will receive \$2,000 for its proposal “Real-Time DNA Barcoding within the Adirondack State Park.” This project aims to use DNA barcoding and portable biotechnology to identify species within the Adirondack Park. Participants, including bioinformatics students and science teachers for sixth through twelfth grades, will get hands-on field experience in sample collection and DNA analysis.

Chapter Achievements



The Barry University Sigma Xi Chapter in Miami celebrated their 20th anniversary in the spring. See the article on page 253.

The **University of Michigan Chapter** partnered with the College of Arts, Sciences, and Letters at University of Michigan–Dearborn to host a symposium to discuss and educate the public about

genetic testing and novel gene-editing techniques. The event's emphasis was on CRISPR and the ethical dilemmas that may arise following its widespread application.

New Chapters

Welcome to the following new Sigma Xi chapters:

- Ferris State University Chapter in Big Rapids, Michigan
- University of South Florida Chapter in Tampa, Florida

The **University of Nebraska at Kearny Chapter** hosted a Sigma Xi barbecue as well as a public panel discussion about climate change and its impact on severe weather, featuring Greg Forbes, severe weather expert from The Weather Channel.

Student Research Showcase Results

Students competed in an online event this spring with the hope of having not only the best research project, but also the best science communication skills. They created a slideshow, abstract, and video for audiences with varying technical expertise for the sixth annual Sigma Xi Student Research Showcase.

Division winners received \$500. People's Choice Award winner Zhen Ye of University of Nebraska Medical Center received \$250. High school students may submit a research manuscript to Sigma Xi's *Chronicle of The New Researcher*.

2018 Division Winners

High School Division

"The Antibacterial Effects of Carrots, Garlic, Kale, and Broccoli on *Escherichia coli*"

Maryam Imran, American Heritage School

Section: Microbiology and Molecular Biology

Undergraduate Division

"Hive Minded: Like Neurons, Honeybees Collectively Integrate Stop Signals to Regulate Forager Recruitment"

Talia Borofsky, Swarthmore College
Section: Ecology and Evolutionary Biology

Graduate Division

"Evolution of North American *Micruracarus* Water Mites"

Rachel Shoop, San Diego State University

Section: Ecology and Evolutionary Biology

Visit www.sigmaxi.org/srs to see the presentations.

Honoring Nobel Prize Laureates



Research Triangle High School students Kaylah Derilus, 16, left, and Nicole Hodge, 17, attended a live teleconference with Nobel Prize laureate and Sigma Xi member William E. Moerner.

Students at Research Triangle High School in Research Triangle Park, North Carolina, walk to class through the Hall of Honor, which bears the names of Nobel Prize winners. Each name represents a story of a significant research accomplishment.

Some students now have a personal connection to one name after speaking with 2014 Nobel Prize in Chemistry laureate William E. Moerner during a live teleconference on April 20. At the event, Sigma Xi, The Scientific Research Honor Society unveiled his

name in the hall along with the names of five more of its members who have won the prize since 2014. The other honored members were chemistry laureate Tomas Lindahl; physiology and medicine laureates William C. Campbell, Satoshi Ōmura, and Jeffrey C. Hall; and physics laureate Kip S. Thorne.

The building housing the high school formerly served as Sigma Xi headquarters. The school became the custodian for the Hall of Honor when Sigma Xi sold the building in 2015.

Moerner, a professor at Stanford University, received his Nobel Prize for developing a method that gives scientists a better view of processes occurring inside living cells. He encouraged the students to ask questions, build things, do experiments, and stay ready for surprises. Student Kaylah Derilus, 16, attended the ceremony and said what resonated with her was Moerner's advice to not be afraid to try something new, even at the risk of failing.