

Sigma Xi Today

A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH HONOR SOCIETY

Sigma Xi Members to Elect Leaders

Sigma Xi seeks qualified candidates for three-year positions to represent the following regions and constituencies, or to run for president.

President: for a three-year term of president-elect (July 1, 2020–June 30, 2021), president (July 1, 2021–June 30, 2022), and immediate past president (July 1, 2022–June 30, 2023).

Board of Directors (serving July 1, 2020–June 30, 2023)

- Research and Doctoral Universities Constituency
- Membership-at-Large Constituency
- Mid-Atlantic Region
- Northeast Region

Associate Directors (serving July 1, 2020–June 30, 2023)

- Area Groups, Industries, State, and Federal Laboratories Constituency
- Comprehensive Colleges and Universities Constituency
- Northwest Region
- Southeast Region

Representatives on the Committee on Nominations (serving November 2019–November 2022)

- Baccalaureate Colleges Constituency
- Canadian/International Constituency
- North Central Region
- Southwest Region

Visit www.sigmaxi.org/2019-elections for nomination requirements. Send nomination packages as a PDF or text file to elections@sigmaxi.org by May 1. All active members are eligible to vote in the online election, which will begin on November 18.

Sigma Xi Today is managed by Heather Thorstensen and designed by Dena Verdesca.

From the President

Creating a Favorable Future

In my last president's letter for Sigma Xi, I want to think long term. After all, I'm a cosmologist.

We owe our children and grandchildren a livable world. Since 1800, humanity's growth in resource use has had a doubling time of about 30 years. We humans are now changing the climate and other properties of the Earth in ways that will have consequences far into the future.

We must control this exponential growth on the timescale of the next doubling, about 30 years—the timescale of a generation. I believe that Sigma Xi researchers can help to do this as well as help an increasing fraction of the population to understand the necessity of addressing this issue. I have proposed an expanded Sigma Xi speaker program for researchers to deliver talks that might help more people understand what science is and why scientific knowledge is essential to creating a desirable future.

We need to think differently about the future. The following is a thought experiment from *A God That Could Be Real: Spirituality, Science, and the Future of Our Planet* by my wife, Nancy Ellen Abrams (Beacon Press, 2016), in the chapter on how to become a revered ancestor:

Economics tells us to discount the present value of any good that won't appear or any event that won't occur for a long time. Misapplying this formula to human beings, we discount the value of their lives, treating people of the future like some kind of low-probability event, barely worth worrying about. To see how crazy that is, imagine if we knew that the present generation would have a normal life but shortly after we die the entire human race would go extinct. Life would lose its meaning! What would be the point of everything we do or create, from raising a child to making a scientific discovery or starting a company? *We* need those future people *now*. To them we owe a spiritual debt for making our lives worthwhile.

One way to help create a favorable future world is to support organizations such as Sigma Xi. Nominate promising young researchers for associate membership, reinvigorate chapters, and attend the next Annual Meeting. Developing a theme for our Annual Meeting—in 2018 it was Big Data and the Future of Research—was a big success, with more member and sponsor participation than in recent history. The theme for the 2019 Annual Meeting, which will be held November 14–17, in Madison, Wisconsin, will be Our Changing Global Environment: Scientists and Engineers Designing Solutions for the Future. Join us, and help make a difference for the future.



Joel R. Primack

Joel R. Primack

Sigma Xi to Government Leaders: Avoid Future Disruptions to Science

In March, Sigma Xi Executive Director Jamie Vernon and President Joel Primack sent a letter to congressional leaders and the president that explained how government shutdowns negatively affect scientific research. The letter included personal accounts from Sigma Xi members. Below are excerpts. You can read the text in full at www.sigmaxi.org/2019-shutdownletter.

Research Is Critical to the United States.

The research enterprise, funded and supported by the United States government for decades, has proven to be an engine of technological advancement, making it possible for this nation to achieve peace, strength, and prosperity through innovation.



Sigma Xi's letter calls for United States congressional leaders and President Donald Trump to seek ways to protect scientific research from disruptions, such as future government shutdowns. (Wikimedia Commons.)

Research Needs a Stable Foundation. We expect the government to provide the stability necessary to complete this work.

Shutdowns Hurt Science.

During the most recent shutdown, we asked our members to share how the interruption was affecting them. We learned that the shutdown affected all levels of research and edu-

cation, from high school students to senior scientists.

Avoid Future Lapses.

We write to urge you to avoid any actions that would result in future federal funding lapses. For the good of the nation and the health of the research enterprise, we encourage you to seek ways to protect scientific research from such disruptions.

Four Ways Sigma Xi Can Help with Your Job Search

Your Sigma Xi membership is a distinction on your curriculum vitae (CV) that potential employers will notice. That honor, however, is just the beginning of how the Society can help with your career goals. Here are four ways that Sigma Xi can assist in your job search.

1. Use the Job Board.

The Sigma Xi Career Center at jobs.sigmaxi.org allows you to browse openings by research discipline or industry type, such as academia or government, as well as by location or job function.

2. Build Your Network.

Your Sigma Xi chapter can connect you with your local scientific community, so you can meet people for networking and learning about job opportunities. Find your chapter at www.sigmaxi.org/chapters. Active members can log on to the member online community, The Lab, at community.sigmaxi.org.

3. Round Out Your Resume.

Leadership experience is a surefire way to impress an employer, and you can build your skills by volunteering as a Sigma Xi chapter officer or serving on a chapter committee. Students can enter a research competition to gain presentation experience; find an upcoming opportunity at www.sigmaxi.org/meetings-events. Nonstudent members can add community service to their CVs by judging a student research competition; sign up at www.sigmaxi.org/judge-vol. Or, volunteer as a manuscript reviewer for Sigma Xi's high school research journal, *Chronicle of The New Researcher*, by contacting ctnr@sigmaxi.org.

4. Make Key Contacts.

Getting in touch with people who already work for an organization you're considering can help you decide if that employer is the right fit for you: What's the work culture? What are the high-priority projects? Active members may log on at www.sigmaxi.org to find these key contacts in the member directory. Search by institution as well as research discipline, field of study, sector, or chapter. You can find email addresses for most members in the directory, and they are listed on profiles in The Lab. Mention that you already have something in common with them: your Sigma Xi membership.

Supporting Women in STEM

In honor of Women's History Month in March, Sigma Xi asked female members about the challenges they see for women in science, technology, engineering, and math (STEM) as well as possible solutions for those issues.



Sonya Smith

Sigma Xi president-elect designee; professor, Department of Mechanical Engineering, Howard University

Challenge: The main challenges for women working in STEM fields are the toxic climate and culture in which they often find themselves. There is much research on strategies to help women cope and navigate hostile work climates: the so-called fix-the-women approaches. These types of approaches are not enough.

Possible solution: Climate and culture results, in part, due to toxic behavior that has been normalized over time. Enforcing existing policies, however, is a good start to remediating toxic climates and cultures.



Jordan B. Harrod

Doctoral student in the Harvard-MIT Division of Health Sciences and Technology; host of everydAI on YouTube

Challenge: STEM fields have retained internal social structures that can be damaging to women, specifically with regard to the #MeTooSTEM movement. Scientists who have sexually harassed their female peers and students should not be praised for their scientific work without equally acknowledging and addressing their wrongdoings.

Possible solution: The STEM community will have to consciously shift internal social structures to acknowledge that scientists are not exclusively defined by their science but also by their impact on their communities.



Andrea Armani

Professor, Department of Chemical Engineering and Materials Science, University of Southern California

Challenge: There is a lack of female engineers in leadership positions who can act as mentors and serve as role models. As a result, the few female scientists in leadership positions carry a disproportionate burden of outreach as compared to their male counterparts.

Possible solution: I encourage students to identify good mentors and to contact them. We should leverage new technologies to build mentoring networks and more effectively utilize existing mentoring resources. We also need to recognize that demonstrating scientific leadership goes beyond scientific discovery.



Marcetta York Darensbourg

Distinguished Professor and Davidson Chair in Science, Department of Chemistry, Texas A&M University

Challenge: While many things regarding work/family balance issues have really changed over the 50 years of my professorship, others have not. When to have children and how to manage, career and all, afterward remain major concerns. Getting recognition for one's ideas and not worrying if we appear to be overly aggressive when trying to speak as loudly as our male counterparts are other concerns.

Possible solution: We are on the right track. Increasing numbers of women in STEM jobs makes the field more attractive for current employees and for recruiting.

See more responses at www.sigmaxi.org/women-in-stem.

In Memory: John Ahearne

John F. Ahearne, who served as Sigma Xi executive director from 1989–1997, died on March 12 at his home in Chapel Hill, North Carolina. He was 85 years old. Ahearne also directed the Society's ethics program.



Sigma Xi members received awards from the National Academy of Sciences: www.sigmaxi.org/2019-nas
Sigma Xi members were elected as members of the National Academy of Engineering: www.sigmaxi.org/2019-nae

Grants in Aid of Research Recipient Profile: Jason Strickland



Sigma Xi member and grant recipient Jason Strickland studies Mojave rattlesnakes in the southwestern United States and central Mexico as a postdoctoral researcher at Clemson University. (Image courtesy of Gregory Territo.)

Grant awarded: \$1,000 in fall 2015

Education level at the time of the grant: doctoral student

How were the funds used: to pay for travel to field locations to find Mojave rattlesnakes and for gene-sequencing costs for data generation

Project goal: Mojave rattlesnakes are known to have neurotoxic venom that can paralyze the nervous system of prey. Some snakebite documentation, however, showed patients displaying symptoms of a second venom type—hemorrhagic—that acts by destroying tissue in the body. Strickland and his colleagues led a study to discover where the different venom types occur. This project involved a research collaboration between principal investigators and students at five laboratories across the United States and Mexico. Through social media and networking, Strickland and colleagues also assembled almost 100 citizen scientists. In total, the project collected 216 Mojave rattlesnakes in California, Arizona, New Mexico, Texas, and Mexico with permission granted by local permits and approval by an animal care and use committee.

Project results: Mojave rattlesnakes with hemorrhagic venom were more

common throughout the snake's geographic distribution than researchers previously thought, and the data suggested that some snakes were hybrids, with both types of venom. The results were published on December 4, 2018, in a *Scientific Reports* article titled "Evidence for divergent patterns of local selection driving venom variation in Mojave Rattlesnakes (*Crotalus scutulatus*)."

"Our study documents the extent of venom variation for the first time and demonstrates that local adaptation can occur at fine scales even when gene flow is high," Strickland said. "Our work will inform research focused on the biochemical properties and medical implications of venom. Additionally, Mojave rattlesnakes will be a great system to help us understand the interplay between evolutionary forces and ecological processes."

Where is he now? Strickland was inducted into Sigma Xi in 2016 and earned his doctorate in conservation biology in 2018 from the University of Central Florida. He completed and published the study as a postdoctoral researcher at Clemson University. He can be reached for research inquiries at jlstreck@clemson.edu.

Reporting by Hannah Halusker of Clemson University and Heather Thorstensen of Sigma Xi.

Annual Meeting to Focus on Changing Global Environment and Research Enterprise

Join us at Sigma Xi's Annual Meeting and Student Research Conference, November 14–17, in Madison, Wisconsin.

Sigma Xi chapter representatives will convene November 14 to complete Society business tasks at the 120th Assembly of Delegates. The public portion of the meeting kicks off on November 15 with workshops, panel discussions, and presentations around six symposia. Three symposia will discuss issues related to the theme of this year's meeting, *Our Changing Global Environment: Scientists and Engineers Designing Solutions for the Future*.

- **Water:** Emerging research and solutions in water science and technology
- **Energy:** Energy research and innovations
- **Life and Health:** How life is affected by environmental changes and how we can respond

The other three symposia relate to supporting the research enterprise.

- **Science Communication:** The science of science communication
- **Research Ethics:** Ethical challenges facing the scientific community
- **Professional Development:** Career advancement advice and discussion of challenges facing the research community

The Student Research Conference will feature research presentation competitions. Students will have access to symposia and networking opportunities. The meeting will conclude with a Family Science Day featuring art and film festival.

Register by July 14 to receive a 20 percent discount. Members, affiliates, and explorers receive additionally reduced rates.

See more at www.sigmaxi.org/amsrc19.