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Sigma Xi Today

A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH HONOR SOCIETY

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For you to get the most from your membership, affiliate status, or explorer status, Sigma Xi needs your current contact information. Updating your profile information is easy when you follow these steps.

1. Go to www.sigmaxi.org, click "Login" in the top-right corner, and then enter your email address and password. (If you haven't created a password, click "Forgot Your Password?" on the login screen, enter the email address that Sigma Xi has on file for you, and follow the steps to create a password.)

2. Once you are logged in, click on your name in the top-right corner, and select "My Sigma Xi" from the drop-down menu.

3. Under the Self Service section on the My Sigma Xi page, select "Update Profile Information."

4. Update your email address, phone number, chapter affiliation, and more. Please provide a nonwork and nonschool email address. Scroll to the bottom of the page, and click the Submit button.

5. Return to the My Sigma Xi page, and select "Manage Addresses" to edit or change your mailing address.

Providing a current mailing address ensures you receive *American Scientist*, a benefit included with active membership. Members also receive an e-newsletter every other week and have access to Sigma Xi's online member community, The Lab: Members to Members.

Join the Mailing List

The public may join the Society's email list at www.sigmaxi.org.

Sigma Xi Today is edited by Heather Thorstensen and designed by Dena Verdesca

From the President

The Road Ahead

Geraldine Richmond

It is my honor to serve as Sigma Xi president for the coming year. With the enormous global challenges facing our planet Earth and its inhabitants, it is crucial that we all do our part to further the science and engineering enterprise in this country and around the world. We all have a role to play as parents, teachers, researchers, policy makers, and community advocates. Data-driven decision making is our scientific creed, and it is up to all of us to practice that skill as well as to engender it in the next generation of scientists.

Sigma Xi chapters are a unique and powerful presence that, in unity, can transform how scientific research is perceived, understood, and valued. I am committed to strengthening, growing, and revitalizing chapters that have been waning and will also work to increase the number of members who have no chapter affiliation over the coming year. We need every voice to speak for research, both basic and applied, and to articulate the devotion that we share for scientific inquiry.

I will be discussing the importance of both social and intellectual diversity in ensuring the most innovative and impactful science and ensuring that the views of all involved are welcomed and their voices heard. I will also be speaking about another passion of mine: educating younger members about the myriad career paths available to those in science, technology, engineering, and mathematics (STEM) fields.

With the pervasive use of technology in our lives, we need scientists in boardrooms, in policy-making positions, as journalists, and as entrepreneurs as much as we need those in what we used to call the traditional academic career path. We also need to be more proactive in communicating science to the public, being strategic in following our scientific passions, and growing our networks to include those in less-developed countries.

With the theme of Our Changing Global Environment: Scientists and Engineers Designing Solutions for the Future, Sigma Xi's Annual Meeting will be held November 14–17 in Madison, Wisconsin. We are already organizing some great symposia with phenomenal speakers, including Vint Cerf, widely known as a "father of the Internet," and National Public Radio science correspondent Joe Palca, who will interview Cerf and also give a talk on science communication. So mark the dates on your calendar, and come be a part of this annual celebration.

I look forward to the year ahead as we work together to make Sigma Xi and the global scientific enterprise the best it can be.

Geraldine Richmond

Grants Help Chapters with Educational Projects

A group of high school science teachers spent two days recently in Adirondack State Park in upstate New York. They were taking a crash course in the latest DNA sequencing technology. They collected insects and learned how to isolate the samples' DNA to carry out DNA sequencing and bioinformatics analyses to identify species. Undergraduate students from State University of New York at Plattsburgh used the insect samples later to learn about DNA sampling.

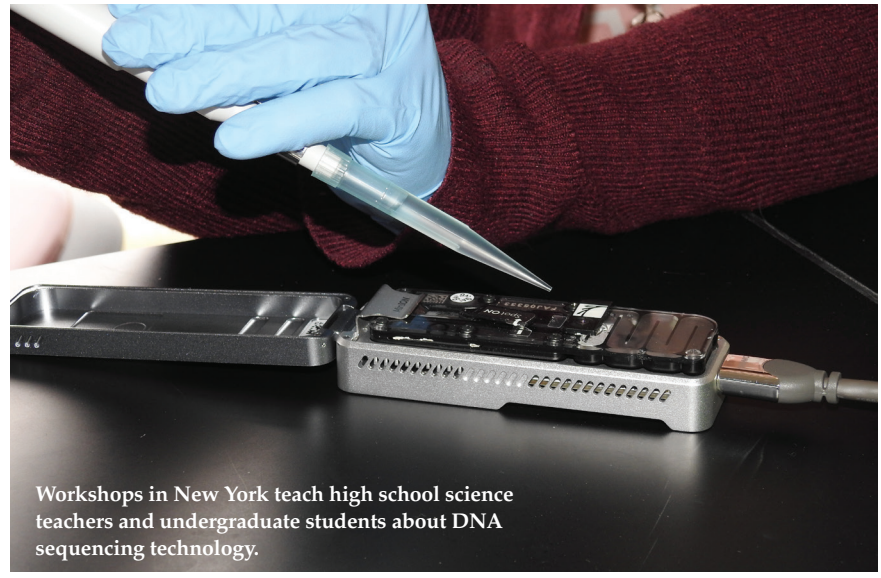
Afterward, the teachers said they could better educate their biology students about how the technology works and the science behind it. Word spread, and more teachers have already filled enrollment in a similar workshop planned for August.

The scientists running the program are members of the State University College at Plattsburgh Sigma Xi Chapter. They purchased their DNA sequencing equipment with the help of a $2,000 Science, Math, and Engineering Education (SMEE) Grant from Sigma Xi. SMEE grants help Sigma Xi chapters create innovative educational programs.

"We are looking at possible means to purchase more portable technology so we can expand this program with our own students as well as with our outreach," said Nancy Elwess, the chapter secretary.

The Southern Illinois University Carbondale Sigma Xi Chapter used their $2,000 SMEE Grant to combine research and teaching efforts. They organized a series of events about big data in research during the 2018–2019 school year, featuring five speakers who discussed developing or using tools for handling large amounts of data. The speakers led hands-on workshops, shared pizza lunches with students and faculty, visited with faculty, and held seminars. Approximately 650 people participated in the events.

True to Sigma Xi's interdisciplinary nature, the series brought together faculty and students from across a variety of subjects—from plant biology to mathematics and statistics to computer science. Library scientists who deal with archive challenges, local information technology personnel for a regional healthcare organization, and environmental health experts were also interested.



Workshops in New York teach high school science teachers and undergraduate students about DNA sequencing technology.

Students at Southern Illinois University learn about big data in research.

"Some students who attended the workshops were surprised at how data analytics could improve their research and how big data could revolutionize their approaches to specific problems," the chapter's officers reported. "The SMEE program has kick-started many ideas for additional interdisciplinary work on big data."

Chapter officers led a team that submitted a proposal to the National Science Foundation's Research Traineeship program, which encourages bold models of science, technology, engineering, and mathematics (STEM) graduate education training. A second supporting proposal was for an infrastructure update and to bring big data analysis to the Discovery Partner Institute (DPI), which is working to support the Illinois economy through interdisciplinary partnerships with the university and other organizations. The DPI proposal was strongly encouraged for further development.

Happy New Fiscal Year

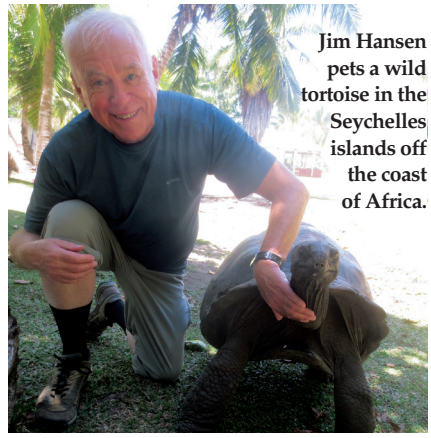
New chapter officers will start their tenure when Sigma Xi's fiscal year begins on July 1. Find your closest chapter at www.sigmaxi.org/chapters.

Find Your Next Adventure

Sigma Xi member Mary Ellen Close of Salem, Wisconsin, has watched eclipses with astronomers, slept on a Trans-Siberian Railway train, and seen a wild hippo along the Nile River, all through Sigma Xi Expeditions. Managed by Betchart Expeditions, this program offers members unique vacations led by naturalists, archaeologists, anthropologists, social scientists, or local residents.

During Close's nine expeditions, she usually traveled in groups of 20 to 25 people. Betchart arranged roommates when she traveled solo.

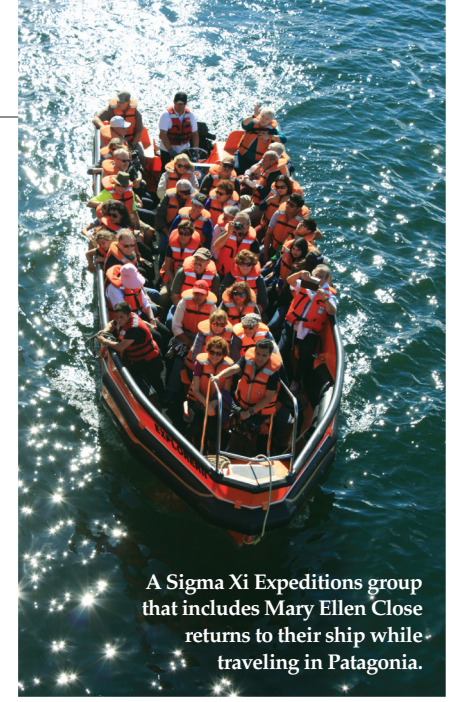
"Academics probably made up the majority of travelers, but each trip had an interesting mix of people," Close said. "While there were always some retirees, there were also younger people. Over the years I have met geologists, physicists, chemists, botanists, and others like myself who did not pursue a scientific career."



Jim Hansen pets a wild tortoise in the Seychelles islands off the coast of Africa.

Jim Hansen of Toppenish, Washington, who has traveled on six Sigma Xi Expeditions, said his favorite trip was to the Republic of Seychelles, off the eastern coast of Africa, because of the islands' deep blue waters splashing on white sand beaches, the peacefulness, the food, and the local fauna.

"I enjoy traveling with Sigma Xi Expeditions because they emphasize the exceptional natural histories and cultural attributes of the locations visited," Hansen said. "I plan to participate in more expeditions as they become available."



A Sigma Xi Expeditions group that includes Mary Ellen Close returns to their ship while traveling in Patagonia.

Visit www.sigmaxi.org/benefits#expeditions for information about upcoming destinations, such as Morocco, Japan, and the Galápagos Islands.

New Sigma Xi Leaders Elected

Congratulations to the following Sigma Xi members who the membership elected to leadership positions within the Society on November 27, 2018. The elected members are listed below with their chapter affiliations. Thank you to all the candidates who participated.

President-Elect

Three-year term comprised of a year each as Sigma Xi president-elect, president, and past-president, beginning July 1, 2019

Sonya T. Smith, Howard University

Directors

Three-year terms, beginning July 1, 2019

Area Groups, Industries, State, and Federal Laboratories Constituency
Cristina Gouin, District of Columbia

Comprehensive Colleges and Universities Constituency
Steve W. Martin, Iowa State University

North Central Region
Carlo U. Segre, Illinois Institute of Technology

Southwest Region
Vilupanur A. Ravi, California State Polytechnic University

Associate Directors

Three-year terms, beginning July 1, 2019, unless otherwise noted

Area Groups, Industries, State and Federal Laboratories Constituency
Christopher John Doona, Natick *(two-year term, effective immediately upon election)*

Baccalaureate Colleges Constituency
Pamela K. Kerrigan, College of Mount Saint Vincent

Canadian/International Constituency
Digvir S. Jayas, Manitoba

Mid-Atlantic Region
Deborah J. Good, Virginia Tech

Northeast Region
Theodora Pinou, Western Connecticut State University

Committee on Nominations

Three-year terms, beginning November 28, 2018

Membership-at-Large Constituency Representative
Indrajit Chowdhury, Membership-at-Large

Research and Doctoral Universities Constituency Representative
Raymond H. Byrne, University of New Mexico

Northwest Region Representative
Subrata Saha, University of Washington

Southeast Region Representative
Lori Eckhardt, Auburn University

Contact elections@sigmaxi.org for more information or to send nominations.

The first of two grants that Sigma Xi awarded to Haylee Archer helped to spark her interest in observational astronomy. She is shown above with the Blanco 4-meter telescope at the Cerro Tololo Inter-American Observatory in Chile.

Grant Recipient Profile: Haylee Archer

Grant awarded: $975 in fall 2015

Education level at the time of the grant: undergraduate student at the University of North Dakota

How the funds were used: travel to and from Kitt Peak National Observatory in Tucson, Arizona, and lodging

Project goal: The project's objective is to quantify the impact of the high-density galaxy cluster environment on the star formation rate (SFR) of dwarf (low-mass) galaxies that gravity is pulling toward the cluster center—a process known as infalling. Dwarf galaxies traveling through the hot intracluster medium are subjected to compression shocks, called ram pressure, that either compress the gas in galaxies and trigger star formation or strip gas from individual galaxies and truncate or quench star formation. Characterizing this process in terms of its effect on the SFR of infalling galaxies will provide valuable insights into the impact of the cluster environment on the galaxy population. Galaxy clusters are the largest gravitationally bound structures in the universe. Learning how the cluster environment affects galaxy evolution provides more understanding of how the universe works at some of the largest scales.

Project results: Evidence was found at all radii for quenching star formation toward the cluster center. Results suggest that both galaxy harassment (high-speed flyby interactions) and ram pressure stripping help to quench star formation in the low-density cluster outskirts, while ram pressure stripping plays a more important role than galaxy harassment in quenching star formation toward the high-density cluster center. It was also found that dwarf galaxies are more susceptible than the giant systems to ram pressure stripping. It was determined that ram pressure and galaxy harassment have similar effects on the SFR for both elliptical and spiral galaxies.

Where is she now? Archer was inducted into Sigma Xi in 2016. She is finishing her master's degree in science teacher education at Northern Arizona University in Flagstaff, Arizona.

How the grant helped her: Sigma Xi's Grants in Aid of Research (GIAR) program funded Archer's first professional observing experience, which sparked her passion for observational astronomy. GIAR also funded her with $2,271 in 2017 for travel to Chile for another observing run at Cerro Tololo Inter-American Observatory.

"What I like most about observational astronomy is that we are looking at things millions or billions of light years away," she said. "I'm continuously fascinated by the capabilities of humans to observe and study things at the largest and smallest scales in the universe."

STEM Art and Film Festival Coming to Wisconsin

Join us at the first Sigma Xi STEM Art and Film Festival on November 17, 2019, at the Monona Terrace Convention Center in Madison, Wisconsin. Celebrating science, technology, engineering, and math (STEM), the festival will feature artwork and films that portray the beauty of STEM, communicate STEM principles, and depict scientific discoveries and phenomena.

A special exhibit, Our Changing Global Environment, will showcase artwork and films about environmental changes and challenges facing the planet.

The event will also feature a screening and panel discussion of the Netflix documentary *Chasing Coral*, winner of a 2017 Sundance Film Festival Audience Award. The film shows how coral reefs are dying on a massive scale due to climate change and hopes to serve as a wake-up call to audiences that action is needed now to address environmental issues. *Chasing Coral* also won a Peabody Award in 2017 and an Emmy for Outstanding Nature Documentary in 2018.

Marking the last day of the Sigma Xi Annual Meeting and Student Research Conference, the festival and its events are free and open to the public to support Sigma Xi's mission of promoting the public understsanding of science.

For more information about the festival, how to submit art or films, and tickets to Chasing Coral, *visit www .sigmaxi.org/stemartandfilm.*