

Sigma Xi Today

A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH SOCIETY

Students Receive Research Grants

The wait was over in January for students hoping to hear if their research projects would receive funding from Sigma Xi, The Scientific Research Society. In the fall 2015 grant cycle, the Society's Grants-in-Aid of Research (GIAR) program awarded a total of \$108,750.92 to 118 undergraduate and graduate students. The average grant amount was \$1,000.

Sigma Xi members who volunteer on the GIAR committee and others read and ranked 787 applications. Often, GIAR provides the first grant a student receives.

"We're often that first, external person to say 'you're doing good work, good science, keep it up—and we believe in you so much, here is some money to help,'" said Emma Perry, a member and former chair of the GIAR committee.

Recipients may use their grants to pay for travel expenses to a research site or to purchase nonstandard laboratory equipment that is necessary for their research projects.

The next application deadline is March 15, 2016. Students may apply through Sigma Xi's website at <https://www.sigmaxi.org/programs/grants-in-aid>.

Membership in Sigma Xi is not required to apply, but approximately 75% of funds are restricted for use by dues-paying student members or students whose project advisor is a dues-paying member.

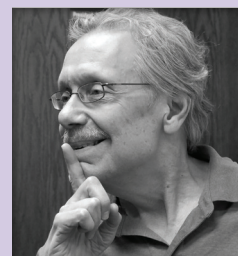
The GIAR program, which began in 1922, is made possible by designated funds from the National Academy of Sciences (NAS) and donations to Sigma Xi. Grants are awarded to students from all areas of science and engineering. NAS allows for grants of up to \$5,000 for astronomy research and \$2,500 for vision-related research.

To donate to the Grants-in-Aid of Research program, go to <https://ecommerce.sigmaxi.org/ecom/#Donate>.

From the President

What Can We Do for Our Institutions?

Several years ago, I was sitting in the office of the vice president for research of my institution, Ohio State University. I don't remember what I was trying to accomplish, but I think it was just to tell her that Sigma Xi was on campus and that one of our goals was to support the public understanding of science. She thought that our Science Café was a great idea, and that our budding Meet a Scientist plan for outreach to public schools was, too. The previous VP for research had agreed to pay for some of the student winners of the Research Forums to attend our chapter's annual banquet, to be recognized for their accomplishment, to meet other student scientists, to meet science and engineering faculty outside their department and classes, and to hear a distinguished Sigma Xi speaker discuss his or her expertise to a broad group of scientists and engineers.



President Mark E. Peeples

She was pleased that her office had been providing such support. And she had an idea. Would Sigma Xi be interested in supporting the Student Innovator of the Year award? I agreed, and the Ohio State Chapter has sponsored this award for the past three years. It involves a cash prize and gives us a presence at the university's annual "State of Research" celebration.

But when I told her that we support communication between scientists and engineers across disciplinary lines, she really became interested. I told her that our annual chapter banquet was a place where scientists and engineers could meet each other, as were our field trips to interesting geological and cultural spots, with expert Sigma Xi members who could bring topics to life for us. And I told her of our idea for Faculty-to-Faculty Chalk Talks without slides or specific data, encouraging discussion of scientific problems and approaches. She was excited. This is what the university needs—encounters that enable collaborations, especially between scientists and engineers.

At the end of our 30-minute meeting, I asked if she was a member of Sigma Xi. She was not, but would be honored to join. She was inducted and is one of our strongest supporters on campus. She recognizes the importance of our science outreach to the general public who ultimately fund our research, she appreciates the recognition that Sigma Xi brings to new scientists, and she sees the potential Sigma Xi has for bringing together scientists and engineers.

Every science administrator that I have talked to has had the same response. They have been supportive of our efforts, conceptually and financially, and have wanted to be part of Sigma Xi. Who knew? I didn't, until I started the conversation. Talk to your administrators or bosses. I bet you'll find the same positive response to Sigma Xi, particularly when it comes to partnerships and to bringing researchers from different disciplines together. Your university or workplace needs Sigma Xi, and vice versa!

Mark E. Peeples

Student Research Showcase Returns in March

Graduate, undergraduate, and high school students are invited to submit a research presentation to Sigma Xi's Student Research Showcase. In this online contest, a presentation consists of a website that has a research abstract, a slideshow for an audience familiar with the student's general field of research, and a video for a general audience. Judges view the web pages and ask presenters questions in the comments sections. In the process, students develop science communication skills and gain valuable feedback on their projects.

The showcase returns March 28–April 3, 2016. Last year's graduate division top presenter Luka Negoita and undergraduate division top presenter Weelic Chong shared their experience and advice for this year's participants. Below are excerpts from that conversation.

What motivated you to participate in this contest?

Negoita: I'm really excited about trying to bridge the gap between the scientific community and a broader audience so that in and of itself was a big pull for me. The other thing is I often find it pretty hard to explain my research to a broader audience, and I wanted to get better at that. I also thought it would help me improve the research because I was presenting on a project that I hadn't completed yet. I thought that having to explain it to a broader audience and have that dis-



Luka Negoita is a PhD candidate at Syracuse University. His presentation in the 2015 Student Research Showcase was about the role of plant dispersal on ecosystem function. (Image courtesy of Luka Negoita.)

cussion with a scientific and general community would help me better understand some of the aspects of the research that I was still developing.

Chong: I joined the competition to push myself further in presenting my research. I had the year to do my project because it's undergraduate thesis research, so it's a really compact schedule.

I spent most of my undergrad trying to bridge the science and nonscience divide [at my school], so this video is a natural extension of that. It's very interesting to see how people respond to the video. They say, "OK, now I learned something new about your research on Parkinson's disease," and it makes me happy that people are interested in stuff like that.

What do you remember about the judging period?

Negoita: It felt like I was at a conference with an oral presentation, but the number of comments was way greater than any physical conference I've ever been to—more details, very much of a discussion. At the end of the showcase, we received a list of specific feedback that each judge had about our presentation. I think I had around 40 judges on that list. The number of judges who commented was more around 18 or so, but then those 18 comments continued on into discussion threads and led to some interesting insights, resources, and exchanges.

I think one of the greatest parts about this whole research showcase is the fact that you can have contact with so many scientists who actually volunteer their time to carefully look at your presentation and give you comments. I'm grateful for all the judges who did that.

What do you think made your presentation successful?

Negoita: Some of the more positive comments I received had to do with the general appeal to a broader audience, the broader implications of the



Weelic Chong graduated from Oberlin College last year. He presented research about the gene-environment interaction of the heavy metal cadmium on a protein involved with Parkinson's disease. (Image courtesy of Weelic Chong.)

research, and the fact that I tried to emphasize those aspects more. Some other things that might have helped were trying to be as engaged as possible with responding to comments and welcoming any and all feedback. I came at this project trying to focus on my own passion and excitement for plant ecology and trying to emphasize that in my presentation. I think that resonated with a lot of judges.

What did you learn by participating?

Chong: One thing I learned is how you actually storyboard your project. I use the word *storyboard* because it's really like painting a picture for your audience. You lead them into your project, you put them through this whole process, not just "this is all my data" but also "why does it matter?" Another thing I learned is how to do something new. I didn't know anything about making videos. Don't be afraid—rock on with your video making or your PowerPoint presentation making, and you'll be good.

To hear how Negoita and Chong made their presentations, or to volunteer to judge, visit the Student Research Showcase web page at <https://www.sigmaxi.org/meetings-events/student-research-showcase>.

Sigma Xi Today is
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George Carruthers Receives Innovation Award

George Carruthers received Sigma Xi's Walston Chubb Award for Innovation on December 9 at the University of Maryland. The award, which honors and promotes creativity among scientists and engineers, comes with a \$4,000 honorarium. Carruthers joined Sigma Xi in 1969. He is a recipient of the National Medal of Technology and Innovation.

Paul Hackett, a student at the university, read the following statement about Carruthers at the Walston Chubb Award ceremony.



George Carruthers, center, and his wife Debra, shown on left, received his Walston Chubb Award for Innovation from Sigma Xi president-elect Tee Guidotti at the University of Maryland.

In order to move toward future innovations, scientists and engineers with vision promote their ideas as challenges. We call them pioneers. These include Dr. Robert Goddard and engineer Milton Rosen.

Milton Rosen challenged the scientific community to raise future aerodynamicists in the early 1950s. He thus opened a way to embolden our achievements and inspire what we think about today. One of those great people is Dr. George Carruthers, who took the challenge

and became both an astrophysicist and an aeronautical engineer. Dr. Carruthers grew up during the space race and was intrigued with space science. From a young age, he began building telescopes and model rockets and read avidly in local libraries. His love for space science extended through his youth and eventually led him to pursue degrees in aeronautical, nuclear, and astronomical engineering from the University of Illinois. Following his graduate studies, he accepted a position at the Naval Research Laboratory in Washington, D.C., after

receiving a fellowship in rocket astronomy from the National Science Foundation. Throughout his tenure at the Naval Research Laboratory, Dr. Carruthers has focused his attention on far ultraviolet astronomy. In 1969, he received a patent for his pioneering instrumentation, "Image Converter for Detecting Electromagnetic Radiation Especially in Short Wave Lengths."

In 1972, Dr. Carruthers' far ultraviolet camera spectrograph was sent to the moon with the Apollo 16 mission. This device allowed us to take readings of, and understand, objects and elements in space that are unrecognizable to the naked eye and gave us views of stars and the solar systems thousands of miles away. His camera still sits on the surface of the moon. A second version of this camera was sent on the 1974 Skylab space flight to study comets and was used to observe Halley's Comet, among others.

Throughout his storied career, Dr. Carruthers has never lost focus of the importance of science and engineering and has used his experience and excitement to drive these disciplines to our youth. He has worked with several local community organizations and promoted apprenticeships, and taught at Howard University.

Hang Out with Sigma Xi's Distinguished Lecturers

Sigma Xi's Distinguished Lecturers are sharing their research in online science sessions held in public Google Hangouts. Please join us and bring your questions.

Late March (to be confirmed)

Distinguished Lecturer: Edward Hackett, professor in the School of Human Evolution and Social Change at Arizona State University

Topics: Making science useful; peer review and the conduct of science

April 5

Distinguished Lecturer: Herman Sintim, Drug Discovery Professor of Chemistry—Organic Chemistry/Chemical Biology at Purdue University

Topics: Bacterial conversation, what it is and how it can be stopped to prevent infections from spreading; new strategies to curb bacterial infections; personalized medicine and the role of simple diagnostic platforms; the bacterial resistance problem

April 19 (to be confirmed)

Distinguished Lecturer: Michael Spencer, professor in the Department of Electrical Engineering at Cornell University

Topics: Van der Waals epitaxy of graphene and 2-D materials; III-nitride devices for high-voltage grid applications; radio isotope nuclear batter-

ies for medical implants and sensors; the promise of 2-D materials

May 2

Distinguished Lecturer: Nicholas Hud, professor of chemistry and biochemistry at Georgia Institute of Technology

Topics: The scientific quest for the origin of life; experimental investigations of the origin and early evolution of life; a self-assembly approach to the origin of ribonucleic acid

To participate in these sessions, or to watch recordings of past sessions, visit <https://www.sigmaxi.org/programs/lectureships>. Recorded topics include diversity in science, air pollution, and the Arctic's melting ice.

Sigma Xi Members Become AAAS Fellows

The following Sigma Xi members have been elected in the 2015 class of fellows for the American Association for the Advancement of Science (AAAS). The honor recognizes AAAS members' contributions to innovation, education, and scientific leadership.

Section on Agriculture, Food, and Renewable Resources

Arthur G. Appel, Auburn University
Kathryn J. Boor, Cornell University
Michael Andrew Grusak, USDA-ARS/
 Baylor College of Medicine
Randall S. Prather, University of
 Missouri-Columbia
James M. Reecy, Iowa State University
Mark R. Riley, University of Nebraska-
 Lincoln

Section on Anthropology

Bruce M. Latimer, Case Western Reserve
 University
Richard R. Wilk, Indiana University

Section on Astronomy

Timothy A. McKay, University of
 Michigan

Section on Atmospheric and Hydrospheric Science

William H. Hooke, American
 Meteorological Society
Brian K. Lamb, Washington State
 University
Jean Lynch-Stieglitz, Georgia Institute of
 Technology

Section on Biological Sciences

Julie A. Brill, The Hospital for Sick
 Children (Canada)
Emily A. Buchholtz, Wellesley College
Zachary F. Burton, Michigan State
 University
David O. Conover, Stony Brook
 University
Pamela K. Geyer, University of Iowa
Paul Stephen Keim, Northern Arizona
 University
David L. Lentz, University of Cincinnati
Maria C. Linder, California State
 University-Fullerton
Cynthia Casson Morton, Brigham and
 Women's Hospital
Steven A. Murawski, University of
 South Florida
Ellen K. Pikitch, Stony Brook University
Jan A. Randall, San Francisco State
 University
Temple F. Smith, Boston University
Wenyi Wei, Harvard Medical School
William E. Zamer, National Science
 Foundation
Janos Zempleni, University of
 Nebraska-Lincoln

Section on Chemistry

Leonard W. Fine, Science Foundation
 Arizona
Edith M. Flanigen, UOP LLC, a
 Honeywell Company

Ingrid Fritsch, University of Arkansas
Amnon Kohen, University of Iowa
Jay A. LaVerne, University of Notre
 Dame
Dennis L. Lichtenberger, University of
 Arizona
Timothy E. Long, Virginia Polytechnic
 Institute and State University
Walter Loveland, Oregon State
 University
Michael J. Maroney, University of
 Massachusetts-Amherst
Joseph S. Merola, Virginia Polytechnic
 Institute and State University
Paul H. Wine, Georgia Institute of
 Technology

Section on Dentistry and Oral Health Sciences

Francis L. Macrina, Virginia
 Commonwealth University

Section on Education

Lin Chambers, NASA
Edward E. Geary, Western Washington
 University
Watson M. Laetsch, University of
 California-Berkeley (retired)
Rochelle D. Schwartz-Bloom, Duke
 University Medical Center

Section on Engineering

James Hiram Aylor, University of
 Virginia
Ian Baker, Dartmouth College
R. Byron Bird, University of Wisconsin-
 Madison
Marc Cahay, University of Cincinnati
Shu Chien, University of California-San
 Diego
Donald P. Gaver III, Tulane University
Vincent G. Harris, Northeastern
 University
Shankar Mahalingam, University of
 Alabama-Huntsville
Babatunde Ogunnaike, University of
 Delaware
Mark T. Swihart, University at Buffalo-
 SUNY
Andrew L. Zydney, Pennsylvania State
 University

Section on Geology and Geography

Annalisa Berta, San Diego State
 University
David P. Dethier, Williams College
Frank R. Effensohn, University of
 Kentucky
Janet Franklin, Arizona State University
Paul L. Koch, University of California-
 Santa Cruz
Michael Mann, Pennsylvania State
 University

Section on History and Philosophy of Science

Sandra D. Mitchell, University of
 Pittsburgh

Section on Industrial Science and Technology

Shigeo (Ted) Oyama, Virginia
 Polytechnic Institute and State
 University/University of Tokyo (Japan)

Section on Information, Computing, and Communication

Legand L. Burge III, Howard University
Bruce Randall Donald, Duke University

Section on Medical Sciences

Joey V. Barnett, Vanderbilt University
 School of Medicine
Robert E. Hurst, University of
 Oklahoma Health Sciences Center
Mitchell Kronenberg, La Jolla Institute
 for Allergy and Immunology
E. Douglas Lewandowski, University
 of Illinois-Chicago/Sanford Burnham
 Prebys Medical Discovery Institute
Asrar B. Malik, University of Illinois-
 Chicago
Robert J. Matusik, Vanderbilt
 University Medical Center
Mark E. Peeples, Nationwide Children's
 Hospital/Ohio State University

Section on Neuroscience

Edwin George (Ted) Abel III,
 University of Pennsylvania
Anna Wang Roe, Vanderbilt University/
 Zhejiang University (China)
Edward L. Stuenkel, University of
 Michigan

Section on Pharmaceutical Sciences

James T. Dalton, University of Michigan
Alan Paau, Guangda Cooperation
 International Technology Center
 (China)
Doodipala Samba Reddy, Texas A&M
 University

Section on Physics

Martin Greven, University of Minnesota
Adilson E. Motter, Northwestern
 University
Sekazi Kauze Mtingwa, Massachusetts
 Institute of Technology (retired)/
 Triangle Science, Education &
 Economic Development, LLC
Beate Schmittmann, Iowa State
 University
Mark Trodden, University of
 Pennsylvania

Section on Psychology

Rebecca D. Burwell, Brown University
Laurence Baker Leonard, Purdue
 University
David G. Myers, Hope College
Kiran K. Soma, University of British
 Columbia (Canada)

Section on Social, Economic, and Political Sciences

Chloe E. Bird, RAND Corporation

Section on Statistics

Michael Paul Cohen, American
 Institutes for Research
Bruce A. Craig, Purdue University
Alan F. Karr, RTI International

Among the elected fellows is Sigma Xi President Mark E. Peeples. To learn about his research, visit <https://www.sigmaxi.org/news/article/2016/01/21/sigma-xi-president-among-new-aas-fellows>.