

Sigma Xi Today

A NEWSLETTER OF SIGMA XI, THE SCIENTIFIC RESEARCH SOCIETY

Kansas City, Here We Come!

We had such a great time at the 2014 Sigma Xi Annual Meeting and Student Research Conference that we've moved up our 2015 meeting dates so we can see you sooner!

The largest Sigma Xi gathering of the year will take place at the Sheraton Kansas City Hotel at Crown Center October 22–25 in Kansas City, Missouri, USA.

Note that with these earlier dates, the deadlines to submit poster presentation abstracts and to reserve hotel rooms will be earlier, too. The deadline for both is September 15, 2015.

The Annual Meeting is an opportunity to make important governance decisions for the Society. It is also a chance for chapter leaders to attend leadership development workshops. All participants can hear from Sigma Xi's 2015 award winners and support young scientists presenting their research at the Student Research Conference. The Student Research Conference is open to graduate, undergraduate, and high school students.

To join the mailing list for meeting updates, send us an e-mail at meeting@sigmaxi.org. Also, follow Sigma Xi's social media channels and watch for #SigmaXimtg.

To connect with Sigma Xi on social media, visit:

Facebook:

<https://www.facebook.com/SigmaXi>

Twitter:

<https://twitter.com/sigmaxisociety>



From the President

Sigma Xi on the Rise



Mark E. Peeples, past president of the Ohio State University Sigma Xi Chapter, will be Sigma Xi's president from July 1, 2015, to June 30, 2016.

Greetings from your new president! I am proud to be taking the helm July 1 of our great organization at a time when we have so many opportunities. I must first thank our immediate past president, George Atkinson, for his tireless leadership through the past year. As a member of the Executive Committee and the Executive Board during that time, I have been amazed by his forethought and tenacity. I am certain that we will look back on the past year as the year that Sigma Xi began to bounce back. Thank you, George! We all thank you.

Now that our finances and our new headquarters are in order, it is time to grow Sigma Xi, to increase our membership particularly among faculty and science and engineering professionals of all kinds. To increase our membership, we need to enhance the value of each Sigma Xi chapter and of our national Sigma Xi programs. Membership and chapters are my two top

priorities as president.

I have been very active in my Sigma Xi chapter at Ohio State, serving for the past eight years on the Chapter Executive Board, including as secretary, vice president, and president. Throughout this time, I have used our chapter as a laboratory to develop and improve our approaches to increase our membership and chapter value.

It's not difficult to convince colleagues that supporting our best and brightest science and engineering students with research grants is important. Or that dialogue with the public, including K–12 students, on what it's like to be a scientist or engineer and how we approach and solve problems is important. Or that connecting with scientists and engineers outside our field is fun and interesting, and important when it leads to collaborations. The great majority of my colleagues are interested in these goals, and I have been able to recruit 30 of them to Sigma Xi membership in the past several years.

Throughout this year, I will be sharing my ideas with you through this column and through Sigma Xi's newer and ever-expanding modes of communication, and I hope that you will share your ideas with me. One of my goals is to expand our library of successful programs for building membership and increasing the value and vitality of our chapters. To that end, at our April meeting the Sigma Xi Board of Directors approved my proposal to establish a Membership and Chapters Task Force. If your chapter has a particularly successful program, please send me a description so that we can include it in our expanded "Library." Many on the Board have offered their help, and we will be asking many of you for your help, too.

Thanks for your continuing membership and participation in Sigma Xi. Now let's get this baby off the ground!

Mark E. Peeples

Attaching Credible Science to Policy Making

In April, Sigma Xi co-sponsored two conferences about food safety and security. The goal of both events was to link scientifically credible information with the creation of public policies. The conference format was pioneered by the Institute on Science for Global Policy (ISGP). Ursinus College in Collegeville, Pennsylvania, and Eckerd College in St. Petersburg, Florida, were the hosts. Faculty members and students from both colleges spoke with Sigma Xi about the outcome of these unique events.

Please describe what happens at these conferences.

Liza Conrad: The first day we had three speakers come in and talk. They [prepare policy position papers that participants may read before the conference] and only speak for five minutes. Then we have a panel of 40 to 50 experts in the field that question them for 85 minutes. It becomes more of a debate or discussion on the topic that they're representing. It's open to the public, so everybody can attend and they all get to witness this interaction. The audience can submit questions as well.

The second day, everybody breaks into small caucus groups to discuss what they can agree on in terms of what we could do, these actionable next steps about, in our case, food security. Everybody in the room gets to put their ideas together and then we come back together at the end of the second day and discuss what all these small caucus groups discussed which will go into a publication.

Anthony Lobo: The conference at Ursinus pretty much ran the same way.

Aubrey Paris: ISGP doesn't really have any opinions. But they create briefings and other materials for different organizations or departments that might be looking for information regarding what the public thinks in terms of policy-making. The books are on the ISGP's website. Anyone on ISGP's mailing list receives the book once it comes out. So does anyone who attended the conference.

Dr. Lobo and Dr. Conrad taught courses before the conference that prepared students from Ursinus and Eckerd to participate. What did students learn from participating?

Aubrey Paris: Our students got to see how science directly impacts society. The other great strength was that we're taking students in the undergraduate sphere and putting them at a table next to people



Sigma Xi and the Institute on Science for Global Policy co-sponsored a conference in April at Ursinus College titled "Safeguarding the American Food Supply." The Society and ISGP also co-sponsored a similar conference at Eckerd College on food security. (Image courtesy of Ursinus College.)

who are leaders in industry or in policy or what have you. You have students and you're telling them, "You are just as qualified, in this case, to sit next to these individuals and ask these really important questions of our presenters." It's really empowering for the students. It gives them a great deal of confidence.

Barbara Del Castello: Being one of the couple of science majors in my class, it really pushed me to break down what we were saying so it was digestible.

Why was it important to bring this conversation to your community?

Liza Conrad: On our panel we had local experts on the food systems here in St. Petersburg. It was a real way for our community to get engaged on the topics of food security.

Anthony Lobo: We had a nice mix of people, all of whom added their unique perspective, especially once we got into the caucus discussions. Those were perfect incubators of discussion for what turned out to be some contention on some issues but a lot of consensus on a lot of the issues.

Barbara Del Castello: People are coming up to me and saying, "Wow, that was really great, I didn't expect that." People were amazed at how effective this conference was and how this model can voice the opinions of everyone involved.

For the full interview, visit <https://www.sigmaxi.org/meetings-events/isgp-sigma-xi-events>.

Meet the Speakers



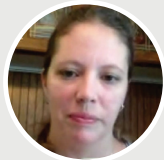
Dr. Anthony Lobo

Associate professor of biology at Ursinus College and a Sigma Xi member



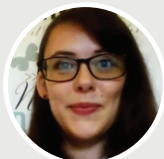
Aubrey Paris

Ursinus College student and senior fellow for the Institute on Science for Global Policy



Dr. Liza Conrad

Assistant professor of biology at Eckerd College and a Sigma Xi member



Barbara Del Castello

Eckerd College student, Sigma Xi member, and Institute on Science for Global Policy fellow

Young Investigator Award Goes to Environmental Decision Analyst

Sigma Xi's 2015 national Young Investigator Award winner, Dr. Melissa A. Kenney, led a team whose recommendations were instrumental in creating the recently released U.S. Global Change Research Program's indicators. These indicators will track climate change and its impacts to help the United States begin to better understand and respond to it. Kenney, an environmental decision analyst at the University of Maryland, spoke with Sigma Xi about developing these recommendations.

What is environmental decision analysis?

It's a social science discipline where we're focused on how we can help people make better decisions. I'm interested in how we can integrate multidisciplinary scientific information and societal values to inform some of our trickiest environmental challenges. I worked on a range of different topics including how we can set water quality standards, how we can restore environments to provide the goods and services that we need as a nation or as a society, and most recently how we can develop indicators to help inform tricky climate resilience decisions.

What initiated the indicator effort?

That was initiated by a National Research Council recommendation to the U.S. Global Change Research Program (USGCRP). They recommended a number of years ago that USGCRP consider developing a system of indicators to give the nation more of a snapshot of what's going on with the climate and how we're



doing as a nation. I was a AAAS Science and Technology Policy Fellow at the time, working with NOAA and the USGCRP and they said we have a research project for you to help us determine how we could build out an indicator system. Tony Janetos of Boston University was put as chair of a federal advisory committee indicator workgroup and we were able to collaborate with over 200 physical, natural, and social scientists across academia, the federal government, and the private sector to think through the kinds of recommendations that we thought would create an indicator system that would be most useful for sustained assessment activities as well as for informing decisions.

How did the team go about creating indicator recommendations for USGCRP?

We thought it would be most useful to think of developing a system of physical, natural, and societal indicators to inform and communicate key aspects of climate changes, impacts, vulnerabilities, and preparedness. We're going from greenhouse gas emissions and sinks through changes in atmospheric composition to changes in our physical climate system and the variability that we see on a year-to-year basis to something that is one of our most important contributions and something that is unique to this effort: a pretty strong emphasis on impacts and vulnerabilities of sectors and resources of concern to the United States.

Once we provided those indicator recommendations, we thought it would be useful to develop a prototype of what we meant by an indicator. My research team went through the process of working with experts at federal agencies and within the broader scientific community to develop the data sets, synthesize them, create the graphics, develop style guides associated with those graphics so that we could create examples of the indicators we thought would be useful as well as processes that would be transferable if a group were to take on the indicator effort.



At the University of Maryland, Dr. Melissa A. Kenney is a research assistant professor in environmental decision analysis at the Earth System Science Interdisciplinary Center and the Cooperative Institute for Climate and Satellites–Maryland. (Images courtesy of Melissa A. Kenney.)

[On May 6, USGCRP released a beta launch of 14 indicators.] The prototype is a proof of concept. It's meant to start a conversation with the broader user community, citizens within the United States as well as around the world, to think through and envision the kind of indicator system that would be most useful for assessing climate changes and impacts as well as providing information that would be useful for supporting climate resilient decisions.

What may be missing and could be incorporated?

One is adaptation indicators—how can we develop indicators that can assess how we're preparing as a nation and responding to some of the climate impacts that we're already experiencing? The other big question is thinking about leading indicators. These are indicators that are predictive of future conditions.

To browse and give feedback on USGCRP's pilot set of climate change indicators, visit <http://www.globalchange.gov/browse/indicators>. For the full interview with Dr. Melissa A. Kenney, see <https://www.sigmaxi.org/programs/prizes-awards/young-investigator/award-winner/melissa-a.-kenney>. She will be a speaker, and accept her award, at Sigma Xi's Annual Meeting, October 22–25 in Kansas City, Missouri.

Meet Your Fellow Companion: Robert E. Kahn

The Meet Your Fellow Companion series features the work of Sigma Xi members. Dr. Robert E. Kahn is an Internet pioneer who, among other things, co-invented the TCP/IP protocols. He was recently elected to the National Academy of Sciences. Dr. Kahn is the chairman, CEO, and president of the Corporation for National Research Initiatives in Reston, Virginia.

You've been developing the concept of Digital Object Architecture. What is that?

The Digital Object Architecture is about managing digital objects, which are sequences of bits, or a set of such sequences, with an associated unique persistent identifier. These are basically structured data in a form that's interpretable by any machine if you've got the right applications. The information, represented in digital form, has a unique persistent identifier. If in a hundred years, you come back and say

"give me the information that's got that identifier," no matter what the technology of the day is, you should be able to find it if that digital information has been managed properly.

There are three components of the architecture. One is something we call the digital object repository, which basically provides a means of accessing these digital objects via their identifiers. Second, if you don't know the identifier, you need a way of acquiring it and so registries store metadata about these objects; those registries can be searched. Once you've got these digital object identifiers, which we call handles, you need to go from the identifiers to a repository where you can access the information. Today, there are thousands of organizations around the globe that are running what we call local handle services. There is also a Global Handle Registry that knows where the local handle services are located.



Dr. Robert E. Kahn is developing a concept to manage digital information over long periods of time. (Image courtesy of Robert Kahn.)

How is Digital Object Architecture used today?

It is being used globally right now. Virtually every major scientific publication that I'm aware of anyway uses the handle system to identify its articles. The entertainment industry and the Library of Congress use it. I think this may find more uptake in some of the big data research initiatives.

What does your election to the National Academy of Sciences mean to you?

It's wonderful to be recognized by your peers that way. Even in the computing field, networking wasn't viewed as a first-class citizen for a while because either it was often viewed as electrical engineering and not part of the discipline or it was viewed as a wiring exercise to make things work together. But eventually, people began to recognize that it has a serious engineering component to it and, more recently, the scientific community writ large may be coming around to that recognition as well. I think this is a very good thing for the network field as a whole.

See the full interview at <https://www.sigmaxi.org/news/meet-your-fellow-companions/robert-kahn>.

National Academy of Sciences Elections

Congratulations to the Sigma Xi members who were elected this year to the National Academy of Sciences:

Samuel A. Bowring; professor, Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology, Cambridge

Adam Burrows; professor of astrophysical sciences, Department of Astrophysical Sciences, Princeton University, Princeton, N.J.

Dorothy L. Cheney; professor of biology and member of the graduate group, Departments of Psychology and Anthropology, University of Pennsylvania, Philadelphia

R. Graham Cooks; Henry Bohn Hass Distinguished Professor of Chemistry, Department of Chemistry, Purdue University, West Lafayette, Ind.

Ralph L. Holloway; professor of anthropology, Columbia University, New York City

Robert E. Kahn; president and CEO, Corporation for National Research Initiatives, Reston, Va.

Steven A. Kliewer; Nancy B. and Jake L. Hamon Distinguished Chair in Basic Cancer Research and professor, Departments of Molecular

Biology and Pharmacology, University of Texas Southwestern Medical Center, Dallas

Warren J. Leonard; NIH Distinguished Investigator and chief, Laboratory of Molecular Immunology, and director, Immunology Center, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, Md.

Joachim Messing; university professor of molecular biology, Selman A. Waksman Chair in Molecular Genetics, and director, Waksman Institute, Rutgers, The State University of New Jersey, Piscataway

Jennifer A. Richeson; professor, Department of Psychology and Department of African American Studies, Northwestern University, Evanston, Ill.

John A. Rogers; Swanlund Chair Professor, Department of Materials Science and Engineering, University of Illinois, Urbana-Champaign

Jeffrey P. Severinghaus; professor, Scripps Institution of Oceanography, University of California, San Diego, La Jolla

William R. Ward; institute scientist, Department of Space Studies, Southwest Research Institute, Boulder, Colo.

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