

# Program Update

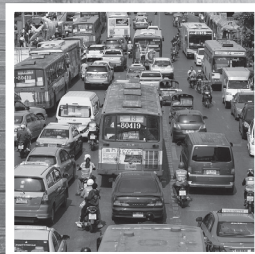
## Symposium on Atmospheric Chemistry, Climate, and Health

November 10, 2017

## Student Research Conference

November 11, 2017

Updated Schedules • Additional Speaker Biographies • Additional Research  
Abstracts • Full Index of Student Presenters • Map of Poster Presentations



Raleigh Convention Center • Raleigh, North Carolina • #SigmaXimtg



# SIGMA XI

THE SCIENTIFIC RESEARCH HONOR SOCIETY

# STUDENT RESEARCH CONFERENCE SCHEDULE, NOVEMBER 10-11

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## FRIDAY, NOVEMBER 10

**3:00–8:00 p.m.**      **Poster Setup**      **Ballroom B**  
Students prepare their posters for presentation.

## SATURDAY, NOVEMBER 11

**6:30–7:45 a.m.**      **Poster Setup**      **Ballroom B**  
Students prepare their posters for presentation.

**7:00 a.m.–7:00 p.m.**      **Registration**      **Ballroom AB Foyer**

**8:00–8:45 a.m.**      **Concurrent Orientations**  
**Student Orientation**      **Meeting Room 402**  
Presenters receive an orientation for the evaluation of presentations and awards selection.

**Judge Forms Pickup and Orientation**      **Room 301 B**  
Judges receive their paperwork, clipboard, and an orientation for the evaluation of student presentations and awards selection.

**8:00–9:15 a.m.**      **Power Up Breakfast**      **Ballroom B**  
Everyone is invited to enjoy a continental breakfast before student presentations begin.

**9:00 a.m.–12:00 p.m.**      **Student Research Poster Session**      **Ballroom B**  
Students present their research to judges.

## STUDENT RESEARCH CONFERENCE SCHEDULE - NOVEMBER 11

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12:00–1:30 p.m.

### Lunch and Panel Discussion

Ticket required for entry

*Communicating Research in a Rapidly Shifting Landscape*

Moderator: **Matt Shipman**, Research Communications Lead at North Carolina State University

Panelists:

**Jen Kernan**, Pharmacology PhD Student at the University of North Carolina at Chapel Hill

**Aaron Huertas**, Founder and Principal at Science Communication Media

**Jory Weintraub**, Science Communication Program Director and Senior Lecturing Fellow at Duke Initiative for Science & Society

Researchers are increasingly interested in communicating their findings to policymakers and the public. But it's often hard to know where to start or how to do so most effectively. Our panel will discuss best practices in science communication, including opportunities for researchers to learn from other fields such as journalism, content marketing, social media and issue education and advocacy. They'll also cover challenges scientists face in conveying information on issues that are often viewed as contentious, such as climate change and genetic engineering. The discussion will involve extensive Q & A time with the audience.

Ballroom A



**Matt Shipman**

1:30–2:45 p.m.

### Concurrent Professional Development Workshops

#### Organizing an Effective Visit with a Policymaker

Workshop Leader: **Aaron Huertas**, Founder and Principal at Science Communication Media

Lab visits are an excellent way for policymakers and their staff to learn about scientific research. They are also an opportunity for scientists and their institutions to showcase why their research matters to policymakers and the press. This session will cover best practices for interacting with policymakers and will challenge participants to roleplay a successful lab visit with a member of Congress. The skills covered in this workshop also apply to visits to legislative offices as well as educational poster sessions that scientific societies host for state and federal legislators. Participants will learn to put themselves in a legislator's shoes and think about how their research fits into a policymaker's view of their district and their role as a public servant.

Room 301 A



## From Exploration to Publication

Workshop Leader: **Eman Ghanem**, Director of Membership, Chapters, and Programs at Sigma Xi, The Scientific Research Honor Society

Publishing in peer-reviewed or professionally refereed journals is an indication of novelty and an opportunity to disseminate outcomes of research endeavors. Converting a research project into a scientific story for publication is a challenging process, especially for junior researchers who are not affiliated with a higher education institution. With the increasing number of high school science and technology classrooms that are shifting from a teacher-centered to a student-centered teaching environment, more ninth through twelfth grade students are engaged in authentic research experiences. This workshop will focus on the steps involved in preparing a manuscript for publication in a referred journal. Participants will learn effective writing techniques and what is important to include in a manuscript.

Room 301 B



## Social Media for Scientists

Workshop Leader: **Fenella Saunders**, Director of Science Communication and Publications at Sigma Xi, The Scientific Research Honor Society and Editor-in-Chief of Sigma Xi's Magazine, *American Scientist*

A presence online is becoming more common for scientists. Having a Twitter account allows scientists to have a more direct voice with the public and an influence over how science is portrayed to a wider audience. But it can also affect a scientist's career. For instance, research has shown that papers that are tweeted receive more citations. Social media is also having an effect on the culture of science, from gender bias to the prospects for postdocs and alternate career paths. We'll discuss some examples of recent incidents where social media coverage has caused change in how science is done, and also a few cases where being naïve of social media conversations has had negative results. We'll provide some pointers to get started on social media, but also ways to manage your time there, and how to ramp up if you want to do more.

Room 302 B



2:45-3:00 p.m.

Refreshment Break

300 Hallway Near  
301 A and 302 A

## STUDENT RESEARCH CONFERENCE SCHEDULE - NOVEMBER 11

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3:00–3:20 p.m.

### Oral Presentation by a High School Researcher

*Rocks, Fossils, and Geochemistry!*

**Emily Cross**, High School Researcher at Hammarskjold High School in Ontario, Canada; Science Mentor and Public Speaker

Have you ever met a high school student that has a crazy idea that just might work? My story is about my geochemistry research, and finding a supportive mentor. Geochemistry is opening fascinating doors in the field of paleontology. Geochemistry allows for new methods of extracting specimens from their matrixes, and can reveal information about the fossilized animal's appearance, environment they lived in, and environment they died in. A lot of my work in this area would not have been possible without my supportive mentors. I developed a new geochemical method of extracting fossil bones from ironstone, and am working on analyzing the chemical composition of several types of fossilized bone.

Meeting Room 402



3:20–3:40 p.m.

### Oral Presentation by an Undergraduate Researcher

*A Snapshot of Early Miocene Primate Activity in West Turkana, Kenya: Using Geology and Geochemistry to Track the Environmental Preferences of our Primate Ancestors*

**Kevin K. Takashita-Bynum**, Undergraduate Geoscience Major at Appalachian State University

Coauthors: Cynthia M. Liutkus-Pierce of Appalachian State University, Luke A. Beane of Appalachian State University, James D. Wright of Rutgers University, Aryeh Grossman of Northwestern University, and Francis M. Kirera of Mercer University

During the late Oligocene, apes and monkeys split from a common ancestor and despite their abundance in East Africa, are rarely found together at the same site. However, on the western side of Lake Turkana in northwestern Kenya, a site known as Loperot preserves a new and unexpected early Miocene primate community that contains both ape and monkey taxa and provides a unique opportunity to study the paleoenvironmental conditions that suited both primates. During fieldwork, we excavated a 28-meter step-trench and measured 30 individual sedimentological units. Fossils (e.g., apes, monkeys) were correlated to units within the trench and we discovered that the ape and monkey fossils were not from the same stratigraphic units. Above each fossil-bearing unit, we collected fossilized root casts known as rhizoliths, and analyzed the stable isotopic signature of these rhizoliths in order to assess the habitat (e.g., forest vs. open shrubland) associated with each primate group. We determined that trees dominated the landscape when apes were present, and that the area was more open when monkeys occupied Loperot. Our data indicates that Loperot's environment shifted from woodland to more open shrubland and back to woodland due to the migration of a meandering river. Trees concentrated on the river-banks,

Meeting Room 402



## STUDENT RESEARCH CONFERENCE SCHEDULE - NOVEMBER 11

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and the density of trees decreased with distance from the river channel. When the river was present, apes dominated the riparian forest; but as the river migrated away (and the trees followed), the shrubland became more attractive to monkeys.

3:40–4:00 p.m.

### Oral Presentation by a Graduate Researcher

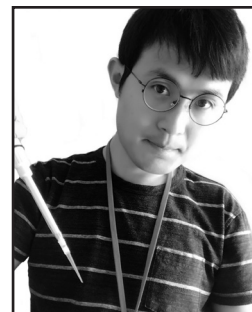
*FeverPhone: An Expandable Diagnostic Platform*

**Xiangkun (Elvis) Cao**, PhD Student at Cornell University

Acute undifferentiated febrile illnesses are responsible for substantial morbidity and mortality globally. Our goal is to develop a technology called FeverPhone, a smartphone-based molecular diagnostics platform for point-of-care differential diagnosis of six common causes of acute febrile illness (namely: Dengue, Malaria, Chikungunya, Leptospirosis, Typhoid fever, and Chagas). In parallel with technical development, this system will be fully validated at our existing field site in Ecuador and be ready for FDA approval by the end of the effort. The effort includes: (1) a specialized 6-plexed colorimetric assay cartridge that exploits color discrimination assay on mobile devices, (2) associated hardware that allows rapid interpretation of the cartridge results, and (3) software that combines differential molecular diagnosis with a confirmatory symptomatic interface used by the operator to enable actionable diagnosis in around 15 minutes.

The system has significant advantages over the state-of-the-art technology as it will enable: (1) quasi-unbiased detection of causative agent behind cause of febrile illness in a single test on a familiar platform requiring little or no training; (2) simplified patient and spatiotemporal tracking; (3) demonstrated inter-device repeatability; (4) health care advice and ability to immediately contact or alert a health-care provider if needed; (5) low-cost; (6) expandable to differential diagnosis of other infections/biomarkers.

Meeting Room 402



4:00–6:00 p.m.

### STEM Mixer

Students and professionals meet and mingle. Student research posters must be removed by 6:00 p.m.

Ballroom B

6:00–6:30 p.m.

### Break

6:30–7:00 p.m.

### Banquet Reception

Meet other attendees and enjoy a cash bar before the banquet.

Ballroom A Foyer

# STUDENT RESEARCH CONFERENCE SCHEDULE - NOVEMBER 11

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7:00–9:00 p.m.

## Banquet with Keynote Address, Student Awards, and Sigma Xi Induction Ceremony

Ballroom A

Ticket required for entry

*Keynote Address: Climate Change, My Journey from Ideology to Science*

**Greg Fishel**, Chief Meteorologist on WRAL-TV and Mix 101.5 WRAL-FM for Capitol Broadcasting Co.

Sigma Xi member Greg Fishel will share his 30-year journey that taught (reminded) him to think like a scientist. “For many years, I did not address the issue of climate change as a scientist, but rather an ideologue,” he said. “I want to help insure that others don’t make the same mistake I did.”



9:00–9:30 p.m.

## Score Sheet Pickup

Ballroom Foyer

Students may pick up their score sheets and certificates of participation. Have a safe trip home!

## Policy on Respect

*Sigma Xi is a multidisciplinary society of scientists and engineers. Our members have diverse professional backgrounds, genders, ages, and ethnicities. It is expected that every meeting participant will treat other members, staff, and everyone that they meet with courtesy, respect, and professionalism at all times. Sigma Xi meetings should be a positive experience for all. Sigma Xi, as a professional society, does not tolerate unprofessional conduct, discrimination, intimidation, or sexual harassment.*

*While approaching the research of others with a critical eye is essential to the research enterprise, it is expected that student presenters, judges, staff, and other event attendees will treat each other with the highest level of respect. This extends to the evaluation of student work in that the relationship between judge and student is similar to mentor and protégé, teacher, and student.*

*Any incident that runs contrary to the Sigma Xi culture of collegiality and this Policy on Respect should be reported immediately to a member of the event staff.*