

SFS Summer of Science



SFS SUMMER OF SCIENCE PROGRAM Weeks 2-4

Week 2 (June 15-June 19, all times EDT)

Website: www.sfssummerofscience.com

MONDAY, June 15, 2020

Featured Virtual Field Trips of the Week

DATE/TIME/LOCATION: June 15-July 3, Summer of Science Event Site

FIELD SITE LOCATION: Shenandoah National Park, Virginia

DESCRIPTION: Kelly McIntyre samples for macroinvertebrates in the headwater streams altered by a history of acid deposition.

FIELD SITE LOCATION: Cuatro Ciénegas, Coahuila, Mexico

DESCRIPTION: Valeria Souza contributes a video describing the streams and springs in the northern region of Mexico.

FIELD SITE LOCATION: Enbieta Reservoir (43° 12' N, 1° 48' W), Artikutza Valley, Navarre, northern Spain

DESCRIPTION: Photo time series of a large, decommissioned dam contributed by Arturo Elosegui.

FIELD SITE LOCATION: Chicago River

DESCRIPTION: Tim Hoellein and Lauren Wisbrock will describe their research on anthropogenic litter (i.e., trash) in urban streams of the Chicago region: including measurements of sources, fate, biological interactions, and bioassessment.

TUESDAY, June 16, 2020

Workshop: “Amphibians and Reptiles of Midwestern and Eastern Rivers and Streams”

DATE/TIME/LOCATION: Tuesday, June 16, 2020, 9 a.m. – 12 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Many reptile and amphibian species are inextricably and uniquely linked to flowing, freshwater aquatic ecosystems. Understandably, we often focus on fish, mussels, and invertebrates when studying these ecosystems, yet a diversity of both reptiles and amphibians are associated with rivers, streams, and creeks. In this workshop, we will discuss species often associated with flowing freshwater ecosystems including taxonomic identification and natural history. Further, we will present and discuss methods to survey and assess herptile communities as well as specific habitat assessment methods that incorporate the presence of salamander diversity.

TARGET AUDIENCE: Anyone interested in identification, natural history, and biological assessment using herpetofauna that occupy rivers and streams.

INSTRUCTORS: Nicholas Smeenk, Herpetologist/Wetland Ecologist, EnviroScience; Teal Richards-Dimitrie, Herpetologist/Natural Resource Technical Lead, EnviroScience

Workshop: “Getting Published: A Writing Workshop for Aquatic Scientists”

DATE/TIME/LOCATION: Tuesday, June 16, 2020, 1:00 – 5:00 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Most scientists are expected to publish their research, and career advancement often depends on how frequently and well we publish. However, completing a technically sound research project does not guarantee it will be published. Manuscripts need to (1) target an appropriate audience and (2) tell an interesting story. In this workshop, I will cover how to select the most appropriate journal for your paper and ways to improve the likelihood that your manuscript will be accepted. The specific topics we will cover include:

- Selecting a journal – it may not be *Science* or *Nature*
- The life history of a submitted manuscript including dealing with reviewers and editors
- The elements of effective scientific writing: clarity and economy
 - Write for the reader
 - Beyond IMRD – Organizing Introduction, Methods, Results, and Discussion sections so they tell a compelling and easily understood story
 - Effective use of citations (less can be more)
 - Good paragraphs – Unified, cohesive, and developed
 - Sentences and word choice – The syntax and grammar stuff you learned in high school (maybe) and then forgot (apparently almost everybody)
- Where to get additional help (self-help resources)

The workshop will include time for participant questions.

Depending on the number of participants, participants may be asked to submit an example of their writing.

TARGET AUDIENCE: Students and early-career professionals

INSTRUCTOR: Charles P. Hawkins, Editor-in-Chief, *Freshwater Science*, and Professor, Utah State University

WEDNESDAY, June 17, 2020

Fun Run--Stay Tuned for Details!

THURSDAY, June 18, 2020

Science Thursday Plenary: “A Conversation on Equity and Inclusion in Freshwater Conservation and Management in Cities”

DATE/TIME/LOCATION: Thursday, June 18, 2020, 2:00 p.m. Eastern Time, Summer of Science Event Site

SPEAKERS: Na’Taki Osborne Jelks, Assistant Professor, Environmental and Health Sciences, Spelman College; Kristin Baja, Programs Director, Climate Resilience at Urban Sustainability Directors Network (USDN)

ABSTRACT: Freshwater scientists working in urban watersheds are confronted with a challenge to ensure that their research is both actionable and salient to the communities and decision-makers who need the information they generate. They must work and communicate effectively with these stakeholders, who have diverse perspectives, backgrounds, and concerns. In this Summer of Science session, Na’Taki Osborne Jelks and Kristin Baja will discuss issues of justice, equity, and inclusion based in their experiences working with local communities and with cities at the national scale. After statements from the speakers, the discussion will then open up to include questions from the organizers, followed by a period of Q&A with the audience. The conversation will be useful to any freshwater scientists looking to establish meaningful, respectful relationships with community members and city practitioners, with a vision toward more just and sustainable watershed management in cities.

FRIDAY, June 19, 2020

Diversity, Equity and Inclusivity Event: “Identifying and Addressing Challenges to a Fully Inclusive Freshwater Community”

DATE/TIME/LOCATION: Friday, June 19, 2020, 4 – 6 pm Eastern Time, Summer of Science Event Site

DESCRIPTION: Join us for a panel presentation followed by a group dialogue on tackling issues that we as freshwater scientists face in creating a diverse, inclusive, and equitable scientific community. A panel of scientists with varying expertise will come together to share their work and thoughts on promoting inclusivity in freshwater sciences. Following the panel presentation, attendees will join one of several breakout rooms hosted by one of the panelists to engage in thoughtful discussion. Topic questions to stimulate discussion include, What are the biggest barriers to creating inclusive environments in science? What have you done to address implicit and explicit biases? What programs/initiatives are effective for recruiting and retaining under-represented scientists? How has your experience shaped your science and/or mentoring style? Finally, this event will conclude in a general session where panelists will share highlights of the breakout room conversations.

MODERATOR/FACILITATOR: Eric Moody

Week 3 (June 22-June 26, all times EDT)

Website: www.sfssummerofscience.com

MONDAY, June 22, 2020

Featured Virtual Field Trips of the Week

DATE/TIME/LOCATION: June 22-July 3, Summer of Science Event Site

FIELD SITE LOCATION: near Grundy, Virginia

DESCRIPTION: Ary James and Murphy Johnson visit the region around headwater streams altered by surface coal mining.

FIELD SITE LOCATION: West Creek, Cleveland, Ohio

DESCRIPTION: Dave and Lauren Kinsman-Costello ask: Can stormwater management restore an urban stream?

FIELD SITE LOCATION: Radium Springs, Albany, Georgia

DESCRIPTION: Steve Golladay and Chelsea Smith visit the streams and rivers of Southwest Georgia.

TUESDAY, June 23, 2020

SRC Workshop: “Talk Nerdy to Me: A Science Communication Panel by Students, For Students”

DATE/TIME/LOCATION: Tuesday, June 23, 2020, 10 – 11 a.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Come hear from a panel of student speakers on various science communication topics such as community outreach, speaking to the press, and social media. Following the panel speakers, there will be an open Q&A discussion period where attendees can ask the speakers questions and talk about ways to improve on or facilitate science communication in their own research lives.

PANELISTS: Michelle Bush, University of Oklahoma; Ed Higgins, University of Oklahoma; Shannon Speir, University of Notre Dame; Lauren Wisbrock, Loyola University of Chicago

MODERATOR: Jonathan Williams Lopez, University of Oklahoma

TARGET AUDIENCE: SFS student members.

Workshop: “What is a Diatom Species?”

DATE/TIME/LOCATION: Tuesday, June 23, 2020, 12 – 2 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Beginning with Linnaeus, scientists and philosophers have developed many concepts in response to the question, “what is a species?”. Diatoms, organisms that are constrained by their rigid, inorganic silica cell wall, leave a unique trail of evidence for us to understand diatom species. In this workshop, we will begin with a discussion of diatom life history. We will examine the unique nature of morphological species within diatoms and how we apply the morphological concept to diatom ecology.

The workshop will allow time for a group discussion, as well as a practical work session on diatom morphometrics using the open access software, ImageJ. We will work through learning how (and where) to measure the dimensions of pennate and centric diatoms, and especially on measurement of stria density.

The concepts and skills developed in this workshop will be closely tied to those of developing a diatom voucher flora and may be part of a higher level SFS Diatom Taxonomic Certification Exam.

INSTRUCTORS: Sarah Spaulding, Ecologist, USGS; Meredith Tyree, Professional Research Associate, University of Colorado; and the Diatom Taxonomic Certification Committee

TARGET AUDIENCE: Students, analysts, and young professionals.

Workshop: “Explore and Work with NEON Biodiversity Data from Aquatic Ecosystems”

DATE/TIME/LOCATION: Tuesday, June 23, 2020, 2:00 – 5:00 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: The National Ecological Observatory Network (NEON) provides open ecological data from 81 locations across the United States. While NEON data cover a wide range of subject areas within ecology, including organismal observations, biogeochemistry, remote sensing, and micrometeorology, this online workshop focuses on NEON biodiversity data collected from our 34 aquatic sites, including 24 wadeable streams, 3 rivers, and 7 lakes. Instruction will include an overview of the breadth of NEON biodiversity data before providing code-along with instruction on how to retrieve and convert NEON biodiversity data to standardized formats (long and wide species tables with relevant metadata to make cross data product comparisons possible) for taxonomic groups such as fishes, benthic macroinvertebrates, and algae. Participants will learn about the ecocomDP data model, a standardized data format designed by the Environmental Data Initiative (EDI) for biodiversity data, and how to import NEON data into this data pattern for synthesis work. Participants will also learn how to format and work with NEON data in a variety of standard R packages, including: Jost (2007)-style alpha, beta, and gamma diversity using the *vegan* package; alpha, beta, and gamma variability using *lme4* R package; and ordinations using *vegan* package for R. Basic familiarity with R is required for participation in the workshop.

This workshop does not provide a general overview of NEON instrument data, nor the details of different ways of accessing NEON data. If you are interested in these topics, we recommend attending the 'Access and explore open, continental-scale aquatic instrument data from NEON' workshop instead of, or in addition to, this one.

INSTRUCTORS: Eric R. Sokol, Battelle/National Ecological Observatory Network (<https://www.neonscience.org/observatory/staff/eric-sokol>), Stephanie M. Parker, Battelle/National Ecological Observatory Network (<https://www.neonscience.org/observatory/staff/stephanie-parker>), Megan A. Jones, National Ecological Observatory Network/Battelle (<https://www.neonscience.org/observatory/staff/megan-jones>)

TARGET AUDIENCE: The target audience for this workshop is a current or potential data user who wants to explore a range of aquatic organismal data products, learn how to download and work with NEON data, and apply popular biodiversity R packages to the data. If time allows, this workshop may also explore environmental data available from the NEON data portal and how biodiversity data and environmental data relate to one another.

WEDNESDAY, June 24, 2020

Fun Run--Stay Tuned for Details!

THURSDAY, June 25, 2020

Science Thursday Plenary: "High-Resolution Climate Projections: Connecting Global Change to Local Impacts"

DATE/TIME/LOCATION: Thursday, June 25, 2020, 2:00 p.m. Eastern Time, Summer of Science Event Site

SPEAKER: Katharine Hayhoe, Political Science Endowed Professor in Public Policy and Public Law, Climate Center Co-Director, Texas Tech University

ABSTRACT: Climate is changing—regionally, across the United States, and for the planet as a whole. Temperatures are increasing, rainfall patterns are shifting, and extreme precipitation and heat wave events are becoming more frequent. Ensuring the sustainability of our natural resources and the resilience of our ecosystems requires understanding of what future climate will look like. Developing high-resolution projections, however, is a challenging task that requires a solid understanding of the uncertainties and errors involved in this process. How do we develop these future projections, and what do they tell us about future climate in our region, and the U.S. as a whole? Using practical examples from our work across the U.S., I will discuss and describe the models and methods used to develop projected future trends in local to regional-scale climate and apply them to quantify climate change impacts on agriculture, ecosystems, and water.

FRIDAY, June 26, 2020

Diversity, Equity and Inclusivity Event: “Talk About It! Conversations About Diversity and Inclusion with SFSers”

DATE/TIME/LOCATION: Friday, June 26, 2020, 2 – 3:30 pm Eastern Time, Summer of Science Event Site

DESCRIPTION: People with different identities face different challenges in freshwater science and a ‘one size should fit all’ solution leaves many behind. Let’s take this time to create space for SFS members who have felt marginalized to share their stories in a welcoming and safe environment. This event will consist of several small breakout rooms, each with a specially invited facilitator. Each breakout room facilitator will provide discussion prompts and ensure that conversations are productive and supportive. Please start in one room, meet others, and move to a new room in 30 minute increments, meeting new people and hearing unique stories along the way! We hope this event will give SFS members a chance to share their own stories as well as broaden their horizons by listening to the experiences of others.

MODERATOR/FACILITATOR: various

Social/Mixer: “Community in the Time of COVID: A Virtual Happy Hour to Vent, Strategize, and Discuss Early Career Needs During a Global Pandemic”

DATE/TIME/LOCATION: Friday, June 26, 2020, 4 – 6 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Please join the SFS Early Career Development Committee (ECDC) for a virtual happy hour to learn more about our committee and provide support (and strategy!) for working through the global pandemic. Our event will feature a ~15-minute summary of who the ECDC is, what we do, and how you can become involved. Attendees will then be invited to join one of four themed breakout rooms covering a range of topics, including: 1) *“Pandemic Education 101: tips for teaching, mentoring, recruiting students, and managing your lab from home,”* 2) *“The Post-Pandemic Job Market: brainstorming ways SFS can support postdocs, researchers, term-workers, pre-tenure professors, and others facing grim post-COVID-19 job prospects,”* 3) *“Work-Life Balance: a support group for those struggling to work remotely, raise a family, and/or maintain mental health during the pandemic,”* and 4) *“Beyond Academia: exploring ways of supporting SFS members interested in work in non-academic sectors.”* Additionally, the main meeting room will remain open for folks to ask questions about the ECDC and discuss ways of meeting the diverse needs of Early Career society members, especially during these uncertain times. If you cannot attend the event, feel free to reach us directly at sfsearlycareer@gmail.com. Additionally, please fill out our SFS Early Career Survey, which will be circulated during the Summer of Science.

Room 1: The Lounge: General Early Career Development Committee information and Q&A

Host: Zacchaeus Compson

Room 2: Beyond academia: exploring ways of supporting SFS members interested in work in non-academic sectors

MODERATOR/FACILITATOR: Mike Hassett

Room 3: Pandemic Education 101: tips for teaching, mentoring, and recruiting students and managing your lab from home

MODERATOR/FACILITATOR: Justin Pomeranz

Room 4: The post-pandemic job market: brainstorming ways in which SFS can support postdocs, researchers, term-workers, pre-tenure faculty, and others facing grim post-COVID-19 job prospects

MODERATOR/FACILITATOR: Corey Krabbenhoft and Megan Fork

Room 5: Work-life balance: a support group for those struggling to work remotely, raise a family, and/or maintain mental health during the pandemic

MODERATOR/FACILITATOR: Angela DePalma-Dow

Week 4 (June 27-July 3, all times EDT)

Website: www.sfssummerofscience.com

MONDAY, June 27, 2020

Featured Virtual Field Trips of the Week

DATE/TIME/LOCATION: June 27-July 3, Summer of Science Event Site

FIELD SITE LOCATION: Shatto Ditch, Kosciusko County, Northern Indiana

DESCRIPTION: Tank Lab graduate student Shannon Speir takes you through her bimonthly monitoring routine at Shatto Ditch, where she is exploring the impact of conservation on water quality in agricultural watersheds.

FIELD SITE LOCATION: Australia

DESCRIPTION: Nick Bond's research group describes water issues of the Murray Darling Watershed.

FIELD SITE LOCATION: Northwestern Arkansas

DESCRIPTION: Michelle and Lilly Evans visit the White River and tributaries.

FIELD SITE LOCATION: Tropical Brazil

DESCRIPTION: Marcos Callisto shares his field work in Brazilian headwater streams.

TUESDAY, June 30, 2020

Workshop: "Macroinvertebrates.org: An Open Educational Tool and Training Resource for Aquatic Macroinvertebrate Identification"

DATE/TIME/LOCATION: Tuesday, June 30, 2020, 11 a.m. – 1 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: Macroinvertebrates.org is the product of a National Science Foundation funded web-based project titled 'Learning to See, Seeing to Learn.' The purpose of the online site is to provide high-quality tools and resources for training citizen scientists to identify aquatic macroinvertebrates with confidence and accuracy for water quality monitoring projects. This open educational resource is a powerful supplement to more-traditional identification keys typically used by volunteers. The tool features zoomable, high-resolution photography of the 150 most commonly found freshwater taxa in the Eastern United States with annotated diagnostic characters for 50 selected taxa at the order, family, and genus levels. These explorable images can be dynamically manipulated with supporting multimedia to see and learn these important characters in context. Detailed descriptions of the diagnostic characters, life history, food preferences, ecological information, pollution tolerance values, and terminology

supports are also provided to aid identification for each taxon. Through this hands-on, minds-on workshop, participants will experience the many enhanced digital tools for identifying aquatic benthic macroinvertebrates to Order and some Family levels. Presenters will also provide an engaging presentation on the background and history of this project and the importance of understanding the needs to support and improve volunteer-level identification. Further time will be provided to explore the website with guided activities as well as time for the user to explore on their own. Additional sharing of effective resources to use with macroinvertebrate identification (keys, apps) to compliment the website and tips for training volunteers on aquatic macroinvertebrate will be presented. Participant feedback and commentary provided during the workshop will be used to improve the site in future design iterations.

INSTRUCTORS: Tara Muenz, Assistant Director of Education, Stroud Water Research Center; Marti Louw, Director, Learning Media Design Center, Carnegie Mellon University

TARGET AUDIENCE: Volunteer biomonitors, macroinvertebrate trainers, entomologists, educators, and water quality professionals.

Workshop: “Access and Explore Open, Continental-scale Aquatic Instrument Data from NEON”

DATE/TIME/LOCATION: Tuesday, June 30, 2020, 2:00 – 5:00 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: The National Ecological Observatory Network (NEON) provides open ecological data from 81 locations across the United States. While NEON data cover a wide range of subject areas, this virtual workshop focuses on NEON aquatic instrument systems (AIS) data collected continuously from our 34 aquatic sites, including 24 wadeable streams, 3 rivers, and 7 lakes. AIS data products span water quality, surface and groundwater elevations, and meteorological instrumentation. Instruction will include an overview of the breadth of available NEON AIS data and data product naming conventions, before jumping into using the `neonUtilities` R package to access NEON AIS data. Participants will then learn how to interpret NEON data by referencing metadata records and standardized quality flags. In the final portion of the workshop participants will be able to explore the individual AIS data products of interest to their research while NEON staff are on hand to address specific questions.

This is an introductory workshop for individuals interested in learning how to access NEON data and understanding the details associated with interpreting instrument data and quality flags. While participants with no prior coding experience are welcome to participate, some live-coding and instruction will be provided in R. This is not an introduction to R workshop and a basic understanding of R will facilitate participation. Attendees should have installed R before arriving. For users interested in aquatic observational data in the context of biodiversity, we suggest participating in the “Explore and work with NEON biodiversity data from aquatic ecosystems” workshop.

INSTRUCTORS: Guy Litt, Battelle/National Ecological Observatory Network (<https://www.neonscience.org/observatory/staff/guy-litt>); Bobby Hensley, Battelle/National

Ecological Observatory Network

(<https://www.neonscience.org/observatory/staff/bobby-hensley>); Megan A. Jones, National Ecological Observatory Network/Battelle

(<https://www.neonscience.org/observatory/staff/megan-jones>)

TARGET AUDIENCE: NEON's target audience for this specific workshop are those interested in learning more about the observatory's aquatic instrument system design, and/or wish to better understand the formatting and quality flagging of NEON instrument data. Instruction will guide participants in data organization and preparation approaches using the R software, with no prior experience with R necessary.

WEDNESDAY, July 1, 2020

Fun Run--Stay Tuned for Details!

THURSDAY, July 2, 2020

Science Thursday Plenary: "POTUS, SCOTUS, and WOTUS: The Clean Water Act in the Era of Trump"

DATE/TIME/LOCATION: Thursday, July 2, 2020, 2:00 p.m. Eastern Time, Summer of Science Event Site

SPEAKER: Royal Gardner, Professor of Law and Director, Institute for Biodiversity Law and Policy, Stetson University College of Law

ABSTRACT: The interaction of law, policy, and science influences freshwater protection and management. In the United States, recent changes to the definition of "waters of the United States"—a statutory term that describes which waters are entitled to federal protection—has been particularly controversial. Indeed, the U.S. Supreme Court has considered legal questions about what qualifies as waters of the United States three times. In response, the Obama Administration issued its interpretation of the term based on a comprehensive scientific review. In turn, the Trump Administration has sought to rescind, suspend, and replace this rule, downplaying the importance of science. Both the Obama and Trump Administration's actions spurred more litigation, and individual scientists and scientific societies have entered the fray to attempt to educate courts about scientific matters in these and related Clean Water Act cases. This presentation highlights the importance of understanding how agencies interpret the Clean Water Act, how stakeholders influence and challenge agency actions, and the role of science in these processes.

FRIDAY, July 3, 2020

Diversity, Equity and Inclusivity Event: “Resources to Address Challenges in Diversity, Equity, and Inclusivity”

DATE/TIME/LOCATION: Friday, July 3, 2020, 3 – 4 pm Eastern Time, Summer of Science Event Site

DESCRIPTION: What are the current challenges in diversity, equity, and inclusion (DEI) within freshwater science and what resources are available to address them? In March 2020, SFS launched a survey to poll its members on the status of DEI within the society and asked what SFS could do to improve current conditions. This event will consist of a 30 minute presentation to summarize the anonymous survey responses followed by multiple breakout rooms to provide attendees with a list of resources (e.g. specialty grants, awards, professional societies) to aid in increasing DEI. Each breakout room will be moderated by an SFS member who will provide an interactive list of resources geared toward specific affinity groups. The resource lists from the breakout sessions will then be compiled and distributed to provide under-represented freshwater scientists and their allies with tools for personal and professional growth.

MODERATOR/FACILITATOR: Anna Boegehold

PUI Mixer

DATE/TIME/LOCATION: Friday, July 3, 2020, 5:00 – 6:30 p.m. Eastern Time, Summer of Science Event Site

DESCRIPTION: This mixer invites faculty from primarily undergraduate institutions (PUI) to meet each other and interact with old friends. There will be 5 themed breakout rooms accommodating up to 12 attendees at a time. Interested participants are encouraged to come and go during the scheduled hour and a half of the mixer, dropping in and out of different breakout rooms at their leisure.

Room 1: Distance learning and online activities (synchronous vs. asynchronous)

Room 2: Online laboratories and field labs

Room 3: How to engage students while they are at home

Room 4: Research? How?

Room 5: Anything but the pandemic