



NATIONAL CENTER FOR  
SCIENCE & CIVIC ENGAGEMENT  
N C S C E



## SENCER Mid-Atlantic Regional Center for Innovation 2022 Conference

### WATER

***Saturday January 15, 2022 via Zoom; 10:45 am to 3:00 pm EST***

Development of natural landscapes and climate change are impacting how humans and ecosystems are experiencing the water cycle. Some areas receive more water than infrastructure can handle now; other areas are receiving less; and any of these locations might experience increased challenges in maintaining the safety of water for humans and other organisms. This conference is designed for K-16 and informal educators to explore this theme in order to advance their abilities to infuse civic awareness and engagement into their instruction and students' learning. Presentations will be from educators at all levels and contexts about the science and societal implications of changes in global and local water cycles as well as issues regarding equitable access to clean water.

#### Conference Hosts

Kathy Browne, PhD - Rider University

Jessica Monaghan, EdD - Princeton University

Missy Holzer, PhD - Nat'l Earth Science Teachers Assoc.

#### Acknowledgements

*Many thanks to presenters and our supporting organizations that have made this conference possible. And to the NCSCE/SENCER community for support and inspiration!*

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**Rider University**

**TeacherPrep**  
PRINCETON UNIVERSITY PROGRAM IN TEACHER PREPARATION



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# Program

10:45-11:00 Greetings and socializing

11:00-12:00 pm Opening and Keynote address: **Bhawani Venkataraman** (The New School),  
***Water: An integrative, socially relevant context for connecting science and society***

12:05-12:50 pm Round 1 Lightning Talks [5mins each with Q&A at end]

1. Kenneth Nicholson, Gregory Anderson & John Kasmer (Northeastern Illinois University) ***Field Methods in Environmental Science at Northeastern Illinois University***
2. Jeannine Lanphear, Candy Hoffman & Brianna Ryan (North Brunswick Township Public Schools), ***Using an Ecological Water Mystery to Drive Water Cycle Instruction and Updating it to Include Environmental Justice and Civic Engagement***
3. Laura Guertin & Matthew Bodek (Penn State University Brandywine), ***Turning the 2021 Earth Science Week theme of Water into a campus-wide photography competition***
4. Diana Samaroo & Sandie Han (NYC College of Technology), ***An Interdisciplinary Study on Water Quality of a Local Lake in New York City***

12:50-1:20 pm Lunch break/Zoom socializing

1:20-2:05 pm Round 2 Lightning Talks [5mins each with Q&A at end]

5. Hazel England, (Director of Education and Outreach, Great Swamp Watershed Association), ***How Much is It Worth? Understanding Ecological Value of Open Space***
6. Hugh Fox, Fernando Nieto (SUNY Old Westbury) and Bettina Fantal-Pinckombe (Westbury High School), ***Piloting an environmental thematic course-embedded research project to develop the scientific skills of first year students participating in the Community Learning and Leadership Action (CALL) program at SUNY Old Westbury***
7. Christopher Badurek, Connor Brierton & Shelby Soule (SUNY Cortland), ***Developing Citizen Science Web GIS Applications for Monitoring Invasive Plants***
8. Ji Kim & Ayisha Sookdeo (Guttman Community College-CUNY), ***Implementation of culturally relevant projects in STEM courses to promote civic awareness***

2:10-3:00 pm Closing Plenary & Closing: **David Smyth** (Texas A & M University San Antonio),  
***Water: Waste not want not.***

## Abstracts

### Opening Plenary

**Bhawani Venkataraman** (The New School), ***Water: An integrative, socially relevant context for connecting science and society***

Water is a molecular marvel. Its seemingly simple formula – H<sub>2</sub>O –dictates the properties that make water the “universal solvent” and essential for life on Earth. Yet, paradoxically, this same property of water makes it susceptible to contamination which can then potentially threaten life. As will be discussed in this talk, exploring the science behind this paradox and the social implications of access to safe drinking water makes water a powerful context for integrating disciplines and connecting science and society.

**Dr. Bhawani Venkataraman Bio:** Dr. Bhawani Venkataraman’s research is in chemical education and science communication. She explores how software visualization tools can assist students in “seeing” molecules and why molecular-level interactions can influence macroscale, real-world outcomes. She is currently an Associate Professor of Chemistry and Chairperson of the Department of Natural Sciences and Mathematics in the Eugene Lang College of Liberal Arts at the New School in Manhattan, New York City.. Using a context-based approach, she has developed curricular materials that connect chemical principles and concepts to understanding social and environmental issues such as water and air pollution, energy systems, and climate change. As part of this work, she has been developing a visual, interactive tool that uses a life-cycle assessment approach to compare the social, health, and environmental benefits and challenges of different energy sources. She is also working on a book that explores the intersections between science, society, and policy around access to safe drinking water.

### Lightning Talks Round 1

Kenneth Nicholson, Gregory Anderson & John Kasmer (Northeastern Illinois University) ***Field Methods in Environmental Science at Northeastern Illinois University***

Field Methods in Environmental Science is an upper-division course in the interdisciplinary Environmental Science program at Northeastern Illinois University (Chicago, IL). Three examples where learning goals were accomplished with civic engagement and responsibilities at the forefront will be described in this presentation. First, students collected and analyzed water samples at local sites to assess water quality using field probes. Next, drinking water and other sites along the Lake Michigan watershed were tested for the presence of persistent and highly toxic perfluorinated compounds using High Performance Liquid Chromatography (HPLC). Finally, students learned data science methods in order to examine air quality, primarily ozone, around the Chicago metropolitan area. Students demonstrated their engagement through the course by their feedback, course evaluations, and the final assessment of their achievement in the course.

Jeannine Lanphear, Candy Hoffman & Brianna Ryan (North Brunswick Township Public Schools), ***Using an Ecological Water Mystery to Drive Water Cycle Instruction and Updating it to Include Environmental Justice and Civic Engagement***

"Fruitvale" is a commercially available resource that engages students in an ecological mystery about water contamination. After "not having time" to use it a few years, followed by the pandemic, we brought this activity back to engage sixth grade students in the return to school

and hands-on lab science, contextualize instruction of the water cycle, and accelerate learning with rigor, while updating it to include environmental racism and civic engagement.

Laura Guertin & Matthew Bodek (Penn State University Brandywine), ***Turning the 2021 Earth Science Week theme of Water into a campus-wide photography competition***

The American Geosciences Institute declares a different theme for its annual Earth Science Week (ESW) in mid-October, with the 2021 theme as Water Today and For the Future. Each year, our campus hosts a photography contest addressing the ESW theme and encourages faculty, staff, and students to learn how to use Adobe products to enhance their images and submit for People's Choice Voting. There is an awards ceremony at the end of ESW and the photos are put on display in the campus library and online. This presentation will share how courses on climate science and information science and technology developed student assignments to connect the discipline to the water theme, and how an event such as this can expand education and engagement efforts on campus themed around earth science. Winning photos and contest details can be found at: <https://sites.google.com/psu.edu/bwesw2021>

Diana Samaroo & Sandie Han (NYC College of Technology), ***An Interdisciplinary Study on Water Quality of a Local Lake in New York City***

A multidisciplinary team involving faculty and students from the Departments of Biological Sciences, Chemistry and Mathematics collaborated on an interdisciplinary study on the water quality of Prospect Park Lake. The study integrated experimental analysis of microbiology and general chemistry with mathematics perspectives using hands-on learning. Key elements promoted in this project included undergraduate research, STEM learning, and the awareness of community resources.

## **Lightning Talks Round 2**

Hazel England, (Director of Education and Outreach, Great Swamp Watershed Association),

***How Much is It Worth? Understanding Ecological Value of Open Space***

How can we develop understanding in students of the value of leaving and protecting an area of open space as is? How can students understand the economic, as well as intrinsic and biological value of maintaining and stewarding open space? - At Great Swamp Watershed Association, we work with middle school to college students hands on, giving them the skills to make rapid on the ground assessments of an area of forest and stream corridor to build insight into the ecological, societal and human value provided by the site. Students learn how to understand and value these Ecosystem functions and services such as biodiversity and water quality protection through stream and forest assessment protocols. In this lightning talk we will share a little on how we do that!

Fernando Nieto & Hugh Fox (SUNY Old Westbury, Bettina Fantal-Pinckombe (Westbury High School), ***Piloting an environmental thematic course-embedded research project to develop the scientific skills of first year students participating in the Community Learning and Leadership Action (CALL) program at SUNY Old Westbury***

In this presentation we discuss a unique curricular model of college/community collaboration between the Science & Technology Entry Program (STEP) and Community, Action, Learning and Leadership (CALL)/First-Year Experience (FYE) Programs at SUNY Old Westbury. The curriculum shared through this session is designed to help students become intentional learners and conscious decision-makers. The STEP/CALL collaboration make course-embedded science

and community engagement a cornerstone of college entry, leveraging college, community and foundation resources to enrich student learning, while enhancing the capacity of intercultural understanding and communication, teamwork and leadership skills necessary to address pressing science and social issues. The collaborative has honed the career-preparatory rigor in its various components in college readiness and in engaging underrepresented minorities (URM) in STEM subjects, while maintaining a reasonably gender-balanced population.

Christopher Badurek, Connor Brierton & Shelby Soule (SUNY Cortland), ***Developing Citizen Science Web GIS Applications for Monitoring Invasive Plants***

We report on development of web GIS applications for reporting invasive species conducted in conjunction with the iMap Invasives team of the NY Natural Heritage Program. The application was developed using ESRI's Story Maps application builder and the NY iMap Invasives and NY Protected Areas Database (NYPAD) web mapping services (WMS) used for citizen science. This application provides citizens information about invasive terrestrial plant species targeted for data collection by the NY Natural Heritage Program, including hemlock woolly adelgid, porcelain berry, and oriental bittersweet. Citizen scientists can then identify locations and upload photos using the iMap Invasives mobile app. In addition, we demonstrate a web GIS dashboard for data visualization and analytics developed as an exemplar for invasive species management. The case example is of data from the Finger Lakes National Forest in Central NY where plant species abundance (points collected) indicate the following species as most prevalent: multiflora rose, honeysuckle, buckthorn, autumn olive, knapweed, and garlic mustard.

Ji Kim & Ayisha Sookdeo (Guttman Community College-CUNY), ***Implementation of culturally relevant projects in STEM courses to promote civic awareness***

This presentation will share how STEM faculty members have strived to provide culturally relevant projects, class activities, and service-learning opportunities to our students. Students in chemistry courses act as renewable energy ambassadors by visiting Newtown Creek Wastewater Treatment Facility (pre-pandemic), learning about our clean drinking water sources and the leading cause of sewer line backup. Upon learning that the primary culprit is fat, oil, and grease (FOG), they embarked on collecting waste cooking oil from restaurants near their homes around NYC. The students would then bring these items to the chemistry lab and brainstorm how to convert them into biodiesel, soap, and nanomaterials. Students from Biology courses collect water samples across NYC to test its quality, conjure up new ways to prevent water pollution and resulting diseases. As most of our students are from underrepresented groups, the activities enhance their learning process by connecting what they learn in class to real-life applications, facilitating their innovative thinking to tackle environmental and social injustices.

## **Closing Plenary**

**David Smyth** (Texas A & M University San Antonio), ***Water: Waste not want not.***

This session will focus on research investigating the impact of human activity on our water bodies and aquatic ecosystems. Overuse and lack of oversight has led to many of our water bodies being heavily contaminated with biological and chemical agents, particularly with sewage and run off from agricultural and industrial activities. Around the world, intrepid individuals, groups, and communities are working to improve sanitation, and to prevent contamination of our precious natural potable water resources. We'll also learn about new ways to use our waste from developing creative methods to make money from wastewater and using our wastewater to conduct surveillance for emerging infectious diseases.

**David Smyth Bio:** Dr. David Smyth is Associate Professor of Microbiology at Texas A&M-San Antonio. Her research investigates the microbiology of the built environment as well as superfund sites such as the Gowanus Canal in NYC. More recently she has been involved in several COVID-19 related projects focused on airborne transmission and humidity in the classroom environment as well as genomics and surveillance in NYC wastewater. She is an Associate Editor for BMC Infectious Diseases, Frontiers in Microbiology and PLoS ONE. She has mentored dozens of undergraduate and high school research students. She is very active in several projects aimed at improving undergraduate education and increasing diversity in STEM. She is Co-PI of Research Experiences in Microbiomes Network (REMNet), the NSF funded RCN-UBE supporting the development of microbiome related curricula for undergraduate education and Co-PI of the NSF Funded IUSE project "Vision and Change in Undergraduate General Education Biology Courses". In 2020 she became Deputy Director of the National Center for Science and Civic Engagement whose signature project is Science Education for New Civic Engagements and Responsibilities (SENCER). She serves as a SENCER Senior Leadership Fellow, Partnership for Undergraduate Life Science Education (PULSE) Ambassador and Fellow and NSF PALM Mentor.

## Registered Participants

First name	Last name	Institution/Organization	Department (if applicable)
Paulo	Acioli	Northeastern Illinois University	Physics
Elizabeth	Albert	St. John's University	ICS
Christy	Andrade	Gonzaga University	Biology
Christopher	Badurek	SUNY Cortland	Geography
Andrea	Bair	Delta College	Science and Mathematics
Joanne	Bartsch	Carolina Day School	
Nadia	Benakli	New York City College of Technology, CUNY	Mathematics
Suparna	Bhalla	Mount Saint Mary College	
Dhruvkumar	Bhatt	Florida Gulf Coast University	
Marufa	Bhuiyan	Everest Innovation Lab LLC	
Emily	Broderick	Kauai Community College	Biology/Marine Sci
Pamela	Brown	New York City College of Technology, CUNY	
Kathy	Browne	Rider University	Dept. of Geological, Environmental & Marine Sciences
Zoe	Camhi	recent grad/job seeker	
Dana	Campbell	University of Washington, Bothell	Division of Biology
Katayoun	Chamany	The New School	Science and Mathematics
Lucy	Chamberlain	Hiram College	
Dawn	Cobb	University at Buffalo/Cora P. Mahoney Center	Science Technology Entry Program
Stephany	Compton	Texas Woman's University	
Phyllis	Conn	St. John's University	
Joshua	Cooper	University of Hawai'i / Hawai'i Institute for Human Rights	Political Science / Center for Hawaiian Studies
Noelle	Cutter	Molloy College	Biology
Walter	Den	Texas A&M University-San Antonio	

Jane	Duke	MixAnalytics	
John	Egekeze	Retired Chemistry Teacher	Science
Julie	Ellefson	Harper College	
Hazel	England	Great Swamp Watershed Association	
Alexis	Erum	Kauai Community College	
Louis	Fadel	Ivy Tech Community College	
Hugh	Fox		
Esther	Garza	Texas A&M-San Antonio	
Samantha	Gigliotti	County College of Morris	
Carlos	Goller	North Carolina State University	Biotechnology Program
Gia	Grier McGinnis	University of Maryland, Baltimore	Graduate school
Laura	Guertin	Penn State Brandywine	Earth Science
Sandie	Han	New York City College of Technology	Mathematics
Jennifer	Hartley	Botanical Society of America	Education
Roberta	Hayes	St John's University	
Gayle	Hilleke	Kentucky Campus Compact	
Missy	Holzer	Great Minds PBC	
Barbara	Hunt	Woodbury University	
Susan	Huss-Lederman	University of Wisconsin-Whitewater	
Alison	Hyslop	St. John's University	Department of Chemistry
Amy	Johnson	Eastern Michigan University	Chemistry
Janina	Jones	University of the District of Columbia	
James	Kearns	Southern Connecticut State University	Chemistry
Lisa	Kelly	Chicago Zoological Society - Brookfield Zoo	
Ji	Kim	Guttman Community College	Science



Corey	Knox	University of Arizona	Education
Mangala	Kothari	LaGuardia Community College, NY	
Ruby	Lang	West Yost Associates	
Jeannine	Lanphear	North Brunswick Twp Public Schools	
Paula	Lazrus	St John's University	
Miku	Lenentine	Kapi'olani Community College	CERENE (Center for Resilient Neighborhoods)
Nina	Leonhardt	Suffolk County Community College	
Laura	Liu	IUPUC	Education
Lynn	Maelia	Mount Saint Mary College	Division of Natural Science
Liz	Malanaphy	Just Add Water	
Christine	Marizzi	BioBus	
Danielle	Mink-Bellizzi	New York Academy of Sciences	
Joydeep	Mitra	Hunter College CUNY	
Ernest	Monaco	Flemington-Raritan School District	Special Education
Jessica	Monaghan	Princeton University	
Melissa	Mullins	Baylor University	Center for Reservoir and Aquatic Systems Research
Kim	Murray	Texas A&M University-Texarkana	Sociology
Athulaprabha	Murthi	Yeshiva University	Biology
Dora	Nelson	Carolina Day School	
Kenneth	Nicholson	Northeastern Illinois University	Chemistry
Fernando	Nieto	SUNY Old Westbury	Biology
Claudio	Otero III	University of Lynchburg	
Erin	Pavloski	Olivet College	
Evangelina	Pena	Gill St. Bernard's School	

Houulalahui	Perry	University of Hawai'i at Mānoa	College of Education CDS
Michelle	Phillips	Hawai'i Community College	Math and Natural Sciences
Amy	Plantarich	Jacques Cousteau National Estuarine Research Reserve	
Eliza	Reilly	National Center for Science and Civic Engagement	
Puali'i	Rossi-Fukino	Kaua'i Community College	
Emma	Sagarese	Newmark High School	
Dorothy	Salinas	County college of Morris	Biology and chemistry
Diana	Samaroo		
Sharadha	Sambasivan	Suffolk Community College	Physical Sciences
Usha	Sankar	Fordham University	
Elaine	Savory	New School University	
Noha	Shawki	Illinois State University	
Sonali	Shetty	public school	
Shayla	Shorter	Hofstra University	
Jada	Siverand	Lehigh University	Earth and Environmental Sciences
Caroline	Sloan	Durham Technical Community College	
Davida	Smyth	Texas A&M-San Antonio	Microbiology
Ayisha	Sookdeo	Stella and Charles Guttman Community College at CUNY	Biology
Kayla	Sorin	YingHua International School	
Emilie	Stander	Raritan Valley Community College	Science & Engineering
Kaeti	Stoss	Rochester Institute of Technology	
Ryan	Tainsh	Johnson & Wales University	
Naushin	Tambo	West Windsor-Plainsboro Regional School District	Science
Dennis	Taylor	Hiram College	Biology

Cheryl	Terranova	jackson School District, Jackson, NJ	science
Julie	Trachman	Hostos Community College	Natural Sciences
Bhawani	Venkataraman	Eugene Lang College of Liberal Arts at the New School	Department of Natural Sciences and Mathematics
Randy	Weintraub	Princeton International School of Mathematics and Science	Chemistry
Erin	Wheeler	Monmouth County Vocational School District	
Kelly	White	New Mexico Museum of Natural History and Science	
Summer	Wilkie	Indigenous Food and Agriculture Initiative, University of Arkansas	
Carrie	Wright	University of Southern Indiana	Geology
Jihyeon Jessie	Yang	York University	Mathematics and Statistics
George	Zhou	University of Windsor	