



**NCSE 2019
ANNUAL
CONFERENCE**

**Sustainable Infrastructure
& Resilience**

January 7-10, 2019 • Washington, D.C.



**National Council for
Science and the Environment**

www.NCSEGlobal.org

NCSE would like to thank our 2019 Annual Conference Sponsors

PREMIER



GOLD



SILVER



BRONZE



SUSTAINING



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WELCOME

Dear Colleagues:

Welcome to the National Council for Science and the Environment 2019 Annual Conference. This year's conference program includes leaders, experts, and programming that spotlights new research, innovation, and the power of collaboration through partnering. During the next two days we will focus on the theme of Sustainable Infrastructure & Resilience which continues the discussions from the 2018 Annual Conference that aimed to create long-term, resilient, and comprehensive solutions to the most pressing needs facing current—and future—natural, built, social, and cyber infrastructure.

While much was achieved during last year's conference, we look forward to convening over the next few days to build upon last year's discussions and continue efforts in improving the scientific basis of environmental policy and decision-making.

Science plays an integral role across all aspects of society and the planet. It provides the capacity to inform resilience and readiness plans, respond to knowledge gaps with study and research, and educate future generations with the skills to embrace the path ahead. Investment in a broad array of next generation infrastructure can foster more sustainable communities and enhance resilience in the face of multiple accelerating socio-environmental and security threats.

The rapid pace of science and technological change provides important opportunities for human prosperity and well-being. Infrastructure is the interconnected system of the physical, natural, and social components that societies need to function. We are living in a world of convergence in which the strains and demands on infrastructure accelerate the urgency for sustainability science and education.

In alignment with NCSE's mission to improve the scientific basis of environmental decision-making, we spent 2018 facilitating stronger connections between science and decision-makers specifically on science policy interface with resilience at the center of attention. We have focused on the best methods for communities to improve their readiness and better plan for the changing climate; make informed decisions that protect the assets of places including people and the environment; and accelerate value for and use of science in environmental decision-making.

On behalf of the NCSE Board of Directors, staff, and myself, we are pleased to be working with you and we welcome you to the NCSE 2019 Annual Conference. We hope you enjoy the next few days in Washington, D.C. Thank you for your continued support, trust, and involvement in service to science and the environment.

Warmest,



Michelle Wyman
Executive Director



Michael Carvalho
Chair, NCSE Board of Directors

SCHEDULE AT A GLANCE

MONDAY, JANUARY 7, 2019

- 8:00 a.m. - 5:00 p.m.** **NCSE 2019 Winter Member Meeting**
3:00 p.m. - 6:30 p.m. Registration Open
5:00 p.m. - 5:30 p.m. **Members Only Welcome Reception**
5:30 p.m. - 7:00 p.m. **Welcome Reception and Exhibits Open**

TUESDAY, JANUARY 8, 2019

- 7:30 a.m. - 8:30 a.m. Networking Breakfast with Exhibitors
8:00 a.m. - 5:00 p.m. Registration Open
8:30 a.m. - 9:00 a.m. **Welcome and Opening Remarks**
9:00 a.m. - 9:30 a.m. **Keynote 1: Blueprint for Tomorrow: Economic Transformation Through Science**
9:30 a.m. - 10:15 a.m. **Plenary 1: Transforming How Companies Operate in a New Carbon Economy: Industry Leading Innovation**
10:15 a.m. - 10:45 a.m. Networking Coffee Break with Exhibitors
10:45 a.m. - 12:15 p.m. **Concurrent Sessions Group A**
12:30 p.m. - 1:45 p.m. **2019 NCSE Lifetime Achievement Awards on Science, Service, and Leadership**
Lunch Served
2:00 p.m. - 3:30 p.m. **Concurrent Sessions Group B**
3:30 p.m. - 4:00 p.m. Networking Coffee Break and Poster Presentations
4:00 p.m. - 5:30 p.m. **Concurrent Sessions Group C**
5:45 p.m. - 7:45 p.m. **An Evening Discussion on Science, Ecology, and Hope**
Film Screening and Discussion. Light snacks provided

WEDNESDAY, JANUARY 9, 2019

- 7:30 a.m. - 8:30 a.m. Networking Breakfast with Exhibitors
8:00 a.m. - 4:00 p.m. Registration Open
8:30 a.m. - 9:15 a.m. **Keynote 2: Cultivating Productive Optimism in Environmental Science**
9:15 a.m. - 10:00 a.m. **Plenary 2: Information and Decision Making: Response, Recovery, and Resilience**
10:00 a.m. - 10:30 a.m. Networking Coffee Break with Exhibitors
10:30 a.m. - 12:00 p.m. **Concurrent Sessions Group D**
12:00 p.m. - 1:20 p.m. **New Perspective on Climate from NASA: From Exoplanets to Earth Planets**
Lunch Served
1:30 p.m. - 3:00 p.m. **Concurrent Sessions Group E**
3:00 p.m. - 3:45 p.m. **Plenary 3: Applying the Convergence of Knowledge, Technologies, and Science to Resilience Thinking: The Case of RISE- PR and the Reconstruction of Puerto Rico's Electric System**
3:45 p.m. - 5:00 p.m. **John H. Chafee Memorial Lecture on Science, Policy, and the Environment**

THURSDAY, JANUARY 10, 2019

- 8:00 a.m. - 4:30 p.m.** **NCSE Academic-Federal Dialogue and Science Policy Symposium**
(Registration Required)
8:00 a.m. - 5:00 p.m. **Related Organization Event: The Coastal Society's Coastal Career Workshop**
(Registration Required)
9:00 a.m. - 12:00 p.m. **Identifying Innovation in Teaching and Learning Resilience: Mapping Assets & Best Practices**
1:00 p.m. - 4:00 p.m. **Progress on Building a Competency Based Curriculum for Sustainability**

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REGISTRATION DESK

The registration desk is located in the West Registration area of the Omni Shoreham and will also serve as the **Information Desk** to help answer any of your questions during the conference. Please let us know how we can maximize your attendee experience.

The Registration Desk will be staffed during these hours:

Monday, January 7	3:00 p.m. - 6:30 p.m.
Tuesday, January 8	8:00 a.m. - 5:00 p.m.
Wednesday, January 9	8:00 a.m. - 4:00 p.m.

CONFERENCE WIFI

Complimentary WiFi is available in the session rooms.

Network Name: NCSE2019

Password: science

VISIT THE NCSE EXHIBIT BOOTH

Be sure to visit the NCSE Exhibit Booth located in the Ambassador Ballroom to meet with NCSE staff and leaders.

Monday, 5:30 p.m. - 7:00 p.m.	Meet the NCSE Staff
Tuesday, 7:30 a.m. - 8:30 a.m.	NCSE Membership
Tuesday, 10:15 a.m. - 10:45 a.m.	NCSE EnvironMentors Chapter Leaders
Wednesday, 7:30 a.m. - 8:30 a.m.	NCSE Membership
Wednesday, 10:00 a.m. - 10:30 a.m.	NCSE Science Policy and Research Programs

NEW PRESENTATION FORMAT: NCSE FLASH TALKS

Flash Talks take place during the 90-minute concurrent session blocks and feature short presentations followed by Q&A. Flash Talks are designed to quickly engage the audience on a concept or idea and encourage follow up with the speakers. Part of the value of the NCSE Annual Conference is the opportunity to network with colleagues and peers, and these talks will facilitate productive and engaging conversations between the session presenters and the audience.

We encourage you to attend these exciting Flash Talk sessions:

Tuesday, January 8, 4:00 p.m. - 5:30 p.m.

S-C8: Urban-Rural Connection: Infrastructure for Food, Energy, and Water

Wednesday, January 9, 1:30 p.m. - 3:00 p.m.

S-E4: Innovation in Resilience: Physical, Financial, and Metrics

SHARE YOUR EXPERIENCE ON SOCIAL MEDIA

Stay connected with NCSE on social media and post about the conference using **#NCSE2019**.

Follow NCSE on:

LinkedIn: National Council for Science and the Environment (NCSE)

Facebook: @NCSEGlobal

Twitter: @NCSEGlobal

NCSE PROGRAMS



NCSE MISSION

The mission of NCSE, to improve the scientific basis of environmental decision-making, dates back to 1990. NCSE occupies a long-standing, non-partisan role at the science-policy interface and specializes in programs that engage scientists, educators, policymakers, business leaders, and officials at all levels of government.

POLICY AND DECISION-MAKING

Policy work at NCSE is motivated by the belief that environmental decisions will be more robust if science is effectively connected to the decision-making process and scientists are engaged participants. We are committed to working with all levels of government and are particularly dedicated to a non-partisan approach to support environmental decision-making. The policy and decision-making program works to:

- Facilitate and catalyze science-policy dialogue through webinars, convenings, roundtables, and briefings
- Connect NCSE's academic members with opportunities to engage with, influence, and collaborate with local, state, and federal decision-makers
- Provide opportunities for members to develop skills for science policy communication and engagement, including developing policy issue briefs
- Inform members on policy context relevant to environmental science through our monthly policy news brief, *NCSE Policy Pathways*

INTERNATIONAL INITIATIVES

Recognizing that the most significant and pressing environmental problems transcend national borders, NCSE is developing a new portfolio of work with the ambition of advancing the use of science to inform environmental decision-making internationally. NCSE's international initiatives advance the following objectives:

- Broaden the spectrum of scientific knowledge available and relevant to international policy-making, including making the knowledge and expertise of the NCSE members accessible to international decision-makers, leaders, and influencers
- Grow and support an academic culture that promotes and incentivizes proactive engagement with policy and decision-makers at all levels of government and across sectors
- Nurture awareness and value by decision-makers for the use of science in environmental governance

NCSE's current international partners include Inserm (Institut National de la Santé et de la Recherche Médicale), the Embassy of France in the United States, and UN Environment. Long Island University supports the LIU-NCSE Global Science Diplomacy Fellowship program.

BUILDING THE NCSE RESEARCH AGENDA

For many years, NCSE has produced a series of reports for our members, charting the development of interdisciplinary environment, sustainability, and energy related programming across the higher education landscape. As NCSE formulates the next phase of research, we will:

- Conceptualize our membership and stakeholders as leading actors within a system that produce and communicate knowledge to inform policy and decision-making
- Allow for a critical and strategic look at the environmental field that can inform continuing efforts to invest in educational programming that meets society's changing needs
- Apply this holistic approach to an analysis of resilience-oriented education and research

FIND OUT MORE ABOUT ALL NCSE PROGRAMS ON OUR NEWLY DESIGNED WEBSITE

www.NCSEGlobal.org

RESILIENCE

NCSE is leading an ongoing portfolio of efforts and activities that focus on scientists and decision-makers working together to achieve a more resilient and sustainable future. In 2018, NCSE was able to:

- Launch a series of regional resilience roundtables in collaboration with universities, community colleges, and local government to convene scientists and decision-makers to consider the possibilities of accelerated impact, relevancy, and resources through collaboration and advance planning at a local scale
- Support the Resilience through Innovation in Sustainable Energy (RISE) initiative that builds a collaborative platform to enhance the role that universities play in post-disaster recovery, readiness, reconstruction, and scholarship by connecting university faculty and administrators across the country to accelerate the use of science by decision-makers
- Host a Resilience Webinar Series, in partnership with Arizona State University and the Security and Sustainability Forum, which explored science-based decision-making for local government, policy, and finance linked to the theme of Sustainable Infrastructure and Resilience

NCSE PROJECT DRAWDOWN FELLOWSHIP

Project Drawdown is a global non-profit organization working to identify strategies that can reverse global warming. In Fall 2018, NCSE launched a new partnership with Project Drawdown. The work is based on the 2017 book *Drawdown*, which catalogs 100 comprehensive, pragmatic solutions utilizing existing technologies and knowledge. NCSE and Project Drawdown's joint initiative seeks to:

- Make the solutions outlined in *Drawdown* more accessible to faculty and administrators in higher education
- Translate the 100 solutions in *Drawdown* into curriculum templates that can be used across disciplines on college and university campuses
- Fit curriculum templates into existing courses or form the foundation of an entirely new course if a course related to this initiative does not exist at a college or university campus

ENVIRONMENTORS

Since 1992, NCSE has led EnvironMentors, a national college access program that matches students with environmental and science professionals, faculty, and college students in one-to-one mentoring relationships. The program motivates high school students who are underrepresented in the sciences to conduct environmental research and acquire skills that will allow them to build careers and become more active stewards of their communities and the environment. Participants in EnvironMentors develop critical thinking, experimental skills, and communication skills as they complete a rigorous research project and submit a research paper and scientific poster.

NCSE is always interested in working with organizations that would like to host a new EnvironMentors chapter. We will plan with your institution to ensure you are prepared to launch a strong, long-lasting, and sustainable chapter.



FIND OUT MORE ABOUT ALL NCSE PROGRAMS ON OUR NEWLY DESIGNED WEBSITE
www.NCSEGlobal.org

NCSE MEMBERSHIP

The backbone of NCSE's programmatic work is its institutional members: four-year and two-year colleges and universities that work collectively with NCSE to advance meaningful work between science, education, and policy. NCSE engages with colleges and universities across the country to provide them with new research and resources, create forums for collaborations, and connect them with a broader community of researchers, funding organizations, and decision-makers. Membership benefits extend across the whole institution and help strengthen a multi-disciplinary campus network.



LEADERSHIP AND COMMUNITY

- Network with peers on the Council of Environmental Deans and Directors (CEDD) and the Community College Alliance for Sustainability Education (CCASE)
- Join a Community of Practice, a technical working group that works to support and amplify education, research, and analysis from higher education institutions through a variety of topic areas
- Access NCSE's network of influencers, including policy-makers and influential leaders across scientific and academic societies, government at all levels, and the private sector
- Receive the *NCSE Weekly Members News & Exchange* to highlight your institution and read about opportunities and resources, the monthly *NCSE Policy Pathways* for in-depth analysis of the intersection of science and policy, and the members-only listserv to connect with peers across the country.



RESEARCH AND EDUCATION

- Learn from NCSE's education research reports, including the 2018 *Energy Programs in Higher Education in the United States: Assessing Trends Across Two Pathways to Knowledge Development*
- Attend the NCSE Annual Conference and Academic-Federal Dialogue and Science Policy Symposium with select complimentary and unlimited discounted registrations
- Participate in the NCSE science policy leadership webinar series
- Invest in youth and diversity through EnvironMentors and related programs



POLICY AND DECISION-MAKING

- Connect scientists with decision-makers at federal, state, and local scales
- Empower scientists to engage in the policy discourse through trainings in policy communication and other important skills
- Contribute to Resilience through Innovation in Sustainable Energy (RISE), a new initiative to enhance the role that universities play in post-disaster recovery, readiness, reconstruction, and scholarship
- Expand engagement in the international space through NCSE's collaboration with the United Nations Environment
- Work with NCSE Applied Solutions to connect with local governments

For more information:
Kate Ceste
Member Communications and Engagement Officer
kceste@ncseglobal.org
202-596-3427

FIND OUT MORE ABOUT NCSE MEMBERSHIP ON OUR NEWLY DESIGNED WEBSITE

www.NCSEGlobal.org

University Affiliate Program

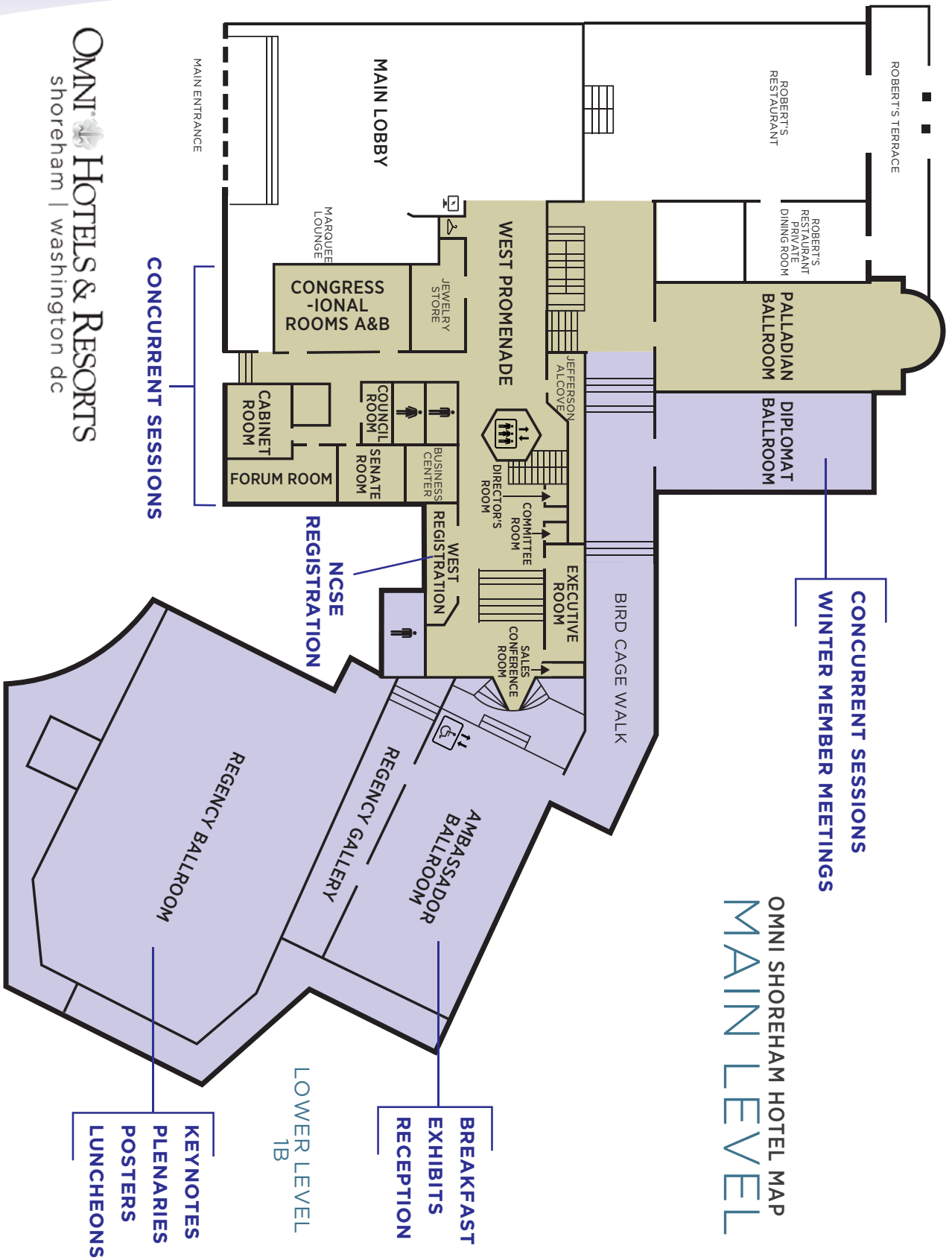
- Adelphi University ♦
- Alabama A&M University ♦♦
- Antioch University New England ♦♦
- Arizona State University ♦♦
- Arkansas State University ♦♦
- Ball State University ♦♦
- Bard College ♦♦
- Boston College ♦
- Boston University ♦♦
- California State University, Chico ♦
- Central Michigan University
- Chatham University ♦
- Clarkson University ♦
- Colby College ♦♦
- Colgate University ♦♦
- Columbia University ♦♦
- Dickinson College ♦♦
- Doane University
- Duke University ♦
- Duquesne University ♦♦
- Fairfield University ♦
- Florida International University ♦
- Franklin & Marshall College ♦♦
- George Mason University ♦♦
- Georgia State University ♦
- Goshen College ♦
- Heritage University ♦♦
- Indiana University ♦♦
- Iowa State University ♦
- Lehigh University ♦♦
- Long Island University
- Louisiana State University ♦♦
- Loyola University New Orleans ♦
- Macalester College ♦♦
- Manhattan College ♦
- Michigan State University ♦♦
- Middlebury College ♦♦
- Moravian College ♦♦
- New College of Florida ♦♦
- North Carolina A&T State University ♦♦
- North Carolina State University ♦♦
- Northeastern University ♦
- Northern Arizona University ♦♦
- Oberlin College ♦
- Purdue University ♦♦
- Rutgers, The State University of New Jersey ♦♦
- Salisbury University ♦
- Sewanee: The University of the South ♦♦
- Siena College ♦
- Smith College ♦♦
- Southern New Hampshire University ♦♦
- St. Mary's College of Maryland
- State University of New York College of Environmental Science and Forestry ♦♦
- Texas A&M University ♦♦
- The Evergreen State College ♦♦
- The George Washington University ♦♦
- The Ohio State University ♦♦
- The Pennsylvania State University ♦♦
- The University of Alabama ♦♦
- The University of Arizona ♦♦
- The University of New Hampshire
- The University of Rhode Island ♦♦
- The University of Texas Rio Grande Valley
- The University of Toledo ♦♦
- The University of Vermont ♦♦
- Tri-Co: Bryn Mawr College, Haverford College, and Swarthmore College
- Tufts University ♦♦
- Unity College ♦♦
- University of Alaska Fairbanks
- University of Arkansas ♦
- University of California, Davis ♦♦
- University of California, Merced ♦
- University of California, San Diego ♦♦
- University of Colorado Boulder
- University of Connecticut ♦♦
- University of Dayton ♦
- University of Findlay
- University of Hawai'i: Mānoa, Hilo, and West O'ahu
- University of Illinois: Urbana-Champaign, Chicago, and Springfield
- University of La Verne ♦♦
- University of Maryland Center for Environmental Science ♦♦
- University of Michigan ♦
- University of North Texas ♦♦
- University of Pennsylvania ♦
- University of Puerto Rico
- University of Rochester ♦♦
- University of South Carolina ♦♦
- University of the District of Columbia ♦♦
- University of Wisconsin-Madison ♦♦
- Warren Wilson College ♦
- Wellesley College
- West Virginia University
- Western Washington University ♦♦
- Williams College ♦
- Worcester Polytechnic Institute ♦♦
- Yale University ♦♦

Community College Alliance for Sustainability Education (CCASE)

- Bristol Community College ♦
- Dallas County Community College District ♦
- Hawai'i Community College
- Honolulu Community College
- Johnson County Community College ♦
- Kapi'olani Community College ♦
- Kaua'i Community College
- Leeward Community College
- Maui Community College
- Northern Virginia Community College ♦
- Saddleback College ♦
- Seminole State College of Florida ♦
- Windward Community College

♦ = 5+ Year Member ♦♦ = 10+ Year Member

ANNUAL CONFERENCE MAP



OMNI HOTELS & RESORTS
shoreham | washington dc



MONDAY, JANUARY 7, 2019

- 8:00 a.m. - 5:00 p.m.**
Diplomat Ballroom
- NCSE 2019 Winter Member Meeting**
- 5:00 p.m. - 5:30 p.m.**
Ambassador Ballroom
- Members Only Welcome Reception**
- 5:30 p.m. - 7:00 p.m.**
Ambassador Ballroom
- Welcome Reception & Exhibits Open**
Light hors d'oeuvres

TUESDAY, JANUARY 8, 2019

- 7:30 a.m. - 8:30 a.m.**
Ambassador Ballroom
- Networking Breakfast with Exhibitors**
- 8:30 a.m. - 9:00 a.m.**
Regency Ballroom
- Welcome and Opening Remarks**
Mike Carvalho, Chair, NCSE Board of Directors and President/CEO, Carvalho & Associates, P.C.
Michelle Wyman, Executive Director, National Council for Science and the Environment
- 9:00 a.m. - 9:30 a.m.**
Regency Ballroom
- Keynote 1: Blueprint for Tomorrow: Economic Transformation Through Science**
Jeff Nesbit, Executive Director, Climate Nexus
- 9:30 a.m. - 10:15 a.m.**
Regency Ballroom
- Plenary 1: Transforming How Companies Operate in a New Carbon Economy: Industry Leading Innovation**
Moderator: Elizabeth R. Cantwell, Ph.D., MBA, Chief Executive Officer of Arizona State University Research Enterprise (ASURE)
Grace Bochenek, Ph.D., Lead, Energy & Environment Center of Excellence, The SPECTRUM Group
Bob Dixon, Senior Vice President and Global Head of Efficiency & Sustainability, Siemens Industry, Inc
Kevin Etter, Director, Humanitarian Relief and Resilience Program, United Parcel Service (UPS) (Retired)
Rohan Patel, Director, Policy and Business Development, Tesla
- 10:15 a.m. - 10:45 a.m.**
Ambassador Ballroom
- Networking Coffee Break with Exhibitors**
- 10:45 a.m. - 12:15 p.m.**
Executive Room
- Concurrent Sessions Group A**
S-A1: Developing Consensus Around Program-Level Learning Outcomes and Key Competencies in Sustainability
S-A2: Community Energy Planning and Implementation - The Transforming Energy Market and Its Impacts on Communities
S-A3: Nature-Based Solutions and Standards for Climate Resilience, in Policy and Practice
S-A4: Building Forward: Closing the Gaps Between Climate Science, Decision-Making, and Engineering
- Congressional Room A*
- Diplomat Ballroom*
- Cabinet Room*

CONFERENCE AGENDA

10:45 a.m. - 12:15 p.m.

Congressional Room B

Forum Room

Senate Room

Council Room

12:30 p.m. - 1:45 p.m.

Regency Ballroom

Lunch Served

2:00 p.m. - 3:30 p.m.

Diplomat Ballroom

Council Room

Congressional Room A

Cabinet Room

Forum Room

Executive Room

Congressional Room B

3:30 p.m. - 4:00 p.m.

Regency Ballroom

4:00 p.m. - 5:30 p.m.

Cabinet Room

Senate Room

Congressional Room B

Executive Room

Forum Room

Concurrent Sessions Group A *continued*

S-A5: A Call for RENEWW Zones - A New Decentralized 'Nexus' Approach to Improving Resilience & Wellbeing in Peri-Urban Communities

S-A6: Mobility For All By All

S-A7: Collective Action: Design-Based Leadership for Resilience and Climate Adaptation in Florida

S-A8: An Emergency Medicine Perspective: Lancet Countdown on Health & Climate Change U.S. Brief and Implications for Healthcare

2019 NCSE Lifetime Achievement Awards on Science, Service, and Leadership

Paul Hawken, Founder and Writer, Project Drawdown

Introduction by **Tom Richard, Ph.D.**, Director, Institutes for Energy and the Environment, Pennsylvania State University

Julia Marton-Lefèvre, Former Director General, International Union for Conservation of Nature

Introduction by **James L. Buizer**, Professor, School of Natural Resources and the Environment, University of Arizona

Concurrent Sessions Group B

S-B1: Opportunities and Challenges for Climate-Smart Infrastructure: Lessons Learned From the California Experience

S-B2: Resiliency Partnerships That Support Military Readiness

S-B4: Spark: Firing up the NCSE Energy Education Community of Practice

S-B5: Achieving a Sustainable Resilience for Infrastructure and Communities: Challenges and Opportunities

S-B6: The Nation's Rural Water Infrastructure Concerns: Past, Current, and Future Development With Associated Health Assessments

S-B7: Natural Capital Accounting, Sustainable Infrastructure, and Resilience

S-B8: Smart Policies for a Changing Climate: Transportation Infrastructure, Natural Systems, and Community Development

Networking Coffee Break and Poster Presentations

Concurrent Sessions Group C

S-C1: Private Sector Roles in Building Community and Resilience

S-C2: Promoting Climate-Smart Healthcare Through Mitigation, Resilience, and Leadership

S-C3: Steering Towards Sustainability: Federal Highway Administration Research Updates

S-C4: Building Resilient Communities: Innovative Funding and Financing Solutions

S-C5: Building Resilient People, Communities, and Sustainable Green Infrastructure

CONFERENCE AGENDA



4:00 p.m. - 5:30 p.m.

Council Room

Diplomat Ballroom

Congressional Room A

Concurrent Sessions Group C *continued*

S-C6: Community Colleges as a Local Nexus to Contribute to Progress of the Sustainable Development Goals

S-C7: Place-Based Resiliency Planning and the Interface of Gray, Green, and Human Infrastructures - Case Studies of Milwaukee and Northern Virginia Regions

S-C8: Flash Talk - Urban-Rural Connection: Infrastructure for Food, Energy, and Water

5:45 p.m. - 7:45 p.m.

Regency Ballroom

An Evening Discussion on Science, Ecology, and Hope

Mary Evelyn Tucker, Ph.D., Senior Lecturer and Senior Research Scholar, Yale School of Forestry & Environmental Studies

John Grim, Ph.D., Senior Lecturer and Senior Research Scholar, Yale School of Forestry & Environmental Studies

Thomas Lovejoy, Ph.D., Professor, George Mason University and Senior Fellow, United Nations Foundation

Frank Sesno, Director of School of Media and Public Affairs, George Washington University

Harrison Watson, Biology Student, Jackson State University

WEDNESDAY, JANUARY 9, 2019

7:30 a.m. - 8:30 a.m.

Ambassador Ballroom

Networking Breakfast with Exhibitors

8:30 a.m. - 9:15 a.m.

Regency Ballroom

Keynote 2: Cultivating Productive Optimism in Environmental Science

Carl Page, President, Anthropocene Institute

Introduction by **Anne-Marie Slaughter**, President and CEO, New America

9:15 a.m. - 10:00 a.m.

Regency Ballroom

Plenary 2: Information and Decision Making: Response, Recovery, and Resilience

Moderator: Evan Lehmann, Editor, E&E News

Ryan Lanclos, Director, Public Safety Industry Solutions, Esri

Robert McGrath, Ph.D., Director of Renewable and Sustainable Industry Institute at University of Colorado Boulder

Shirlee Zane, Supervisor, Sonoma County, California

10:00 a.m. - 10:30 a.m.

Ambassador Ballroom

Networking Coffee Break with Exhibitors

10:30 a.m. - 12:00 p.m.

Director's Room

Concurrent Sessions Group D

S-D1: Sustainable Materials Management, Resiliency, and Natural Disaster Debris

S-D2: Realizing the New Carbon Economy: Innovations For Carbon Negative Infrastructure

S-D3: Career Pathways and Opportunities in Environment and Sustainability

Congressional Room B

Congressional Room A

CONFERENCE AGENDA

10:30 a.m. - 12:00 p.m.

Senate Room

Council Room

Executive Room

Forum Room

Cabinet Room

Concurrent Sessions Group D *continued*

S-D4: Community Science 101: Practical Tips and Real-World Strategies for Engaging With Communities

S-D5: Climate Change Adaptation and Mitigation For Natural Resource Agencies - A Case Study

S-D6: Climate-Ready Infrastructure: Federal Policy Opportunities and Challenges to Increase the Nation's Resilience

S-D7: 50th Anniversary of the Burning of the Cuyahoga: Science and Policy Working For Success

S-D8: Building Resilience Principles Into Higher Education: Challenges and Opportunities

12:00 p.m. - 1:20 p.m.

Regency Ballroom

Lunch Served

New Perspective on Climate from NASA: From Exoplanets to Earth Planets

James Green, Ph.D., Chief Scientist, NASA

Thomas Wagner, Ph.D., Program Scientist for the Cryosphere, NASA

1:30 p.m. - 3:00 p.m.

Congressional Room B

Cabinet Room

Forum Room

Congressional Room A

Director's Room

Executive Room

Council Room

Senate Room

Concurrent Sessions Group E

S-E1: Realizing the New Carbon Economy: Innovation and Design for Urban Ecosystem Engineering

S-E2: Orienting and Adapting Existing Institutions for Resilient Built and Natural Environments

S-E3: Translating Science Into Infrastructure Resilience: National Security Perspective

S-E4: Flash Talk - Innovation in Resilience: Physical, Financial, and Metrics

S-E5: Green Infrastructure Flood Control: How Flooding Contaminated Parks and Impacted Resident Perceptions of Environmental Health

S-E6: Bringing Science to Decision Makers - Innovative Partnerships to Promote Climate Resilience

S-E7: Wildland Fire: Understanding the Economic, Air Quality, and Water Impacts to Protect Public Health

S-E8: Best Practices in Integrating Smart-Infrastructure Development Needs With Biodiversity Conservation Priorities

3:00 p.m. - 3:45 p.m.

Regency Ballroom

Plenary 3: Applying the Convergence of Knowledge, Technologies, and Science to Resilience Thinking: The Case of RISE- PR and the Reconstruction of Puerto Rico's Electric System

Moderator: Valerie Luzadis, Ph.D., Professor, State University of New York College of Environmental Science and Forestry

Cecilio Ortiz García, Ph.D., Associate Professor, Department of Social Science, University of Puerto Rico-Mayagüez

Marla Pérez-Lugo, Ph.D., Professor, Sociology at the Department of Social Sciences, University of Puerto Rico-Mayagüez

Kim Diana Connolly, Professor; Clinical Legal Education Director; Vice Dean for Advocacy and Experiential Education, University at Buffalo, School of Law

Jacob Mans, AIA, Assistant Professor, University of Minnesota

Fernando Rivera, Ph.D., Associate Professor of Sociology, Director of Puerto Rico Research Hub, University of Central Florida

3:45 p.m. - 5:00 p.m.

Regency Ballroom

John H. Chafee Memorial Lecture on Science, Policy, and the Environment

Aaluk Edwardson, Artist, Teacher and Community Collaborator, University of Alaska Fairbanks Geophysical Institute and Ilisaġvik College
 Gary Geernaert, Ph.D., Director, Climate and Environmental Sciences Division, U.S. Department of Energy

THURSDAY, JANUARY 10, 2019

8:00 a.m. - 4:30 p.m.

Ambassador Ballroom

NCSE Academic-Federal Dialogue and Science Policy Symposium

Additional Registration Required

8:00 a.m. - 5:00 p.m.

Executive Room

Related Organization Event: The Coastal Society's Coastal Career Workshop

Additional Registration Required

9:00 a.m. - 12:00 p.m.

Forum Room

Identifying Innovation in Teaching and Learning Resilience: Mapping Assets & Best Practices

1:00 p.m. - 4:00 p.m.

Forum Room

Progress on Building a Competency Based Curriculum for Sustainability

NATIONAL COUNCIL FOR SCIENCE AND THE ENVIRONMENT AND LONG ISLAND UNIVERSITY GLOBAL PARTNERSHIP

The National Council for Science and the Environment has entered into a global partnership with Long Island University (LIU) to advance the shared priority of work on science policy internationally. LIU and NCSE have established several initiatives as part of the collaboration:

- **Román Macaya Hayes Global Science Diplomacy Fellowship** - honors Román Macaya Hayes, a scientist and former Costa Rican Ambassador to the United States widely known for his work to advance global science diplomacy. The inaugural fellows are Dr. Alan Gertler and Dr. Veera Mitzner.
- **Certificate in Science Diplomacy** - provides students with the opportunity to work alongside a network of global experts and international scientists at sites such as the Sub-Antarctic Biocultural Center located at the southern tip of Chile.
- **International Science Alliance on Environmental Health** - explores opportunities to increase engagement and collaboration between the scientific community and policy-makers to improve the scientific basis of environmental decision-making at all levels of government with a focus on environmental health.



TUESDAY, JANUARY 8

WELCOME AND OPENING REMARKS

Regency Ballroom - 8:30 a.m. - 9:00 a.m.



Mike Carvalho, Chair, NCSE Board of Directors; President, Carvalho & Associates

Michael Carvalho is the President of Carvalho & Associates, P.C., a law firm he founded in 2004. Carvalho concentrates his practice in environmental and construction law, complex litigation and energy matters. He is an experienced trial lawyer and has both successfully defended and prosecuted claims in connection with violations of the federal Clean Water Act, Superfund, the Clean Air Act, and Resource Conservation and Recovery Act, among other environmental laws. He has successfully defended clients in a broad range of construction matters, including the catastrophic failure of an earthen dam. He regularly advises clients on environmental risk management, construction-related Best Management Practices, and transactional matters involving risk allocation and transfer (Brownfields). Carvalho also counsels clients in regulatory, permitting, and licensing in the areas of Coastal Zone Management, Climate Change (planning, adaptation, and mitigation), Renewable

Energy, Clean Water Act compliance, and Hazardous Waste Management.



Michelle Wyman, Executive Director, National Council for Science and the Environment

Michelle Wyman has worked on energy and environmental policy with states and local governments for over 15 years, developing strategic and tactical solutions to their energy planning, climate mitigation, and adaptation challenges. Before joining NCSE, she served as Director of Intergovernmental Affairs at the U.S. Department of Energy (DOE). She founded Applied Solutions-Local Governments Building a Clean Economy and led ICLEI USA, both of which are non-profits engaging directly with cities, counties, and states on clean energy, environmental, and sustainability issues. Wyman has served in a wide variety of leadership capacities including with the World Bank and United Nations. She was Natural Resources Director of the city of Fort Collins, Colorado.

KEYNOTE 1:
BLUEPRINT FOR TOMORROW:
ECONOMIC TRANSFORMATION THROUGH SCIENCE

Regency Ballroom - 9:00 a.m. - 9:30 a.m.

With CO₂ levels rising dramatically, threatening human existence, climate change is no longer just an “issue.” It’s a critical reality that impacts every single inhabitant on this home called Earth. We find ourselves in a boxed canyon as a planet. In the next 10 to 15 years, life as we know it will start to change irreversibly. But there is a realistic way out. How can we effect lasting change with such an overwhelming crisis? The answer is in the opportunity that the crisis of climate change has created, one unparalleled in the world’s history. Over the next 15 years, necessary infrastructure shifts will cost \$90 trillion dollars, most revolving around energy needs. We’re going to spend that money regardless. But how and where we spend those dollars is what matters.

Jeff Nesbit, Executive Director of Climate Nexus, will share his blueprint for real-time, workable solutions we can tackle together. As laid out in his most recent book, *This Is the Way the World Ends*, Nesbit’s blueprint explores the current economic transformation and offers a realistic, doable, and innovative plan—one that works with nearly every sector of the economy, each country at some level, and relies on individual decisions rather than international treaties. It’s a path forward that prevents the worst impacts of climate change, provides sustainable energy—enough for the world’s energy requirements—and could simultaneously lead to the greatest economic resurgence in history.

KEYNOTE



Jeff Nesbit, Executive Director, Climate Nexus

Jeff Nesbit is the executive director of Climate Nexus, a sponsored project of Rockefeller Philanthropy Advisors that works with science, technology, public health, energy, and environmental organizations on climate and clean energy issues and solutions. Nesbit was the director of legislative and public affairs at the National Science Foundation from June 2006 to June 2011. Previously, he managed his own strategic communications consulting firm in Washington; served as a senior communications official at the Food and Drug Administration and White House during the administration of President George H.W. Bush; and was a national journalist with Knight-Ridder and others. Nesbit is the author of *Poison Tea* and 25 other books.

PLENARY 1:

TRANSFORMING HOW COMPANIES OPERATE IN A NEW CARBON ECONOMY: INDUSTRY LEADING INNOVATION

Regency Ballroom - 9:30 a.m. - 10:15 a.m.

The fragile balance of opportunities and challenges the world faces in the race to curb the frequency and intensity of extreme weather events requires new cradle-to-grave approaches to carbon management by leaders in industry, academia, and government. This plenary, led by Arizona State University, will feature how Tesla, UPS, The SPECTRUM Group, and Siemens are preparing for an economy that must treat carbon very differently to move the world and its infrastructure—natural, cyber, social, and built—on a forward looking path that anticipates dynamic climate and markets. Each company will address how they are investing in research and approaches to innovation to transform their operations, business practices, and supply chains, and engage with customers to address carbon utilization across their business enterprises.

MODERATOR



**Elizabeth R. Cantwell, Ph.D., Chief Executive Officer of Arizona State University
Research Enterprise (ASURE)**

Dr. Elizabeth R. Cantwell is responsible for leading the creation, management, and capture of large-scale, externally funded programs and projects that advance the University's research enterprise. She works with her Board and ASU leadership on a portfolio of institutional level initiatives and the pursuit of new partnerships and resources to advance those initiatives, including support for applied faculty research with defense and intelligence endpoints. She is a Professor of Practice in the Fulton Schools of Engineering, and an Affiliate of the School for Earth & Space Exploration and The School for the Future of Innovation in Society at Arizona State University.

PANELISTS



**Grace Bochenek, Ph.D., Lead, Energy & Environment Center of Excellence,
The SPECTRUM Group**

As the leader of The SPECTRUM Group's Energy & Environment Center of Excellence, Dr. Grace Bochenek supports clients throughout the technology and innovation product lifecycle, from navigating research and technology development opportunities, to strategizing and building technology investment, and developing partnership and commercialization opportunities. She specializes in strategic planning, organizational design, technology roadmapping, and product delivery plans. Prior to joining The SPECTRUM Group, Bochenek was appointed by President Obama as the Acting Secretary of the Department of Energy (DOE). She also previously served as Director of the National Energy Technology Laboratory, Chief Technology Officer for the Army Materiel Command (AMC), Director of U.S. Army TARDEC, and as the Deputy PEO for Combat Support & Combat Service Support.



Bob Dixon, Senior Vice President and Global Head of Efficiency & Sustainability, Siemens Industry, Inc.

Bob Dixon is an industry veteran and visionary with over 34 years of experience in building systems, facility operations, energy conservation and management. As the Senior Vice President and Global Head of Efficiency & Sustainability at Siemens Industry, Inc., Building Technologies Division, Dixon leads all strategic global initiatives on building efficiency and sustainability including strategic planning, operations, product/solution development, program implementation, business development, and mergers and acquisitions.



Kevin Etter, Director, Humanitarian Relief and Resilience Program, United Parcel Service (UPS) (Retired)

Through work over three decades with UPS (United Parcel Service), Kevin Etter is a knowledge leader in humanitarian and international aid logistics and supply chain service innovation. Career highlights include aircraft fleet acquisition and integration; strategic mergers and acquisitions; pharmaceutical, medical device, and health products supply chain innovation; and new approaches to corporate social responsibility. Etter played a critical role in many of the UPS Foundation's humanitarian and public health initiatives including a Medical Drone Network, skilled volunteer programs, and thought leadership efforts in helping to strengthen Ministries of Health across Africa by leveraging the UPS global network.



Rohan Patel, Director, Policy and Business Development, Tesla

Rohan Patel serves as the director of policy and business development at Tesla, where he oversees regulatory and legislative efforts throughout North America. Previously, he served as Special Assistant to the President and Senior Advisor for Climate and Energy Policy, where he worked on a range of power sector and transportation policies. In addition, Patel was President Obama's primary liaison with city and county officials. He also served as Associate Director at the White House Council on Environmental Quality, overseeing climate change and conservation issues.

CONCURRENT SESSIONS GROUP A

10:45 a.m. - 12:15 p.m.

S-A1: DEVELOPING CONSENSUS AROUND PROGRAM-LEVEL LEARNING OUTCOMES AND KEY COMPETENCIES IN SUSTAINABILITY

Location: Executive Room

Every year, new sustainability degree programs are launched at colleges and universities across the US joining a global trend of sustainability degree programs offered at higher education institutions. Important questions for the field of sustainability in higher education relate to defining programmatic outcomes or standards, conduct program assessment, design processes of program development and administration, and communicate the skills and abilities sustainability graduates would have to potential employers. In early 2018, the National Council for Science and the Environment (NCSE) launched a process focusing on “key competencies” in sustainability degree programs in collaboration with NCSE member institutions, including the School of Sustainability at Arizona State University (ASU) and University of Northern Arizona (NAU) and the Sustainability Curriculum Consortium (SCC). The goal of this initiative is to create a “Consensus Statement” on sustainability competencies employing an expert-based Delphi-Study and participatory professional meetings as methods for data collection.

The breakout session at the NCSE Annual Conference, led by members in this initiative, will report on the current state of research on key competencies in sustainability and on the preliminary and aggregated data gathered through the Delphi-Study and the preceding professional meetings on program level learning outcomes related to key competencies in sustainability. Participants are invited to review the collected data and contribute their experiences, insights, and rankings to the emerging consensus building process. The session will conclude with discussing next steps to finalize the consensus building process.

Presenters:

Christopher G. Boone, Ph.D., Dean of the School of Sustainability, Arizona State University

Katja Brundiers, Ph.D., Assistant Research Professor, Arizona State University

Rod Parnell, Ph.D., Professor, Northern Arizona University

Ira R. Feldman, J.D., M.Sci., Founder and Managing Director, Sustainability Curriculum Consortium (SCC)

S-A2: COMMUNITY ENERGY PLANNING AND IMPLEMENTATION - THE TRANSFORMING ENERGY MARKET AND ITS IMPACTS ON COMMUNITIES

Location: Congressional Room A

The transformation of the energy market is accelerating, creating new opportunities for communities. Technology, business, and institutional structures are enabling transitions from centralized regional structures to more decentralized frameworks with higher reliability, resiliency, competitive costs, and dramatically lower carbon emissions. Through rigorous Community Energy Planning and effective implementation, communities and their governments can benefit greatly from this transition. This planning directly supports resilient, sustainable development and related infrastructure, and creates a magnet to new investment and high-quality employment.

The session will review a typical Community Energy Planning process for the built-environment and transportation. Parallel Analytical and Community Engagement methodologies will be addressed. The data acquisition and analysis strategies will be discussed, along with an integrated scenario-based approach to select optimum long-term strategies tailored to the specific community. These strategies will balance economic and environmental sector-based outcomes with technical, policy, institutional and business supporting measures, along with multi-year targets. Community Energy Planning best practice is empirical, data-driven and measurable.

The Analytical Process informs an equally rigorous and structured Community Engagement Process. Successful Community Energy Plans are supported by a highly engaged and informed network of influential public and private stakeholders, who inform and support the Plan's development, approval, and implementation. The session will discuss Community Engagement process, methods, and tactics and the emerging role in of engagement standards in community energy planning as supported by the International Association of Public Participation. The session also specifically addresses the unique role of local governments in driving energy planning and implementation.

Presenters:

Peter Garforth, President, Garforth International llc

Oliver Baumann, President, Baumann Consulting Inc

Herbert Sinnock, Manager Sustainable Energy, Sheridan College

Robert Kerr, President, Robert J. Kerr + Associates

S-A3: NATURE-BASED SOLUTIONS AND STANDARDS FOR CLIMATE RESILIENCE, IN POLICY AND PRACTICE

Location: Diplomat Ballroom

Healthy and diverse ecosystems provide ecosystem goods and services in food security, water provision, disaster risk reduction, and carbon storage and sequestration, among others. With these multiple functions, healthy ecosystems play a key role in building climate resilience of the most vulnerable and contribute to the sustainable reduction of poverty and food insecurity. Within the narrative and actions towards adaptation to climate change, Nature-based solutions (NbS) - actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges for both human well-being and biodiversity benefits - should be an integral aspect of building climate-resilient communities, ecosystems, and economies. NbS link sustainable socioeconomic development with traditional biodiversity and ecosystem conservation approaches as part of an overall strategy towards climate resilience, contributing to the achievement of development goals and climate commitments including the Paris Agreement and the Sendai Framework for Disaster Risk Reduction, and safeguarding human well-being in ways that enhance the resilience of ecosystems. In this session, experts across the spectrum of NbS will (1) Showcase nature-based actions being undertaken around the globe as green infrastructure in both rural and urban areas; (2) Demonstrate how climate risk information can guide nature-based solutions and adaptation options; and (3) Explore the transformational, integrated change that will be required to mainstream nature-based solutions into climate resilience policies and actions.

Session Organizer: Emily Goodwin, International Union for the Conservation of Nature, Programme Assistant, Ecosystem-based Adaptation

Presenters:

Mangrove ecosystems as natural infrastructure, and opportunities for restoration in both science and policy

Emily Landis, The Nature Conservancy

Ecosystem-based Adaptation in Mountain Regions of the Himalayas, Andes, and Mt. Elgon

Erin Gleeson, The Mountain Institute

Climate Risk Information to Guide Nature-based Solutions

Cynthia Rosenzweig, Center for Climate Systems Research, NASA GISS/Columbia University

Nature-based solutions in International development & Aid

Jennifer Kane, Biodiversity and Natural Resources Specialist, U.S. Agency for International Development

The Idea of "Nature's Infrastructure" in the age of the Anthropocene

Nancy Lee Wood, Ph.D., Director and Coordinator of Sustainability Studies Program, Institute for Sustainability and Post-carbon Education - Bristol Community College

S-A4: BUILDING FORWARD: CLOSING THE GAPS BETWEEN CLIMATE SCIENCE, DECISION-MAKING, AND ENGINEERING

Location: Cabinet Room

To build resilient and sustainable infrastructure in the face of climate change requires forward-looking science, robust decision-making procedures in the face of deep uncertainty, risk management approaches for high-stakes investments, and enabling conditions that allow resilient infrastructure to be built. Connecting climate science with infrastructure engineering, however, is challenging; the technical nature of both would seem to make that connection easier than in other areas of practice, but engineering is traditionally guided and carried out within the confines of carefully developed standards, codes and manuals of practice. Most climate-sensitive standards rest on historical data or are confined by regulatory requirements that do not permit the use of forward-looking climate projections. Moreover, there are significant barriers related to climate modeling, professional norms, and a wide range of additional regulatory, institutional and financial barriers that make the bridging of the climate science-engineering gap challenging. California Assembly Bill 2800 required a working group of scientists and engineers to make recommendations on how to close this gap and how to update the state's infrastructure design standards. This symposium provides a coherent set of building blocks to bridge that gap: advances in climate science to meet engineering needs; advances in decision-making approaches to facilitate decisions; and an example of a multi-objective risk management approach to a transportation project (high speed rail) in California. The opening presentation will set these presentations in the context of AB2800 and the recommendations developed by the Climate-Safe Infrastructure Working Group. Discussion with the audience will complete the session.

Presenters:

Susanne Moser, Ph.D., Principal Researcher, Stanford University

Dan Cayan, Ph.D., Climate Researcher, University of California, San Diego: Scripps Institution of Oceanography

James Deane, Senior Supervising Architect of the Rail Operations Group, CA High Speed Rail Authority

Robert Lempert, Ph.D., Frederick S. Pardee Center for Longer Range Global Policy and the Future Human Condition; Principal Researcher; Professor, Pardee RAND Graduate School

S-A5: A CALL FOR RENEWW ZONES - A NEW DECENTRALIZED 'NEXUS' APPROACH TO IMPROVING RESILIENCE & WELLBEING IN PERI-URBAN COMMUNITIES

Location: Congressional Room B

By 2030, impoverished peri-urban areas are expected to double in size to almost two billion people. Rapid urbanization is already outpacing many city governments' ability to extend basic services to slums and informal settlements, while centralized legacy infrastructure systems are breaking down. How will cities that cannot meet their populations' needs for sustainable water, food, energy, and sanitation now be able to meet them in future?

This session focuses on the emerging principles and practice of implementing linked Renewable Energy, Nutrition, Environment, Water, and Waste systems in "RENEW" Zones, a new planning and development model launched at Habitat III in Quito (2016). RENEWW Zones are based on decentralized, closed-loop models of spatial planning and peri-urban service provision that harness innovations at the nexus of food, energy, water, sanitation, and other systems to improve standards of living and well-being of populations. Such an approach represents a move towards an optimized planning framework that creates local employment opportunities, reinvests profits locally to propel economic growth, and utilizes community-based governance and finance models.

During the first half of the session, panelists will introduce the core function and value of RENEWW Zones, as well as examine related technological, social/enterprise, and business model implications of such an approach. Supporting this, related experiences and case studies from South Africa, India, and South East Asia will be introduced. The second

half of the session will feature an interactive audience discussion that collaboratively explores where first-of-their-kind RENEWW Zones might be best supported and developed.

Presenters:

Joshua Foss, CEO, Regensia

Vatsal Bhatt, Director of Cities and Communities, U.S. Green Building Council

Jan Mueller-Volmer, Principal Engineer and Sustainability Strategist, EnviroNet

Prachi Vakharia, Managing Director/CTO, Womanium

Alicen Kandt, Senior Engineer, National Renewable Energy Laboratory (NREL)

S-A6: MOBILITY FOR ALL BY ALL

Location: Forum Room

In the next decade, St. Louis could spend \$2 billion on an expansion of its Metrolink light rail system. The proposed Northside/Southside (NS/SS) alignment is intended to help stabilize and revitalize the most challenged neighborhoods in St. Louis while better connecting them to jobs and services. Decades of displacement and disinvestment in neighborhood resources have resulted in a city where the access gap is as stark as the nearly twenty-year gap in life expectancy, and where trust in developers and agencies is deservedly low. This multi-billion dollar infrastructure investment has the potential to help balance that gap.

This session will feature the Mobility For All By All (MFABA) project, an interdisciplinary investigation that emerged from a desire to assure that the NS/SS expansion be designed to be inclusive, accessible, and grounded in the community. The project is premised on the idea that mono-functional infrastructure is not enough; next generation infrastructure must contribute to quality of life for all and actively improve rather than degrade environmental conditions. Our metrics for success should reflect these priorities.

The interdisciplinary team includes designers, architects, artists, scholars, and neighborhood activists in partnership with Bi-state development (Metro) and East/West Gateway (regional planning). The project incorporates three unique methods to achieve the above goal: a metrics system that gauges equity progress utilizing opportunity mapping; artist/activist-led teams who engage residents around the most challenged proposed station locations; and incorporating the concepts of MFABA and next gen infrastructure into urban design studio and seminar coursework around the NS/SS alignment.

Presenters:

Matthew Bernstine, Sr. Urban Designer, Washington University in St. Louis

Linda C. Samuels, Ph.D., Associate Professor in Urban Design, School of Architecture, Washington University in St. Louis

Lisa Cagle, Public Policy Research Fellow, Bi-State development

Iris E. Patten, Ph.D., Principal, Geospatial Collaborative LLC

Antionette Carroll, Founder, President & CEO, Creative Reaction Lab

S-A7: COLLECTIVE ACTION: DESIGN-BASED LEADERSHIP FOR RESILIENCE AND CLIMATE ADAPTATION IN FLORIDA

Location: Senate Room

In 2017 Climate Central reported a list of American cities most at risk from climate change. Of the 25 cities listed, 22 are in the state of Florida. Significant efforts to prepare and adapt are ongoing at the municipal and county level but Florida lacks a robust statewide effort to plan for the results of climate change. Given the disproportionate share of need across the state, Florida Universities are aggressively working towards research, pedagogy, and outreach in the rapidly developing realm of coastal resilience and adaptation. Design-based institutes, centers, and research collaborations are producing trans-disciplinary research to help communities adapt to increased vulnerability and risk.

These efforts are significant not only for the communities served but for the processes that guide, govern, and reward effective university research coupled with public action. Design research is proving to be an effective methodology to connect a broad coalition of university researchers – spanning the humanities, arts, and sciences – to climate-related challenges.

However, climate adaptation is going to require an integrated vision statewide. In addition to reflection on individual challenges and successes, a primary goal of the panel is to identify opportunities, structures, and mechanisms for growing a statewide network of design-centered resilience-based research.

Presenters:

Jeff Carney, Associate Professor, University of Florida, Associate Director, FIBER

Nancy Clark, Associate Professor, University of Florida, Director, UF Center for Hydro-generated Urbanism

Martha Kohen, Director, University of Florida Center for Hydro-generated Urbanism and Member, UNESCO Chair Sustainable Urban Quality and Urban Culture, Rome

Jeff Huber, Associate Professor, Florida Atlantic University

Marilys Nepomechie, Professor and Associate Dean, Florida International University

S-A8: AN EMERGENCY MEDICINE PERSPECTIVE: LANCET COUNTDOWN ON HEALTH & CLIMATE CHANGE U.S. BRIEF AND IMPLICATIONS FOR HEALTHCARE

Location: Council Room

Emergency medicine has primary roles in prehospital care, healthcare access and coordination, disaster management, and care for disproportionately-affected populations. All of these roles ensure that emergency physicians will play important parts in responding to the impacts of climate change. At the same time, emergency medicine is the specialty with the broadest reach within hospitals, touching on every other specialty and service. These roles give emergency physicians a unique opportunity to lead on the environmental and human health impacts of climate change and environmental degradation. This session will highlight the expertise of emergency physicians at the forefront of the intersection of climate change and health and environmental-responsible healthcare.

The lead and senior authors, both emergency physicians, will highlight the relevant sustainable infrastructure and resiliency recommendations from the United States (U.S.) Lancet Countdown Brief. This Brief is part of the *Lancet Countdown: Tracking Progress on Health and Climate Change*. It is a global, interdisciplinary research initiative that monitors climate change impacts, the global response, and associated health outcomes. It publishes an annual paper describing the current evidence along with a suite of national policy briefs that utilize country-specific data. This discussion will be followed with a special emphasis on recent natural disasters and hospital preparedness and resilience strategies.

SESSION DETAILS: TUESDAY, JANUARY 8

The second half of the session, led by two emergency physician experts in the field of environmentally responsible healthcare, will discuss current approaches that exist to promote climate-smart sustainable healthcare. This will include a discussion of emergency medicine's role in climate change leadership and advocacy, including reduction of greenhouse gas emissions from the health sector. These roles will benefit dramatically from collaboration and coordination with the healthcare and sustainability spheres.

Presenters:

Renee N. Salas, M.D., M.P.H., M.S., Burke Fellow and Affiliated Faculty, Harvard Global Health Institute / Instructor in Emergency Medicine, Massachusetts General Hospital and Harvard Medical School

Jonathan E. Slutzman, M.D., Instructor in Emergency Medicine, Massachusetts General Hospital and Harvard Medical School

Amy Collins, M.D., Senior Clinical Advisor for Physician Engagement, Health Care Without Harm

2019 NCSE LIFETIME ACHIEVEMENT AWARDS ON SCIENCE, SERVICE, AND LEADERSHIP

Regency Ballroom - 12:30 p.m. - 1:45 p.m.

The NCSE Lifetime Achievement Award is given to an individual or group of individuals in recognition of their exceptionally meritorious contribution to science and the environment. The award honors those who have made a significant impact to our community through research, education, diplomacy, and/or innovative technologies. Join us for lunch as we honor our 2019 Award Recipients.

2019 Lifetime Achievement Award Recipients

Introduction by Tom Richard, Ph.D., Director of Penn State Institutes for Energy and the Environment, Pennsylvania State University



Paul Hawken, Founder and Writer, Project Drawdown

Paul Hawken starts ecological businesses, writes about nature and commerce, and consults with heads of state and CEOs on climatic, economic, and ecological regeneration. He has appeared on numerous media including the Today Show and Talk of the Nation and has been profiled or featured in hundreds of articles including the *Wall Street Journal*, *Washington Post*, and *Businessweek*. He has written eight books including four national and NYT bestsellers: *Growing a Business*, *The Ecology of Commerce*, *Blessed Unrest*, and *Drawdown*. In 2013, *The Ecology of Commerce* was voted #1 college text on business and the environment by professors in 67 business schools. President Clinton called *Natural Capitalism* one of the five most important books in the world. Hawken's latest book, *Drawdown, The Most Comprehensive Plan Ever Proposed to Reverse Global Warming*, debuted April 18, 2017, as a #9 NYT bestseller.

He is the founder of Project Drawdown, which works with over two hundred scholars, students, scientists, researchers, and activists to map, measure, and model the one hundred most substantive solutions that can cumulatively reverse global warming by reducing and sequestering greenhouse gases.

Introduction by James L. Buizer, Professor, School of Natural Resources and the Environment, University of Arizona



Julia Marton-Lefèvre, Former Director General, International Union for Conservation of Nature

Julia Marton-Lefèvre is the former Director General of the International Union for Conservation of Nature. She stepped down in January 2015, after eight years as head of the world's largest international conservation membership organization. Prior positions have included Rector of the UN-mandated University for Peace, Executive Director of Leadership for Environment and Development International, and Executive Director of the International Council for Science (ICSU).

At present, she is focusing on using her broad experience to advise organizations on how to achieve their goals. In this effort, she chairs several international groups. Marton-Lefèvre is linked with Yale University, Oxford University, Arizona State University, and the Federal Polytechnique Institute in Lausanne (EPFL) through various visiting scholarships and advisory boards. She recently completed a 10-year term as a founding member of the board of the Geneva-based Graduate Institute of International and Development Studies, and remains a member of the advisory board of the Institute's Center for Environmental Studies.

CONCURRENT SESSIONS GROUP B

2:00 p.m. - 3:30 p.m.

S-B1: OPPORTUNITIES AND CHALLENGES FOR CLIMATE-SMART INFRASTRUCTURE: LESSONS LEARNED FROM THE CALIFORNIA EXPERIENCE

Location: Diplomat Ballroom

Extreme weather events are increasingly straining aging infrastructure across the nation. California is on the front lines, as wildfires, heat waves, sea level rise, floods, and mudslides devastate critical infrastructure with significant societal impacts. This session will highlight specific approaches to adaptation that California is pioneering at the state and local levels for climate resilient infrastructure, including green bonds and other innovative financing mechanisms; adaptive design approaches; the Climate-Safe Infrastructure Working Group collaboration among scientists and engineers; and efforts to advance equity through a range of climate planning and Program activities. Speakers will discuss lessons learned and remaining challenges to help inform efforts to ensure that the infrastructure we build today will reliably and equitably serve communities in the face of a changing climate future.

Presenters:

Jamesine Rogers Gibson, Senior Climate Analyst, Union of Concerned Scientists

Chione Flegal, Managing Director, PolicyLink

Caitlin MacLean, Senior Director, Innovative Finance, Milken Institute

David Behar, Climate Program Director, San Francisco Public Utilities Commission

S-B2: RESILIENCY PARTNERSHIPS THAT SUPPORT MILITARY READINESS

Location: Council Room

Given the 2018 National Defense Strategy's emphasis on military readiness, the U.S. Department of Defense is increasingly concerned about the long-term resilience of its installations and rangelands tasked with training warfighters and testing defense technology. The physical and natural infrastructure experience a variety of environmental impacts including coastal flooding and erosion, wildland fire, drought and water scarcity, and heat impacts on recruits. The presence of protected or endangered species on military lands can lead to regulatory training restrictions. With the ever-present risk of Base Realignment and Closure, the social support services and general quality of life provided by civilian communities for military families is critical for the continued sustainability of the installations themselves. This can mean that infrastructure outside the fence line becomes critical to military readiness.

For 15 years, Congress has funded the Readiness and Environmental Protection Integration (REPI) Program to build military readiness through partnerships with federal, state, and local agencies and private conservation groups in win-win land transactions that enhance training capability while protecting species and habitat. As of the 2019 National Defense Authorization Act, Congress has added the authority to enter into agreements that maintain or improve military installation resilience. This opens the door to new partners that have important resources to provide. This session will explore both old and new opportunities for scientific and conservation engagement with DOD featuring programs such as REPI, the Strategic Environmental Research and Development Program (SERDP), regional DOD partnerships, the NOAA Regional Integrated Sciences and Assessments (RISA) program, and the DOI/USGS Climate Adaptation Science Centers. We will consider how to expand such collaborations.

Presenters:

Sean Bath, RISA Program Specialist, University Corporation for Atmospheric Research/ NOAA

Kristin Thomasgard-Spence, REPI Program Director, Office of the Secretary of Defense

SESSION DETAILS: TUESDAY, JANUARY 8

Addie Thornton, Program Manager, Texas A&M Natural Resources Institute

Gregg Garfin, Associate Professor in Climate, Natural Resources and Policy, University of Arizona

Kurt Preston, Program Manager Resource Conservation and Resiliency, Strategic Environmental Research and Development Program (SERDP), Environmental Security Technology Certification Program (ESTCP)

S-B4: SPARK: FIRING UP THE NCSE ENERGY EDUCATION COMMUNITY OF PRACTICE

Location: Congressional Room A

For nearly a decade NCSE has been convening energy education leaders from across the nation to address the full span of energy education needs – from basic literacy for citizens and youth through various types of undergraduate and graduate degrees, including powerful and novel partnerships with government, the trades, K-12 schools, and the private sector. We have held three national Energy Education Summits, hosted (and recorded) webinars, and generated reports, all of which are available on the web at: <http://www.energyeducationsummit.org/>. With the advent of the new Energy Education Community of Practice we are pleased to open up this opportunity to share novel ideas, best practices, and educational scholarship to all members of NCSE. As we launch and expand our Community of Practice we wanted to invite all participants at the Annual Conference to learn, share, and help us set a near term, action-oriented agenda for the coming year. This 90 minute session will include an introduction to the Energy Education Community of Practice, a series of five 7-minute PechaKucha lightning talks, and a discussion about how to maximize our opportunities to improve and increase our impact.

Introduction to the Energy Education Community of Practice

Jennie Stephens, Ph.D., Dean's Professor of Sustainability Science and Policy and Director of the School of Public Policy and Urban Affairs, Northeastern University

Tom Richard, Ph.D., Professor of Agricultural and Biological Engineering and Director of the Institutes of Energy and the Environment, Penn State

PechaKucha Lightning Talks

Focus: Lighting up a new Energy Education degree Program

Joel Swisher, Ph.D., P.E., Research Professor, Department of Environmental Sciences and Director, Institute for Energy Studies, Western Washington University

Actuate: Embracing market pull with industry partners and Virtual Assets

Monty Alger, Ph.D., Professor of Chemical Engineering and Director, Institute of Natural Gas Research, Penn State University; President Elect, American Institute of Chemical Engineers

Infuse: Embedding energy content across the campus curriculum

Amanda Graham, Ph.D., Academic Director, Arthur L. Irving Institute for Energy and Society, Dartmouth College

Diffuse: Energy Literacy for Campus and Community

Scott Williams, M.P.A., Research and Education Coordinator, Wisconsin Energy Institute, University of Wisconsin, Madison

Smart Energy Education: Best practices and metrics of success

Jennifer Sklarew, Ph.D., Adjunct Professor, Department of Environmental Science and Policy, George Mason University

S-B5: ACHIEVING A SUSTAINABLE RESILIENCE FOR INFRASTRUCTURE AND COMMUNITIES: CHALLENGES AND OPPORTUNITIES

Location: Cabinet Room

Growing awareness of increased threat to infrastructure and communities has generated interest in improving their resilience to better prepare systems for faster and more effective response to and recovery from short-term disruptions such as natural hazards, manmade attacks, and accidents. At the same time, slow onset events resulting from long-term changes such as increase in precipitation and demographic development call for attention to sustainable strategies in resource allocation and management of infrastructure and communities. As a result, one can argue that, due to limited resources, there can be a trade-off between achieving resilience in the short-term and maintaining sustainability over the long-term or that they can complement each other under certain circumstances. While both concepts are critical for thriving societies, they have historically been decoupled in many methods and tools developed in research and practice. The focus of this session is on the interactions between resilience and sustainability. Research in this field has been devoted to (i) understand, at the conceptual level, the interdependence between resilience, sustainability, and other related concepts, and (ii) develop approaches to qualitatively and quantitatively model metrics and implement strategies in real world or hypothetical communities.

The goal of this session is to highlight recent research advances and best practices in achieving resilience and sustainability for vulnerable infrastructure and communities. More specifically, the objective is to showcase work by experts in academia and industry that will help identify challenges and opportunities of seeking both resilience and sustainability as well as illustrate applications of such strategies.

Presenters:

Hiba Baroud, Assistant Professor, Vanderbilt University

Leslie Gillespie-Marthaler, Ph.D. Candidate, Vanderbilt University

Therese McAllister, Ph.D., Community Resilience Group Leader and Program Manager, National Institute for Standards and Technology

Peter Schultz, Ph.D., Vice President, ICF

David Rouse, Managing Director of Research and Advisory Services, American Planning Association

Lars Ole Grottenberg, Research Fellow, Societal Safety and Risk Management, University of Stravanger

S-B6: THE NATION'S RURAL WATER INFRASTRUCTURE CONCERNS: PAST, CURRENT, AND FUTURE DEVELOPMENT WITH ASSOCIATED HEALTH ASSESSMENTS

Location: Forum Room

The nation's water infrastructure is of concern. Delivery of potable water of high quality is desired. Although such assurance of high quality can often be found at the treatment facility, the delivery systems to households can be flawed allowing changes in chemical and microbial quality. Rural areas can lack treatment schemes for quality assurance. Populations subjected to inferior quality can be found in many rural, poor, and Native American communities. This proposal would assess the issues surrounding rural water resources including adequate delivery and adequate quality for those populations receiving such supplies. Specific attention will be given to the vulnerable populations of Native American, low income communities in Appalachia, and other areas. Associated health consequences will be considered.

Presenters:

Jane Valentine, Associate Professor, UCLA Fielding School of Public Health

Joseph Kane, Senior Research Associate, Brookings Institution

Harry Allen, M.S., U.S. EPA, Region 9, Chief, Emergency Response Section

S-B7: NATURAL CAPITAL ACCOUNTING, SUSTAINABLE INFRASTRUCTURE, AND RESILIENCE

Location: Executive Room

Natural capital accounting (NCA) information is critical to our ability to effectively plan infrastructure development that is sustainable and resilient. We need to be able to assess information on the status and trends of natural capital that exists in land, water, and ecosystems. Speakers in this session will summarize recent efforts to develop natural capital accounts in the United States and around the world, and will discuss connections between NCA and sustainable infrastructure and resilience. The accounts being developed include both biophysical and monetary measures and provide important input to sustainable infrastructure and resilience planning and development.

Presenters:

Carl Shapiro, U.S. Geological Survey
Jim Boyd, Resources for the Future
Pierre Glynn, U.S. Geological Survey
Jane Carter Ingram, Ernst and Young
Glenn-Marie Lange, The World Bank
Scott Wentland, Bureau of Economic Analysis

S-B8: SMART POLICIES FOR A CHANGING CLIMATE: TRANSPORTATION INFRASTRUCTURE, NATURAL SYSTEMS, AND COMMUNITY DEVELOPMENT

Location: Congressional Room B

Designing and building resilient infrastructure and communities is increasingly critical in the face of climate change. This two-part session will start with a broad look at design and planning strategies and public policies that support community resilience, as drawn from *Smart Policies for a Changing Climate*, the report of the American Society of Landscape Architects' interdisciplinary Blue Ribbon Panel on Climate Change and Resilience. Speakers will identify best practices for planning, building, and enhancing communities and show how these strategies are being applied successfully in communities across the country. The second half of the session will focus on resilience in transportation infrastructure. Major disruptions to transportation networks associated with natural hazards can cause significant social and economic impacts and will potentially be exacerbated by climate change. Speakers will address barriers and opportunities for improving transportation infrastructure resilience, how incentives and insurance can serve to improve resilience, and key resilience metrics. The resilience of road infrastructure and need for potential retreat, in light of the changing climate and sea level rise, will also be addressed.

Presenters:

Nancy Somerville, Hon. ASLA, Hon. AIA, SITES AP, CEO, American Society of Landscape Architects
Mark Dawson, FASLA, Managing Principal, Sasaki Associates
Dwane Jones, Ph.D., University of the District of Columbia, Director, Center for Sustainable Development + Resilience
Gina Tonn, Ph.D., P.E., Postdoctoral Research Fellow, Wharton Risk Management and Decision Processes Center, University of Pennsylvania
Allison C. Reilly, Ph.D., Assistant Professor of Civil and Environmental Engineering, University of Maryland at College Park

CONCURRENT SESSIONS GROUP C

4:00 p.m. - 5:30 p.m.

S-C1: PRIVATE SECTOR ROLES IN BUILDING COMMUNITY AND INFRASTRUCTURE RESILIENCE

Location: Cabinet Room

The impacts of acute and chronic physical climate risks are placing added stress on communities and infrastructure systems throughout the U.S. and the world, exacerbating longstanding economic, social and governance challenges. As communities respond to and prepare for the current and future impacts of a changing climate, including on key infrastructure, a critical need will be cultivating strategic cross-sectoral partnerships as well as sustainable sources of funding and financing that can be used to implement actions to build climate resilience.

While the “private sector” is often mentioned as a critical partner in building climate resilience, local jurisdictions often struggle successfully to incentivize and engage private sector entities as well as leverage the specific assets that different private sector entities bring to bear. This session explores investor, insurance, and rating agency perspectives to shed light on these entities’ reasons for and approach to understanding and incorporating climate resilience considerations, and their potential role in building local/regional climate resilience.

Presenters:

Yoon Kim, Director of Advisory Services, Four Twenty Seven

Ksenia Koban, Vice President & Municipal Strategist, Payden & Rygel

Samantha Medlock, Senior Vice President, Head of North America Capital, Science & Policy, Willis Towers Watson

Lisa Schroeer, Senior Director & Cross-sector Lead, S&P Global Ratings

Thomas R. Barr, Founder & CEO, Infrastructure Services Group, LLC

S-C2: PROMOTING CLIMATE-SMART HEALTHCARE THROUGH MITIGATION, RESILIENCE AND LEADERSHIP

Location: Senate Room

The U.S. healthcare system produces 10 percent of national greenhouse gas emissions, and significant fractions of other pollutants that contribute to the burden of disease. Recent extreme weather events serve as a reminder that hospitals on the disaster front-lines must be prepared and operational during climate-driven emergencies. For these reasons, hospitals and health systems have been working to study and promote climate-smart healthcare through mitigation, resilience, and leadership. This physician- and researcher-led session will discuss current healthcare sustainability research that uses life cycle assessment to quantify environmental emissions of medical services and help guide mitigation strategies. We will share examples of facilities ill-prepared for weather-related diseases, facilities with innovative infrastructure design, and sustainable healthcare services. This session highlights the collaborations between clinicians and engineers that aid in understanding and promoting environmentally responsible, climate-smart healthcare.

Presenters:

Amy Collins, M.D., Senior Clinical Advisor Physician Engagement, Healthcare Without Harm

Cassie Thiel, Ph.D., Assistant Professor, New York University (NYU) Langone Medical Center

Jodi Sherman, M.D., Associate Professor of Anesthesiology and Epidemiology in Environmental Health Sciences, Yale University School of Medicine, Director of Sustainability, Anesthesia

Jonathan Slutzman, M.D., Instructor in Emergency Medicine Faculty in Wilderness Medicine, Department of Emergency Medicine Massachusetts General Hospital Harvard Medical School

S-C3: STEERING TOWARDS SUSTAINABILITY: FEDERAL HIGHWAY ADMINISTRATION RESEARCH UPDATES

Location: Congressional Room B

The transportation sector is undergoing transformative changes with the advent of connected and automated vehicles, shared mobility, and electrification. At the same time, more frequent extreme weather events and sea level rise stress aging infrastructure. How can transportation planning and environmental policy respond to a rapidly changing context to achieve shared goals of safety, mobility, opportunity, environmental restoration, and accelerated project delivery? Come hear an update on FHWA research on innovations in bicycle and pedestrian network planning, mobility-as-a-service, and automated vehicles and their influence on personnel mobility and other societal issues. Better understand transportation investments and opportunities to address resiliency. Discuss how research partnerships at the federal, state, and local levels can help transportation agencies respond to changing realities in ways that help them meet multiple community goals.

Presenters:

Shari Schaftlein, Director, Office of Human Environment, Federal Highway Administration

Kevin Adderly, Transportation Specialist, Federal Highway Administration

Jeremy Raw, Transportation Specialist, Federal Highway Administration

Tina Hodges, Environmental Protection Specialist, Federal Highway Administration

S-C4: BUILDING RESILIENT COMMUNITIES: INNOVATIVE FUNDING AND FINANCING SOLUTIONS

Location: Executive Room

Across the country, communities, private sector organizations, and governments at all levels are taking action to improve their ability to withstand and recover quickly from extreme weather events and to build resilience into their social, natural and built infrastructure. Successful solutions are often integrated across sectors, and so the need to leverage diverse investment streams to support such complex projects is critical. To enable those efforts, the public and private sectors have been developing innovating funding options and financing mechanisms that reduce the cost of action and incentivize opportunities to build resilience. Solutions that leverage partnerships, insurance mechanisms, regulatory incentives, and new financial tools are helping communities, businesses and families take action now. Through an interactive panel discussion, we will make the case for working across sectors to build partnerships that can help support and finance community resilience. Panelists will be asked to share ideas and highlight projects that leverage funding sources and innovative tools for successful implementation.

Presenters:

Kim Penn, Climate Coordinator, NOAA's Office for Coastal Management

Keelin Kuipers, Deputy Director, NOAA's Office for Coastal Management

Holly A. Bamford, Ph.D., Chief Conservation Officer, National Fish and Wildlife Foundation

Jeff Merkowitz, Senior Advisor, Community Development Financial Institutions Fund, U.S. Department of the Treasury

Stewart Sarkozy-Banoczy, Senior Advisor, Resilience Finance, 100 Resilient Cities

Whit Remer, Counsel & Director of Public Policy, Insurance Institute for Business & Home Safety

S-C5: BUILDING RESILIENT PEOPLE, COMMUNITIES, AND SUSTAINABLE GREEN INFRASTRUCTURE

Location: Forum Room

Extreme weather events have challenged the nation's communities to respond and adapt. Research and practitioner experience has demonstrated that natural resource stewardship activities can play a key role in helping community and individual long-term recovery from natural disturbances such as hurricanes, floods, tornadoes, and wildfire, as well as from human-caused disasters, such as terrorism and other forms of violence. The act of coming together, working side-by-side, and creating change helps individuals and communities recover emotionally, psychologically, and/or spiritually. And the resulting stewardship and restoration of public spaces can help communities become stronger than before the trauma by strengthening social cohesion through acts of shared creation, memorialization, storytelling, and care. The U.S. Forest Service and partners have worked together to co-develop and strengthen local approaches that grow more resilient people, communities, and the natural resources that sustain them. In this panel, the District of Columbia Department of Transportation (DDOT) and the non-profit Casey Trees will lay out the scope of the problem and their response, and the Forest Service will introduce recent study findings and new products that will help communities to focus and prioritize local investment in people and green infrastructure to sustainably mitigate storm impacts over time.

Presenters:

Earl Eutsler, Director, Urban Forestry Administration, District of Columbia Department of Transportation

Jessica Sanders, Ph.D., Director of Science and Policy, Casey Trees

Nancy Sonti, Ph.D., Research Ecologist, USDA Forest Service

Carlos Rodriguez, Ph.D., Deputy Chief of Research and Development, USDA Forest Service

S-C6: COMMUNITY COLLEGES AS A LOCAL NEXUS TO CONTRIBUTE TO PROGRESS OF THE SUSTAINABLE DEVELOPMENT GOALS

Location: Council Room

In this session, a panel of community college (CC) leaders will share how their campuses are engaging meaningfully with the Sustainable Development Goals in curriculum, operations, and community. The discussions focus on SDG 9 (Industry) specifically in connection to goals 4 (Education), 6 (Water and Sanitation) and 17 (Partnerships). We begin with a deeper dive into the SDG targets to understand the critical role that community colleges play in achieving the Global Goals:

- SDG 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development...
- SDG 6 Ensure access to water and sanitation for all
- SDG 9.1 Develop quality, reliable, sustainable and resilient infrastructure...to support economic development and human well-being...
- SDG 17.17 Encourage and promote effective public, public-private and civil society partnerships....

After the panel discussion, community college stakeholders (faculty, administrators, staff, and four-year partners) will then have an opportunity to work in small groups, facilitated by the panelists, on proposals, initiatives, and best practices related to the Sustainable Development Goals that can best catalyze transformative action on their campuses.

Panelists include the immediate past and present chairs of the NCSE Community College Alliance for Sustainability Education (CCASE) as well as representatives from CCs most active in curriculum, operations, and community

SESSION DETAILS: TUESDAY, JANUARY 8

partnerships for the goals. Specific initiatives including the CCASE 2.0 Handbook for Sustainability Implementation and regional professional development opportunities will be shared with opportunities for participants to engage with these projects.

Moderator:

Krista Hiser, Ph.D., Professor of Composition and University of Hawaii System Sustainability Curriculum Coordinator, Kapi'olani Community College, HI

Presenters:

Stephen Summers, Ph.D., Associate Vice President, School of Arts & Sciences, Seminole State College, FL

Maria Boccalandro, Ph.D., Director of Sustainability, Cedar Valley College of the Dallas County Community College District, TX

Robert Franco, Ph.D., Director, Office for Institutional Effectiveness, Kapi'olani Community College, HI

Robert Rak, Professor and Environmental Science & Technology Coordinator, Bristol Community College

Craig Urbanski, Ph.D., Water Resources Technologies, Program Director, Gateway Community College, A Maricopa Community College

Jay Antle, Ph.D., Executive Director, Center for Sustainability, Professor of History, Johnson County Community College

S-C7: PLACE-BASED RESILIENCY PLANNING AND THE INTERFACE OF GRAY, GREEN, AND HUMAN INFRASTRUCTURES - CASE STUDIES OF MILWAUKEE AND NORTHERN VIRGINIA REGIONS

Location: Diplomat Ballroom

The pressures have greatly increased on local and regional governments to reduce emissions of greenhouse gases and to strategically react to the effects emanating from climate change. These challenges compel new, science-based and innovative planning approaches grounded in the community. This session will profile two special stories of climate resiliency and ways the regions of Milwaukee, Wisconsin, and Northern Virginia have partnered with regional research and science organizations to tap into the creative enthusiasm of their communities that have integrated human, natural and mechanical capital.

Milwaukee: In 2017, the Milwaukee Metropolitan Sewerage District (MMSD) launched the Resilience Plan process to identify regional risks and create a menu of comprehensive action items to reduce those risks. Prior to the launch, MMSD staff and partners worked to lay the groundwork for this large-scale effort. The ambitious timeframe for completing the work was a mere 9 months. Over 20 interviews, two stakeholder workshops, and comprehensive review of 93 plans informed this planning effort that engaged municipalities, public and private partners. MMSD as a utility played a unique role in spearheading the development of a plan that identified how social, economic and environmental components can collectively be addressed. Drivers of resilience that were addressed include climate change, urbanization and globalization; Crafting an outreach and engagement strategy for a plan that is geographically and jurisdictionally broad on an unfamiliar topic like resilience; Relying on actions proposed in the 100 Resilient Cities plans as the principal source of proposed resilience actions; The relative balance of gray, green, and social infrastructure proposed in actions; Making trade-offs in relation to broad public engagement versus gaining stakeholder commitments for proposed actions; and Forging an approach for implementation.

Northern Virginia: Northern Virginia is one of the most rapidly growing urban and coastal regions of the United States. However, the region's abilities to sustainably manage this dynamic growth is challenged by the effects of multiple environmental stressors – particularly the projected changes to precipitation patterns, intensity, and extremes emanating from climate change. The ability to cope with these phenomena are further challenged by rapid urbanization and reliance of stormwater and precipitation models and statistical methods that are retrospective. In response, NVRC

has partnered with the American Geophysical Union and the Terrestrial Earth Exchange through faculty at George Mason University to explore development of a hydrological model informed by downscaled projected climate data to assess future precipitation and runoff trends over a fifty-year time horizon. This model will also take into consideration the effects from land use and land cover change and changing climate, especially increased precipitation. The goal is to create climate data for future conditions so that there can be an analysis of potential impact and risk to infrastructure and the need to invest in flood resilient landscapes.

Presenters:

Corey Miles, Senior Environmental Planner, Northern Virginia Regional Commission

Dale Medearis, Ph.D., Senior Environmental Planner, Northern Virginia Regional Commission

Nancy Frank, AICP, Ph.D., Associate Professor, Urban Planning, University of Wisconsin - Milwaukee

Nadia Vogt, MA, Senior Project Manager, Milwaukee Metropolitan Sewerage District

S-C8: FLASH TALK - RURAL-URBAN CONNECTION: INFRASTRUCTURE FOR FOOD, ENERGY, AND WATER

Location: Congressional Room A

Flash Talk sessions are a new addition to the NCSE Annual Conference. During each Flash Talk, presenters will deliver a 10-minute presentation followed by 5 minutes of Q&A with the audience. At the conclusion of the final presentation, the audience will once again be able to ask questions of the presenters.

Presentations focus on a similar theme. This Flash Talk session will focus on infrastructure as it relates to water, food, and cities.

Moderator: Rae Zimmerman, Ph.D., Research Professor and Professor Emerita of Planning and Public Administration, New York University - Wagner School

Presenters:

Urban Forestry: An Infrastructure for Resilience

Ian Leahy, Director of Urban Forestry, American Forests

Informal Water Systems in Lebanon: Strengths and Weaknesses

Yasmina Choueiri, Ph.D. Student, University of California, Davis

Urban Waters Program-A Platform for Actionable Science to Improve Cities and Their Waterways

Roy Simon, Staff to the Urban Waters Federal Partnership (UWFP), U.S. EPA

A Framework to Capture Impacts of Infrastructure Interdependencies on Food Supply Chains

Rae Zimmerman, Ph.D., Research Professor and Professor Emerita of Planning and Public Administration, New York University - Wagner School

Healthy Lands and Healthy Communities: linking land conservation and quality of life

William Keene, General Manager, Sonoma County Ag + Open Space

NCSE & Project Drawdown: Teaching and Implementing 100 Solutions to Global Warming in Higher Education

Ariane Mohr-Felsen, NCSE Drawdown Fellow, University of Arizona

David Proffitt, NCSE Drawdown Fellow, University of Utah

SESSION DETAILS: TUESDAY, JANUARY 8

AN EVENING DISCUSSION ON SCIENCE, ECOLOGY, AND HOPE

Regency Ballroom - 5:45 p.m. - 7:45 p.m.

Many of the world's greatest scientific stories begin with a journey into wonder. An exploration into the very nature of life's most intimate questions: "Where do we come from? Why are we here?" In the groundbreaking trilogy *Journey of the Universe*, an elegant narrative story of the universe is presented that illuminates and celebrates the profound role humans play in the flourishing of Earth. This immense sweep of cosmic history is distilled into a highly-acclaimed film that aired nationally on PBS, a book (published by Yale University Press), and an engaging series of conversations that weaves together modern scientific discoveries with the enduring wisdom found in the humanistic traditions worldwide.

Join us for a dynamic discussion and film screening of *Journey of the Universe*.

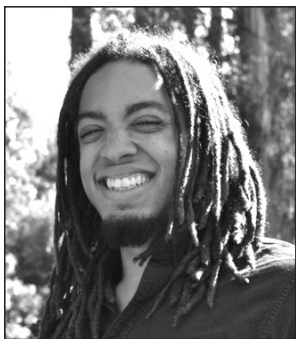
KEYNOTES



Mary Evelyn Tucker, Ph.D., Senior Lecturer and Senior Research Scholar, Yale School of Forestry & Environmental Studies

John Grim, Ph.D., Senior Lecturer and Senior Research Scholar, Yale School of Forestry & Environmental Studies

Mary Evelyn Tucker and John Grim teach at Yale School of Forestry & Environmental Studies and Yale Divinity School. They direct the Forum on Religion and Ecology at Yale, which arose from 10 conferences they organized at Harvard's Center for the Study of World Religions. They are series editors of the Harvard volumes from the conferences on Religion and Ecology. Tucker specializes in East Asian religions, especially Confucianism. Grim specializes in indigenous traditions, especially Native American religions. Tucker and Grim have written a number of books including *Ecology and Religion* and edited the *Routledge Handbook of Religion and Ecology*. Tucker and Grim edited Thomas Berry's books and are currently writing his biography for Columbia. Berry was a major inspiration for *Journey of the Universe*. With Brian Swimme, Tucker and Grim created this multi-media project that includes a book, an Emmy award winning film, a series of Conversations, and online courses.



Harrison Watson, Biology Student, Jackson State University

Harrison Watson is a senior biology major with an emphasis in marine science currently attending Jackson State University of Jackson, MS. He is passionate about conserving the health of Earth and communicating the wonders of Earth's many communities. Watson is currently working on research in marine science and molecular biology through the National Oceanic and Atmospheric Administration at his home institution. He is also a correspondent with Planet Forward where he shares his passion for the Earth through storytelling. Following graduation, Watson plans to further his education through graduate programs around environmental science.



Frank Sesno, Director, Media and Public Affairs, George Washington University

Frank Sesno currently serves as Director of George Washington University's School of Media and Public Affairs, where he leads nearly two dozen world-class faculty who research and teach journalism, political communication, and the impact of digital media in international affairs. Sesno is an internationally recognized journalist with more than 30 years of experience reporting from around the world. He joined CNN in 1984 and for seven years was White House Correspondent after which he moved to the anchor chair. From 1996 through 2001, he served as the Washington Bureau Chief and Senior Vice President. In this capacity, he oversaw the bureau's editorial direction and supervised the network's largest newsgathering operation—including its White House, Congressional, and Pentagon coverage, as well as its political reporting. For seven years, he hosted Late Edition with Frank Sesno, CNN's flagship weekend interview program. He has interviewed five U.S. Presidents

as well as numerous Nobel prize-winning scientists, renowned economists, Hollywood celebrities, CEOs, best-selling authors and leaders including Hillary Clinton, Israeli Prime Minister Benjamin Netanyahu, Microsoft founder Bill Gates, and broadcast legend Walter Cronkite.



Thomas Lovejoy, Ph.D., Professor, George Mason University and Senior Fellow, United Nations Foundation

Thomas Lovejoy is an innovative and accomplished conservation biologist who coined the term "biological diversity." In 2010 he was elected University Professor in the Department of Environmental Science and Policy at George Mason University. He also holds the Biodiversity Chair at the Heinz Center for Science, Economics, and the Environment based in Washington, D.C. He served as President of the Heinz Center from 2002 to 2008.

Before assuming this position, Lovejoy was the World Bank's Chief Biodiversity Advisor and Lead Specialist for Environment for Latin America and the Caribbean as well as Senior Advisor to the President of the United Nations Foundation. Spanning the political spectrum, Lovejoy has served on science and environmental councils under the Reagan, Bush, and Clinton administrations. Lovejoy produced the first projection of global extinctions for the Global 2000 Report. He developed the now ubiquitous "debt-for-nature" swap programs and led the Minimum Critical Size of Ecosystems project. With two co-edited books, he is credited with founding the field of climate change biology. Lovejoy has been honored with a number of prestigious awards. Lovejoy holds B.S. and Ph.D. (biology) degrees from Yale University.

WEDNESDAY, JANUARY 9

KEYNOTE 2:

CULTIVATING PRODUCTIVE OPTIMISM IN ENVIRONMENTAL SCIENCE

Regency Ballroom - 8:30 a.m. - 9:15 a.m.

As scientists we are trained to be truthful and knowledgeable and impress our peers. But as citizens and humans, we must advocate for the safety and sustainability of life on Earth. There is an urgent need for our big industries to change their supply and pollution profile. How do we maintain truthful accuracy, without undercutting the need for quick and effective action, despite uncertainty? How do we know we can sustain a healthy climate for sure, with an engineering safety margin? What does science tell us about tactics for building popular support for environmental stewardship? The rules of the popular debate are not scientific, but truth can prevail.

KEYNOTE



Carl Page, President, Anthropocene Institute

Carl Page is currently President of the Anthropocene Institute. He is a highly sought after entrepreneur, an advisor to technology, internet marketing, and emerging clean-tech companies, as well as a prominent investor in both hi-tech and clean-tech ventures. A highly skilled computer scientist and clean technologist, Page was a co-founder of E-Groups, which later became Yahoo Groups.



Introduction by **Anne-Marie Slaughter, President and CEO, New America**

Anne-Marie Slaughter is the president and CEO of New America, a think and action tank dedicated to renewing America in the Digital Age. She is also the Bert G. Kerstetter '66 University Professor Emerita of Politics and International Affairs at Princeton University. From 2009 to 2011, Slaughter served as director of policy planning for the United States Department of State, the first woman to hold that position. Prior to her government service, Slaughter was the Dean of Princeton's Woodrow Wilson School of Public and International Affairs and the J. Sinclair Armstrong Professor of International, Foreign, and Comparative Law at Harvard Law School. She was the convener and academic co-chair of the Princeton Project on National Security, a multi-year research project aimed at developing a new, bipartisan national security strategy for the United States. She has written or edited eight books, is a contributing editor to the Financial Times, and writes a bi-monthly column for Project Syndicate. Slaughter provides frequent commentary for both mainstream and new media. Foreign Policy magazine named her to their annual list of the Top 100 Global Thinkers in 2009, 2010, 2011, and 2012. She received a B.A. from Princeton, an M.Phil and D.Phil in international relations from Oxford, where she was a Daniel M. Sachs Scholar, and a J.D. from Harvard.

PLENARY 2: INFORMATION AND DECISION MAKING: RESPONSE, RECOVERY, AND RESILIENCE

Regency Ballroom - 9:15 a.m. - 10:00 a.m.

The past year has brought extremes the likes of which we've rarely seen, but are becoming increasingly common - from devastating fires and floods to drought and extreme heat. Building resilience in the face of these extremes requires that we marshal all of our best knowledge and information to the decisions we make - in order to prepare, respond, recover, and plan for the future. This plenary will bring together diverse expertise on the role of data and information in decision-making, with examples from wildfires in California and other extreme weather events, focusing both on how information is generated and how it is used by decision-makers on the ground. Panelists will also explore the impact of extreme weather events on sustainable energy trends for the future.

MODERATOR



Evan Lehmann, E&E News

Evan Lehman is Editor of *Climatewire*, a publication of E&E News. Evan has been a journalist for 16 years. He has written about communities along the Mississippi River and covered city politics in Massachusetts. He began covering Congress in 2005 and joined E&E News in 2008 to write about federal policy related to climate change and the insurance industry. He covered the Trump presidential campaign and the White House. He received a journalism degree from the University of Wisconsin-Madison.

PRESENTERS



Shirlee Zane, Sonoma County Supervisor

Sonoma County Supervisor Shirlee Zane took office in January 2009. Prior to her election she served for 10 years as CEO for Council on Aging. Zane has over three decades of experience working in the fields of health and human services. She serves on several county, regional, and national boards including the Bay Area Air Quality Management District, Sonoma County Agricultural Preservation and Open Space District, Sonoma County Transportation Authority/Regional Climate Protection Authority, Sonoma County Water Agency, and the National Council on Science and the Environment. The Supervisor is leading Sonoma County's Water Agency on atmospheric rivers, related weather forecasting technology, and their potential benefits to the future of water management. Through her advocacy and leadership, Zane has developed a well-earned reputation for strong conservation values in addition to her environmental and social

justice ethic. In the wake of the 2017 North Bay/Sonoma Complex wildfires the effort to rebuild lost homes, add new housing, bolster the economy, and ensure full disaster recovery are the Supervisor's primary goals.



Ryan Lanclos, Director, Public Safety Industry Solutions, Esri

Ryan Lanclos is Esri's Director of Public Safety Industry Solution where he is responsible for coordinating initiatives across emergency management, fire and EMS, law enforcement and national security, and emergency call taking and dispatch. During his time at Esri, he has helped formalize the Esri Disaster Response Program (DRP) which provides global 24x7 GIS support to organizations facing disaster. Ryan's background is in state and local government where he built a nationally recognized bio-security GIS program; served as Missouri's first State Geographic Information Officer (GIO) and GIS lead for the Governor's Homeland Security Advisory Council; and he provided county-wide GIS strategic planning and implementation

SESSION DETAILS: WEDNESDAY, JANUARY 9

for Montgomery County, Texas, in the Houston area. He also served as the Director of State and Local Government at the National Alliance for Public Safety GIS (NAPSG) Foundation, a non-profit dedicated to building the public safety community's GIS capacity and capability.



Robert McGrath, Ph.D., Director of Renewable and Sustainable Industry Institute, University of Colorado Boulder

Robert McGrath currently serves as the Director of the Renewable and Sustainable Energy Institute (RASEI), a joint research institute between the University of Colorado Boulder and the U.S. Department of Energy's (DOE's) National Renewable Energy Laboratory (NREL). He has previously served as scientist, educator, and R&D executive leader within major U.S. universities and several DOE National Laboratories.

McGrath's previous positions include serving as Senior Vice President for Research and Director of the Georgia Tech Research Institute (2011-2015), Associate Laboratory Director at the National Renewable Energy Lab (2008-2010), Senior Vice President for Research at The Ohio State University (2004-2008), and Professor of Engineering Science & Associate Vice President for Research at Penn State University (1996-2004). From 1981 to 1998, McGrath served as researcher and/or R&D program manager at Sandia National Laboratories with responsibility at various times for Cooperative R&D Agreements with SEMATECH on microelectronics manufacturing, for SNL's Advanced Super Computing Applications Program, and for coordination of U.S. international collaborations on plasma-materials for magnetic fusion with the European Union, Japan, Russia, and the Former Soviet Union.

CONCURRENT SESSIONS GROUP D

10:30 a.m. - 12:00 p.m.

S-D1: SUSTAINABLE MATERIALS MANAGEMENT, RESILIENCY, AND NATURAL DISASTER DEBRIS

Location: Director's Room

The need for effective natural disaster debris management is growing rapidly as the number of man-made and natural disasters continues to increase. Considering the cost and impacts to communities associated with recovery, developing effective strategies to plan for, mitigate, and respond to natural disaster debris is critical to helping communities become more resilient. Post-disaster reconstruction also presents opportunities to revisit building practices and embrace new approaches such as designing for increased resiliency and increasing use of secondary materials to reduce the quantity of virgin raw materials used upfront in construction.

Melissa Kaps, Materials Recovery and Waste Management Division, Office of Resource Conservation and Recovery, EPA, will discuss its responsibilities regarding debris management and its tools for assessing recycling and reuse opportunities before, during, and after a natural disaster. Cheryl Coleman, Division Director, Resource Conservation and Recovery Challenge, Office of Resource Conservation and Recovery, EPA, will also discuss its application of sustainable materials management (SMM) principles – a systematic view of resource use with numerous economic benefits, the potential to conserve resources, and reduce waste – to enhance resiliency to natural and man-made disasters, and minimize the environmental impacts of the materials we use.

EPA will be joined by Alan Wilcom, Chief, Recycling Division, Ellicott City Department of Public Works in Ellicott City, Maryland, a community recently hard hit by two 100-year floods in a two-year period. Mr. Wilcom will discuss the city's experience and what they learned from these flood events. Rachel Minnery, from the Resilience and Adaptation Initiative, American Institute of Architects, will contribute to the session through a discussion of how building design considerations can contribute to increased resiliency.

Presenters:

Melissa Kaps, Materials Recovery and Waste Management Division, Office of Resource Conservation and Recovery, EPA

Cheryl Coleman, Division Director, Resource Conservation and Recovery Challenge, Office of Resource Conservation and Recovery, EPA

Alan Wilcom, Chief, Recycling Division, Ellicott City Department of Public Works in Ellicott City, Maryland

Rachel Minnery, Resilience and Adaptation Initiative, American Institute of Architects

S-D2: REALIZING THE NEW CARBON ECONOMY: INNOVATIONS FOR CARBON NEGATIVE INFRASTRUCTURE

Location: Congressional Room B

Carbon is a primary component of many materials and most fuels, and as such, it is the backbone of the modern global economy. Inexpensive sources of fossil carbon drove the industrial revolution and have led to great prosperity, but continued reliance on fossil resources is not sustainable. Further, carbon dioxide emissions from the use of fossil fuels continue to accumulate in the atmosphere and other environmental systems, and beyond reducing carbon dioxide emissions, industrial economy-wide scale drawdown of these legacy emissions will be necessary in the near future to avoid the most severe impacts of climate change. This session will quantify the current global carbon budget and outline the scale for carbon negative infrastructure needed to achieve ambitious carbon removal targets. Two

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strategies for removing and managing carbon to enable substantial carbon drawdown will be discussed. First, the nearterm potential for leveraging the bioeconomy including agricultural biomass resources for bioenergy carbon capture and storage (BECCS) will be discussed, and second, the prospects for developing and deploying direct air capture at relevant scales will be considered. For both BECCS and direct air capture, the presentations and facilitated discussions will focus on the necessary technical innovations required to de risk these carbon drawdown strategies.

Presenters:

Ian Rowe, Ph.D., Technology Manager, U.S. Department of Energy - EERE

David M. Babson, Ph.D., USDA Office of the Chief Scientist, Senior Advisor for Renewable Energy, Natural Resources & Environment

Klaus Lackner, Ph.D., Arizona State University, Director, Center for Negative Carbon Emissions (CNCE)

Daniel Sanchez, Ph.D., Assistant Professor, University of California Berkeley

Katharine J. Mach, Ph.D., Senior Research Scientist, Stanford University Woods Institute for the Environment

S-D3: CAREER PATHWAYS AND OPPORTUNITIES IN ENVIRONMENT AND SUSTAINABILITY

Location: Congressional Room A

The Career Pathways and Opportunities in Environment and Science Panel provides students and early-career professionals with the opportunity to hear from professionals in order to gain first-hand information and practical advice on various careers paths. Panelists will be from a variety of backgrounds including academia, industry, government and non-profit sectors. During the 90-minute session, panel members will share their personal experiences and offer a broad understanding of what it means to be a sustainability professional. After the panel, there will be an opportunity to ask questions directly to the panelists. Don't miss this session if you are looking for the next step of your career.

Moderator:

Chris Boone, Ph.D., Dean and Professor, School of Sustainability, Arizona State University

Presenters:

Corey Ershow, Transportation Policy Manager, Lyft

Dionne Toombs, Ph.D., Director, Office of the Chief Scientist, U.S. Department Agriculture

Carolina Leonhardt, Sustainability Project Manager, Clif Bar & Company

Meghan Chapple, Office of Sustainability, George Washington University

S-D4: COMMUNITY SCIENCE 101: PRACTICAL TIPS AND REAL-WORLD STRATEGIES FOR ENGAGING WITH COMMUNITIES

Location: Senate Room

Thriving Earth Exchange helps volunteer scientists and community leaders work together to use science, especially Earth and space science, to tackle community issues and advance local priorities related to natural hazards, natural resources, and climate change. By 2019, Thriving Earth Exchange will launch 100 partnerships, engage over 100 AGU members, catalyze 100 shareable solutions, and improve the lives of 10 million people. Through Thriving Earth Exchange, local leaders and Earth and space scientists create resilient communities that enrich the Earth.

Join Thriving Earth Exchange staff for this workshop to learn and practice the skills needed to build effective relationships with communities to address critical local needs in climate change, natural hazards and natural resources.

In this workshop Thriving Earth Exchange staff will help participants identify barriers to co-creation of science and teach ways to overcome these barriers, provide concrete strategies that scientists can employ to make community science projects a success, and teach participants how to scope community science projects through hands-on interactive activities that allow them to practice strategies and techniques.

Presenters:

Sarah Wilkins, American Geophysical Union and Thriving Earth Exchange, Project Manager

Zack Valdez, American Geophysical Union and Thriving Earth Exchange, Contractor

S-D5: CLIMATE CHANGE ADAPTATION AND MITIGATION FOR NATURAL RESOURCE AGENCIES - A CASE STUDY

Location: Council Room

Natural resource agencies are complex organizations that must balance habitat conservation and species protection with recreation, resource extraction, and maintenance and construction of infrastructure ranging from dams and bridges to trails and buildings. Reducing the carbon footprint of these agencies while implementing adaptation strategies to make them more resilient to climate change can be a daunting task. This session will present a case study of how the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) is tackling this challenge.

PA DCNR is the caretaker of 2.2 million acres of state forests, 121 state parks, advisor to the owners of 15 million acres of private forest land, and the state's primary conservation agency. Attendees will learn how the department used a structured decision-making process to develop a climate change adaptation and mitigation plan that addresses climate change across all of the department's functions, including conservation, recreation, grant making, and forest management. A detailed look at how the department is making its infrastructure more resilient to climate change will also be covered, with a special emphasis on designing bridges and culverts to withstand severe floods.

Presenters:

Greg Czarnecki, Climate Change and Research Coordinator, PA DCNR

Alfred Uzokwe Sr., P.E., Director of Facility Design and Construction, PA DCNR

Wayne Nguyen, P.E., Civil Engineer Manager, PA DCNR

S-D6: CLIMATE-READY INFRASTRUCTURE: FEDERAL POLICY OPPORTUNITIES AND CHALLENGES TO INCREASE THE NATION'S RESILIENCE

Location: Executive Room

2017 was a record breaking year for the weather and climate disasters. The hurricanes, wildfires and floods among other events cost the nation \$306.2 billion dollars cumulatively. Other climate change impacts such as extreme precipitation, sea level rise, and worsening heat waves are also straining an already aging infrastructure. These strains are putting our infrastructure, from bridges and roads, to electricity grids, to dams, water conveyance, and sea walls, at risk of failure. Recent analysis by the Union of Concerned Scientists finds that chronic inundation from sea level rise alone will have profound implications for coastal residents, businesses, communities, infrastructure and the economy. The loss of coastal property values and impacts on coastal infrastructure will have reverberations throughout the economy—affecting banks, insurers, investors, and developers—potentially triggering regional housing market crises or a more widespread economic crisis.

We need to anticipate and prepare for utility disruptions from storms and other impacts. To reduce power outages and increase the resilience of critical public and private facilities such as schools, hospitals, community centers, federal investment and policies are needed to deploy more clean energy micro-grids systems.

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Taken together, this is a clarion call for policies and investments that increase access to reliable and affordable clean energy, while also reducing our vulnerability to extreme weather and future conditions from climate change. Principles and standards are needed for climate-smart infrastructure to ensure that risk mitigation measures and new infrastructure projects are implemented to reflect future conditions, including climate change.

Presenters:

Rachel Cleetus, Policy Director, The Union of Concerned Scientists

Alice F. Hill, M.S., Research Fellow, University of Colorado at Boulder

Joyce Coffee, President, Climate Resilient Consulting

Josh Sawislak, Senior Advisor, Center for Climate and Energy

S-D7: 50TH ANNIVERSARY OF THE BURNING OF THE CUYAHOGA: SCIENCE AND POLICY WORKING FOR SUCCESS

Location: Forum Room

The 1969 fire on the Cuyahoga River of Lake Erie was an iconic event in the American environmental movement that led to the creation of Earth Day, the formation of the United States Environmental Protection Agency, and the passage of the Clean Water Act. The restoration of the river has included a number of novel approaches ranging from the creation of a national park and metro park system centered on the river, removal of dams, Ohio EPA's first Total Maximum Daily Load watershed program and innovative biological approaches to evaluating stream health, Akron and Cleveland city planning, Burning River Beer, and sewer district projects to control combined sewer overflows. The panel consists of experts who have been part of the river's restoration for much of that time and will report on the successes and remaining challenges for the Cuyahoga River.

Presenters:

Richard Moore, NCSE Senior Fellow/OSU Academy Professor

Bill Zawiski, Ohio EPA Water Quality Supervisor

Elaine Marsh, Conservation Director for Friends of the Crooked River and Watershed Specialist for the Summit Metro Parks

Kyle Dreyfuss-Wells, Chief Executive Officer, Northeast Ohio Regional Sewer District

S-D8: BUILDING RESILIENCE PRINCIPLES INTO HIGHER EDUCATION: CHALLENGES AND OPPORTUNITIES

Location: Cabinet Room

20th Century design principles used resistance as the primary means to lessen damage from hazards, particularly, regarding built systems. A new interdisciplinary paradigm in curricula is needed to prepare planners, architects, engineers, and scientists at both the undergraduate and graduate levels to advance sustainable and resilient communities.

Resilience curricula must approach disaster loss reduction and avoidance by using multifaceted approaches that build collective resilience capacity for communities. This session explores how traditional and emerging practices in design, planning, science and engineering can incorporate social sciences, policy and non-traditional approaches to improve outcomes in communities vulnerable to disasters. There is a strong need to educate professionals to tackle the grand challenges associated with the complexity and interdependencies of the built, natural and socio-cultural systems that define community. Due to the transdisciplinary nature of resilience problems, developing an effective program in resilience poses challenges that include:

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- Balancing subject matter depth with interdisciplinary breadth;
- Building a flexible curriculum that can grow and evolve with rapid advances in the field;
- Overcoming academic cultural inertia that perpetuates traditional pillars of education;
- Breaking down the administrative and financial barriers to implementing interdisciplinary programs and course-sharing across departments and colleges within the system; and
- Ensuring that graduates have desirable and marketable skills.

This session will provide a forum for academics to share experiences from resilience curriculum development and for practitioners to share their insights regarding critical skill sets and knowledge gaps.

Presenters:

Michelle Bensi, Assistant Professor, University of Maryland at College Park

Sandra Knight, Senior Research Engineer, University of Maryland at College Park

Hiba Baroud, Assistant Professor, Vanderbilt University

Mai Thi Nguyen, Ph.D., Associate Professor & Associate Chair, Director of Master's Program,
The University of North Carolina at Chapel Hill

Barry D. Keim, Ph.D., Louisiana State University, Richard J. Russell Professor and Louisiana State Climatologist

Allison Reilly, Ph.D., Assistant Professor, University of Maryland

NEW PERSPECTIVE ON CLIMATE FROM NASA: FROM EXOPLANETS TO EARTH PLANETS

Regency Ballroom - 12:00 - 1:20 p.m.

During the NCSE luncheon, Dr. James L. Green, NASA's chief scientist, will present a talk entitled *The Search for Life beyond Earth in Space and Time*. He will elaborate on how we look at our climate with respect to exoplanets and its evolution over planetary time scales. This presentation will be followed by *Changes in the Earth as Seen From Space*, a series of stunning visualizations of NASA scientific observations presented by Dr. Thomas Wagner, a Program Manager in NASA's Earth Sciences Division.



James Green, Ph.D., Chief Scientist, NASA

James (Jim) Green is NASA's Chief Scientist. He received his Ph.D. in Physics from the University of Iowa and worked at NASA's Marshall Space Flight Center from 1980 to 1985 in the Solar System Division. Green was a safety diver in the Neutral Buoyancy Simulator supporting NASA's manned spaceflight program making over 150 dives. In 1985, Green transferred to the Goddard Space Flight Center and was the deputy Project Scientist on the Imager for Magnetopause-to-Aurora Global Exploration mission and the Global Geospace Science Missions WIND and POLAR.

From 2006 to 2018 Green was the Director of the Planetary Science Division (PSD) at NASA Headquarters. Under his leadership several missions have been successfully executed, including the New Horizons spacecraft flyby of Pluto, the MESSENGER spacecraft to Mercury, the Juno spacecraft to Jupiter, the Grail A and B spacecraft to the Moon, the Dawn spacecraft to Vesta and Ceres, and the landing of the Curiosity rover on Mars, just to name a few. Over his career, Green has received numerous awards, including the Arthur S. Flemming award for outstanding individual performance in the federal government, and Japan's Kotani Prize in recognition of his international science data management activities. He has written over 115 scientific articles in refereed journals about heliophysics and planetary science and over 50 technical articles on data systems and networks. In 2015 Green was a part of the NASA involvement with the film *The Martian*.



Tomas Wagner, Ph.D., Program Scientist, NASA

Thomas P. Wagner is the NASA Program Scientist for the cryosphere. He directs NASA activities for study of the earth's polar regions, glaciers, sea ice, and related aspects of climate change and sea level rise. Before joining NASA in early 2009, Wagner was Program Director for Antarctic Earth Sciences at the U.S. National Science Foundation. He has been to Antarctica six times, and helped plan the U.S. research program for the International Polar Year (2007-2009).

Wagner holds a bachelor's degree from the State University of New York at Binghamton and a doctorate from the Massachusetts Institute of Technology. His thesis research focused on volcanoes of the earth and moon. After finishing his Ph.D., Wagner spent six years teaching at the University of Papua New Guinea, where he was also involved in university administration and foreign aid projects. Wagner enjoys science outreach, and has helped various film makers and other artists interested in polar work. He has also appeared on various television, radio, and web programs to discuss polar science and climate change.

CONCURRENT SESSIONS GROUP E

1:30 p.m. - 3:00 p.m.

S-E1: REALIZING THE NEW CARBON ECONOMY: INNOVATION AND DESIGN FOR URBAN ECOSYSTEM ENGINEERING

Location: Congressional Room B

As the global population grows, so too does food demand as well as constraints on land and natural resources. By the year 2050, the world's population will approach 10 billion people, and at least 2 out of 3 people will live in urban centers. With this increased urbanization and the need to realize a new carbon economy comes the unique opportunity to develop engineering and agricultural innovations within urban systems that sustainably stimulate growth and manage resources more efficiently and circularly to help meet future needs and address global resource and climate challenges.

One strategy for improving the sustainability of food and agriculture systems is to engineer vertical farms and urban ecosystems to manage resources and deliver products simultaneously. Vertical agriculture operations could augment production while offering lower emissions, higher-nutrient produce, and reduced water usage and runoff. And placing vertical farms in the context of a renewable urban ecosystem – where one industry's waste is another's raw material – could stimulate sustainable economic growth.

This session will bring together experts to identify and discuss the challenges, opportunities and possibilities associated with vertical agriculture and sustainable urban ecosystems. It will seek to quantify some of the environmental benefits that could be realized by designing new food and agriculture production systems including discussions of the land sparing, water saving, and carbon mitigating benefits.

Presenters:

David M. Babson, Ph.D., Senior Advisor for Renewable Energy, Natural Resources & Environment, USDA Office of the Chief Scientist

Sarah Federman, Ph.D., AAAS Science and Technology Policy Fellow, USDA Office of the Chief Scientist

Steven Newman, Ph.D., Professor, Colorado State University

Weslyne Ashton, Ph.D., Associate Professor, Illinois Institute of Technology

S-E2: ORIENTING AND ADAPTING EXISTING INSTITUTIONS FOR RESILIENT BUILT AND NATURAL ENVIRONMENTS

Location: Cabinet Room

Governments worldwide are increasingly grappling with systemic risk and system complexities for which existing science, management, and policy tools are insufficient. Resilience is emerging as an alternative paradigm to cope with the events that threaten modern societies – natural hazards, aging population, global migration, and many others. However, achieving more resilient outcomes requires active participation of countless actors to lay significant groundwork. A combination of institutions and informal practices dictate how the built and natural environments are treated – balanced, designed, and developed – and how this proceeds has vast implications for the impact of stressors and shocks on citizens, economies, and the environment. Adapting current practices to be oriented toward resilience is no small feat; we may need to rethink the economics of managing risk, the appropriate levels of analysis to account for system complexities; and what mechanisms best catalyze broad participation. Dialogue about how to leverage and modify existing policy realities, e.g., statutory authorities, as opposed to broadly overhauling governance is lacking. This breakout session engages experts in civil engineering and environmental policy to discuss how formal and informal policies and institutions can be adapted and/or reformed to push the current built and natural environment school of thought toward one of resilience. Included

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in the discussion is the growing importance of resilience relative to risk management, which has underlain much of modern society's policies and practices for engineered systems in past decades.

Presenters:

Igor Linkov, Ph.D., Risk and Decision Science Team Lead, U.S. Army Engineer Research and Development Center

Thomas Seager, Associate Professor in the School of Sustainable Engineering & the Built Environment, University of Arizona

Lynn Scarlett, Co-Chief External Affairs Officer, The Nature Conservancy

Ilker Adiguzel, Director of the Environmental Laboratory (EL), U.S. Army Engineer Research and Development Center

S-E3: TRANSLATING SCIENCE INTO INFRASTRUCTURE RESILIENCE: NATIONAL SECURITY PERSPECTIVE

Location: Forum Room

This session seeks to integrate fundamental science research on earth and human systems with operational national security research to develop decision-making tools for infrastructure resilience. It explores progress made since the 2012 NCSE Conference Recommendations for Disasters and Environment: Science, Preparedness, and Resilience which recommended the development of resilience indicators and the creation of multi-disciplinary programs to ensure an all-hazards approach to infrastructure resilience. Over the last six years programs have made progress and the session will explore examples including the development of the next generation of intensity duration and frequency curves that are providing guidance on infrastructure vulnerability to flooding currently and simultaneously providing infrastructure design guidance for future conditions. In addition, the session will review the results of the 2017 Department of Defense Nonstationary Weather Patterns and Extreme Events workshop which expressed the need to (1) develop a wide range of hazard and resilience thresholds; (2) better understand most likely and maximum recurrence intervals for extreme events; (3) push toward analyzing historical and projected conditions at high temporal and spatial resolutions; and (4) suggested defining information requirements by discipline and location. Finally, the session participants will participate in the drafting a set of new recommendations to continue making progress toward effectively translating new science into resilience infrastructure design guidance.

Presenters:

Gary Geernaert, Department of Energy Office of Science, Biological and Earth System Research

Jill Brandenberger, PNNL Program Manager National Security Environmental Intelligence

Kim Fowler, PNNL Program Manager National Security Infrastructure Resilience

Kurt Preston, Program Manager Resource Conservation and Resiliency, Strategic Environmental Research and Development Program (SERDP), Environmental Security Technology Certification Program (ESTCP)

S-E4: FLASH TALK - INNOVATION IN RESILIENCE: PHYSICAL, FINANCIAL, AND METRICS

Location: Congressional Room A

Flash Talk sessions are a new addition to the NCSE Annual Conference. During each Flash Talk, presenters will deliver a 10-minute presentation followed by 5 minutes of Q&A with the audience. At the conclusion of the final presentation, the audience will once again be able to ask questions of the presenters.

Presentations focus on a similar theme. This Flash Talk session will bring together presentations on new and innovative ideas in resilience.

Moderator: Anne Waple, Ph.D., Science Advisor, National Council for Science and the Environment; CEO, Studio30k

Presenters:

Reducing Extreme Weather in Mid-Latitudes with Reflective Sand in the Arctic

Roman Decca, Strategy & Engineering, Ice911 Research

The System of Accounts for Global Entropy Production, (SAGE-P) to Measure of Sustainable Infrastructure and Resilience

Anthony Marcus Friend, Ph.D., Director, OIKOΣ: Centre for Research in Non-Linear Accounting, Ottawa, Canada

Advancing resilient solar power and fuel cell infrastructure in Economically Depressed Areas Utilizing Tax Credit Programs

Keith Baker, Faculty, North Lake College, Chair of Curriculum for Mortgage Banking and Financial Services for Dallas County Community College District

Building Disaster Resilient Universities

Andre Le Duc, Chief Resilience Office and Associate Vice President, University of Oregon

Quantitative Resilience Assessments of Built Infrastructure

Jeremy Gregory, Ph.D., Research Scientist, Department of Civil and Environmental Engineering, Executive Director, Concrete Sustainability Hub, Massachusetts Institute of Technology

S-E5: GREEN INFRASTRUCTURE FLOOD CONTROL: HOW FLOODING CONTAMINATED PARKS AND IMPACTED RESIDENT PERCEPTIONS OF ENVIRONMENTAL HEALTH

Location: Diplomat Ballroom

Hurricane Harvey made landfall in August 2017 and became the wettest tropical cyclone on record. Flooding in Houston is controlled in part by Buffalo Bayou, a 500-acre watershed with creeks and bayous connected to a network of parks. Over time, flood control areas of Houston have become more highly urbanized, leading to more frequent and extensive flooding.

In addition to flood control, Buffalo Bayou offers nature trails, bike paths, children's playgrounds, and dog parks. Unprecedented flooding from Hurricane Harvey moved potentially contaminated sediments into recreation areas; after Harvey, some parks had up to six feet of accumulated sediment.

We collected soil samples from 6 parks 6, 12, and 18 weeks post-Harvey. Samples were tested for heavy metals, pesticides, and PAHs. A series of spatial analyses using GIS were conducted to assess for potential pollution sources. Surveys (N=117) and in-depth interviews (N=27) were conducted with residents using parks. Quantitative and qualitative analyses assessed perceptions of pollution, self-rated mental and physical health, and opinions about resilience and recovery.

While the use of open space to attenuate flooding during disasters is a practical way to reduce flood risk, using recreational areas for flood control potentially exposes residents using these areas post-disaster to mobilized or redistributed contaminants. The use of green infrastructure for flood control should be undertaken with an improved understanding of potential sources of pollution. Those who use parks post-disaster should be provided with more information to address their concerns about potential health impacts, as well as tools to reduce exposure.

Presenters:

Jennifer A. Horney, Ph.D., MPH, Professor, Department of Epidemiology and Disaster Research Center, University of Delaware

Galen Newman, Ph.D., Associate Professor, Texas A&M University

Emily Rauscher, Ph.D., Assistant Professor, Texas A&M University

S-E6: BRINGING SCIENCE TO DECISION MAKERS - INNOVATIVE PARTNERSHIPS TO PROMOTE CLIMATE RESILIENCE

Location: Executive Room

This session will use two case studies to highlight partnerships between academia, NGOs and state government that facilitates science-based decision-making to advance climate resilience. Presenters will describe how researchers from academia have partnered with conservation NGOs to demonstrate to state and local leaders the effectiveness of a variety of approaches to using nature to protect communities from flooding and to reduce water pollution.

According to the National Climate Assessment the Northeast United States will experience more frequent, intense storms. These storms, like Tropical Storm Irene in 2011 and Hurricane Sandy in 2012, create powerful erosive floods that destroy homes, businesses and public infrastructure, and inundate waterways with harmful nutrient pollution. The projects highlighted in this session were designed to protect Vermont communities from the impact of floods, and to reduce nutrient pollution from severe storms.

Presenters will describe how the innovative partnerships came about, how they were managed and how they are expected to impact public policy and land management practices. Presenters will also describe the studies and their findings. One study uses basin level data and modeling tools to map floodplain and wetland restoration opportunities and to target which opportunities, combined with a variety of possible interventions will maximize flood protection and pollution reduction at the lowest cost. The second study demonstrates the flood protection value of conserved wetlands by monetizing the avoided costs to nearby communities from flooding.

Presenters:

Taylor Ricketts, Ph.D., Director, Gund Institute of Environment, University of Vermont

Deb Markowitz, Director of Policy Outreach, Gund Institute for Environment, University of Vermont

Heather Furman, Vermont State Director, The Nature Conservancy

Keri Watson, Ph.D., Assistant Professor, Sewanee, The University of the South

S-E7: WILDLAND FIRE: UNDERSTANDING THE ECONOMIC, AIR QUALITY, AND WATER IMPACTS TO PROTECT PUBLIC HEALTH

Location: Council Room

In the U.S., large, intense wildfires have become a “new normal.” Some ecosystems need fire to maintain the health of native species, improve habitat and providing forage, remove unwanted invasive species, and reduce the build-up of flammable fuels to reduce the likelihood of highly destructive future wildfires. But while these wildland fires, from both accidental and intentional ignitions, may originate in the wildlands, they can spread to the rapidly growing wildland-urban interface (WUI) putting the built environment at risk. Further, as these fires pose immediate risk to the burn area, the emissions from these fires can travel great distances and negatively impact air quality, human health and ecosystems near and far. This session will discuss wildland fire research that investigates: improving resilience to fire in the WUI, the public health impacts from smoke exposure, water quality and quantity risks from environmental exposures, and the use of technology and social science in a citizen science crowdsourced study to understand and reduce smoke exposure.

Presenters:

David Butry, Applied Economics Office, National Institute of Standards and Technology (NIST)

Wayne E. Cascio, M.D., Director National Health and Environmental Effects Research Laboratory, U.S. Environmental Protection Agency (EPA)

Stephen Leduc, Ecologist, U.S. Environmental Protection Agency (EPA)

S-E8: BEST PRACTICES IN INTEGRATING SMART-INFRASTRUCTURE DEVELOPMENT NEEDS WITH BIODIVERSITY CONSERVATION PRIORITIES

Location: Senate Room

The Smithsonian Conservation Biology Institute (SCBI) has been collaborating with the development sector, governments, and other stakeholders for over 20 years to integrate infrastructure development priorities with biodiversity conservation needs. In this symposium we present four sustainable infrastructure case studies from Peru. Peru is one of the world's most biodiverse countries, and infrastructure development represents a major threat to its flora, fauna, and ecosystem services. SCBI researchers have worked in the country's ecologically sensitive habitats in the Amazon, Andes, and South America Pacific coast with linear infrastructure, energy exploration, and coastal marine infrastructure. The complexities and challenges of each project have required science-based landscape-level analysis to develop best practices that can be integrated into management and operations. Examples include participatory scenario planning and ecosystem services assessments; the application and quantification of the mitigation hierarchy to avoid and minimize infrastructure impacts on biodiversity and restore ecosystems post-impact; and the development and implementation of Biodiversity Action Plans and Biodiversity Monitoring and Assessment Programs for the design, construction, and operation of infrastructure projects. In this symposium, we will present the challenges, opportunities, and best practices developed for four case studies:

1. Participatory ecosystem services assessment and landscape scenario planning for smarter green and gray infrastructure development in the Amazon (*Ana Maria Sanchez and Hadrien Vanthomme, CCS, Smithsonian Conservation Biology Institute, Peru*)
2. Quantifying impacts of an inland-offshore gas exploration project in a protected area in the Amazon (*Tremaine Gregory and Jessica Deichmann, CCS, Smithsonian Conservation Biology Institute*)
3. Best practices in quantifying impact reduction due to avoidance, minimization and restoration for a natural gas pipeline in the Peruvian Andes (*Alfonso Alonso and Reynaldo Linares, CCS, Smithsonian Conservation Biology Institute, Peru*)
4. Impact and influence of a liquefied natural gas marine terminal and artificial reef in a coastal upwelling ecosystem (*Ximena Velez and Francisco Dallmeier, CCS, Smithsonian Conservation Biology Institute, Peru*)

Presenters:

Francisco Dallmeier, Director, Center for Conservation and Sustainability, Smithsonian Conservation Biology Institute

Ana Maria Sanchez-Cuervo, CCS, Smithsonian Conservation Biology Institute, Peru

Tremaine Gregory, CCS, Smithsonian Conservation Biology Institute

Alfonso Alonso, CCS, Smithsonian Conservation Biology Institute, Peru

PLENARY 3:

APPLYING THE CONVERGENCE OF KNOWLEDGE, TECHNOLOGIES, AND SCIENCE TO RESILIENCE THINKING: THE CASE OF RISE - PR AND THE RECONSTRUCTION OF PUERTO RICO'S ELECTRIC SYSTEM

Regency Ballroom - 3:00 p.m. - 3:45 p.m.

In the wake of Hurricane Maria, numerous universities became involved in Puerto Rico's Extreme Operating Environments (EOE) to assist in recovery efforts. This summer, over 20 universities participated in a RISE-PR (Resiliency through Innovation in Sustainable Energy) workshop at Mayagüez, Puerto Rico, designed to explore just that. Its proceedings brought about the need for a "new ethic" of university community relations around resilience. Through this experience, it has become clear that involvement of universities in post-disaster recovery and the partnerships created have a large impact on future resilience. This panel will discuss the possibilities, opportunities, limits and barriers emanating from this historic encounter utilizing the Puerto Rico experience to galvanize a multi-level, multi-sector, transdisciplinary alliance of universities, local, state, and federal governments, NGOs, and local communities around resilience innovation towards sustainability.

MODERATOR



Valerie Luzadis, Ph.D., Professor, State University of New York, College of Environmental Science and Forestry

Valerie Luzadis is Professor of Social-Ecological Systems and Ecological Economics at the State University of New York College of Environmental Science and Forestry (ESF). Luzadis has also served as Interim Provost and as the first Executive Vice President of ESF and held several other leadership roles in the institution. Her teaching and research focuses on systems approaches to social-ecological foundations for conservation and sustainability. Luzadis' scholarly work also includes the study and practice of collaborative interdisciplinary science and efforts to bring science into policy. Luzadis serves on the Executive Committee of the Council of Environmental Deans and Directors within the National Council for Science and the Environment. She is a Past President of the United States Society for Ecological Economics, having also served as leader of the Founding Organizational Committee for the United States Society for Ecological Economics. She brings to the academy strong practical experience having worked in Cornell Cooperative Extension, a forestry trade organization and for environmental NGOs including The Nature Conservancy and the Wildlife Conservation Society.

PRESENTERS



Kim Diana Connolly, Vice Dean for Advocacy and Experiential Learning, University at Buffalo

Kim Diana Connolly has focused her academic career on how best to educate future lawyers, as well as how best to use laws and policies to protect the planet and its inhabitants. She serves as the Vice Dean for Advocacy and Experiential Learning for the University at Buffalo School of Law, and directs both the Advocacy Institute and the Clinical Legal Education Program. Connolly often presents and participates in collective endeavors that focus on experiential legal education, and has served in national leadership positions. She also studies, writes, and speaks about environmental and animal law policies. Connolly's commitment to advocacy began before she attended law school, when she ran a non-profit working to bring social justice to those facing a lack of access to clean water and sanitary wastewater removal in North Carolina. Connolly taught at the University of South Carolina School of Law, where she was associated faculty at the School of the Environment. Prior to her teaching career, she practiced law with a number of Washington, D.C., law firms.



Jacob Mans, AIA, Assistant Professor, University of Minnesota

Jacob Mans is an architect and educator focused on understanding the feedback loops between building-scaled technical systems and large-scaled social and ecological systems. His architectural research and practice focuses on developing high performing socio-technical partnerships that can redefine the design of more resilient systems. Mans is currently conducting design-research projects on affordable housing and economic development with the Opaskwayak Cree Nation in Manitoba, Canada; on the development of valued-added manufacturing processes to better utilize low-quality Minnesota wood resources; and on the development of trans-scalar academic, community, and private sector convergence practices through the design development of the RISE (Resilience through Innovation in Sustainable Energy) platform (with INESI, UPR, and the emerging RISE network). In the spring of 2018, he coordinated a catalyst workshop at the UMN

to develop partnerships between the university and communities from Puerto Rico, OCN, Micronesia/Minnesota, and the Twin Cities homeless community.



Cecilio Ortiz García, Ph.D., Associate Professor, University of Puerto Rico-Mayagüez

Cecilio Ortiz García is currently working as an Associate Professor in the Department of Social Science, University of Puerto Rico-Mayagüez, Puerto Rico. His research interests includes public administration, public policy analysis, renewable energy, public participation, intergovernmental relations and environmental federalism. He is serving as an editorial member and reviewer of several international reputed journals. Ortiz García is the member of many international affiliations. He has successfully completed his Administrative responsibilities. He has authored many research articles/books related to public administration, public policy analysis, renewable energy, public participation, intergovernmental relations and environmental federalism.



Marla Pérez-Lugo, Ph.D., Professor, University of Puerto Rico-Mayagüez

Marla Pérez-Lugo is a professor of Sociology at the Department of Social Sciences, University of Puerto Rico-Mayagüez. She received her Ph.D. in environmental sociology, with a special focus on vulnerability to natural hazards and risk/disaster communications, from Rutgers, the State University of New Jersey. Since 2005, her research has shifted towards the social aspects of energy, energy policy, interdisciplinary energy studies, and public engagement in energy decision-making processes in Puerto Rico. In 2015, in collaboration with Dr. Cecilio Ortiz García and Dr. Lionel Orama Exclusa, she co-founded the National Institute for Energy and Island Sustainability (INESI in Spanish), the only interdisciplinary and inter-campus institute of the UPR System. Pérez-Lugo is currently a member of INESI's steering committee and

a co-developer of RISE-PR, Resilience through Innovation in Sustainable Energy for Puerto Rico, an interuniversity collaborative platform with NCSE and colleagues at Arizona State University and University of Minnesota.



Fernando I. Rivera, Ph.D., Associate Professor of Sociology, University of Central Florida

Fernando I. Rivera is an Associate Professor of Sociology, Interim Assistant Vice-Provost for Faculty Excellence, and Director of the Puerto Rico Research Hub at the University of Central Florida. His research interests and activities are in the sociology of health/medical sociology, disasters, and race and ethnicity. His published work has investigated how different mechanisms are related to certain health and mental health outcomes with a particular emphasis on Latino populations. His disaster research has explored the investigation of factors associated with disaster resilience and restoration and resilience in coupled human-natural systems. He is currently Guest Editor of a special journal issue for *Population and Environment* on Puerto

Rico's population before and after Hurricane Maria. He earned his M.A. and Ph.D. in sociology from the University of Nebraska-Lincoln and his B.A. degree in sociology from the University of Puerto Rico-Mayagüez.

JOHN H. CHAFEE MEMORIAL LECTURE ON SCIENCE, POLICY AND THE ENVIRONMENT

Regency Ballroom - 3:45 p.m. - 5:00 p.m.

The Chafee Memorial Lecture is dedicated in the memory of the Honorable Senator John H. Chafee who, in his 23 years representing Rhode Island in the U.S. Senate, was a leader in promoting a bipartisan, science-based approach to environmental issues.

PRESENTER



Gary Geernaert, Ph.D., Director, Climate and Environmental Sciences Division, in the Office of Biological and Environmental Research, Office of Science, U.S. Department of Energy

Gary Geernaert oversees and directs basic scientific research at DOE National Laboratories and Universities, involving atmospheric, climate, and environmental sciences. In addition, he is the federal official responsible for two DOE scientific user facilities: the Atmospheric Radiation Measurement research facility and the Environmental Molecular Science Laboratory. Besides his DOE duties, Geernaert serves as Vice-Chair and DOE principal to four science committees under the National Science and Technology Council. Geernaert earned a B.S. degree in Atmospheric Sciences from the University of California, Davis and he received a Ph.D. degree

in Atmospheric Sciences from the University of Washington. Before joining DOE in 2010, Geernaert spent eight years as Director, Institute of Geophysics and Planetary Physics, at Los Alamos National Laboratory.



Discussion by Aaluk Edwardson, Artist, Teacher, and Community Collaborator, University of Alaska Fairbanks Geophysical Institute and Iliisagvik College

Aaluk Edwardson is a longtime science enthusiast from Utqiagvik, Alaska. She works as an artist in science outreach and communication with the University of Alaska Fairbanks Geophysical Institute and teaches creative writing and performance at Iliisagvik College, Alaska's only tribal college. Edwardson is a writer of plays, film, and poetry, and is passionate about supporting projects in education, art, and community resilience.



About Senator John H. Chafee (1922 - 1999)

Senator John H. Chafee earned degrees from Yale University and Harvard Law School. After six years in the Rhode Island House of Representatives, Chafee was elected Governor in 1962 and re-elected in 1964 and 1966. In January 1969 he was appointed Secretary of the Navy and served that post until he was elected to the United States Senate in 1976. As Chairman of the Environment and Public Works Committee, the Senator was a leading voice in crafting the Clean Air Act of 1990. He led successful efforts to enact oil spill prevention and response legislation and a bill to strengthen the Safe Drinking Water Act. Senator Chafee was a long-time advocate for wetlands conservation and open space preservation and was the recipient of every major environmental award. John Chafee was a Republican, committed conservationist, and a political leader who worked across party lines to advance environmental protection.

THURSDAY, JANUARY 10**NCSE ACADEMIC-FEDERAL DIALOGUE AND SCIENCE POLICY SYMPOSIUM****Ambassador Ballroom - 8:00 a.m. - 4:30 p.m.**

The NCSE Academic-Federal Dialogue and Science Policy Symposium is designed to facilitate discussion between scientists and federal agencies on their programs, research priorities, and funding opportunities. The event will also provide opportunities for scientists to engage with decision-makers from Executive and Legislative Branches at local, state, and federal levels of decision-making to broaden participants' perspective on how science and policy can interact to better inform environmental decisions.

Separate registration is required. Onsite registration is available until room capacity is reached. NCSE Member Institutions may attend for free. Non-member registration is \$149. Stop by the registration desk for details.

- 8:00 a.m. Breakfast served (coffee & light breakfast available)**
- 8:30 a.m. Welcome and Introduction; Goals of the Day**
- 8:45 a.m. Opening Panel: NCSE Academic-Federal Dialogue**
This panel will share high-level perspectives on research priorities from different federal agencies and opportunities for scientists to engage in the federal research enterprise — drawing connections between current Administration and Congressional priorities, agency budgets, and current and forthcoming research opportunities.
- 9:45 a.m. Table Talk with Federal Agencies**
Participants will have an opportunity to mix and mingle with program directors from different federal agencies to ask specific questions about research priorities and grant opportunities.
- 11:00 a.m. Break**
- 11:15 a.m. Skill Building: Policy Communication for Scientists**
NCSE is partnering with COMPASS, a pioneering science communication organization that helps scientists effectively share their knowledge in the public discourse and decision-making, to provide a skill-building workshop that focuses on distilling and framing the “so what” of your science for a policy audience.
- 12:15 p.m. Networking Lunch**
- 12:45 p.m. Skill Building: Policy Communication for Scientists (continued)**
- 1:15 p.m. Perspectives from Policymakers: Federal, State, and Local**
The panel will bring together diverse policy perspectives from Capitol Hill and the Administration, as well as from the state and county government to give scientists a sense of the kind of decision frameworks in which policymakers operate and to share different possible entry points for scientists into the policy process.
- 2:15 p.m. Coffee Break**
- 2:30 p.m. Policymaker and Scientist “Speed Dating”**
An opportunity for scientists to engage in fast-paced, lively conversations with policymakers in a structured but fun format.
- 3:45 p.m. Wrap Up: Future goals for NCSE’s policy work and opportunities to contribute**
- 4:30 p.m. Adjourn**

RELATED ORGANIZATION EVENT: THE COASTAL SOCIETY'S COASTAL CAREER WORKSHOP

(REGISTRATION REQUIRED)

Executive Room - 8:00 a.m. - 5:00 p.m.

As part of the “Margaret A. Davidson Coastal Career Development Program,” The Coastal Society (TCS) is organizing a full-day workshop to provide valuable skills and information to the next generation of coastal practitioners. The Coastal Society and the Women’s Aquatic Network will host the workshop at the Omni Shoreham in conjunction with the NCSE Annual Conference. Please note that this is not a part of the Annual Conference and a separate registration is required. Speakers will share insights on the coastal job market, activities will provide skills to succeed, and attendees will have the opportunity to network with speakers and potential mentors. Students and young professionals in the coastal and environmental field are encouraged to attend.

Registration information and program details are available at www.thecoastalsociety.org/. Please contact TCS at admin@thecoastalsociety.org with any questions.

IDENTIFYING INNOVATION IN TEACHING AND LEARNING RESILIENCE: MAPPING ASSETS & BEST PRACTICES

Forum Room - 9:00 a.m. - 12:00 p.m.

Many universities are rallying around the concept of resilience and resilience thinking, in an effort to organize knowledge to deal with the high level of uncertainty associated with the challenges of climate change and the anthropocene. The multi level, multi sectoral, and multi disciplinary challenges brought about by the concept of resilience, forces higher education institutions (HEI) to constantly search for new and innovative curricula, research, and community engagement models. This NCSE workshop is an effort to identify, map, and reflect about where the teaching and learning about resilience and resilience thinking in major U.S. universities has been, is, and is going.

PROGRESS ON BUILDING A COMPETENCY BASED CURRICULUM FOR SUSTAINABILITY

Forum Room - 1:00 p.m. - 4:00 p.m.

Every year, new sustainability degree programs are launched at colleges and universities. These efforts raise important questions for the field of sustainability in higher education related to quality and standards, processes of program development and administration, and communicating the skills and abilities needed for sustainability graduates to potential employers. In early 2018, the National Council for Science and the Environment (NCSE) launched a process focusing on developing “key competencies” in sustainability degree programs in collaboration with the Sustainability Curriculum Consortium (SCC) and NCSE member institutions. The goal of this initiative, through workshops, dialogues, and other activities, is to create a “Consensus Statement” on sustainability competencies. This workshop is one of a series of opportunities to learn about the initiative’s progress to date, to further explore these goals, and to invite workshop participants to contribute to a shared and growing body of knowledge around key competencies in sustainability degree programs. Participants will share the learning outcomes of their courses/curricula and compare these with established key competencies in sustainability. The workshop will identify lessons learned for the development of key competencies in sustainability and formulate next steps, including what would be useful institutional structures to support development and administration of sustainability programs. The workshop is interactive. Participants will be invited to answer a pre-conference survey to inform the dialogue on key competencies in sustainability. Small-group discussions will draw lessons learned for future development and identify support structures. A final plenary discussion will integrate the workshop findings.

Don't miss the posters located in the Regency Ballroom.

Join us for coffee with the poster presenters on Tuesday from 3:30 p.m. to 4:00 p.m.

1. A Survey of One-Day Environmental Communication Through Twitter

David Nadler, Ph.D., Chair/Assistant Professor, New York Institute of Technology

2. Factors Affecting Knowledge and Beliefs of College Freshmen towards Climate Change

Virginie M. Rolland, Associate Professor, Arkansas State University

3. What Should Professors Teach about Sustainability? Perspectives from Policymakers, Administrators, Professors, & Students

Jessica Ostrow, Postdoctoral Research Fellow, Teachers College, Columbia University

4. Communal Resiliency and Integrated Emergency Operations

Dr. Tonya T. Neaves, Director, Centers on the Public Service, Schar School of Policy and Government - George Mason University

Denise Nelson, P.E., CFM, ENV SP, LEED AP, Environmental Engineer, The Berkley Group

Amb. (ret.) Richard Kauzlarich, Director, Center for Energy Science and Policy, Schar School of Policy and Government - George Mason University

5. Empowering Rural Communities to Increase Sustainability and Resilience through Disaster Planning Games

Dr. Erin Leckey, Program Manager, Research Associate, University of Colorado Boulder

6. Energy, Resilience, and Culture: Education at the interface of physical and social systems

Dr. Amanda Graham, Academic Director, Irving Institute for Energy and Society, Dartmouth College

Julia Snodgrass, Student, Dartmouth College

7. Resilient Land Remediation: Addressing Extreme Weather and Climate Change, Creating Community Value

Barbara Maco, Climate Change and Resilience Technical Initiative Leader, Sustainable Remediation Forum

8. What does climate resilience mean for the Williamstown, MA community? An undergraduate perspective

Amber Lee, Student, Williams College

9. Sustainability and Resilience in Low Income Neighborhoods: the Example of Homewood, Pittsburgh

Iris Grossmann, Assistant Professor of Sustainable Technology, Chatham University

10. Sustainable & Resilient: To What? For Whom? And...What Is "Functioning"?

Jaime D. Ewalt Gray, Ph.D., CEO, C. E. Bugdal, LLC

11. Linking Adaptation and Mitigation towards a Resilient and Robust Infrastructure Sector in Emerging Economies

Ruth Nyabonyi Onkangi, Research Officer, National Construction Authority

12. Tools of Resiliency - Cultivating Community Resilience

Oscar Ojeda-Cana, Student Assistant Researcher and Community Facilitator, University of Puerto Rico - National Institute for Energy and Island Sustainability (INESI)

13. Building Novel Pathways via Educational Intersections: Alliances as a Source of Resilience

Debra Socci, Biology Professor, Seminole State College of Florida

Bruce T. Milne, Ph.D., Professor, University of New Mexico

14. Resilience through Agency of the Built Environment

Jennifer Kristen Smith, Visiting Professor, Auburn University

15. Resilience of Chemical and Refining Infrastructure: Do the Data Support EPA's Case for Rescinding Disaster Prevention Rules?

Darius Sivin, Ph.D., Epidemiologist/Industrial Hygienist, Self-published author, speaker

16. Best Practices in Resilience Planning

Elizabeth Hotchkiss, Disaster Recovery and Resilience Lead, National Renewable Energy Laboratory (NREL)

17. HARVEST(IN)Gowanus: Designing for Resilience

Amanda Gann, Creative Director/Communications Manager, Association of Collegiate Schools of Architecture

18. The NOAA RISA Program: Building a Culture of Resilience Underpinning Sustainable Economic Growth

Sean Bath, RISA Program Specialist, UCAR and NOAA

19. Cybersecurity Managers

Rick Trilling, Associate Professor, Wentworth Institute of Technology

20. Preparing Assets for Disaster: Do Nothing, Relocate and Everything In-Between

Dana Davis, Senior Manager, Hitachi Consulting

21. Flexible Infrastructure: Adapting to Changing Conditions

Fletcher Fields, Economist, U.S. Department of Energy

22. The “R” Rule: Presence of *Vibrio* spp. In Oysters

Briana Coleman, Student, Scotlandville Magnet High School

23. Saving the Delta by Managing the Natural Ecosystem of Marshland: Sustaining the Population of *Eurytemora Affinis* (zooplankton/copepod)

Rhithishah Yuva Raju, Student, Mira Loma High School

24. The Effect of Friendships and Parental Relationships on Climate Change Perceptions

Anika Palekar, Student, Panther Creek High School

25. The Effects of Stream Water Quality and Landscape Characteristics on Aquatic Insects in the Sandhills, Northern Outer Piedmont and Triassic Ecoregions in NC

Ashleigh Henry, Student, University of North Carolina at Chapel Hill

26. Comparison of Impact of Wood Smoke from a Wood Stove on Indoor and Outdoor Air Quality in a Typical White Swan, WA Home

Jayenell Lee, Student, White Swan High School

27. Nut production and Changing Carbon Allocation in an Experimental Hazelnut Orchard Subjected to Three Levels of Fertilization

Naomi Fireman, Student, Oberlin University

28a. Ecological Water Budgets: Reintroducing Natural Processes into Urban Waterways

Kassidee Bambrough, Mitch Gardiner, Rachelle Litt, Matt Perry, Mara Van Meer
Students from Ecosystem Management Technology Program, Fleming College

28b. Reimagining Floodwater Infrastructure: Smaller Wetlands, Larger Area of Effect

Jennifer Buchanan, Kyle Derry, Lauren Vanderlingen and Emma Whilding
Students from Ecosystem Management Technology Program, Fleming College

29a. Light on the Salt: Water Desalination using Coastal Salt Marshes

Gurnoor Kaur, Jenna Kip, Maryjane Proulx, David Reavie, and Kirsten Spivak
Students from Ecosystem Management Technology Program, Fleming College

29b. 3D Printed Coral Reefs as Resilient Storm Breaks

Danielle Chiasson, Camille Cooper, Sadie Fischer, Junjie Jacob Ke
Students from Ecosystem Management Technology Program, Fleming College

30. Go With The Flow: Mitigating the Effects of Flooding by Restoring the Don River Watershed in Toronto

Martina Albert, Connor Hill, Andrew McNaughton and Jake Venton
Students from Ecosystem Management Technology Program, Fleming College

- 31. Flower Power: Incorporating Pollinator Habitat into LID Designs**
Evan Britton, Garrett Bulmer, Christian Poschmann, Peter Sourges
Students from Ecosystem Management Technology Program, Fleming College
- 32. Social Ecology in Action**
Jessica Abernethy, Adam McMullen, Nicole McClennan, Amanda Porter
Students from Ecosystem Management Technology Program, Fleming College
- 33. Ecosystem Services in Action: Observations from the 2017 Hurricane Season**
Greg Guannel, Research Scientist, University of the Virgin Islands
- 34. The Evolution of a Nourishing Ecosystem: Historical Insights from a Sustainable and Resilient Community Managed Aqueduct in PR**
Joan I. Asencio-Yace, MBA Candidate, University of Puerto Rico Mayagüez Campus, Corcovada's community leaders
Javier Nieves-UPRM, Lisa Dirks-ASU, Alex Heid-UMN, Marla Pérez, Ph.D., INESI-UPR, Cecilio Ortiz, Ph.D., INESI-UPR
- 35. Assessing the Potential for Distributed Energy Generation from Food Waste using Small-scale Anaerobic Digestion**
Sara Pace, Postdoctoral Scholar, University of California, Davis
- 36. Urban infrastructure for a sustainable and resilient food, energy, and water system**
Ziqian (Cecilia) Dong, Ph.D., Associate Professor, New York Institute of Technology
- 37. Urban Forestry: An Infrastructure for Resilience**
Ian Leahy, Director of Urban Forestry, American Forests
- 38. Assessing Urban Tree Benefits in Desert Parking Lots**
Phillip Zawarus, Assistant Professor, University of Nevada, Las Vegas
- 39. Financing Sustainable Infrastructure Development in Emerging Economies using Applied Resilience Thinking**
Catherine Drumheller, QEP, Principal, Oak Services, LLC
Matthew Martin, Program Development Manager, ECC
- 40. Infrastructural Urbanism: a design strategy for socio-environmental symbiosis**
Linda C. Samuels, Associate Professor in Urban Design, Washington University in St. Louis
Tom Klein, Master of Landscape Architecture, Washington University in St. Louis
- 41. Infrastructure and the Built Environment in the Fourth National Climate Assessment**
Natalie Bennett, Adaptation and Assessment Analyst, U.S. Global Change Research Program
- 42. Ranking Green Infrastructures Resilience in the Urban Environment**
Leila Mosleh, Ph.D. student, University of Maryland-College Park
- 43. Sustainability in an Unfamiliar Environment: Resilience of the Earthship Biotechture Community**
Hayley Furman, Student, Seminole State College of Florida
- 44. Internal Carbon Pricing Tools to Transform Infrastructure in Higher Education and Beyond**
Alexander Barron, Assistant Professor of Environmental Science and Policy, Smith College
- 45. Sustainable and Resilient Design of Urban Integrated Centralized and Decentralized Water Systems**
Weiwei Mo, Assistant Professor, University of New Hampshire
- 46. Assessing The Impact of Significant Environmental Events On Attitudes Towards Flood Mitigation Policies**
Eli Jacobson, Master's Student, Lehigh University

47. Climate Impacts & Community Responses in Coastal Areas: Lessons for Community Resilience and Resistance in Risk-prone Regions

Simone English, Graduate Researcher, Florida Agricultural & Mechanical University
Christianah A. Oyenuga, Graduate Researcher, Florida Agricultural & Mechanical University School of the Environment

48. Partnerships for Coastal Resilience: The USFWS Coastal Program

Samantha Brooke, National Team Lead Coastal & Marine Program, USFWS

49. Waste Utilization through the use of Red Mud and Inedible Oils in the Transesterification Process

Yelda Hangun-Balkir, Ph.D., Associate Professor, Manhattan College

50. Ultrasonic technology in wastewater treatment

David Nadler, Ph.D., Chair/Assistant Professor, NYIT

51. Optimizing System Storage during Flood Events in a Small, Multi-Jurisdictional Urban Watershed

Shirley E. Clark, Professor of Environmental Engineering, The Pennsylvania State University
Christopher Homer, Penn State Harrisburg and Tsinghua University

52. Renewable Natural Gas for Sustainable Agriculture and Resilient Energy Systems in Puerto Rico

Isamar Amador Diaz, ABE Graduate Assistant, M.S., Pennsylvania State University
Tom L. Richard, Ph.D., Professor of Agricultural and Biological Engineering, Director of Penn State Institutes for Energy and the Environment, Bioenergy and Bioresource Engineering, Pennsylvania State University

53. From Sikorsky to Tesla: The Limits of Energy Transitions in Puerto Rico

Javier A. Nieves-Torres, Research Assistant INESI, University of Puerto Rico - Mayagüez

54. North American Renewable and Neutral Energy Alliance

Ava Medina, Lead Research Assistant, UNC Chapel Hill
Gabri Mannino, Research Assistant, UNC Chapel Hill

55. A Regenerative Framework for Building Energy Retrofit Project Development

Mahsa Safari, Ph.D. Candidate, Pennsylvania State University

56. Leveraging Energy and Water Infrastructure Interdependencies: Parameters for In-pipe Hydropower Micro-turbine Deployment

Jennifer Sklarew, Ph.D., Adjunct Professor, George Mason University, Department of Environmental Science and Policy

57. Solar Commons Role In US Energy Infrastructure: Successful Prototypes of Low-Income Community Trust Solar Ownership

Kathryn A. Milun, Ph.D., Associate Professor, University of Minnesota Duluth

58. Health Effects of Heat Vulnerability in Rio de Janeiro: A Validation Model for Policy Applications

Diogo Oscar Borges Prosdocimi, Graduate Fellow, RAND Corporation

Network with exhibitors and other attendees in the Ambassador Ballroom

Exhibit Hours:

Monday, 5:30 p.m. - 7:00 p.m.
 Tuesday, 7:30 a.m. - 8:30 a.m.
 Tuesday, 10:15 a.m. - 10:45 a.m.
 Wednesday, 7:30 a.m. - 8:30 a.m.
 Wednesday, 10:00 a.m. - 10:30 a.m.

Exhibitors by Booth Number

1. Earth Day Network
2. National Council for Science and the Environment
3. Sonoma Water
4. The SPECTRUM Group
5. Radiant Earth
6. E&E News
7. Army Corps of Engineers
8. Federal Highway Administration
9. Centers for Disease Control and Prevention
10. U.S. Geological Survey
11. National Aeronautics and Space Administration
12. U.S. Forest Service
13. U.S. Department of Agriculture
14. Fleming College
15. National Renewable Energy Laboratory

Visit the NCSE Booth to meet NCSE Staff and Leaders

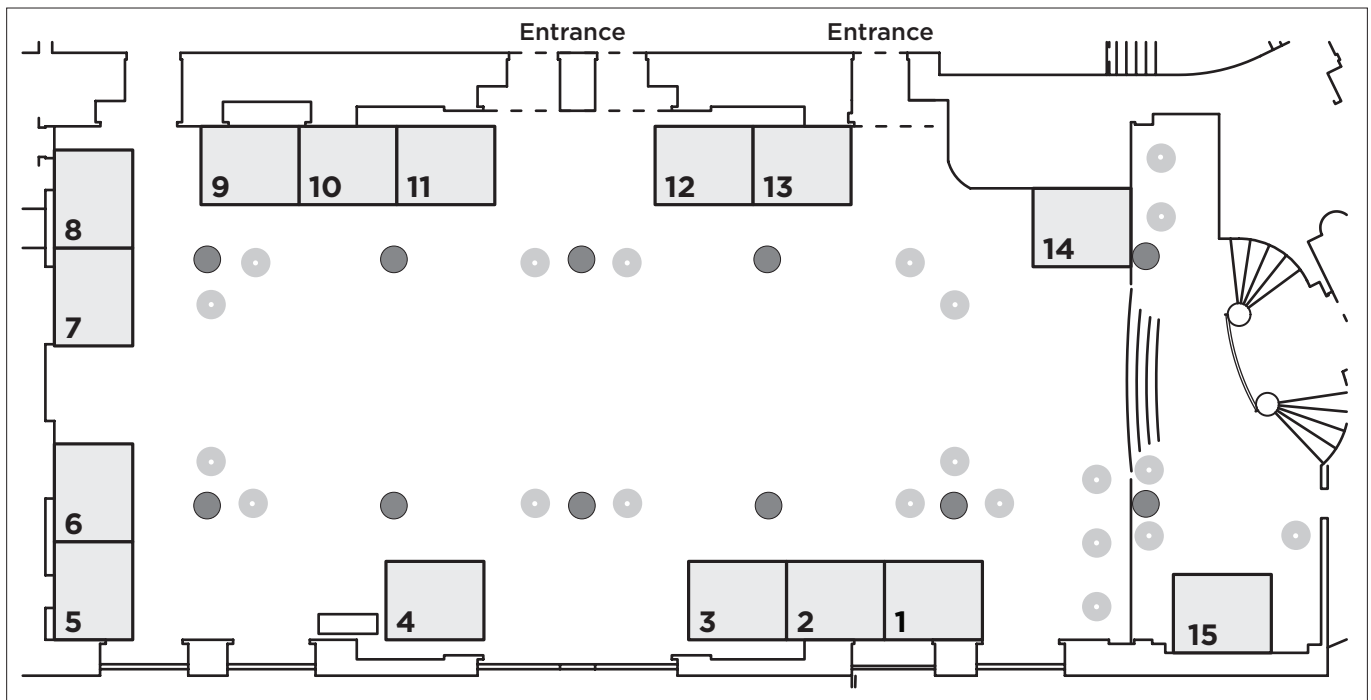
Monday, 5:30 p.m. - 7:00 p.m.
Meet the NCSE Staff

Tuesday, 7:30 a.m. - 8:30 a.m.
NCSE Membership

Tuesday, 10:15 a.m. - 10:45 a.m.
NCSE EnvironMentors Chapter Leaders

Wednesday, 7:30 a.m. - 8:30 a.m.
NCSE Membership

Wednesday, 10:00 a.m. - 10:30 a.m.
NCSE Science Policy and Research Programs



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JEFFREY LEONARD In Memory, 1954-2018

**President & CEO, Global Environment Fund
Treasurer, New America
Founders Circle, National Council for Science and the
Environment**

Dr. Jeffrey Leonard was a true visionary whose contributions to improving our planet will have a lasting effect for many years to come. He dedicated his life’s work to protecting the environment and was globally renowned for advancing innovative, science-based solutions to complex socio-environmental challenges. As the CEO and Co-Founder of the Global Environment Fund, Dr. Leonard was a pioneer in private investment mechanisms aimed at the interface between the energy and environmental sectors. Dr. Leonard was a founding member of the National Council for Science and the Environment’s (NCSE) Board of Directors, where he served for more than 27 years, until this year when he was inducted into the NCSE Founders Circle. He is held in the highest regard by his fellow Board Members and the broader NCSE community, and by countless colleagues worldwide. Dr. Jeffrey Leonard will forever be remembered for his integrity and leadership and for his commitment to NCSE’s mission of improving the scientific basis for environmental decision-making.

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Jenny Cornacchione,
HR Partner

Elio Cruz, Youth and Diversity
Program Officer

Erica Goldman, Ph.D., Science
Policy Director

Paul Hirsch, Ph.D., Senior
Research Fellow

Leah Izzett, Special Assistant
to the Executive Director

Natalie Koo, Senior Manager,
Meetings & Events

Shelley Kossak, Senior Advisor

Veera Mitzner, Ph.D., Director,
International Initiatives

Maribel Torres, Chief Financial
Officer

Anne Waple, Ph.D., Science
Advisor

Michelle Wyman, Executive
Director

NCSE Fellows

Marvi Ahmed, Fellow

Ira Feldman, Senior Fellow,
Sustainability Curriculum
Consortium

Kathy Jacobs, Senior Fellow,
University of Arizona

Andy Jorgensen, Ph.D., Senior
Fellow, University of Toledo

Ariane Mohr-Felson, NCSE
Drawdown Fellow, University
of Arizona

Richard Moore, Ph.D., Senior
Fellow, The Ohio State
University

Alberto Parenti, Ph.D., Senior
Fellow,

Rod Parnell, Ph.D., Senior
Fellow, Northern Arizona
University

David Gregory Proffitt, NCSE
Drawdown Fellow, University
of Utah

NCSE Interns

Sophie Adams
Micaela Hyams
Alyssa Ingelido

Volunteers

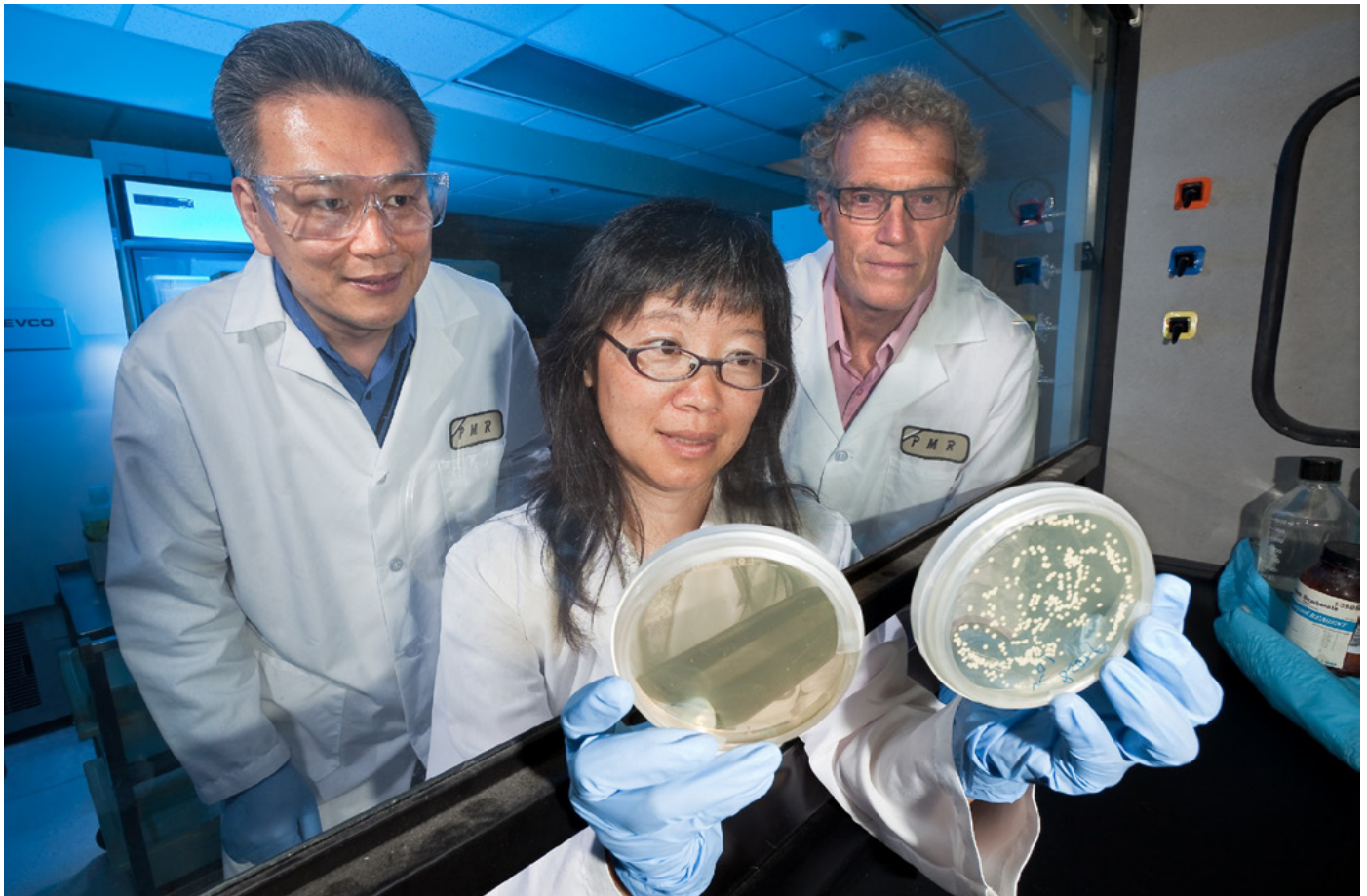
Jessica Abernethy
Douglas Bennett
Chantal Doyon
Mitchell Gardiner
Chelsea Houston
Michelle Jackson
Nafiseh Jafaradeh
Jenna Kip
Rhonda Kranz
Abigail Leavens
Melanie Lefaive
Nicole McClennan
Kathryn Milun
Leila Mosleh
John Perry
Kelly Sackheim
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Wade Williams
Elizabeth Wronko
Yuanrong Zhou



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reservoir operations



carbon-free water

Sonoma Water strives to encourage innovation, resourcefulness, creativity, and ingenuity, recognizing that the best solutions often have not been tried before.

We are a leader in real world relevant action and policy making in combatting climate change, demonstrating that science based local action can be performed cost effectively. Sonoma Water helped create Applied Solutions in 2008. The purpose of Applied Solutions is to assist local governments through collective leadership and in cooperation with the scientific community to achieve permanent, quantifiable and cost-effective reductions in greenhouse emissions and water and energy consumption.

We are proud to announce that Applied Solutions will become a program within the National Council for Science and Environment.



habitat enhancement

fish ladder and viewing gallery



**Sonoma
Water**

SonomaWater.org

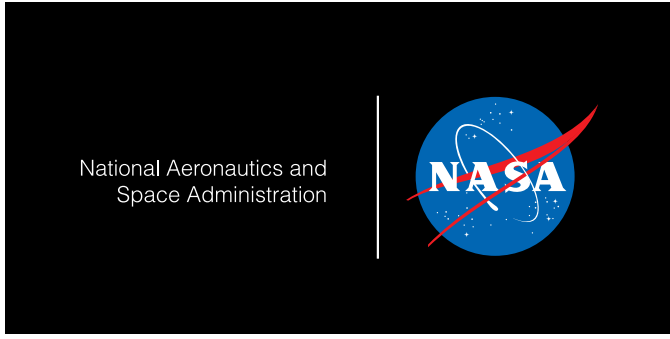
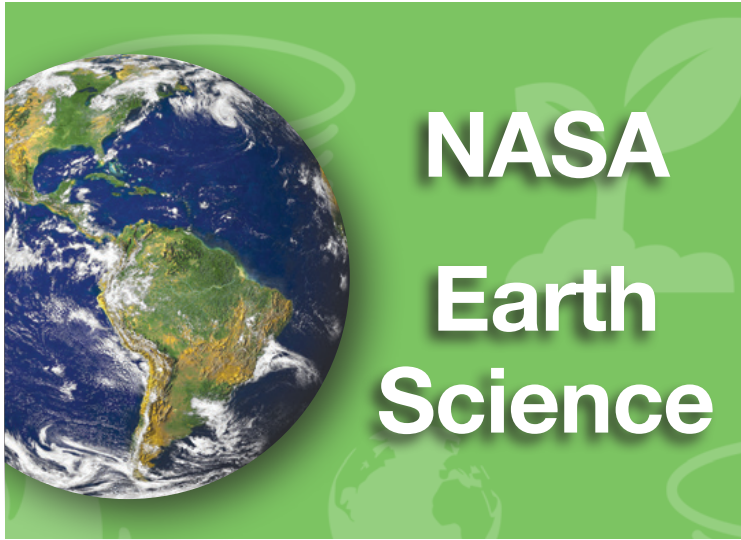


COMMITTED TO RESILIENCE



The USDA Forest Service works to sustain the health, diversity, and productivity of the nation's forests and grasslands and the communities that depend on them—through management, research, and technical assistance.

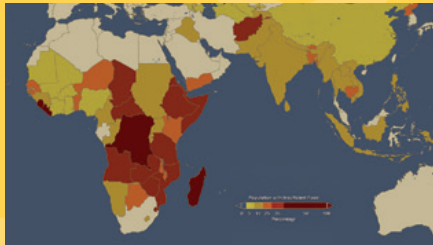
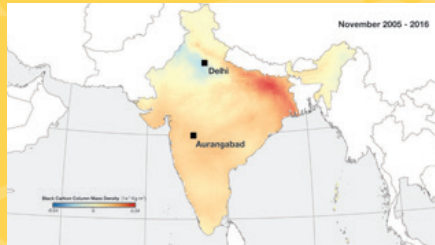
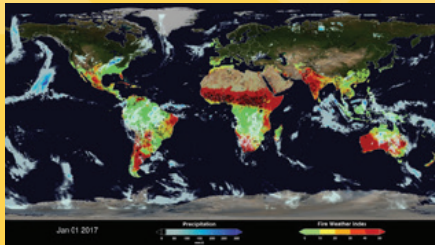
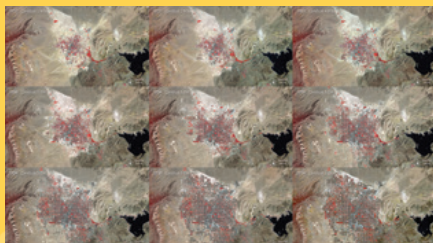
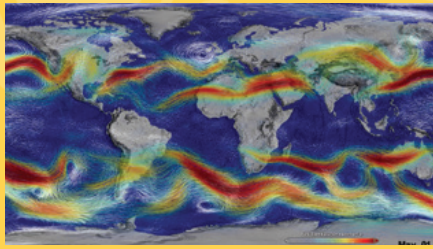
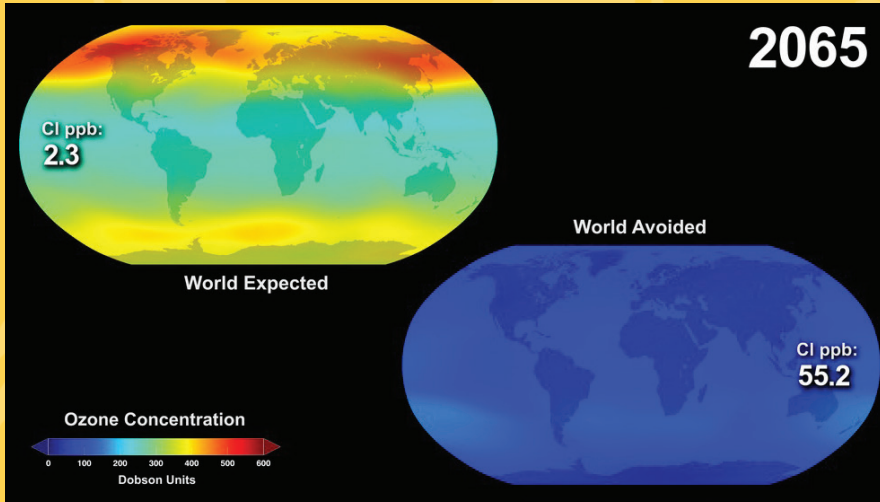
White Mountain National Forest
Photo by Lon Henderson, USDA Forest Service



Providing New Perspectives of Earth's Environment and Health

You're invited to join us at the NASA Booth, January 8-9.

We live on a dynamic, living planet. Land shifts. Seas rise. Volcanoes erupt. Storms rage. Snow melts. Plants grow. Cities expand. These ever-changing, interconnected systems affect all life on Earth, and the planet itself. To understand these natural and human-caused changes, NASA's Earth Science Division uses unique global observations from space, air, sea and on land. This data enables informed decision-making for agriculture, water and food security, urban planning, disaster preparedness and response, transportation, climate and weather, and myriad other things that benefit life on Earth.



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**2019 EnvironMentors National Fair
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Monday, June 3, 2019
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Science in Environmental Decision-Making

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Omni Shoreham
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Resilience Roundtables

In collaboration with universities, community colleges, and local governments, these events will bring together scientists and decision-makers to consider the possibilities of accelerated impact, relevancy, and resources through collaboration at a local scale.

Find out more about these and other events at
www.NCSEGlobal.org/events