

Building

January 28 - 30, 2014
Washington, D.C.



Climate Solutions

14th National Conference and Global Forum
on Science, Policy and the Environment

VISION

The **14th National Conference and Global Forum on Science, Policy and the Environment: Building Climate Solutions** will engage some 1,000 key individuals from many fields of sciences and engineering, government and policy, business and civil society to advance solutions to minimize the causes and consequences of anthropogenic climate change.

The conference is organized around: [1] The Built Environment; and [2] Agriculture and Natural Resources. Under these two themes, 30 tracks connect the conference to specific initiatives led by partnering organizations that advance solutions. In this manner, participants will engage with and have lasting impact on real world responses to climate change.

The conference is timely for many reasons such as:

- the ongoing release of the 5th Assessment Reports of the Intergovernmental Panel on Climate Change (the Working Group I component was released on September 27th, 2013);
- the completion of the draft U.S. National Climate Assessment in early 2014; and
- the renewed emphasis on climate change by President Obama and by many other global leaders.

We invite you to join with others, work across traditional boundaries, and contribute your insights and skills to addressing the most significant environmental challenge of our time.

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**REDUCE VULNERABILITY
TO EXTREME EVENTS**

**MANAGE RISKS TO
MARINE ECOSYSTEMS**

**MITIGATE & ADAPT
TO CLIMATE IMPACTS**

**PROTECT COASTS &
COASTAL INFRASTRUCTURE**

**PREPARE FOR DROUGHT
& WATER CHALLENGES**

TOWARD
A CLIMATE-SMART NATION

DATA AND INFORMATION TO IMPROVE THE NATION'S RESILIENCE



NOAA.GOV | CLIMATE.GOV

NASA Earth Science



*One Planet
Your Story
Our Mission*

National Aeronautics and
Space Administration



*Providing
New Perspectives of
Earth's Environment*

NASA Earth System Science conducts and sponsors research, collects new observations from space, develops technologies and extends science and technology education to learners of all ages. Working closely with our global partners, we enhance economic security and environmental stewardship, benefiting society in many tangible ways. NASA research seeks to answer fundamental science questions about the changes we see in climate, weather and natural hazards, and deliver sound science that helps decision-makers make informed decisions.



NASA's Hyperwall

Storytelling like never before! NASA's hyperwall is a sophisticated visualization tool used to display large datasets. Visit the NASA Science exhibit for a live demonstration.

Hyperwall stories, World of Change, and archived visualization topics are available online, at:

***science.nasa.gov/hyperwall
earthobservatory.nasa.gov/
svs.gsfc.nasa.gov***



PUTTING SCIENCE TO WORK FOR YOU



USDA scientists are at work every day helping to keep our food safe and nutritious; our crops, livestock and forests healthy and productive; and our communities vibrant and prosperous.

The USDA Research, Education, and Economics (REE) mission area is proud to support the 13th National Conference on Science, Policy and the Environment: *Disasters and Environment*.



UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH SERVICE (ARS)
ECONOMIC RESEARCH SERVICE (ERS)
NATIONAL AGRICULTURAL STATISTICS SERVICE (NASS)
NATIONAL INSTITUTE OF FOOD AND AGRICULTURE (NIFA)
OFFICE OF THE CHIEF SCIENTIST

STOP BY AND CHECK OUT THE ENVIRONMENTAL DATA & CITIZEN'S SCIENCE ZONE

Experience interactive exhibits by environmental innovators such as Azavea, EcoAdapt, PublicLab, and SkyTruth.

Part of the Building Climate Solutions Exhibition in Independence Hall



Azavea specializes in the creation of geographic web and mobile software, as well as geospatial analysis services to enhance decision-making. We are committed to working on projects with strong social value in order to promote the emergence of more vibrant and sustainable communities.



EcoAdapt has one goal - creating a robust future in the face of climate change. We bring together diverse players in the conservation, policy, science, and development communities to reshape planning and management in response to rapid climate change.



PublicLab is a community where you can learn how to investigate environmental concerns. Using inexpensive DIY techniques, we seek to change how people see the world in environmental, social, and political terms.



SkyTruth is a nonprofit organization using remote sensing and digital mapping to create stunning images that expose the landscape disruption and habitat degradation caused by mining, oil and gas drilling, deforestation, fishing and other human activities.

Screening Area & Lounge

Sit in on a film screening or take a break and network in the lounge at the Environmental Data & Citizen's Science Zone.



The Betsy and Jesse Fink Foundation is committed to using environmental data for resilient solutions to a changing climate. Special thanks to the Foundation for providing support for this interactive section of the Building Climate Solutions Exhibition.

AGENDA

Tuesday, January 28, 2014

- 7:45 a.m. Continental Breakfast, Exhibition and Scientific Poster Presentations open – *Independence Hall*
Screening of *Earth: The Operator’s Manual* – *Regency Ballroom CDEF*
Visual Images throughout the plenaries provided by **Gary Braasch**, Environmental Photography
- 8:30 a.m. Opening and Introduction: **Governor Bill Richardson**, former Ambassador to the United Nations and Secretary of Energy; former Member of Congress
Regency Ballrooms CDEF
- 8:35 a.m. Keynote Address: **Richard Alley**, Evans Pugh Professor of Geosciences, Pennsylvania State University
- 9:20 a.m. **Plenary 1: Framing Climate Change Science** – *Regency Ballrooms CDEF*
Moderator: **Richard Harris**, Science Correspondent, National Public Radio
- **Virginia Burkett**, Chief Scientist for Climate and Land Use Change, U.S. Geological Survey; Intergovernmental Panel on Climate Change
 - **Katharine Jacobs**, Director, Center for Climate Adaptation Science and Solutions, The University of Arizona
 - **Anthony Janetos**, Director, Pardee Center for the Study of the Longer-Range Future, Boston University
 - **Jack Kaye**, Associate Director for Research, Earth Science Division, NASA Science Mission Directorate
- 10:20 a.m. **Plenary 2: Framing the Challenges Facing Societies** – *Regency Ballrooms CDEF*
Moderator: **Jon Hamilton**, Science Correspondent, National Public Radio
- **Molly Brown**, Research Scientist, Biospheric Science Branch, NASA Goddard Space Flight Center
 - **Bryan Bloomer**, Assistant Director, National Center for Environmental Research, U.S. Environmental Protection Agency
 - **Edward Maibach**, Director, Center for Climate Change Communication, George Mason University
 - **Maggie Opondo**, Socio-economic and Cultural Studies Coordinator, Institute for Climate Change and Adaptation, University of Nairobi; Intergovernmental Panel on Climate Change

11:20 a.m. **Plenary 3: Framing Solutions** – *Regency Ballrooms CDEF*

Moderator: **Terry Tamminen**, CEO and Founder, 7th Generation Advisors

- **Richard Jackson**, Joan H. Tisch Distinguished Fellow in Public Health, Hunter College and Professor and Chair, Environmental Health Sciences, Fielding School of Public Health, University of California – Los Angeles
- **Clay Nesler**, Vice President of Global Energy and Sustainability, Johnson Controls International
- **Priya Shyamsundar**, Director, South Asian Network for Development and Environmental Economics
- **Brian Swett**, Chief of Environment and Energy, City of Boston

12:20 p.m. Lunch on your own

Assorted items can be purchased at the Building Climate Solutions Exposition located in Independence Hall

Book signings – *Building Climate Solutions Exposition*

David Blockstein – *The Climate Solutions Consensus: What We Know and What To Do About It*

12:50 p.m. Special event: **Action on Climate Change as a Moral Imperative: Conversing with the Religious Community** – *Potomac 1&2*

Moderator: **Terri Eickel**, Executive Director, Interreligious Eco-Justice Network and Connecticut Interfaith Power & Light

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3. Preparing Campuses and Communities for a Changing Climate	<i>Regency B</i>	30
4. Nature as a Source of Innovation for a Sustainable Metropolis	<i>Potomac 5&6</i>	31
5. Linking Global, Regional, and Local Perspectives for Climate Solutions	<i>Washington B</i>	32
6. Applying an Ecosystems Framework for Adaptation	<i>Regency F</i>	33
7. Food Security and Climate Change	<i>Regency A</i>	34
8. The Arctic: The Changing Role of the Polar North in a Climate Constrained World	<i>Potomac 3&4</i>	35
9. Reducing Emissions from Deforestation and Forest Degradation (REDD+)	<i>Fairfax</i>	36
10. Managing Marine Fisheries in a Changing Climate	<i>Regency D</i>	37
11. Building the Climate Change Education and Communication Collective	<i>Washington A</i>	38
12. Sustainability for the Nation: Resource Connections and Governance Linkages	<i>Potomac 1&2</i>	39
13. Identifying Security Risks and Opportunities from Climate Change	<i>Conference Center</i>	40
13b. National Climate Assessment: Innovations in Science and	<i>Tidewater 2</i>	41

Engagement – Part I

13c. Environmental Performance Disclosure and Climate Risk Governance	<i>Prince William</i>	42
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3:45 p.m.	Symposia B (14 concurrent sessions):	Room	Page
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	16. Monitoring and Measuring Greenhouse Gases in Cities for Decisions	<i>Regency C</i>	44
	17. Goldilocks and Climate Adaptation: The Regional Approach is “Just Right”	<i>Regency B</i>	45
	18. Creating Resilient Rivers for Sustainable Cities: The Urban Waters Federal	<i>Potomac 5&6</i>	46
	19. Preparing U.S. Agriculture to Manage Climate Change Risk	<i>Regency A</i>	47
	20. An Arctic Preservation Roadmap	<i>Potomac 3&4</i>	48
	21. Managing Forest Risk and Resilience to Climate Change	<i>Washington B</i>	50
	22. Natural Capital and Information Networks for Adapting Coastal Communities to Climate Change	<i>Regency F</i>	51
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	26. National Climate Assessment: Innovations in Science and Engagement – Part II	<i>Tidewater 2</i>	54
	27. Financing Climate Solutions	<i>Conference Center</i>	56
	28. Climate Adaptation + Mitigation Synergies: Pursuing Implementation Pilots	<i>Fairfax</i>	57

5:45 p.m. Keynote Address: **Kathryn Sullivan**, Acting Administrator, NOAA
Regency Ballrooms CDEF

Wednesday, January 29, 2014

- 7:45 a.m. Continental Breakfast, Exhibition and Scientific Poster Presentations open – *Independence Hall*
- 8:45 a.m. Opening and Introductions – *Regency Ballrooms CDEF*
- 9:00 a.m. Keynote Address: **Jack Sinclair**, Executive Vice President, Grocery Division, Walmart
- 9:30 a.m. **Plenary 4 The Built Environment – Building Solutions** – *Regency Ballrooms CDEF*
 Moderator: **Andrew Revkin**, Senior Fellow for Environmental Understanding, Academy for Applied Environmental Studies, Pace University
- **Robert Dixon**, Vice President, Industry Affairs, Building Performance and Sustainability, Siemens Infrastructure & Cities - Building Technologies Division
 - **David Hales**, President and CEO, Second Nature
 - **Harvey Ruvin**, Clerk of Courts, Miami-Dade County, Florida
 - **Diana Ürge-Vorsatz**, Director, Center for Climate Change and Sustainable Energy Policy (3CSEP), University of Central Europe; Intergovernmental Panel on Climate Change
- 10:40 a.m. Keynote Address: **Rachel Kyte**, Vice President for Sustainable Development, The World Bank
- 11:15 a.m. Presentation of United Nations Environment Programme video with **Jim Toomey**, cartoonist
- 11:20 a.m. **Plenary 5 Agriculture and Natural Resources – Building Solutions** – *Regency Ballrooms CDEF*
 Moderator: **Elizabeth Shogren**, Science Correspondent, National Public Radio
- **Donald Boesch**, President, University of Maryland Center for Environmental Science
 - **Yannick Glemarec**, Director of Climate Finance, UN Development Programme
 - **Christopher Shore**, Executive Director, Secure the Future – East Africa, World Vision
 - **Anthony Slatyer**, First Assistant Secretary, Australian Government Department of the Environment
 - **Tom Tidwell**, Chief, U.S. Forest Service
- 12:30 p.m. Lunch on your own – breakout workshop leaders will meet – *Chesapeake View*
Assorted items can be purchased at the Building Climate Solutions Exposition located in Independence Hall
 Book signings – *Building Climate Solutions Exhibition*
- Jim Toomey** – *Here We Go Again (Sherman’s Lagoon)*
 - Larry Nielsen** – *Provost*
 - Susanne Moser** – *Successful Adaptation to Climate Change: Learning Science and Policy in a Rapidly Changing World*
 - Randy Olson** – *Don’t Be Such A Scientist and Connection*
- 2:00 p.m. Breakout Workshops (24 concurrent sessions)
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5.	Linking Global, Regional and Local Perspectives for Climate Solutions	<i>Tidewater 2</i>	32
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9.	Reducing Emissions from Deforestation and Forest Degradation (REDD+)	<i>Lincoln</i>	36
10.	Managing Marine Fisheries in a Changing Climate	<i>Washington A</i>	37
11.	Building the Climate Change Education and Communication Collective	<i>Regency A</i>	38
12.	Sustainability for the Nation: Resource Connections and Governance Linkages	<i>Regency F</i>	39
13.	Identifying Security Risks and Opportunities from Climate Change	<i>Arlington</i>	40
14.	Taking “Eco-districts” to Scale	<i>Potomac 2</i>	43
16.	Monitoring and Measuring Greenhouse Gases in Cities for Decisions	<i>Potomac 1</i>	44
17.	Goldilocks and Climate Adaptation: The Regional Approach is “Just Right”	<i>Roosevelt</i>	45
18.	Creating Resilient Rivers for Sustainable Cities: The Urban Waters Federal Partnership	<i>Potomac 3</i>	46
19.	Building Effective Climate Change Partnerships and Networks for Agriculture	<i>Regency E</i>	47
20.	<i>Combined with W8</i>	<i>Washington B</i>	48
21.	Managing Forest Risk and Resilience to Climate Change	<i>Jefferson</i>	50
22.	Natural Capital and Information Networks for Adapting Coastal Communities to Climate Change	<i>Potomac 5</i>	51
23.	MomentUs: Building a Movement for Climate Action	<i>Kennedy</i>	52
25.	Climate Change: It’s My Story and I’m Sticking to It	<i>Fairfax</i>	53
26.	National Climate Assessment: Innovations in Science and Engagement	<i>Potomac 6</i>	54
28.	Climate Adaptation + Mitigation Synergies: Pursuing Implementation Pilots	<i>Prince William</i>	57
5:30 p.m.	NCSE Lifetime Achievement Awards: Founders of the US Global Change Research Program <i>Regency Ballrooms CDEF</i> Robert Corell, Mike Hall, Shelby Tilford, Ari Patrinos, and Jack Fellows Moderator: Eileen Shea , Pacific Island Regional Coordinator, NOAA		
6:15 p.m.	John H. Chafee Memorial Lecture: Minimizing Irreversible Impacts of Human-Made Climate Change James E. Hansen , Adjunct Professor, Earth Institute, Columbia University		
7:00 p.m.	Reception – <i>Building Climate Solutions Exhibition</i> Book signing by James Hansen – <i>Storms of my Grandchildren</i>		

Thursday, January 30, 2014

- 7:45 a.m. Continental Breakfast, Exhibition and Scientific Poster Presentations open – *Independence Hall*
- 8:45 a.m. Opening – *Regency Ballrooms CDEF*
- 9:00 a.m. Keynote Address: **Rt. Hon. John Gummer, Lord Deben**, Chair, Climate Change Committee, UK
- 9:30 a.m. Keynote Address: **Gina McCarthy**, Administrator, U.S. Environmental Protection Agency
- 10:00 a.m. **Plenary 6: Implementing Solutions** – *Regency Ballrooms CDEF*
Moderator: **Cristina Rumbaitis del Rio**, Senior Associate Director, Rockefeller Foundation
- **Ann Bartuska**, Deputy Under Secretary for Research, Education and Economics, U.S. Department of Agriculture
 - **Kara Hurst**, CEO, Sustainability Consortium
 - **Christopher Pyke**, Vice President for Research, U.S. Green Building Council
 - **Petra Tschakert**, Associate Professor of Geography and the Institutes of Energy and the Environment, Pennsylvania State University; Intergovernmental Panel on Climate Change
- 11:00 a.m. **Plenary 7: Moving from Science to Action** – *Regency Ballrooms CDEF*
Moderator: **Juliet Eilperin**, National Environmental Reporter, The Washington Post
- **Quamrul Chowdhury**, Lead Climate Negotiator of Least Developed Countries, Bangladesh
 - **Robert Inglis**, Executive Director, Energy and Enterprise Initiative, George Mason University and former Member of Congress (South Carolina)
 - **Robert Perkowitz**, President, ecoAmerica
 - **Robert Summers**, Secretary, Maryland Department of the Environment
- 12:00 p.m. Keynote Address: **Gabriel Quijandría**, Deputy Minister of Strategic Development of Natural Resources, Ministry of the Environment, Peru
- 12:30 p.m. Keynote Address: **Marie-Hélène Aubert**, Adviser to the President of France on international negotiations on climate and environment
- 1:00 p.m. Buffet Lunch (with youth mentoring activities) – *Regency foyer*
- 1:30 p.m. Exhibitions and Scientific Poster Presentations Close
- 2:15 p.m. Adjourn

Keynote Biographies

Governor Bill Richardson completed his second term as Governor of New Mexico in January 2011. He was elected Governor in 2002 and served for 15 years in northern New Mexico representing the 3rd Congressional District. Richardson served in 1997 as the U.S. Ambassador to the United Nations, and in 1998, he was unanimously confirmed by the U.S. Senate as Secretary of the U.S. Department of Energy. While a congressman, Richardson served as a special envoy on many sensitive international missions. Richardson has been nominated several times for the Nobel Peace Prize. Before serving as Governor, in 2001, Richardson assumed the chairmanship of Freedom House, a private, non-partisan organization that promotes democracy worldwide. He also worked as a business consultant in Santa Fe and served on several boards including the Natural Resources Defense Council and United Way International. Since entering life as a private citizen in 2011, Richardson was named chairman of APCO Worldwide's executive advisory service Global Political Strategies (GPS) and Special Envoy for the Organization of American States (OAS). In addition, Richardson serves as Senior Fellow for Latin America at Rice University's James A. Baker III Institute for Public Policy. He has joined several non-profit and for-profit boards, including Abengoa's International Advisory Board, WRI World Resources Institute, Refugees International, the National Council for Science and the Environment (NCSE), and is Chairman of the International Council for Science and the Environment (ICSE). Bill Richardson has authored two books, "Between Worlds" and "Leading by Example."

Richard Alley has ranged from Antarctica to Greenland to help learn the history of Earth's climate, and whether the great ice sheets will fall in the ocean and flood our coasts. With over 225 scientific publications, he has been asked to provide advice to the highest levels of government, and been recognized with numerous awards including election to the U.S. National Academy of Sciences. He hosted the recent PBS miniseries *Earth: The Operators' Manual*, and has been compared to a cross between Woody Allen and Carl Sagan for his enthusiastic efforts to communicate the excitement and importance of the science to everyone. He is the Evans Pugh Professor in the Department of Geosciences at Pennsylvania State University.

Kathryn Sullivan assumed the role of Acting Under Secretary of Commerce for Oceans and Atmosphere and Acting NOAA Administrator on February 28, 2013, where she has been serving as Assistant Secretary of Commerce for Environmental Observation and Prediction and Deputy Administrator for the National Oceanic and Atmospheric Administration (NOAA), NOAA's Chief Scientist. An accomplished oceanographer, she was appointed NOAA's Chief Scientist in 1993. Dr. Sullivan was the inaugural director of the Battelle Center for Mathematics and Science Education Policy in the John Glenn School of Public Affairs at Ohio State University. She served a decade as President and CEO of the Center of Science and Industry (COSI) in Columbus, Ohio, one of the nation's leading science museums. Dr. Sullivan joined COSI after three years' service as Chief Scientist. Dr. Sullivan was one of the first six women selected to join the NASA astronaut corps in 1978 and holds the distinction of being the first American woman to walk in space. She flew on three shuttle missions during her 15-year tenure, including the mission that deployed the Hubble Space Telescope. Dr. Sullivan has also served on the National Science Board (2004-2010) and as an oceanographer in the U.S. Navy Reserve (1988-2006).

Rachel Kyte is Vice President of Sustainable Development at the World Bank. As such, she has overall responsibilities for the organization's global work in agriculture, infrastructure, urban development, environment, disaster risk management, and social development. Ms. Kyte is responsible for driving the World Bank's leadership on inclusive green growth and climate change. Prior to her appointment, Ms. Kyte was Vice President for Business Advisory Services at the International Finance Corporation. She previously served as IFC's Director for Environmental and Social Development, where she led efforts to develop new sustainability performance standards, and in IFC's office of Compliance

Advisor/Ombudsman. She has held elected positions in Europe, and founded and led non-government organizations focusing on women, the environment, health, and rights. Ms. Kyte is Professor of Practice in Sustainable Development at The Fletcher School of Law and Diplomacy at Tufts University.

Jack Sinclair is Executive Vice President of the Grocery Division for Walmart U.S. He has responsibility for all aspects of grocery merchandising at more than 4,000 stores in the United States. Jack joined Walmart in 2007 from McCurrach, a U.K.-based field merchandising business. He has worked in the retail food business since 1982, when he began his career as a trainee at Shoppers' Paradise in the United Kingdom. He has also worked for Tesco and Safeway PLC, where he eventually served on the board of directors that led the merger of Safeway PLC and Morrisons. Previously, he served as the European development director for SB Capital, partnering with banks, private financiers and private equity houses to assess, advise and implement strategic retail acquisitions.

Rt. Hon. John Gummer, Lord Deben, Chairman of the UK Government's Committee on Climate Change, served for sixteen years as a British minister in the governments of Margaret Thatcher and John Major, as Employment Minister, Paymaster General in HM Treasury, Minister for London and Minister for Agriculture, Fisheries and Food, before moving in 1992 to the Department of the Environment. John went into government from business, where he had first been a publisher and then chairman of a medium sized public company, specializing in distribution and communication resources. In 1997, he returned to his business roots, founding Sancroft to advise companies on their corporate responsibility strategy. John also chairs Valpak Ltd and the Association of Professional Financial Advisers and is a director of Castle Trust.

Gina McCarthy is the Administrator of the U.S. Environmental Protection Agency, confirmed in 2013. Appointed by President Obama in 2009 as Assistant Administrator for EPA's Office of Air and Radiation, she has been a leading advocate for common-sense strategies to protect public health and the environment. Previously, McCarthy served as the Commissioner of the Connecticut Department of Environmental Protection. During her career, which spans over 30 years, she has worked at both the state and local levels on critical environmental issues and helped coordinate policies on economic growth, energy, transportation and the environment.

Gabriel Quijandría Acosta has been the Deputy Minister of Strategic Development of Natural Resources of the Ministry of Environment of Peru since December 2011. He has 15 years of experience in development promotion, with emphasis on environmental issues. Mr. Quijandría is an expert in design, implementation and evaluation of public policies, projects of financial and technical international cooperation with bilateral, multilateral and private sources, policy-oriented research, and training & education and consulting for public sector and private sector institutions. He holds a degree in sociology from the University of the Republic of Uruguay, with a Masters in Natural Resource Management by the Central America Institute of Management (INCAE) in Costa Rica

Marie-Hélène Aubert is the adviser to the French President François Hollande on climate and environmental negotiations. She is a former member of the European Parliament, Regional representative and Congresswoman and Vice President of the French National Assembly. She was the rapporteur of the Kyoto Protocol during its ratification by the Parliament. She was in charge of the Environmental, Sustainable Development and Energy section in President Hollande's electoral campaign.

Plenary Biographies

Plenary 1: Framing Climate Change Science

Richard Harris has been a science correspondent at NPR since 1986. He has covered climate change since the early 1980s, and has followed the major scientific advances as well as the diplomatic story since then, including the 1992 Earth Summit in Rio, and climate talks in Kyoto, Bali, Copenhagen and Durban among others. He has won many awards for his work, including the 2013 AGU Presidential Citation for Science and Society, as well as a AAAS science journalism award for his coverage of the Deepwater Horizon disaster. Harris was first to report that the government was vastly underestimating the volume of oil flowing into the Gulf of Mexico.

Virginia Burkett is the Chief Scientist for Climate and Land Use Change at the U.S. Geological Survey. Her research and publications of the past 20 years have focused on climate change, sea level rise, and impacts to coastal communities and ecosystems. Burkett was formerly Secretary/Director of the Louisiana Department of Wildlife and Fisheries. She has also served as Deputy Secretary/Director of the Louisiana Department of Wildlife and Fisheries, Director of the Louisiana Coastal Zone Management Program, and Assistant Director of the Louisiana Geological Survey. Burkett is a Lead Author of the United Nation's Intergovernmental Panel on Climate Change (IPCC) Third, Fourth, and Fifth Assessment Reports (2001, 2007, 2014); the IPCC Technical Paper on Water (2008); and three U.S. National Climate Assessments (2000, 2009, 2014). She is a Senior Editor of the journal *Regional Environmental Change*.

Katharine Jacobs is a faculty member at the University of Arizona (UA) in the Department of Soil, Water and Environmental Science and is the Director of the Center for Climate Adaptation Science and Solutions. From 2010 – 2013, Jacobs served as an Assistant Director in the Office of Science and Technology Policy (OSTP) in the Executive Office of the President. Jacobs was the director of the National Climate Assessment, leading a team of 300 authors and more than a thousand contributors who wrote the Third NCA report. She also was the lead advisor on water science and policy, and climate adaptation within OSTP. From 2006-2009, Jacobs was the Executive Director of the Arizona Water Institute. She has more than twenty years of experience as a water manager for the State of Arizona Department of Water Resources, including 14 years as Director of the Tucson Active Management Area. She was Chair of the NRC Panel on Adapting to the Impacts of Climate Change and a member of the panel on America's Climate Choices.

Anthony Janetos recently joined Boston University as Director of the Frederick S. Pardee Center for the Study of the Longer-Range Future, and Professor of Earth and Environment. Dr. Janetos was most recently Director of the Joint Global Change Research Institute at the University of Maryland, and has held positions at The Heinz Center for Science, Economics and the Environment, WRI, NASA, and the EPA. He has written and spoken widely on the need to understand the scientific, environmental, economic, and policy linkages among the major global environmental issues. In addition to his research interests in the interaction of land systems with human needs and climate change, he has been an IPCC Lead Author and Coordinating Lead Author, and has served on multiple National Research Council Committees and Boards. His priorities for the Pardee Center are to foster the integration of natural and social sciences, so that it can continue its long tradition of “interdisciplinary, policy-relevant, and future-oriented research that contributes to long-term improvements in the human condition.”

Jack Kaye serves as Associate Director for Research in the Earth Science Division of NASA's Science Mission Directorate. In this role, he has responsibility for NASA's research programs in Earth System Science, covering the earth's land, atmosphere, oceans, cryosphere, and biosphere and all the interactions among them. The research program includes satellite data analysis, computational modeling, airborne

science, and ground-based measurements, and supports researchers at NASA centers, universities, laboratories of other government agencies, and private and non-profit entities. Dr. Kaye is a 30-year veteran of NASA, having started as a researcher at the Goddard Space Flight Center in 1983 and then working at NASA HQ as manager of the Atmospheric Chemistry Modeling and Analysis Program prior to taking on his current role. He represents NASA in many interagency and international organizations, especially the US Global Change Research Program, for which he is NASA's principal member (and for which he served as the program's acting director for much of 2009-2010). He currently serves as the chair of the Expert Team on Satellite Systems for the World Meteorological Organization.

Plenary 2: Framing the Challenges Facing Society

Jon Hamilton is a correspondent on the Science Desk for NPR News, focused on neuroscience, environmental health risks, and extreme weather. Following the 2011 earthquake and tsunami in Japan, Hamilton was part of NPR's team of science reporters and editors who went to Japan to cover the crisis at the Fukushima Dai-ichi nuclear power plant. Before joining NPR in 1998, Hamilton was a media fellow with the Henry J. Kaiser Family Foundation studying health policy issues and a health care reporter at the *Commercial Appeal* newspaper in Memphis, TN.

Molly Brown is a Research Scientist with the Biospheric Sciences Laboratory at NASA's Goddard Space Flight Center. She holds an M.A. and Ph.D. in Geography from the University of Maryland College Park, where she specialized in Remote Sensing, Economics, and Development. Dr. Brown conducts her research in three areas: data fusion and analysis to develop long term data records of vegetation dynamics for carbon cycle and terrestrial ecosystem modeling; research to develop science data and analysis for societal applications; and the development of models and methods that enable the quantification of the impact of climate change on human economic and political systems. Dr. Brown is an advisor to NASA's Applied Sciences Division and USAID's Famine Early Warning Systems Network (FEWS NET).

James H. Johnson is the Director of the National Center for Environmental Research (NCER) at the U.S. Environmental Protection Agency. He oversees NCER's role in supporting cutting-edge, high-quality research by the nation's leading scientists and engineers to improve scientific basis and knowledge for decisions on national environmental issues. He has served on several National Academies committees and boards, most recently as a member of the Division of Earth and Life Sciences oversight committee. His previous experience with EPA includes Chair of the Board of Scientific Counselors, Chair of the National Advisory Council for Environmental Policy and Technology, and a member of the Science Advisory Board. He is currently a member of the Anne Arundel Community College (MD) Board of Trustees, and is Professor Emeritus of Civil Engineering and Dean Emeritus of the College of Engineering, Architecture and Computer Sciences at Howard University. Dr. Johnson is the 2005 recipient of the National Society of Black Engineers' Lifetime Achievement Award in Academia and the 2008 Water Environment Federation Gordon Maskew Fair Award.

Edward Maibach is a University Professor at George Mason University, and the Director of Mason's Center for Climate Change Communication. Leveraging three decades of experience as a communication and social marketing practitioner and scholar, Ed's research focuses on public engagement in climate change mitigation and adaptation. Ed currently co-chairs the Engagement & Communication Working Group of the National Climate Assessment Development and Advisory Committee, and he previously served as Associate Director of the National Cancer Institute, Worldwide Director of Social Marketing at Porter Novelli, and Chairman of the Board for Kidsave International.

Maggie Opondo is the socio-economic and cultural studies coordinator in the Institute for Climate Change and Adaptation at the University of Nairobi. She has researched and published widely on

vulnerability and adaptability to climate change impacts (e.g. on malaria, cholera and drought); risk communication; smallholder agriculture; gender and labour rights in global supply chains; ethical trade and corporate social responsibility and trade policy. She was an expert reviewer for the Inter-governmental Panel on Climate Change Working Group II Fourth Assessment (IPPC) (2005-2006) and WHO's book entitled: *Methods for Assessing Vulnerability and Adaptation: Climate Change and Human Health* (2003). She is currently a coordinating lead author of Chapter 13 of the IPCC 5th Assessment Report. She is one of the founding members of the recently (2011) established Institute for Climate Change and Adaptation (ICCA) at the University of Nairobi.

Plenary 3: Framing Solutions

Terry Tamminen is one of the world's leading authorities on environmental policy and sustainability. Governor Arnold Schwarzenegger appointed him Secretary of the California Environmental Protection Agency in 2003 and later Cabinet Secretary, the chief policy advisor to the Governor. He is the co-founder of the "R20 Regions of Climate Action", a public-private partnership among more than 500 regional governments, the United Nations, and numerous clean technology companies focused on low carbon economic development worldwide. Mr. Tamminen advises global companies on sustainability, including Pegasus Capital Advisors, Walmart, and Proctor & Gamble.

Richard Jackson is Professor and Chair of Environmental Health Sciences at the Fielding School of Public Health at the University of California, Los Angeles. A pediatrician, he has served in many leadership positions in both environmental health and infectious disease with the California Health Department, including the highest as the State Health Officer. For nine years he was Director of the CDC's National Center for Environmental Health in Atlanta and received the Presidential Distinguished Service award. In fall of 2013 he was the Tisch Distinguished Public Health Fellow at Roosevelt House in Manhattan. He co-authored two Island Press Books: *Urban Sprawl and Public Health* in 2004 and *Making Healthy Places* in 2011. He is the host of a 2012 public television series *Designing Healthy Communities* which links to the J Wiley & Sons book by the same name published in October, 2011. He has served on the Board of Directors of the American Institute of Architects.

Clay Nesler is the Vice President, Global Energy and Sustainability for Johnson Controls. He is responsible for energy and sustainability strategy, policy, innovation and the Johnson Controls Institute for Building Efficiency. Since joining Johnson Controls in 1983, Clay has held a variety of leadership positions in research, product development, marketing and strategy in both the United States and Europe. Clay is the vice-chair of the World Environment Center.

Priya Shyamsundar is the Executive Director of the South Asian Network for Development and Environmental Economics (SANDEE). SANDEE's mission is to strengthen the capacity of individuals and institutions in the South Asia region to undertake research on the inter-linkages among economic development, poverty, and environmental change and to disseminate practical information that can be applied to development policies. As part of its various activities, SANDEE has supported over 100 research projects in the area of climate change, ecosystem services, poverty and natural resource management and the economics of pollution management. Priya has previously served as a consultant at the World Bank, as Senior Program Officer at the John D. and Catherine T. MacArthur Foundation, Visiting Assistant Professor at Duke University and as Research Associate at the Institute of Social Studies Trust.

Brian Swett is Chief of Environment and Energy for the City of Boston. Over the last year, Mr. Swett has led a variety of major policy and program initiatives in Boston including developing and passing a building energy disclosure ordinance, launching Greenovate Boston, a sustainability education and

outreach initiative, and kicking off Climate Ready Boston, a set of climate preparedness initiatives. Chief Swett is now starting efforts to update the City's Climate Action Plan, which is due in 2014. Prior to his Boston appointment, Mr. Swett oversaw sustainability related initiatives at Boston Properties, worked for an environmental justice nonprofit, two socially responsible investment firms, U.S. Senator Barbara Boxer, and several offices in the U.S. Environmental Protection Agency.

Plenary 4: The Built Environment – Building Solutions

Andrew Revkin has covered science and the environment for 30 years in newspapers, magazines, books, documentaries and his New York Times blog, *Dot Earth*, winning the country's top science journalism awards multiple times. He was a staff reporter at The New York Times from 1995 to 2009. Since 2010, he has been the Senior Fellow for Environmental Understanding at Pace University, where he teaches courses on blogging, environmental-science communication and documentary video with a focus on sustainable development. He has written acclaimed books on global warming, the changing Arctic and the fight to save the Amazon rain forest. Revkin has also written three book chapters on communication and the environment and speaks to varied audiences around the world about the power of the Web to foster progress on a finite planet. Two films have been based on his writing – “The Burning Season” (HBO, 1994) and “Rock Star” (WB, 2001). He's a performing songwriter and accompanist for Pete Seeger in spare moments and has released his first album of original songs this year, “A Very Fine Line.”

Robert Dixon serves as the Vice President of Industry Affairs, Building Performance & Sustainability for the Building Technologies Division of Siemens Infrastructure and Cities. He is responsible for strategy development, market positioning, and industry leadership to businesses, industry, and governments on efficiency and sustainability in buildings in North America. He is also the Industry First-Vice Chair for the Alliance to Save Energy, and is a past president of National Association of Energy Service Companies (NAESCO). Previously at Siemens, he served as the Global Head of Efficiency & Sustainability and as Vice President and Senior Advisor to the Management Board for the International Headquarters of the Building Technologies Division. He was the first designated Senior Principle Expert for the 39,000 employee Building Technologies division. Prior to that, he served as the Senior Vice President, Global Head, Energy and Environmental Solutions, with worldwide P&L responsibilities. He spent the first 19 years of his professional career with Johnson Controls.

David Hales has been President and CEO of Second Nature, the Boston-based advocacy organization committed to promoting sustainability through higher education since August, 2012. Prior to assuming this post, Hales was President of College of the Atlantic, which received recognition for innovative academic excellence, and became the first institution of higher education in the United States to be a “NetZero” emitter of greenhouse gases. Hales has held numerous positions promoting sustainability nationally and internationally, including directing environmental policy and sustainability programs of the United States Agency for International Development throughout the Clinton administration.

Diana Ürge-Vorsatz is Director of the Center for Climate Change and Sustainable Energy Policy (3CSEP) at the Central European University (CEU) in Budapest and Professor at CEU's Department of Environmental Sciences and Policy. She has advised, worked on and directed several international research projects for organisations including the European Commission, the European Parliament, the Global Environment Facility, United Nation's Environment Programme, the World Energy Council, Climate Strategies, and the World Bank. She has been regularly advising the Hungarian government on environmental, climate change, and energy issues. Dr. Ürge-Vorsatz acted as a Coordinating Lead Author for the Fourth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) for the chapter “Climate Change Mitigation in Buildings”, served on the United Nation's Special Expert Group on Climate Change, and is a member of the United Nations Foundation's expert group on energy

efficiency advising the German G8+5 process. She was acknowledged for her contributions in 2007 when she shared the Nobel Peace Prize. She received the Hungarian Republic's Presidential Award "Medium Cross" in March 2008 and has been distinguished with the Role Model Award of Pannon Példakép Foundation as one of Hungary's role models in March 2009.

Plenary 5: Agriculture and Natural Resources – Building Solutions

Elizabeth Shogren is an NPR News Science Desk correspondent focused on covering environment and energy issues and news. Since she came to NPR in 2005, Shogren's reporting has covered everything from the damage caused by the BP oil spill on the ecology of the Gulf Coast, to the persistence of industrial toxic air pollution as seen by the legacy of Tonawanda Coke near Buffalo, to the impact of climate change on American icons like grizzly bears. Prior to NPR, Shogren spent 14 years as a reporter on a variety of beats at *The Los Angeles Times*, including four years reporting on environmental issues in Washington, D.C., and across the country. While working from the paper's Washington bureau, from 1993-2000, Shogren covered the White House, Congress, social policy, money and politics, and presidential campaigns. Shogren was given the opportunity to travel abroad on short-term foreign reporting assignments, including the Kosovo crisis in 1999, the Bosnian war in 1996, and Russian elections in 1993 and 1996. Before joining the Washington bureau, Shogren was based in Moscow where she covered the breakup of the Soviet Union and the rise of democracy in Russia for the newspaper.

Donald F. Boesch is a Professor of Marine Science and President of the University of Maryland Center for Environmental Science and University System of Maryland's Vice Chancellor for Environmental Sustainability. Don has conducted research on coastal and continental shelf ecosystems along the Atlantic Coast, and in the Gulf of Mexico, eastern Australia, and the East China Sea. He serves as a member of the Maryland Governor's Chesapeake Bay Cabinet and was appointed by President Obama to the Gulf Oil Spill Commission. Don has been engaged in assessing the impacts of global climate change, co-authoring several reports for the state, federal government and National Academy of Sciences, including *Global Warming and the Free State*, *Global Climate Change in the United States*, and *America's Climate Choices*. Recently, he led a panel of scientists that updated sea-level rise projections for Maryland at the request of Governor O'Malley. Don also heads the Maryland-Delaware Climate Change Education, Assessment and Research (MADE CLEAR) Program to advance climate change education throughout the two states.

Yannick Glemarec joined the United Nations in 1989. He has held increasingly responsible positions with UNDP Country Offices in Viet Nam, China and Bangladesh. He served as UNDP Executive Coordinator for the Global Environment Facility and Director of Environment Finance in New York from June 2007 to January 2012. He was appointed Executive Coordinator of the Multi-Partner Trust Fund Office in February 2013. He has primary responsibility for the establishment and administration of about 100 trust funds supporting humanitarian, post conflict, development and climate actions in over 100 countries.

Christopher Shore is World Vision International's Director of Natural Environment and Climate Issues. A serial "intrapreneur", Chris has led this relatively new part of World Vision's work since 2006 when he began investigating whether and how to harness the emerging markets for carbon credits for poverty alleviation. His team works on issues of environmental restoration and protection, as well as climate change adaptation, mitigation, and advocacy. Through 2008, Chris led World Vision's work in Economic Development. He led the development of World Vision's first work in economic recovery, and into innovative ways of raising microfinance capital. Chris was the founder of VisionFund International which is World Vision's holding and operating company for its microfinance operations. Prior to moving to California in 2000, Chris led World Vision's work in Romania. Chris not only led the organization into

rural economic development, innovative partnerships, and large social movements, but expanded the work he helped begin in microfinance, in reforming the governmental system of care for special needs children, and was instrumental in leading World Vision's work which modeled in three counties the restructuring of the entire system of care for children for the nation, moving it from an institutional basis to a family basis.

Anthony Slatyer is a First Assistant Secretary in the Australian Government Department of the Environment. He heads the Water Reform Division of the Department. In this role, he has been a lead adviser to the Australian Government on water resource policy matters, including responses to the millennium drought, improvements to the national water market, and the current Murray-Darling Basin water reforms. Mr. Slatyer held a number of other senior executive positions in the Australian Public Service, with environment, transport and regional development policy responsibilities.

Tom Tidwell has spent 33 years in the Forest Service. He has served in a variety of positions at all levels of the agency, including as district ranger, forest supervisor, and legislative affairs specialist in the Washington Office. As deputy regional forester for the Pacific Southwest Region, Tom facilitated collaborative approaches to wildland fire management, roadless area management, and other issues. As regional forester for the Northern Region, Tom strongly supported community-based collaboration in the region, finding solutions based on mutual goals and thereby reducing the number of appeals and lawsuits. In 2009, after being named Chief, Tom set about implementing the Secretary's vision for America's forests. Under Tom's leadership, the Forest Service has charted a national roadmap for addressing climate change through adaptation and mitigation. Such challenges cross borders and boundaries; no single entity can meet them alone. The Forest Service is working with states, Tribes, private landowners, and other partners for landscape-scale conservation—to restore ecosystems on a landscape scale.

Plenary 6: Implementing Solutions

Cristina Rumbaitis del Rio joined the Rockefeller Foundation in April 2007. As a Senior Associate Director, Dr. Rumbaitis del Rio helps develop the Foundation's initiatives regarding building resilience for poor and vulnerable people who will be affected by climate change. She is currently leading the Rockefeller Foundation's exploratory work on oceans and fisheries conservation. Prior to joining the Foundation, Dr. Rumbaitis del Rio was a post-doctoral fellow conducting research on sustainable development at Columbia University's Earth Institute. She also did policy research for the United Nations Environmental Program, the U.S. Department of State and other institutions. She was a recipient of the 1996 National Harry S. Truman Scholarship for Public Service and a Mass Media Fellow of the American Association for the Advancement of Science (AAAS).

Ann Bartuska is Deputy Under Secretary for USDA's Research, Education, and Economics (REE) mission area. She came to REE in September 2010 from the USDA Forest Service, where she was Deputy Chief for Research & Development, a position she had held since January 2004. She served as Acting USDA Deputy Undersecretary for Natural Resources and Environment from January - October of 2009, and was the Executive Director of the Invasive Species Initiative in the Nature Conservancy. Prior to this, she was the Director of the Forest and Rangelands staff in the Forest Service in Washington, DC. Bartuska represents USDA on the Committee on Environment, Natural Resources and Sustainability of the White House National Science and Technology Council and also is co-chair of the Science and Technology for Sustainability Roundtable of the National Academies. She is active in the Ecological Society of America, serving as Vice-President for Public Affairs from 1996-1999 and as President from 2002-2003. She has served on the Board of the Council of Science Society Presidents and is a member of AAAS and SACNAS (Society for the Advancement of Chicanos and Native Americans in Science).

Kara Hurst was appointed as the CEO of The Sustainability Consortium (TSC™) in September 2012. Prior to TSC, Kara spent eleven years at BSR (Business for Social Responsibility), where she last served as Vice President, playing a crucial role in BSR's global expansion. Hurst has managed strategic consulting engagements for over 30 of the world's largest companies, including GE, Google, eBay, Pfizer, Apple, Microsoft, HP, Johnson & Johnson, Cisco, American Express and Hyatt. Hurst's areas of expertise include corporate transparency, responsible supply chain management, social enterprise and industry collaboration.

Christopher Pyke is the Vice President of Research for the U.S. Green Building Council. He directs a diverse research portfolio leveraging green building project experience to gain practical insights into building performance, occupant experience, and market trends. He directs the development and operation of the Green Building Information Gateway (www.gbig.org), a unique global data platform for the green building industry. Dr. Pyke serves in a number of technical advisory roles, including representing the United States on greenhouse gas mitigation issues related to residential and commercial buildings on the United Nation's Intergovernmental Panel on Climate Change (Working Group 3). He is a faculty member at George Washington University, teaching in the graduate Sustainable Urban Planning Program.

Petra Tschakert is an associate professor of Geography and the Earth and Environmental Systems Institute (EESI) at Pennsylvania State University and a Senior Research Fellow with the Center for International Climate and Environmental Research Oslo (CICERO) in Norway. Tschakert is Coordinating Lead Author of Chapter 13 "Livelihoods and Poverty" on the IPCC's Fifth Assessment Report, Working Group II. She directs several research initiatives that explore and facilitate co-generative inquiry, adaptive capacity, and livelihood resilience among resource-poor land users in Africa and the Himalayas. With support from NSF, she has been exploring anticipatory learning under climatic uncertainty and coupled social-ecological dynamics in the context of climatic extremes, land disturbance through mining, and disease. She also led a research initiative on limits to adaptation and is part of a network on gender and climate change, both supported by the Worldwide Universities Network (WUN). Tschakert works at the intersection of political ecology, climate change adaptation, social-ecological resilience, environmental justice, livelihood security, and participatory action research and learning within a development context.

Plenary 7: Moving from Science to Action

Juliet Eilperin A born-and-bred Washingtonian, Juliet Eilperin joined *The Washington Post* in March of 1998 as its House of Representatives reporter, where she covered the impeachment of Bill Clinton, lobbying, legislation, and five national congressional campaigns. After serving for nine years as the *Post*'s national environmental reporter, reporting on climate change, oceans, and air quality, she became one of the paper's White House reporters in the spring of 2013. In that capacity she covers energy, environment and health care. In the spring of 2006, Rowman & Littlefield published her first book, "Fight Club Politics: How Partisanship is Poisoning the House of Representatives," which has been featured on NPR's "Fresh Air with Terry Gross" and Comedy Central's "The Daily Show with Jon Stewart." In June 2011 Pantheon published Ms. Eilperin's second book, "Demon Fish: Travels Through the Hidden World of Sharks," which has been featured in *Smithsonian*, *Popular Science* and *People* magazines. She is the 2011 recipient of the Peter Benchley Ocean Award for Media.

Quamrul Chowdhury was deeply involved in the Rio Summit in 1992, Rio+5 in 1997, Rio+10 Summit in 2002, and the Rio+20 Summit in 2012. He has been one of the key figures in the UN climate negotiation since its inception and is one of the mooters of the National Adaptation Programme of Action (NAPA) for Least Developed Countries (LDCs). Chowdhury was chair of the Kyoto Protocol Joint Implementation Committee, a member of the United Nations Climate Adaptation Committee, a member of UN

Water Future and Solutions Focused Group, Chairman of the Forum of Environmental Journalists of Bangladesh (FEJB) and the Asia-Pacific Forum of Environmental Journalists (APFEJ), and Secretary General of the World Water Forum of Journalists (WWFJ).

Robert Inglis is the Executive Director of the Energy and Enterprise Initiative (E&EI) based at George Mason University in Fairfax, VA. Inglis founded and launched the national grassroots organization on July 10, 2012. Under Inglis' leadership, E&EI advocates conservative alternatives to big-government mandates and fickle tax incentives. Before starting E&EI, Inglis represented South Carolina's Fourth Congressional District (Greenville, Spartanburg, Union counties) for 12 years in the U.S. House of Representatives. He was first elected to Congress in 1992, having never run for public office. He spent six years in the U.S. House (1993-99) and kept a campaign commitment to serve just three terms. In the fall of 2004, Inglis was re-elected to the open House seat he previously held and went on to serve another six-year stint in Congress. He was a member of the House Science Committee where he served as the Chairman of the Research Subcommittee and then as the Ranking Member of the Energy and Environment Subcommittee. During his six years on the Science Committee, interactions with scientists in Antarctica, Australia and elsewhere shaped his views on climate change. Inglis spent the spring semester of 2011 as a Resident Fellow at the Institute of Politics at Harvard University, and he taught at the Nicholas School at Duke University in the spring of 2012.

Robert Perkowitz is an entrepreneur, environmentalist, writer, investor and cyclist. Bob is Managing Partner of VivaTerra, LLC; President and Founder of ecoAmerica, and sits on the boards of SNAP A/V, World Bicycle Relief and Environmental Defense Fund. Bob has also served as President of Cornerstone Brands, Inc.; President of Smith+Noble LLC; President of Joanna Western Mills, and Chairman and CEO of Home Fashions, Inc., as well as on a number of other boards including SRAM, Inc. and the Sierra Club Foundation.

Robert Summers was appointed Secretary of the Maryland Department of the Environment by Governor Martin O'Malley on April 28, 2011. Dr. Summers leads the Department's planning, regulatory, management and financing programs to protect public health; ensure a safe and reliable water supply; restore and protect air quality, water quality, wetlands and waterways; clean up contaminated land; and ensure proper management of hazardous and solid wastes. Between 2001 and 2007, he served as the Director of MDE's Water Management Administration and prior to that served for 4 years as Director of MDE's Technical and Regulatory Services Administration. Throughout his career, Dr. Summers has been a key contributor to the multi-jurisdictional Chesapeake Bay restoration effort. He is Chairman of the Governor's Climate Change Commission, leading Maryland's Climate Change plan to reduce greenhouse gases 25 percent by 2020.

John H. Chafee Lecture and Lifetime Achievement Awards

Lifetime Achievement Awards: Founders of the U.S. Global Change Research Program

The U.S. Global Change Research Program (USGCRP) was established by Presidential initiative in 1989 and mandated by Congress in the Global Change Research Act (GCRA) of 1990 in order to “assist the nation and the world to understand, assess, predict, and respond to human-induced and natural processes of global change.”

The U.S. Global Change Research Program is a confederation of the research components of 13 Federal departments and agencies: the Department of Agriculture, the Department of Commerce, the Department of Defense, the Department of Energy, the Department of Health & Human Services, the Department of the Interior, the Department of State, the Department of Transportation, the Environmental Protection Agency, the National Aeronautics and Space Administration, the National Science Foundation, The Smithsonian Institution, and the U.S. Agency for International Development. These 13 departments and agencies carry out research and maintain and develop capabilities that support the Nation’s response to global change, in coordination with the Subcommittee on Global Change Research of the National Science and Technology Council’s Committee on Environment, Natural Resources and Sustainability (CENRS) and overseen by the White House Office of Science and Technology Policy (OSTP). Through interagency partnerships, working groups, and collaborations with leading experts, USGCRP coordinates a budget of over two-and-a-half billion dollars a year to advance climate science and our understanding of how global change is impacting society, both today and into the future. To date, USGCRP has:

- Made major advances in our knowledge of Earth’s past and present climate
- Quantified changes in the Earth’s climate systems
- Improved climate change projections for the future
- Advanced our understanding of the vulnerabilities society may have to the impacts of global change

The U.S. Global Change Research Program is one of the most significant scientific enterprises. Its creation was the work of many far-sighted individuals. The Lifetime Achievement Award recognizes five of the most significant founders on behalf of all those who helped bring USGCRP into existence and guide it through its early years.

Moderator: Eileen Shea is NOAA's Pacific Islands Regional Coordinator responsible for supporting Agency-wide programs and projects that support NOAA and National priorities and respond to the information needs of Pacific Islands communities, businesses, governments and resources management. Ms. Shea has been involved in Pacific Islands environmental science and services since 1990 including: establishing the Pacific Climate Information System (PaCIS), involving multiple Federal and state agencies, universities and regional organizations in the Pacific; and serving as founding chair of the Pacific Risk Management 'Ohana (PRiMO), a multi-institutional hazards risk management collaborative. Prior to assuming the NOAA Pacific Regional Coordinator, Ms. Shea's positions included: Chief of the Climate Services Division and Special Advisor to the Director of the National Climatic Data Center (2006-2012); Climate Projects Coordinator at the East-West Center in Honolulu, HI; Director of the NOAA Integrated Data and Environmental Applications (IDEA) Center (1998-2006); Executive Director of the Center for the Application of Research on the Environment (1995-1998); and over eighteen years

of federal government service in NOAA as Deputy Director of the NOAA Office of Global Programs including responsibilities for the U.S. Global Change Research Program from its inception.

Robert W. Corell is a Principal at the Global Environment Technology Foundation (GETF) and Leads its Center for Energy and Climate Solutions. He has several academic appointments: Senior Faculty Fellow, College of Arts and Science and its School of Environment, Arts and Society, Florida International University; Professor II at the University of the Arctic's EALÁT Institute; and held the Arctic Chair at the University of Tromsø, Norway (2009-2012). He was appointed Vice Chancellor of the Academy of Science and Art in 2012. He is a Member of the Modeling Team at Climate Interactive Initiative, Council Member of the Global Energy Assessment (GEA) and Lead Author of GEA's Chapter 3 on Environment and Energy and Co-Chair of Phase II of the GEA. He is Founder (in 2008) and Chair of the Global Climate Action Initiative established to assist international negotiators (US, China, Indonesia, etc.) in the UNFCCC and beyond processes. In 2010, Dr. Corell founded the non-profit Global Science Associates, an interdisciplinary nucleus for the world's best science experts and collaborators. He led the Arctic Climate Impact Assessment (2005) and most recently led a comprehensive study of governance issues in the circumpolar Arctic. In 2013, he chaired and was the lead author of the 2013 UNEP Year Book on "*The View from the Top: Searching for Responses to a Rapidly Changing Arctic*". Dr. Corell was recognized with the other scientists for the 2007 Nobel Peace Prize for his work with the Intergovernmental Panel on Climate Change (IPCC), and in 2010 he was awarded an *Honorary Doctor of Veterinarian Medicine* by the Norges Veterinærhøgskole (Norwegian School of Veterinarian Science). Dr. Corell is actively engaged in research concerned with the sciences of global change and the interface between science and public policy, particularly research activities that are focused on global and regional climate change, related environmental issues, and science to facilitate understanding of vulnerability and sustainable development. Dr. Corell was Assistant Director for Geosciences at the National Science Foundation, where he had oversight for the Atmospheric, Earth, Ocean Sciences, and Polar Programs. He was Chair of the United States Global Change Research Program for over a decade. He was a professor and academic administrator at the University of New Hampshire. He has also held appointments at the Woods Hole Institution of Oceanography, the Scripps Institution of Oceanography, the University of Washington, and Case Western Reserve University.

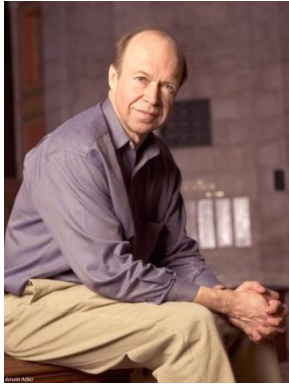
Jack D. Fellows began his career as a research faculty member at the University of Maryland, where he conducted research in the use of satellite data in hydrologic models. In 1984, he was selected as the American Geophysical Union's congressional science fellow and worked on a range of policy issues, including water resources, satellite remote sensing, R&D, and helped write legislation that was enacted to commercialize land remote sensing satellites. After his fellowship, he joined the White House's Office of Management and Budget, where he oversaw the budget and policy issues related to NASA, NSF, Federal-wide R&D programs, and helped initiate the U.S. Global Change Research Program. From 1997-2012 he served the University Corporation for Atmospheric Research (UCAR) as their Vice President. He is currently the Director of the Climate Change Science Institute at Oak Ridge National Laboratory.

J. Michael Hall retired from the Federal Senior Executive Service in 2004. He had been Director of the Office of Global Programs within the National Oceanic and Atmospheric Administration, where he managed a multidisciplinary research program in climate variability, long term environmental change, and their societal relevance. In over thirty years of public service, Dr. Hall held a series of senior management positions in weather, climate, oceanography, and environment. He was one of the founders of the U.S. Global Change Research Program (USGCRP). His office conducted some of the earliest research in predictive climate assessment and its practical application to human problems worldwide. Dr. Hall has received numerous awards, including the Presidential Rank Award for Meritorious Executive (1998), the Cleveland Abbe Award of the American Meteorological Society (1999), the U.S. Department of Commerce Gold Medal (1989), and the Waldo E. Smith Medal of the American Geophysical Union (2004).

Aristides A. N. Patrinos is the Deputy Director for Research of the Center for Urban Science and Progress at New York University's Brooklyn Polytechnic Institute (NYU-Poly). He is also a Distinguished Industry Professor of Mechanical Engineering and Chemical and Biomolecular Engineering at NYU-Poly. Dr. Patrinos joined NYU-Poly from Synthetic Genomics Inc. (SGI), a privately held company founded in 2005 applying genomic-driven commercial solutions that address global energy and environmental challenges. At SGI he served as President and as Senior Vice President for Corporate Affairs. Prior to joining SGI, Dr. Patrinos was instrumental in advancing the scientific and policy framework underpinning key governmental energy and environmental initiatives while serving as associate director of the Office of Biological and Environmental Research in the U.S. Department of Energy's Office of Science. He oversaw the department's research activities in human and microbial genome research, structural biology, nuclear medicine and climate change. Dr. Patrinos played a historic role in the Human Genome Project, the founding of the DOE Joint Genome Institute, and the design and launch of the DOE's Genomes to Life Program, a research program dedicated to developing technologies to use microbes for innovative solutions to energy and environmental challenges. Dr. Patrinos served on several National Academy of Science committees, including America's Energy Future, Providing Strategic Advice to the Climate Science Program, and the Economic and Environmental Impacts of Increasing Biofuels Production. He is a fellow of the American Association for the Advancement of Science and of the American Meteorological Society. Dr. Patrinos is also the recipient of numerous awards and honorary degrees, including three Presidential Rank Awards and two Secretary of Energy Gold Medals, and honorary doctorates from the National Technical University of Athens and the Hellenic American University.

Shelby Tilford served as NASA's Director of Environmental Observations in 1981 with the additional responsibility for Oceanic Processes, Solar Terrestrial Theoretical Studies, the development of all NOAA operational meteorological satellites, and the development of NASA's research satellites and shuttle experiments. As Director of the new Earth Science and Applications Division, he was given, for the first time in NASA, the charter to form a broad integrated Earth Science and Applications Program within the Agency. In 1983, he established the Earth System Science Committee with participants from the university and research communities, other governments agencies, and the private sector. This group generated a well-formulated science plan for the study of the Earth as system with specific emphasis on the interactions among the major components of the system – the atmospheres, oceans and land. An "Overview" was published in May, 1986, and the final report was issued in January, 1988. This was a landmark document providing an integrated set of recommendations for future research in the Earth sciences. It also formed the primary basis for US and International Global Change Research Programs. In 1987 the NASA Earth Sensing Aircraft Program was added to Earth Science and Applications Division. In 1989, the OSTP FCCSET Committee on Earth Sciences published "Our Changing Planet" describing "The U.S. Global Change Research Program" (USGCRP). The FY1990 Budget included USGCRP as the first of six Presidential FCCSET Initiatives. In 1991, the space development components of the Communications Division (ACTS) and Search & Rescue were incorporated into the Earth Science and Applications Division. Dr. Tilford was designated Acting Associate Administrator for the newly formed Office of Mission To Planet Earth (MTPE) from 1992-1994. In this position he provided direction, planning, development, coordination, and implementation of NASA's programs in all NASA's Mission to Planet Earth and Earth Science activities plus coordination with other U.S. government agencies, NASA field centers, the private and commercial sectors, the university community, and the international space-based earth observations community through the CEOS and many bilateral national programs. He interacted closely with the FCCSET Committee on Earth and Environmental Sciences (CEES) to develop and implement the U.S. Global Change Research Program, of which the NASA Mission to Planet Earth component was the major contributor. From 1994 to his retirement in 2000, he was Chief Scientist of the Orbital Sciences Corporation in Dulles, Virginia.

14th Annual John H. Chafee Memorial Lecture



James E. Hansen, formerly Director of the NASA Goddard Institute for Space Studies (GISS), is Adjunct Professor at Columbia University's Earth Institute, where he directs a program in Climate Science, Awareness and Solutions. He was trained in physics and astronomy in the space science program of Dr. James Van Allen at the University of Iowa. His early research on the clouds of Venus helped identify their composition as sulfuric acid. Since the late 1970s, he has focused his research on Earth's climate, especially human-made climate change. Dr. Hansen is best known for his testimony on climate change to congressional committees in the 1980s that helped raise broad awareness of the global warming issue. He was elected to the National Academy of Sciences in 1995 and was designated by Time Magazine in 2006 as one of the 100 most influential people on Earth. He has received numerous awards including the Carl-Gustaf Rossby and Roger Revelle Research Medals, the Sophie Prize and the Blue Planet Prize. Dr. Hansen is recognized for speaking truth to power, for identifying ineffectual policies as greenwash, and for outlining actions that the public must take to protect the future of young people and other life on our planet.



Senator John H. Chafee (R--RI) was born in Providence, Rhode Island, in 1922. He earned degrees from Yale University and Harvard Law School. Upon the United States' entry into World War II, Chafee left Yale to enlist in the Marine Corps, and then served in the original invasion forces at Guadalcanal. In 1951 he was recalled to active duty and commanded a rifle company in Korea.

Chafee began his political career by serving for six years in the Rhode Island House of Representatives, during which time he was elected Minority Leader. He was then elected Governor by a 398 vote margin in 1962. He was re-elected in 1964 and 1966—both times by the largest margins in the state's history. In January 1969 he was appointed Secretary of the Navy and served in that post for three and a half years. 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.

As senior member of the Finance Committee, Senator Chafee worked successfully to expand health care coverage for women and children and to improve community services for people with disabilities. In 1990, Senator Chafee spearheaded the Republican Health Care Task Force. He went on to lead the bipartisan effort to craft a comprehensive health care reform proposal in 1994.

Senator Chafee also was a leader in efforts to reduce the federal budget deficit and co-chaired the centrist coalition that produced a bipartisan balanced budget plan in 1996. He was an active proponent of free

trade and was a strong supporter of the North American Free Trade Agreement (NAFTA). He served as Chairman of the Republican Conference for six years.

The Senator received awards and endorsements from such organizations as the National Federation of Independent Business, the American Nurses Association, the League of Conservation Voters, the Sierra Club, Handgun Control Inc., Planned Parenthood, Citizens Against Government Waste, and the National PTA.

On October 24, 1999, Senator John H. Chafee died from congestive heart failure. He is sorely missed.

SYMPOSIA & BREAKOUT WORKSHOPS

On Tuesday, January 28, two sets of concurrent symposia will provide focused discussion on critical cross-cutting topics. Symposia A will occur from 2:00 p.m. to 3:30 p.m., and Symposia B from 3:45 p.m. to 5:15 p.m. Symposia are 90 minute mini-plenary sessions comprised of coordinated presentations by a diverse panel of experts who offer insightful perspectives on the topic of the session, followed by moderated discussion among the speakers and a brief question-and-answer period and open discussion with all session attendees.

Breakout workshops will take place Wednesday, January 29 from 2:00 p.m. to 5:00 p.m. The workshops are the core of the conference and are intended to be an opportunity for participants to generate science-based outcomes within the topic area. Using the information gleaned from the symposia the day before, the goal of the session is to generate additional action through development of improved strategies, tools, and partnerships. The session and follow-up after the conference should develop action plans with commitments to work together for implementation. These sessions are organized by leading individuals from partnering organizations working at the forefront of climate situations.

Each workshop is connected with a symposium from the previous day. We strongly encourage participants to attend the workshop connected with one of the symposia they attended on Tuesday.

SESSION DESCRIPTIONS

1. WHAT MAKES A CLIMATE-SMART CITY AND HOW CAN WE BUILD THEM?

Organizers/Moderator: Keya Chatterjee, Senior Director for Renewable Energy and Footprint Outreach, World Wildlife Fund U.S.; Kevin Taylor, Program Officer, World Wildlife Fund US and Hilary French, Program Officer, Climate Change and Resource Efficiency, United Nations Environment Programme (UNEP)

Summary: Global climate change represents one of the greatest challenges facing humanity over the coming decades. An informed, science-based response to climate change now must include action to both reduce the carbon pollution driving it and preparation for and adaptation to the now unavoidable threats humans and nature will experience. Cities are uniquely positioned to act quickly and innovatively and many city leaders around the world have already displayed a commitment to action. Those leaders and those in city service require solutions to reduce carbon emissions and to protect their communities.

Urban development has long been incompatible with natural areas and has exploited the environment. However, proven technologies and management practices are now available, for example renewable energy (RE) systems and ecosystem based adaptation (EBA). We know that to thrive in any urban future, especially a future with climate change, we must get our energy from renewable sources and develop in a way that sustains ecosystems and the services they provide.

The session will discuss the unique capacity and responsibility of cities to adopt both climate mitigation and adaptation solutions in order to become climate-smart cities. Thereby, the focus will be on renewable

energy and ecosystem based adaptation. Best practices in each area will be presented. Deeper discussion will also cover the ways those best practices are accessed by cities, namely through technical guidance from organizations like UNEP and through networks of peers developed by organizations like the World Wildlife Fund, C40 Climate Leadership Group, among many others.

As a special feature, the symposium session will also include the launch of a short video on the subject of sea-level rise and adaptation responses. It is part of UNEP's video series called "Two Minutes on Oceans with Jim Toomey" and is produced by UNEP in partnership with host and cartoonist Jim Toomey, who narrates and animates the video. (*see www.rona.unep.org/toomey*)

Speakers:

- Moderator: Keya Chatterjee, Senior Director for Renewable Energy and Footprint Outreach, World Wildlife Fund US
- Keith Alverson, Coordinator, Climate Change Adaptation and Terrestrial Ecosystems Branch, UNEP/DEPI
- Kara Reeve, Manager, Climate-Smart Communities, National Wildlife Federation
- K.C. Doyle, Sustainability Manager, Village of Oak Park, IL
- William Solecki, Professor, Hunter College and Director, SUNY Institute for Sustainable Cities

Outcomes: Discuss strategies and solutions for:

- increased deployment of renewable energy generation through policy levers available to cities;
- urban ecosystem resilience through the promotion and application of Ecosystem-Based Adaptation (EBA);
- cities (as network members) to understand the ways their networks can spread innovations; and
- network administrators to explore creative ways they can facilitate the spread of these innovations based on the input of cities and collaboration with one another.

Products and follow up activities: Distillation of ideas, tools, case studies, and opportunities into an accessible summary document.

2. HAZARD MITIGATION AND CLIMATE ADAPTATION

Organizers/Moderator: Kelly Klima, Research Scientist, Department of Engineering and Public Policy, Carnegie Mellon University; Edward Thomas Esq., President, Natural Hazard Mitigation Association (Moderator)

Summary: This symposium will discuss the merits of fostering connections between hazard mitigation and adaptation communities of practice. Presenters will describe hazard mitigation, its overlap with adaptation, the development of new climate information for use by hazard mitigation professionals, the economic benefits of combining adaptation and hazard mitigation, and insurance. The following workshop will build upon the symposium and discuss communicating adaptation and hazard mitigation to communities, businesses, and individuals and provide insights from local, state, and federal groups that have successfully integrated adaptation and hazard mitigation. The moderator will then hold an open discussion on ways to improve and advance the methodology behind hazard mitigation plans.

Speakers:

- Michael Cohen, Vice President of Government Affairs, RenaissanceRe and Director, RenaissanceRe Risk Science Foundation
- Jordan Fischbach, Policy Researcher, RAND Corporation and Professor, Pardee RAND Graduate School
- Katie Skakel, Hazard Mitigation Senior Planner, Tetra Tech, Inc.
- Jessica Grannis Esq., Adaptation Program Manager, Georgetown Climate Center, Georgetown University Law Center

Workshop Discussants:

- Alessandra Jerolleman, Executive Director, Natural Hazard Mitigation Association and Senior Hazard Mitigation and Emergency Management Planner, JEO Consulting Group
- Michael Cohen, Vice President of Government Affairs, RenaissanceRe and Director, RenaissanceRe Risk Science Foundation
- Katie Skakel, Hazard Mitigation Senior Planner, Tetra Tech, Inc.

Outcomes: The symposium will help the hazard mitigation and adaptation communities better understand the problem. It will highlight gaps and overlaps between the hazard mitigation and adaptation communities, and improve the understanding of information, policy, and technical assistance communities need to integrate climate adaptation and hazard mitigation efforts. The workshop will help integrate solutions and encouraging professionals to identify scientific, technical, policy, and operational solutions that incorporate hazard mitigation and adaptation into local planning efforts.

Products and follow up activities: The Natural Hazard Mitigation Association would like to create resources for those interested in replicating these efforts. Through our workshop discussion time, we plan to elicit specific resources and tools needed. We hope to begin identifying funding for these resources and tools, as well as to begin drafting some of these materials.

3. PREPARING CAMPUSES AND COMMUNITIES FOR A CHANGING CLIMATE

Organizers: David Hales, President; Sarah Brylinsky, Director of Climate Resilience and Educational Programs; and Anne Waple, Director of Communications and Science; Second Nature

Summary: Higher education has already taken a successful leadership role in climate mitigation through the American College & University Presidents' Climate Commitment (ACUPCC), with nearly 700 campuses committed to achieving climate neutrality (no net carbon emissions). Campuses must now take the lead in climate adaptation in tandem with their surrounding communities.

This session will explore how institutions can collaborate through the new Higher Education Alliance for Climate Resilience in sharing best practices for the incorporation of long-term community-based adaptation and resilience research, hands-on living laboratory experiences for students to help implement adaptation within campus infrastructure, and provide all campus and community members with participatory learning opportunities for adaptation planning and implementation. Session participants will assist in prioritizing efforts needed to implement the Alliance.

Particular emphasis will be paid to forging community partnerships with existing adaptation initiatives and relevant stakeholders, and assessing and preparing for the needs of vulnerable and under-resourced communities and institutions.

Speakers:

- David Hales, President, Second Nature
- Emily Seyller, Program Manager, Inform Decisions and Adaptation Science, U.S. Global Change Research Program
- Anne Waple, Director of Communications and Science, Second Nature
- John Mills, President, Paul Smith's College

Outcomes:

- Identify and prioritize components for a flexible vulnerability assessment framework.
- Identify necessary partnerships.
- Define the parameters of success and long-term implementation of resilience efforts.
- Create clear linkages between resilient practices on campus and educational programs.

Products and follow up activities:

- Active program growth plan aligned with “regional hubs” that has identified: [1] key action areas; [2] new partnerships and alliances for community/campus success; and, [3] a strategy for continued engagement for participants in the alliance and related projects.
- Launch of the proposed alliance, including regional hubs, the national network, and individual campus-community allegiances - will be strengthened and expanded during the formative growth of the program.

4. NATURE AS A SOURCE OF INNOVATION FOR A SUSTAINABLE METROPOLIS

Organizers: Patrick Monfort, Senior Scientist at the French National Center for Scientific Research (CNRS); Chantal Pacteau, Senior Scientist at CNRS, Deputy Director of the Paris Research Consortium Climate-Environment; Louise Vandelac, Tenured Professor at University of Quebec in Montreal and Chair of the Natural, Social and Human Sciences (NSHS)- Sectoral Commission of the Canadian Commission for UNESCO

Summary: This session will address the integration of nature, in all its aspects, into cities and the significant role it can play in the transition towards a carbon free economy and a more resilient metropolis with a reduced ecological footprint. The outcome aims to assist urban planners faced with the formidable task of choosing between high maintenance and environmentally costly urban nature, and multifunctional and self-maintaining natural systems.

Experiments in the use of nature will be explored from diverse angles such as: [1] reducing emissions of greenhouse gases; [2] attenuating the urban heat island; and [3] designing buildings using less energy or [4] mastering the cycle of water. Case studies will inform this session, which follows and builds upon the green urban infrastructure debates and proposals made during Ecocity 2013 (The World Summit on Sustainable Cities) held in Nantes, France, 25-27 September 2013.

The goal of this session is to engage researchers, public decision-makers and professionals in developing a framework for better scientific knowledge and understanding of the potential, the design criteria and the long-term evolution of natural systems that both mitigate urban contributions to climate change and

increase urban climate change resilience. A common thread of the discussion will be the role of ecological services and ecohealth in urban and architectural projects, touching on particular issues related to urban rooftops seen as a new territory for sustainable development of cities. This approach also recognizes the importance of the way cities are connected to their hinterlands.

Speakers:

- Sylvie Joussaume, CNRS, Head of the Paris Research Consortium *Climate-Environnement-Society*, French Representative in European Joint Programming Initiative on Climate; Review Editor, IPCC
- Radley Horton, Columbia University, Convening Lead Author for the 3rd National Climate Assessment, and Head of the Science Policy Team of the New York City Panel on Climate Change
- Luc Abbadie, Head of Institute of Ecology and Environmental Sciences of Paris, University of Paris
- Alena Prochazka, Researcher at the Urban Planning Institute (Ivanhoe Cambridge Urban Development Observatory), University of Montreal, Canada; Scientific Manager of the research *Rooftopscape: Learning from Chicago, Montreal and Paris* (Ignis Mutat Res initiative)

Discussants:

- Minh-Hà Pham, Science Counselor, Office of Science & Technology, Embassy of France to the United States
- Louise Vandelac, Tenured Professor at University of Quebec in Montreal and Chair of the Natural, Social and Human Sciences (NSHS)- Sectoral Commission of the Canadian Commission for UNESCO
- Marc Barra, Biologist and Biodiversity Advisor in Natureparif, the Regional Agency for Nature and Biodiversity in Île-de-France (Greater Paris)

Outcomes:

- Determine the scientific state of the art, strengthening awareness for the need of assessing the impacts of widespread green infrastructure (GI) implementation at a metropolitan scale, possible disservices, and health issues.
- Exchanges on cost-effective means to manage GI and examples of tradeoffs in implementing GI.
- Link with sustainability goals.

Products and follow up activities:

- To pursue ongoing green infrastructure (GI) state-of-knowledge reports for advocacy, negotiation and decision-making
- Integrating GI in building sustainability and capacity for action
- Building a platform to enhance science-based decision-making on GI, related to sustainability issues in cities. This platform will be an extension of the American-Canadian-French network supported by the Ignis Mutat Res project, the Paris Research Consortium *Climate-Environnement-Society* and the Social Sciences and Humanities Research Council, Government of Canada.

5. LINKING GLOBAL, REGIONAL, AND LOCAL PERSPECTIVES FOR CLIMATE SOLUTIONS

Organizers/Moderator: Ian Kraucunas, Deputy Director, Atmospheric Science and Global Change Division, Pacific Northwest National Laboratory and Tom Wilbanks, Group Leader, Global Change and Developing Countries, Environmental Science Division, Oak Ridge National Laboratory

Summary: Climate Change combines with many other factors in most decision-making, such as agriculture and other land uses, water and energy supplies, transportation and physical infrastructure, and vulnerability to hazards. This requires an integrated approach to assessing climate impacts, adaptation strategies, and mitigation. A Regional Integrated Assessment Modeling (RIAM) Framework is being developed to generate insight into issues such as:

- Regional characteristics and opportunities for mitigation and adaptation strategies such as how water availability, soil fertility, or physical infrastructure help or hinder energy choices or carbon capture and storage.
- How changes in mean climate and climate variability affect adaptation and mitigation strategies.
- The interactions between management decisions and natural processes that contribute to rapid or nonlinear changes in the environment.
- Where nonlinearities might occur and how they might contribute to climate feedbacks.
- How adaptation and mitigation strategies interact.

The implementation of this integrated regional modeling approach will not only illustrate the consequences of potential actions by regional stakeholders, but also improve our general understanding of multi-scale modeling challenges and of the interdependencies among human and natural systems in the context of climate change.

We will explore how recent advances in integrated regional modeling can be applied to real-world stakeholder concerns, as well as an opportunity for those insights to inform future model development activities, both within the context of the RIAM project as well as more generally.

Speakers:

- Tony Janetos, Director and Professor, Pardee Center for the Study of the Longer-Range Future, Boston University
- Ian Kraucunas, Deputy Director, Atmospheric Science and Global Change Division, Pacific Northwest National Laboratory
- John “Jed” Shilling, Senior Advisor, Millennium Institute
- Bob Vallario, Climate and Environmental Sciences Division, Department of Energy
- Ariane de Bremond, Research Assistant Professor, Department of Geographical Sciences, University of Maryland

Outcomes: Identify and discuss issues that demand a regional perspective and that would benefit from regional-scale analysis.

6. APPLYING AN ECOSYSTEMS FRAMEWORK FOR ADAPTATION

Organizers: Frank Casey, Economist, Ecosystem Services Theme Lead, U.S. Geological Survey; Carl Shapiro, Senior Economist, Energy and Minerals, and Environmental Health and Director, USGS Science and Decision Center; U.S. Geological Survey; and Greg Arthaud, National Leader for Ecosystem Services Research, Research and Development, USDA Forest Service

Summary: Climate and land use change significantly impacts ecosystem services and natural capital. These impacts and the consequences from potential human responses must be explicitly considered in planning and making adaptation decisions.

This part of the conference will address key issues relating to application of an ecosystem services (ES) framework to address climate change adaptation. It will identify the benefits and challenges of using an ES framework in this context, the methods and tools that are available, and institutional issues and constraints. It aims to develop a strategy for moving forward with this integration between ES and climate change adaptation.

Speakers:

- Olivia Ferriter, Deputy Director, Office of Policy Analysis, U.S. Department of Interior
- Melissa Kenney, Lead Principal Investigator, USGCRP
- David Ervin, Professor of Environmental Studies and Coordinator of Academic Sustainability Programs, Portland State University
- Jim Boyd, Senior Fellow and Director, Center for the Management of Ecological Wealth, Resources for the Future (RFF)
- Mark Shaffer, National Climate Change Advisor, U.S. Fish and Wildlife Service

Outcomes:

- An operational approach for integrating an ES framework with climate adaptation strategies.
- Advance our ability to apply ecosystem services to planning and implementing climate change adaptation.

Products and follow up activities: The Ecosystem Services and Adaptation Project (ESAP) will begin at the NCSE conference, will continue throughout 2014, and will be reported on and discussed at the ACES (A Community on Ecosystem Services) Conference in Washington, DC, December 9-14, 2014.

7. FOOD SECURITY AND CLIMATE CHANGE *(Symposium only)*

Organizers: Margaret Walsh, Ecologist, Climate Change Program Office and Tawny Mata, AAAS Science and Technology Policy Fellow, U.S. Department of Agriculture

Summary: Through changes to temperature and precipitation patterns, as well as weed, pest, and disease dynamics, climate change will impact the main elements of food security: availability, access, utilization, and stability. Climate change may result in large transformations in ecosystem functioning and the economic viability of agriculture in many regions of the world. Arid and semi-arid ecosystems are particularly vulnerable to these changes, where many poor and food insecure communities already face difficulty meeting the food needs of their growing populations. The U.S. agriculture sector, which

currently provides much food to the international market, is the safety net of many food insecure nations and is also likely to experience effects on its productivity and competitiveness.

The U.S. Department of Agriculture is currently writing a technical report on food systems and food security for the National Climate Assessment. Previous work from USDA has focused on the effects of climate change on crop production in the U.S., and this report will expand on that work to look at how U.S. production interacts with the greater food ecosystem of global production, development, markets, and trade under a changing climate. The report will assess the current status of food systems and food security and then develop scenarios for future socioeconomic and agricultural development to examine how a changing climate may affect global food systems and food security in the next 25 to 100 years.

Speakers:

- Molly Brown, Research Scientist, Biospheric Science Branch, NASA Goddard Space Flight Center, National Aeronautics and Space Administration
- Anthony Murray, Economist, Economic Research Service, U.S. Department of Agriculture
- Bill Hohenstein, Director, Climate Change Program Office, U.S. Department of Agriculture
- Margaret Walsh, Ecologist, Climate Change Program Office, U.S. Department of Agriculture
- Ed Carr, Associate Professor, Department of Geography, University of South Carolina

Outcomes:

- Guidance to produce a report that is more useful for decision-makers across the relevant sectors.
- A richer dialogue within the food security community about what sorts of solutions the science of climate change can provide them with, and we hope we will be able to provide decision makers with a new perspective on the issues that they may or may not be beginning to think about in the food security realm.

8. THE ARCTIC: THE CHANGING ROLE OF THE POLAR NORTH IN A CLIMATE CONSTRAINED WORLD

Organizers/Moderator: Molly Jones, Research Analyst, NORC at the University of Chicago and Joseph Broz, Senior Fellow, NORC at the University of Chicago (Moderator)

Summary: The Arctic is facing the impacts of climate change more quickly and more severely than anywhere else in the world. Two sessions in the NCSE Conference will address the Arctic; the first (Session 8) will focus on the impact on the indigenous people, the energy industry, and the transportation field. The second (Session 20) will focus on climate change solutions.

The panelists will discuss how changes are impacting natural resource development, transportation, and indigenous populations in the region:

1. Natural Resource Development: Energy and mineral extraction and development are currently underway in the Arctic region. As ice continues to melt more each year, interest in deepwater energy drilling has increased.
2. Transportation: In addition to increased traffic from resource development, ice volumes have opened shipping routes through the region. This has resulted in increased deposits of black carbon as well as increased need for possible emergency response capabilities. These open

routes may play a significant geopolitical role.

3. **Indigenous Populations:** The result of climate change, resource development, increased transportation, and more have caused drastic and unprecedented changes to the way of life for the people living in the Arctic. The panelists will weigh in on these changes and what can be done to preserve and protect their way of life in the face of climate change.

Each of these realms has intersecting cause-and-effect relationships with the others. As a result, the challenges, opportunities, and solutions in each realm often affect the others, either in complimentary or contradictory ways. In the symposium, each of the themes will be explored through the diverse perspectives on the panel – highlighting where interests may diverge or intersect. The symposium will engage the expertise, experience, and perspective of each panelist to identify challenges and opportunities.

Speakers:

- Beth Ferris, Co-director, Brookings-LSE Project on International Displacement and Senior Fellow, Foreign Policy, Brookings
- Heather Conley, Senior Fellow and Director, Europe Program, Center for Strategic and International Studies
- Christian Burgsmuller, Head of the Energy, Transport and Environment Section, The European Union Delegation to the U.S.
- Ken Leonard, Principal, Cambridge Systematics
- Robert Corell, Principal, Global Environment and Technology Foundation

Workshop Summary and Outcomes: *See Session #20*

9. REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION (REDD+)

Organizers: Bruce Cabarle, REDD+ Specialist and Josefina Brana-Varela, Policy Director, Forest and Climate Programme, World Wildlife Fund International

Summary: REDD+ is perhaps the leading area of consensus within the global climate change negotiations but remains at a crossroads. While REDD+ has taken longer to realize than originally anticipated, no other single mechanism has ever before mobilized this scale of political attention and financial resources for tropical forest conservation, nor had the potential for even greater conservation outcomes. It will be a defining moment for tropical forest conservation when REDD+ is realized – and if REDD+ treads off its path, it will be, perhaps, one of the greatest lost opportunities for tropical forest conservation in our generation. This session will provide an overview on the state of REDD+ as well as a deeper look at the critical outstanding issues that must be resolved between now and 2015 in order to ensure that REDD+ becomes a reality as an integral part of the global climate change agreement anticipated at the 21st Conference of the Parties to the UN Framework Convention on Climate Change to held in Paris. The session will include a range of perspectives from government negotiators, climate investment funders and civil society advocates.

Speakers:

- Thomas Lovejoy, UN Foundation

- Jonah Busch, Research Fellow, Center for Global Development
- Naikoa Aguilar-Amuchastegui, Forest Carbon Scientist, World Wildlife Fund International
- Celine Ramstein, Deputy Attache for Environment and Sustainable Development, Embassy of France
- Lou Leonard, Vice President, Climate Change, World Wildlife Fund U.S.

Outcomes:

- Identification of key linkages and outstanding issues to be resolved to ensure that tropical forests are included as part of a comprehensive Climate Change agreement by 2015 (under the auspices of the UN-sponsored UNFCCC negotiations).
- Lessons regarding effective linkages between tropical forests and climate change, and points of convergence between Developing and Developed Nations toward a comprehensive, global environmental and development agreement between the next round of negotiations in Lima, Peru (2014) and its conclusion in Paris, France (2015)

Products and follow up activities:

- Scorecard to identify outstanding elements and key points therein to be resolved in order to include tropical forests as part of a global agreement on climate change by 2015
- Strategy for successful negotiation on outstanding issues to be resolved by 2015

10. MANAGING MARINE FISHERIES IN A CHANGING CLIMATE

Organizers: Wendy Morrison, Contractor/Ecologist, Office of Sustainable Fisheries, NOAA Fisheries Service and Earth Resources Technology, Inc.; Roger Griffis, Climate Change Coordinator, Office of Science and Technology, NOAA Fisheries Service; Mark Nelson, Expert, Office of Sustainable Fisheries, Domestic Fisheries Division; and Erin Seney, Contractor/Ecologist, Office of Science and Technology, NOAA Fisheries Service and Erin Seney Consulting, LLC.

Summary: Globally, an estimated 1.5 billion people depend on marine fish as a primary food source and over 43.5 million people work in fisheries-related jobs. With a changing climate and changing oceans, the fisheries that sustain us now may not be the same fisheries that sustain us in the future. Additional tools and approaches may be needed to prepare for and respond to these changes in management actions, and the tools needed to sustainably manage the fish stocks may be different than the tools needed to manage the fishing effort.

Fisheries managers will have to address four major climate-driven changes for effective fisheries management including (1) changes in ecosystem productivity/fish abundance, (2) changes in distribution of fish stocks and fishers, (3) changes in interactions with non-target species (bycatch), and (4) changes in habitat use (e.g., shifting nursery grounds).

Three key questions will be addressed:

- What tools can be used for fisheries managers to effectively maintain *living marine resources* in the face of a changing climate?
- What does fisheries management need to do to effectively evolve *fisheries (i.e. the human component)* in the face of a changing climate?
- How can we better *partner* managers, scientists and fishermen over these common goals?

Speakers:

- Jason Link, Senior Scientist for Ecosystem Management, NOAA Fisheries Service
- Andrew Pershing, Research Scientist, Ecosystem Modeling, Gulf of Maine Research Institute
- Gretta Pecl, Senior Research Fellow, Institute for Marine and Antarctic Studies, University of Tasmania

Workshop panelists:

- Heather Deese, Vice President, Strategic Development, Islands Institute
- Bill Tweit, Chair, North Pacific Fisheries Management Council Ecosystem Committee
- Sonke Mastrup, Executive Director, California Fish and Game Commission
- Rebecca Lent, Executive Director, Marine Mammal Commission

Outcome: Identification of tools, actions, and collaborations to develop new approaches or test ongoing efforts.

Products and follow up activities:

- A tech memo and published peer-reviewed paper of the findings and recommendations, in addition to specific projections and collaborations set in motion.
- Contribute to on-going efforts of the NOAA Fisheries Service to prepare for and respond to changing climate and ocean conditions in fisheries management.
- The articulation of best management alternatives will allow NMFS staff to determine what types of documents, tools, guidance, etc. are needed by regional managers to effectively tackle this issue.

11. BUILDING THE CLIMATE CHANGE EDUCATION AND COMMUNICATION COLLECTIVE

Organizers: Anita Davis, Lead, Earth to Sky Interagency Partnership and Coordinator, Interagency Partnerships, NASA Terrestrial Sciences; Mary Jo Leber, Virginia Space Grant Consortium (VSGC) Program Manager, NASA Innovations in Climate Education (NICE); Tamara Shapiro Ledley, Senior Scientist, TERC

Summary: Effective, accurate, and consistent communication and education about climate change is critical in order for society to take the major steps needed to address both mitigation and adaptation to climate change. We propose to build a stronger, more integrated community of climate education/communication practitioners—a Collective—that is characterized by shared goals, common messaging, and leveraging of the strengths of each of the individual members. The Collective will identify synergies and successful approaches that could be shared across all sectors, as well as sources of funding for its work. Drawing upon the expertise of presenters and participants, we will apply the Collective Impact Model as a framework for building our Collective.

During the symposium, presenters and participants will share goals, objectives, metrics and needs of their projects/programs. This information will form the starting point for the breakout workshop in which we will develop a common vision, identify the type of backbone organization needed, and outline actions we will take toward to making the Collective a reality, including identifying possible funding sources.

Participants will be encouraged to share their own projects and expertise, and articulate the needs of climate educators.

Speakers:

- Anita Davis, Lead, Earth to Sky Interagency Partnership and Coordinator, Interagency Partnerships, NASA Terrestrial Sciences
- Monica H. Barnes, NASA Project Manager, NASA Innovations in Climate Education (NICE)
- Tamara Shapiro Ledley, Senior Scientist, TERC
- Daniel Zalles, Senior Learning Scientist, Center for Technology in Learning, Stanford Research Institute (SRI)
- Neil Leary, Director, Center for Sustainability Education, Dickinson College
- David R. Brooks, President, Institute for Earth Science Research and Education

Discussants:

- Theresa G. Coble, Associate Professor, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University
- Mark McCaffrey, Programs and Policy Director, National Center for Science Education
- Frank Niepold, Climate Education Coordinator, NOAA Climate Education and Communication and Education Interagency Working Group Co-chair, U.S. Global Change Research Program
- Ruth Paglierani, Coordinator of Public Programs, University of California Center for Science Education

Goals, Outcomes, Products and Follow-up Activities:

- Identify needs and begin to developing a more cohesive community of climate change educators. This will include development of shared messages, adoption of effective communication techniques, sharing expertise and resources, and seeking adequate funding for our work.
- Take concrete steps toward building a Climate Change Education and Communication Collective, which will continue beyond the conference.
- Outline the characteristics of a Backbone Organization that can meet the needs of the Collective, and on efforts needed to sustain both the Backbone Organization and the members of the Collective, including funding sources.
- Motivate the public to become climate literate so that they are equipped to take substantive action in mitigating and adapting to climate change.

12. SUSTAINABILITY FOR THE NATION: RESOURCE CONNECTIONS AND GOVERNANCE LINKAGES

Organizers: Jennifer Saunders, Program Officer; Marina Moses, Director; and Emi Kameyama, Program Associate; Science and Technology for Sustainability Program, The National Academies

Summary: The National Research Council's (NRC's) Committee on Sustainability Linkages in the Federal Government released a report in June 2013 that identified the linkages among areas such as energy, water, health, agricultural production, and biodiversity that are critical to promoting and encouraging long term sustainability within the federal policy framework. The premise of the study is that achieving sustainability is a systems challenge that cannot be realized by separately optimizing pieces of the system.

The committee's report includes an analytical framework for decision making that can be used by U.S. policymakers and regulators to assess the consequences and tradeoff/synergies of policy issues involving a systems approach to long term sustainability and decisions on sustainability-oriented programs. The framework includes social, economic and environmental dimensions of sustainability, highlighting certain dimensions that are sometimes left unaccounted for in cross media analyses. Committee members will present the findings and recommendations from the report while federal agency sponsors will participate as discussants to talk about how the report resonates and can be applied to their work.

The breakout session will follow on the themes discussed during the symposium, including building partnerships, particularly with academia, to implement the findings and recommendations of the report. The session will include a focus on urban sustainability and coastal issues. Facilitators will include committee members, study sponsors, and National Academies staff.

Symposium speakers:

- Thomas Graedel, Clifton R. Musser Professor of Industrial Ecology, Yale University
- Ann Bartuska, Deputy Under Secretary for Research, Education and Economics, U.S. Department of Agriculture
- Sally Katzen, Senior Adviser, Podesta Group and Visiting Professor of Law, New York University School of Law
- Lynn Scarlett, Managing Director, Public Policy, The Nature Conservancy
- Alan Hecht, Director for Sustainable Development, Office of Research and Development, U.S. Environmental Protection Agency
- Cathy Snyder, Vice President, Energy and Environment, Lockheed Martin

Workshop speakers:

- Marina Moses, Director, Science and Technology for Sustainability Program, The National Academies
- Lynn Scarlett, Managing Director, Public Policy, The Nature Conservancy
- Joseph Fiksel, Executive Director, Center for Resilience, Ohio State University and Sustainability Advisor, U.S. Environmental Protection Agency
- Alan Hecht, Director for Sustainable Development, Office of Research and Development, U.S. Environmental Protection Agency
- Cathy Snyder, Vice President, Energy and Environment, Lockheed Martin

Outcomes, Products and Follow-up Activities: The session will provide input into additional dissemination events on the report, with the goal of engaging in an ongoing dialogue with policymakers throughout the federal government, academia, and the nongovernmental and private sectors. It will ensure that the report findings and recommendations are widely and effectively communicated to interested parties. Understanding the challenges and barriers to implementing the report's recommendations will be a key area of interest in these dissemination discussions.

13. IDENTIFYING SECURITY RISKS AND OPPORTUNITIES FROM CLIMATE CHANGE

Organizers: Chad Briggs, Strategy Director, GlobalINT; Birgitta Liljedahl, Senior Scientist and Annica Waleji, Swedish Defence Research Agency; and Tracy Briggs, Executive Director, GlobalINT LLC

Summary: This part of the conference will address how climate impacts affect human and national security interests, and how such assessments can be used to shape policy. It will integrate data from international scientific communities and regional knowledge from international policy participants to identify both challenges and opportunities for policy solutions, using vulnerability frameworks developed for security assessments. Drawing from environmental security programs in the US military, Swedish defense community, US and international think tanks, participants will be encouraged to contribute to new and ongoing efforts to increase community and national resilience to climate change.

Practical policy recommendations will be developed and focused on the following questions:

- What areas are most at risk to climate changes?
- What scientific research or monitoring is most needed to address these risks?
- Beyond the general 'threat multiplier' warning, what are the direct or indirect security implications of potential climate change risks?
- How can these security risks also be opportunities?
- What policies can provide cost savings by decreasing disaster risks, increasing energy efficiencies/cyber security, reducing health risks, etc.?

Speakers:

- Chad Briggs, Strategy Director, GlobalINT LLC and Security Studies Faculty, Johns Hopkins University
- Zvika Krieger, Strategist, Office of the Secretary of Defense
- Jennifer Irish, Associate Professor of Coastal Engineering, Virginia Tech University
- Melissa Finucane, Senior Social and Behavioral Scientist, RAND Corporation

Outcomes: A list of workable and salient recommendations for the US government (local/state/federal), including close consideration of how policies can be coordinated with partners and allies abroad, and with attention to fiscal realities facing governments.

Products and follow up activities: Participants in the workshop will help produce recommendations around a scenario-based risk assessment of climate-related disasters in the US. These recommendations will become part of ongoing efforts to address critical security vulnerabilities, in line with the new Climate Resilience Council established by President Obama in October 2013. Security assessments may start with Pacific Islands (including Hawaii), in cooperation with Pacific RISA and the US Global Change Research Program, and extend both domestically and internationally.

13b. NATIONAL CLIMATE ASSESSMENT: INNOVATIONS IN SCIENCE AND ENGAGEMENT – PART I

Organizers: James Buizer, Director, Climate Adaptation and International Development, University of Arizona; Katharine Jacobs, Director, Center for Climate Adaptation Science and Solutions, University of Arizona; and Susanne Moser, Director, Susanne Moser Research and Consulting

Symposium Summary: This two-part session will focus on lessons learned in the process of developing the Third National Climate Assessment (NCA3) report, which is due for release in the spring of 2014. To be useful for adaptation and mitigation decision support and for improving scientific understanding, assessments need to be built on a strong foundation of knowledge and tools. A number of assessment products and processes were initiated in the NCA3 that were intended to build towards ongoing

improvements in assessment capacity over time. They include 1) climate histories and projections for all regions of the US; 2) a national set of sea level rise projections; 3) an engagement and communications strategy; 4) electronic access to underlying data supporting conclusions; and 5) an integrated set of national indicators of change across social, physical and ecological systems.

Workshop Summary:

This workshop is designed to address some of the most challenging components of building a sustained assessment process. As discussed in the earlier Symposium session, building the capacity to sustain assessment activities over time is a critical component of the third National Climate Assessment team's activities. Developing a truly sustainable path forward means ensuring sufficient resources and human capital to support ongoing regional assessment activities. In addition, a critical missing component of the NCA3 activity is an explicit and well-documented approach to documenting the costs and benefits of adaptation activities as opposed to the costs of the impacts themselves. Building a roadmap for a national approach to this problem, including ways that the NCA process can begin to build the required database for a credible effort of this kind, is a desired outcome from this session. The final hour of this workshop will be devoted to a discussion of how to best evaluate the processes and products of the NCA3 and associated capacity building efforts.

Speakers:

- Moderator: Susanne Moser, Director, Susanne Moser Research and Consulting
- Katharine Jacobs, Director, Center for Climate Adaptation Science and Solutions, University of Arizona
- Emily Cloyd, Public Participation and Engagement Coordinator, U.S. Global Change Research Program
- James Buizer, Director of Climate Adaptation and International Development, University of Arizona

Symposium Outcomes:

The presentations and discussion will be synthesized into transferable lessons that can be integrated into other assessments and the Sustained Assessment process that is now being implemented at the US Global Change Research Program. Components of this discussion will be contributions to a special issue of a journal. A workshop focused on resolving critical issues related to building the Sustained Assessment follows this symposium.

Workshop Outcomes: *See #26*

13c. ENVIRONMENTAL PERFORMANCE DISCLOSURE AND CLIMATE RISK GOVERNANCE (*Symposium only*)

Organizers: Troy D. Abel, Academic Program Director and Steve Hollenhorst, Huxley College of the Environment, Western Washington University

Summary: In 2009, the U.S. Environmental Protection Agency (EPA) announced the first facility level regulatory program addressing climate change when it issued the Mandatory Reporting of Greenhouse Gases (GHGs) rule. Facilities surpassing an emissions threshold of 25,000 metric tons are now required to annually estimate and report their GHG volume to the EPA. This session brings together environmental information disclosure scholars and practitioners to discuss how these policies influence governance, how

they function in polycentric systems, and how they can be designed and utilized to improve climate risk governance.

Speakers:

- Mark Stephan, Associate Professor of Political Science, Washington State University
- Dorothy Daley, Associate Professor of Political Science and Environmental Studies, University of Kansas
- Anhar Karimjee, Director, Greenhouse Gas Reporting Program, U.S. Environmental Protection Agency
- Kyle Aarons, Senior Fellow, Center for Climate and Energy Solutions

Outcomes: This session will begin a new dialogue on climate risk governance approaches among policy leaders, and practitioners in North America. Public environmental officials, both civil servants and elected representatives, can benefit from a clearer understanding of how to analyze what works to reduce GHG emissions and why. Moreover, panelists will discuss the development of a research program that advances theory and policy analysis with the Institutional Analysis and Development (IAD) framework to better understand how polycentricity -- through institutional diversity, nesting, and analytical deliberation -- affects climate risk governance performance. Panelists will also clarify key conceptual and methodological issues that will enable other scholars to investigate and diagnose the institutions and interactions driving U.S. climate risk governance with both large and small-N studies. Understanding that ways in which multilevel climate risk governance arrangements impact GHG emissions also promotes learning and innovation among national and international decision makers.

14. TAKING “ECO-DISTRICTS” TO SCALE: THE ROLE OF NEIGHBORHOOD SCALE INTERVENTIONS IN ADDRESSING CLIMATE CHANGE AND FOSTERING RESILIENCE

Organizers: Jennifer H. Allen, Associate Professor of Public Administration and Director of the Institute for Sustainable Solutions, Portland State University and Rob Bennett, CEO, Ecodistricts

Summary: Neighborhood scale “eco-districts” represents an integrated approach to addressing urban sustainability challenges at the district level. Powered by partnerships involving industry, local and state government, universities, and non-governmental organizations; eco-districts seek to become integrated and resilient neighborhoods that are resource efficient, capture, manage, and reuse a majority of energy, water, and waste on site. They offer a range of transportation options, provide a rich diversity of habitat and open space, and enhance community engagement and well-being.

Efforts are underway to develop comprehensive assessment tools, scalable project financing, and public policy support that will ensure strategies for enhancing neighborhood sustainability can be successfully implemented. Portland, Oregon has launched five formal eco-district pilots; other examples include the Regenerative Neighborhoods work initiated by the University of British Columbia, the development of False Creek in Vancouver BC and efforts in San Francisco.

We will share and critically examine district-scale innovation in urban settings to better understand the role they can play in climate change mitigation, adaptation, and broader community resilience efforts. We will examine the potential for district scale developments to address climate change mitigation and

adaptation and broader community resilience goals internationally.

Speakers:

- Rob Bennett, CEO, Ecodistricts
- Brian Swett, Chief of Environment and Energy, City of Boston
- Don Edwards, Principal and CEO, Justice and Sustainability Associates, LLC
- Charles Kelley, Principal, ZGF Architects

Outcomes:

- Build on the outcomes of the Ecodistrict Summit in November 2013, during which there was a shoulder session on research agenda development.
- Create a network of practitioners and researchers engaged in understanding the potential for district scale development to help address climate change mitigation and adaptation and broader community resilience efforts.

Products and follow up activities:

- An ongoing effort to share information and foster innovation at the neighborhood scale in urban communities, and seed a community of interest and practice around these efforts.
- Inform regional and national policies that can more effectively foster innovation at this scale.

15. HEALTHIER AND HIGH PERFORMING LEARNING ENVIRONMENTS; NEW TOOLS FOR EDUCATIONAL FACILITIES

Session #15 has been canceled. We apologize for any inconvenience.

16. MONITORING AND MEASURING GREENHOUSE GASES IN CITIES FOR DECISIONS

Organizer and Moderator: James R. Whetstone, Special Assistant to the Director for Greenhouse Measurements, National Institute for Standards and Technology (NIST)

Summary: As the world moves toward addressing climate change drivers, cities and urban areas will be the focus of many mitigation actions and urban decision-makers will need information that clearly identifies, quantifies, and attributes greenhouse emission sources and sinks - in real-time, at spatial scales of approximately 1 to 2 km².

Research is underway to improve urban measurement and modeling capabilities to determine greenhouse gas flux. This measurement science research is particularly important in cities and urban areas, where multiple emission sources exist in close proximity. To this end, research in several cities including Indianapolis, Indiana (INFLUX), and Los Angeles (Los Angeles Megacity Carbon Project) are supported, or partially so, by the U.S. National Institute of Standards and Technology (NIST).

These research efforts can potentially nucleate an international coalition of megacities where nations can work cooperatively to enhance the science base needed to advanced measurement capabilities supporting decision-making tools needed not only by local authorities, but by regional and national interests. This part of the conference will bring together scientists and decision-makers to explore the status of the science and how to create a global coalition of cities to advance the science and develop tools for decision-makers.

Speakers:

- Kenneth J. Davis, Professor of Meteorology, The Pennsylvania State University
- Kevin R. Gurney, Associate Professor, Arizona State University
- Howard Choy, General Manager, County Office of Sustainability, Los Angeles County Internal Services Department
- Michael Steinhoff, Program Manager, Tools and Technical Innovation, ICLEI-Local Governments for Sustainability
- Leigh Raymond, Professor of Political Science and Director, Center for the Environment, Purdue University

Outcomes: The basis for a coalition of cities to collaboratively conduct accurately monitoring and modeling of greenhouse gases and develop decision-making tools that can support more precise and targeted action on greenhouse gases at a local level.

17. GOLDILOCKS AND CLIMATE ADAPTATION: THE REGIONAL APPROACH IS “JUST RIGHT”

Organizers: Amber Mace, Policy Fellow, UC Davis Policy Institute for Energy, Environment and the Economy; Bruce Riordan, Climate Consultant, Bay Area Joint Policy Committee; Nicola Hedge, Director, Climate Initiative, the San Diego Foundation; Michael McCormick, Senior Planner, Governor Brown’s Office of Planning and Research; and Jonathan Parfrey, Executive Director, Climate Resolve

Summary: Many climate change issues (and other existing hazards and threats) must be addressed regionally. Furthermore, in building community resilience, local governments need to work closely with state governments, the private sector, non-profit and community organizations to improve communities’ ability to effectively adapt to changing environmental conditions and recover more quickly from climate-related disasters.

We will provide a forum to better understand barriers to adaptation from a regional/local perspective. We will explore the lessons learned from California’s Alliance of Regional Collaboratives for Climate Adaptation (ARCCA), an organization consisting of representatives of four regions of the state (San Diego, Los Angeles, the Bay Area and, Sacramento), formed in early 2012. The lessons will include: The value of regional collaborations; the genesis of ARCCA and the relationship with the state; the role of regional/local foundations in catalyzing regional action; and science informing decision making and the role of the universities.

The workshop will also explore:

- Barriers, including lack of funding, governance, policy and institutional constraints, and difficulty anticipating exact climate change impacts that impede action
- Mainstreaming climate considerations into existing policies and plans

- Pursuing no and low regrets strategies including those that achieve dual benefits of mitigation and adaptation

Speakers:

- Nicola Hedge, Director, Climate Initiative, the San Diego Foundation
- Amber Mace, Policy Fellow, UC Davis Policy Institute for Energy, Environment and the Economy
- Michael McCormick, Senior Planner, California Governor’s Office of Planning and Research
- Jonathan Parfrey, Executive Director, Climate Resolve
- Bruce Riordan, Climate Consultant, Bay Area Joint Policy Committee

Discussants: John Nordgren, Senior Program Officer for Environment, Kresge Foundation

Outcomes: Participants will discuss successful strategies for catalyzing regional adaptation efforts and overcoming common barriers.

Products and follow up activities: We will develop a set of example guidelines for creating a regional collaboration including templates for guiding principles and MOUs, options for governance structures, suggestions for community engagement, and science-policy translation. During the workshop, these products will be tested and suggestions for improvement discussed with attendees so these can be more widely useful.

18. CREATING RESILIENT RIVERS FOR SUSTAINABLE CITIES: THE URBAN WATERS FEDERAL PARTNERSHIP

Organizers: Rachel Muir, Science Advisor, Northeast Region, U.S. Geological Survey and Lisa Pelstring, Urban Waters Coordinator, U.S. Department of Interior

Summary: Urban rivers and associated habitats are severely degraded and delimited by hard structures and subject to multiple uses that include water transportation, shipping and other commercial activities. These stresses can all be exacerbated by climate change. Further, the effects of extreme weather events such as flooding will have greater impact on human structures, including cultural resources of unique value.

In the United States, the Urban Waters Federal Partnership operates in 18 locations to reconnect urban communities, particularly those that are overburdened or economically distressed, with their waterways by improving coordination among federal agencies and collaborating with community-led revitalization efforts to improve their water systems and promote their economic, environmental and social benefits.

Conference participants will engage in a dialogue on the value and outcome of such projects and activities and provide guidance on how to conserve urban rivers as more ecologically and socially valuable and less risky parts of cities under future climate changes.

Three broad topical areas will be addressed:

- Water resources, including water quality, quantity, impacts of floods and drought, aquatic biota.
- Urban terrestrial resources associated with urban river corridors and in the context of creating sustainable cities and economically viable urban forests.

- Socio-economic issues; maximizing benefits to human welfare, as economic, recreational, and educational resources in cities.

Symposium Speakers:

- Tom Iseman, Deputy Assistant Secretary for Water and Science, U.S. Department of Interior
- Mike Shapiro, Deputy Assistant Administrator for Water, U.S. EPA
- Chris Muller, Co-Founder, Grand Rapids Whitewater and Co-Leader, Grand River Urban Waters Federal Partnership
- Morgan Grove, Research Forester, the Baltimore Ecosystem Study, USDA Forest Service
- Tom Busiahn, Coordinator, National Fish Habitat Partnerships Coordinator, U.S. Fish and Wildlife

Workshop Facilitators:

- Tom Busiahn, Coordinator, National Fish Habitat Partnership, U.S. Fish and Wildlife Service
- David Ericson, Environmental Site Assessment Program Manager, City and County of Denver
- Emily Greene, Coordinator, Atlantic Coastal Fish Habitat Partnership
- Dianna Hogan, Eastern Geographical Mapping Center, U.S. Geological Survey
- Cherie Miller, Researcher, Maryland, Delaware and District of Columbia Water Science Center
- Rachel Muir, Science Advisor, Northeast Region, U.S. Geological Survey
- Lisa Pelstring, Urban Waters Coordinator, U.S. Department of Interior
- Emily Pindilli, Economist, U.S. Geological Survey
- Robert Shedlock, Director, Maryland, Delaware and District of Columbia Water Science Center
- Roy Simon, Special Assistant for Urban Waters, Office of Groundwater and Drinking Water, U.S. EPA

Outcomes:

- Network the Urban Waters Federal Partnership with new partners
- Ideas to provide the best science for focused conservation action for climate adaption and potentially mitigation in urban environments; and, how to provide and connect to local communities to such science.

**19. PREPARING U.S. AGRICULTURE TO MANAGE CLIMATE CHANGE RISK:
BUILDING EFFECTIVE CLIMATE CHANGE PARTNERSHIPS AND NETWORKS
FOR AGRICULTURE**

Organizers/Moderators: Michael Hoffmann, Director, Cornell University Agriculture Experiment Station and Associate Dean, College of Agriculture and Life Sciences and Allison Morrill Chatrchyan, Director, Institute for Climate Change and Agriculture, Cornell University; and William "Bill" Hohenstein, Director of the Climate Change Program Office, U.S. Department of Agriculture

Summary: Climate change poses unprecedented challenges to U.S. agriculture because of the sensitivity of agricultural productivity to unpredictable weather, and the costs of impacts and adaptations. In light of the increasing pace of climate change, there is an urgent need to communicate the science and solutions to various groups within the agricultural sector who can take more aggressive action to reduce greenhouse gas emissions and prepare for climate change impacts. The symposium panel and workshop will explore

the experiences of universities, US government regional initiatives, and corporate and NGO partners to build effective climate change partnerships and networks for agriculture.

Symposium Speakers:

- Michael Hoffmann, Director, Cornell University Agriculture Experiment Station and Associate Dean, College of Agriculture and Life Sciences, Cornell University
- William "Bill" Hohenstein, Director of the Climate Change Program Office, U.S. Department of Agriculture
- Matthew C. Larsen, Associate Director, Climate and Land Use Change, U.S. Geological Survey
- Lois Wright Morton, Professor, Department of Sociology and Project Director, Climate and Corn-based Cropping System CAP, Iowa State University
- David Gustafson, Senior Fellow, Climate and Environmental Science Engagement, Monsanto

Workshop Participants:

- Allison Morrill Chatrchyan, Director, Institute for Climate Change and Agriculture, Cornell University
- Robin O'Malley, Policy and Partnership Coordinator, U.S. Department of the Interior Climate Science Centers
- Caitlin Simpson, Program Manager, Regional Integrated Science and Assessments Program, National Oceanic and Atmospheric Administration – Climate Program Office
- Keith Tidball, State Coordinator, Department of Natural Resources, Cornell University Extension Disaster Education Network
- Luis Tupas, Director, Division of Global Climate Change and Acting Director, Division of Bioenergy, Institute of Bioenergy, Climate and Environment, National Institute of Food and Agriculture, U.S. Department of Agriculture

Outcomes:

- Learn lessons about the state of climate change science and agriculture partnerships, and future directions, from federal agencies, university, and NGO and corporate perspectives.
- Create a more cohesive community of practice to share lessons learned and best practices of communicating climate change science and research updates to farmers, and gathering data on needs and adaptations from agricultural producers.

Products and follow up activities:

- Develop a set of specific recommendations for the effective structuring of the new USDA Regional Climate Change Hubs, including identifying existing networks and stakeholders that should be involved, developing new partnerships, effective data management, and outreach mechanisms, and identifying funding opportunities.
- Develop an action plan and teams for follow-up activities.
- Explore the possibilities of developing a white paper and/or peer-reviewed journal article on the findings and recommendations.

20. AN ARCTIC PRESERVATION ROADMAP

Organizer: Linda Brown, Senior Vice President, SCS Global Services and John Topping, The Climate Institute, Founder and President, The Climate Institute

Summary: Some of the most important opportunities related to the current climate challenge lie in recognizing that climate change has regional as well as global dimensions. Actions focused on slowing climate change in certain regional “hot spots” around the globe, such as the Arctic, can make a huge difference, not just for the region itself, but for the planet as a whole. Updated climate accounting metrics that integrate the latest climate science make it possible to more accurately model the benefits of various mitigation options, better understand the scale of mitigation needed, and pinpoint the countries and sectors in which early, focused action can make the most difference.

This panel will:

1. Describe the emerging upgrades in climate accounting, now being standardized under the open, multi-stakeholder American National Standards Institute process. These upgrades include the extension of climate accounting beyond Kyoto-era metrics in several respects: inclusion of short-lived climate forcers such as black carbon; inclusion of negative climate forcing substances in the accounting equations; and calibration to regional and global temperature thresholds.
2. Report research findings based on these upgraded accounting protocols, identifying the countries that are the greatest sources of anthropogenic and non-anthropogenic emissions contributing to accelerated warming in the Arctic, and considering those sectors in which mitigation actions may be particularly important to most effectively reduce warming the Arctic.
3. Discuss the catastrophic risks to global climate from a warming Arctic, and describe a possible roadmap for slowing warming in the Arctic to preserve its critical cooling capacity involving public and private sector cooperation. This roadmap will have implications for future development activities in the region.
4. Discuss the potential for carbon registries and carbon markets to play an important role in incentivizing and financing mitigation projects related to short-lived climate forcers and methane.

Speakers:

- Michael MacCracken, Chief Scientist for Climate Change Programs, The Climate Institute
- Tobias Schultz, Lifecycle Assessment Practitioner, SCS Global Services
- Bill Karsell, Chair, LEO-SCS-002 Standard Committee and Chair, U.S. SubTAG to ISO TC 207 SC5
- Charles Bayless, Chair, Essential Power and Former President and CEO, Unisource Energy, Illinova Corporation, and TXU Corporation
- Stanley P. Rhodes, President, SCS Global Services

Workshop: THE ARCTIC: CHANGING CLIMATE, SOCIO-ECONOMIC IMPLICATIONS, AND STRATEGIC MITIGATION

Organizers: Linda Brown, Senior Vice President, SCS Global Services; Molly Jones, Research Analyst, NORC at the University of Chicago; and Joseph Broz, Senior Fellow, NORC at the University of Chicago

The workshop will be a facilitated roundtable discussion split into three sections – Climate Science and Metrics, Roadmap Obstacles and Opportunities, and Next Steps.

Roundtable Section 1. Climate Science and Metrics

Workshop participants will interact with the presenting scientists from Symposia 8 and 21 to gain a better understanding of the state of climate change in the Arctic, discuss implications for specific regional and global climate change, and gain a clearer understanding of the updated methods used for calculating global and Arctic climate footprints, reductions, and offsets.

Roundtable Section 2. Discussion of Arctic Preservation Roadmap Obstacles and Opportunities

Workshop participants will join industry, academic, and scientific panel experts in exploring the opportunities and obstacles associated with the Arctic Preservation Roadmap outlined during Symposium 20, and including the three topics discussed in Symposium 8 –natural resource development, transportation, and indigenous populations – as well as country-level mitigation measures.

Roundtable Section 3. Next Steps: Projects, Partnerships and Action Plan

Based on the discussions in the previous two sections, this section will focus on next steps, potential projects and partnerships, and a possible plan of action.

Outcomes:

- Educate government, business, civil society, and carbon market representatives about the significance of recent changes in the Arctic to indigenous people, transportation, climate science, and policymaking.
- Engage country governments, business, and civil society representatives in concrete projects that can begin to roll back the emissions influencing warming in the Arctic region.
- Initiate policy discussions to incorporate the information presented into future policy planning and decision-making in the public and private sectors.

21. MANAGING FOREST RISK AND RESILIENCE TO CLIMATE CHANGE

Organizer: Richard Pouyat, National Program Leader Bioclimatology and Environmental Science Research Staff, U.S. Forest Service Research and Development – Washington Office

Summary: Forest and grassland ecosystems are undergoing significant changes as a result of climate change. How resilient particular ecosystems will be in the future will depend on many environmental, social, and economic factors. Further, different structural and functional aspects of ecosystems will respond to these factors in different ways. Thus, it is important to recognize the multiple stressors on different aspects of forests and seek to integrate them into a holistic “systems” view that reflects particular physical, biological, and societal aspects of each forest and grassland ecosystem. By connecting hydrology, air quality, biodiversity, human uses, and other factors, natural resource managers can develop more effective practices to achieve sustainable and resilient ecosystems in a changing climate. This symposium and workshop will explore and build upon a number of initiatives being undertaken by the U.S. Forest Service (USFS) and other agencies to integrate diverse uses, multiple stressors, and risk to develop new natural resource management tools.

First, a symposium utilizing a panel format will address adaptive risk management and forest resilience to climate change and provide examples of managing forest and grassland ecosystems to enhance resilience to climate change.

Second, a workshop will consider 3 case examples of current agency efforts to plan or manage for resiliency to climate change. These examples will be followed by facilitated discussions that will address several questions regarding current state of knowledge, future research needs, and the future development of natural resource management tools, preferably through collaborations across federal and state agencies.

Symposia Speakers:

- David A. Cleves, Climate Change Advisor, U.S. Forest Service
- Matthew G. Rawlings, Wildland Fire Science Coordinator, U.S. Geological Survey
- Claire O’Dea, Air Quality Specialist, Eastern Region, U.S. Forest Service
- Linda Pardo, Research Forester, Northern Research Station, U.S. Forest Service
- David Levinson, National STREAM/Fish and Aquatic Ecology Unit Program Leader, U.S. Forest Service: Watershed, Fish, Wildlife, Air, and Rare Plants

Workshop Case Examples:

- Greg Kujawa, Senior Staff Assistant, Climate Change Advisor’s office, U.S. Forest Service
- David Levinson, National STREAM/Fish and Aquatic Ecology Unit Program Leader, U.S. Forest Service: Watershed, Fish, Wildlife, Air, and Rare Plants
- Patrick Gonzalez, Climate Change Scientist, Natural Resource Stewardship and Science, U.S. National Park Service
- Mark Shaffer, National Climate Change Policy Advisor, Office of the Science Advisor, U.S. Fish and Wildlife Service, Department of the Interior

Outcomes/ Products and follow up activities:

- Collect case studies or best practices, which will be summarized in a publication
- List of future research and monitoring needs for integrating climate change and ecosystem resilience, which will then be developed into a plan of action
- Build a community of practice across agencies
- Plan future workshops/meetings to develop plan for interagency cooperation on tool development

22. NATURAL CAPITAL AND INFORMATION NETWORKS FOR ADAPTING COASTAL COMMUNITIES TO CLIMATE CHANGE

Organizer: Tracy Rouleau, Senior Social Science Advisor and Deputy to the Chief Economist, National Oceanic and Atmospheric Administration; Katya Wowk, Advisor, Office of the Assistant Secretary for Conservation and Management, Department of Commerce, National Oceanic and Atmospheric Administration; Kim Penn, Climate Change Coordinator CSC-OCRM, National Oceanic and Atmospheric Administration Ocean Services; Mantha Mehallis, Professor, Department of Management Programs, College of Business, Florida Atlantic University and Leonard Berry, Director, Florida Center for Environmental Studies and Co-Director, FAU Climate Change Initiative, Florida Atlantic University

Summary: The session will result in the formalization and expansion of an existing climate information network on the Eastern Seaboard and Gulf Coast to better integrate natural capital in coastal urban planning decisions and financing to enhance coastal resilience. We intend to gain a better understanding of how counties, cities, regional planning organizations and businesses can use the methods of valuing natural capital to continue to address what they see as an immediate and important set of problems with respect to climate hazards, even in the absence of national and state policy.

Speakers:

- Mark Schaefer, Assistant Secretary of Commerce for Conservation and Management, NOAA
- David Waggoner, Principal, Waggoner and Ball Architects, New Orleans
- Stephen Weinstein, Senior Vice President and Group General Counsel, RenaissanceRe; Chair, RenaissanceRe Risk Science Foundation, RenaissanceRe Holdings Ltd.
- Dev Motwani, President, Merrimac Ventures
- Sheila Reddy, Senior Scientist, Sustainability Central Science Division, The Nature Conservancy
- Holly Bamford, Assistant Administrator, NOAA's National Ocean Service

Outcomes: In the near-term (1-2 years), increase the use of natural capital in urban planning by formalizing an existing knowledge transfer network through the engagement of new partners and the identification of sustained financing mechanisms. This will provide an ongoing mechanism of communication among the involved parties, including sharing of tools and information, and identifying regulatory and policy barriers. The creation of an information exchange network along the East Coast has already begun in the aftermath of Super Storm Sandy.

In the long-term the network will be evaluated to identify lessons learned and potential transferability to other regions.

23. MOMENTUS: BUILDING A MOVEMENT FOR CLIMATE ACTION

Organizers: Robert Perkowitz President, and Meighen Speiser, Chief Engagement Officer, ecoAmerica

Summary: The visible effects of climate change have gone unnoticed or been ignored by the general public until recently. Climate change now directly threatens our economy, public health, and national security—and challenges our moral character. We burn fossil fuels as we strive for economic prosperity and personal comfort, releasing many tons of carbon emissions into the atmosphere annually. Empowered in collective action, we can build momentum to align the myriad of climate change solutions available and exponentially increase our effectiveness. Millions of individual Americans await guidance.

By studying past social change movements, contemporary public mobilization efforts, and climate change solutions to date, we learned what worked and didn't. From this, we know we need to:

1. Focus the movement toward people, and away from abstract science.
2. Embed climate and sustainability solutions in American social and moral values.
3. Create a shared vision that unites us. A principles-based solutions framework, not a policy.
4. Have a mission critical, purpose-driven national organization to bring a new narrative.

The recently launched MomentUs initiative combines social science and marketing research to understand what Americans need to respond effectively to domestic climate change impacts.

This part of the conference will share resources, best practices, and a tool kit for engagement with a lively, transparent problem-solving discussion. The participants will gain resources for their respective organizations to develop their own commitments and return to their communities with the resources to embed climate change solutions in their networks.

Symposium Speakers:

- Moderator: Tracy Russ, Chief Convergence Officer, ecoAmerica
- Danielle Deane, The Raben Group
- Anthony Cortese, Senior Fellow, Second Nature

Workshop Facilitators:

- Tracy Russ, Chief Convergence Officer, ecoAmerica
- Anthony Cortese, Senior Fellow, Second Nature
- Danielle Deane, The Raben Group
- Richard Kirsch, Senior Fellow, Roosevelt Institute

Outcomes:

1. Apply a Principles Based Solutions Framework (PBSF) for their organizations to engage more Americans to address climate change.
 - Identify clear actions, tools, and resources to design their own climate change solution plan with respective commitments.
 - Design sustainable and inclusion focused strategies to solve for climate change.
 - Manage their newly extended networks for future collaboration.
2. Launch their own strategy and link into the MomentUs network to share their experiences and Best Practices.
 - Keep climate change in the media (social media, their local media and mainstream)

24. INCENTIVIZING ADAPTATION IN THE BUILT ENVIRONMENT *(Symposium only)*

Organizer: Daniel Mazmanian, Professor of Public Policy USC Sol Price School of Public Policy, University of Southern California

Summary: This session will focus on how to incentivize developers, property owners, and communities to adapt to the projected effects of climate change – from sea-level-rise, changes in precipitation and patterns of droughts and flooding, to warming temperatures. It will present two policy proposals aimed at planners, builders, approving agencies, investors, and property owners at the state and local level to incorporate climate change projections in their decisions and actions. In particular, policies that are not only incentive-based but designed to be adaptive in their requirements in response to improving scientific information about climate change effects and on-the-ground experience.

Speakers:

- Moderator: Hon. Randy Johnson, Chair, Board of Commissioners, Hennepin County, Minnesota and Past President, National Association of Counties
- Daniel Mazmanian, Professor of Public Policy, USC Sol Price School of Public Policy, University of Southern California
- Christopher Pyke, Vice President for Research, U.S. Green Building Council
- Howard Kunreuther, Co-Director, Wharton Risk Management and Decision Process Center, Wharton School and Professor, Department of Operations and Information Management, University of Pennsylvania
- Sam Medlock, Policy and Partnerships Manager, Association of State Flood Plain Managers

Outcomes: The goal of the session is two-fold. First, it is to provide examples of policies that move in this direction and/or concepts for doing so under development. Second, it is to engage the presenters,

drawn from the public, private, and academic arenas at the national and state level, and members of the audience, in a discussion of the several presentations.

25. CLIMATE CHANGE: IT'S MY STORY AND I'M STICKING TO IT

Organizers: Marcy Rockman, Climate Change Adaptation Coordinator for Cultural Resources, U.S. National Park Service; Douglas Parsons, Climate Change Liaison, U.S. National Park Service

Summary: This session will examine the critical role of stories in engaging social response to climate change. It will also explore the critical roles the U.S. National Park Service (NPS) holds in the national and global conversation on climate change through the development and sharing of stories on the human experience with the natural world.

There is growing recognition in the climate change community that the “information deficit” model of communication – providing more data with the intent that increased information will generate needed action to address climate change – is not the most effective strategy and can no longer be the sole strategy. The fundamental goal of interpretation is to enable meaningful and memorable experiences. Sharing climate stories is – in this sense – the essence of interpretation of climate change. Interpretation training emphasizes that effective interpretation uses a combination of four types of knowledge: science literacy, knowledge of the resource, knowledge of the audience, and how to use an appropriate technique to engage the audience in an experience that has meaning for them. Finding and communicating climate stories, therefore, requires close collaboration between climate scientists, natural resource scientists, cultural resources scientists, and interpreters and educators who have the capacity to help scientists not sound so much like scientists. It is often challenging to develop a strong narrative, based on sometimes technical and esoteric topics, that can resonate with the public. This symposium will emphasize the value of storytelling and provide training in the companion session workshop to make these connections with a public unfamiliar with many of the complexities associated with climate change.

This session will cover an arc of methods of finding and communicating climate stories. The process of finding stories lies not in just logically or chronologically organizing facts, but in finding the heart of what it is the teller of the story wants to convey. Real stories follow a path listeners easily absorb: setting the stage, development of tension or conflict, and resolution. Following Randy Olson, science communicator, any story can be told in one sentence using the pattern “...AND...BUT...Therefore....” This session will use this method to tell a diverse range of climate stories (then show you how we did it).

Speakers:

- Patrick Gonzalez, Climate Change Scientist, U.S. National Park Service
- Randy Olson, Scientist-turned-Filmmaker, Prairie Starfish Productions
- Marcy Rockman, Climate Change Adaptation Coordinator for Cultural Resources, U.S. National Park Service
- Douglas Parsons, Climate Change Liaison, U.S. National Park Service

Outcomes:

- Integrate the concepts, methods, and potentials of place-based climate change storytelling into the broad practice of climate change response as represented by the participants of the NSCE National Conference.
- Informally train participants in the development and sharing of climate stories.

- Capture the ideas and stories presented in the discussions and integrate them back into NPS's ongoing practices.

26. NATIONAL CLIMATE ASSESSMENT: INNOVATIONS IN SCIENCE AND ENGAGEMENT – PART II

Organizers: James Buizer, Director of Climate Adaptation and International Development, University of Arizona; Katharine Jacobs, Director, Center for Climate Adaptation Science and Solutions, University of Arizona; and Susanne Moser, Director, Susanne Moser Research and Consulting

Symposium Summary: This session will focus on lessons learned in the process of developing the Third National Climate Assessment (NCA3) report, which is due for release in the spring of 2014. To be useful for adaptation and mitigation decision support and for improving scientific understanding, assessments need to be built on a strong foundation of knowledge and tools. A number of assessment products and processes were initiated in the NCA3 that were intended to build towards ongoing improvements in assessment capacity over time. They include 1) climate histories and projections for all regions of the US; 2) a national set of sea level rise projections; 3) an engagement and communications strategy; 4) electronic access to underlying data supporting conclusions; and 5) an integrated set of national indicators of change across social, physical and ecological systems.

Workshop Summary: This workshop is designed to address some of the most challenging components of building a sustained assessment process. As discussed in the earlier Symposium session, building the capacity to sustain assessment activities over time is a critical component of the third National Climate Assessment team's activities. Developing a truly sustainable path forward means ensuring sufficient resources and human capital to support ongoing regional assessment activities. In addition, a critical missing component of the NCA3 activity is an explicit and well-documented approach to documenting the costs and benefits of adaptation activities as opposed to the costs of the impacts themselves. Building a roadmap for a national approach to this problem, including ways that the NCA process can begin to build the required database for a credible effort of this kind, is a desired outcome from this session. The final hour of this workshop will be devoted to a discussion of how to best evaluate the processes and products of the NCA3 and associated capacity building efforts.

Speakers:

- Moderator: Katharine Jacobs, Director, Center for Climate Adaptation Science and Solutions, University of Arizona
- Susanne Moser, Director, Susanne Moser Research and Consulting
- Kenneth Kunkel, Senior Scientist and Science Lead for Assessment, CICS-NC, National Oceanic and Atmospheric Administration
- Anne Waple, Director of Communications and Science, Second Nature
- Melissa Kenney, National Oceanic and Atmospheric Administration

Workshop Panelists:

- Facilitator: Eileen Shea, Director, NOAA Integrated Data and Environmental Applications Center
- Facilitator: Diana Liverman, Co-Director, Institute of the Environment and Professor of Geography, University of Arizona
- Adam Parris, RISA Program Manager, NOAA Climate Program Office
- Amy Luers, Director of Climate Change, Skoll Global Threats Fund

- Paul Fleming, Seattle Public Utilities
- Gregg Garfin, Assistant Professor, School of Natural Resources and the Environment, University of Arizona
- Melissa Finucane, Senior Behavioral and Social Scientist, RAND Corporation; Senior Fellow, East-West Center, Honolulu
- Vicki Arroyo, Executive Director, Georgetown Climate Center and Visiting Professor and Director, Environmental Law Program, Georgetown University Law Center
- Susanne Moser, Director, Susanne Moser Research and Consulting
- Joyce Coffee, Managing Director, ND Global Adaptation Index, Notre Dame University

Symposium Outcomes: *See #13b*

Workshop Outcomes:

All three discussions will be recorded and integrated into white papers that will form the basis of further work, potentially including white papers that can be transmitted to the US Global Change Research Program or developed into grant proposals. Some components of the conversation may be included in a special issue of a journal.

27. FINANCING CLIMATE SOLUTIONS (*Symposium Only*)

Organizers: Leila Yim Surratt, Director, International Programs and Michael Comstock, Manager, International Climate Dialogue, Center for Clean Air Policy

Summary: This session will explore the role that governments, multilateral financial institutions and the private sector play in supporting low-carbon development and climate change investments. The international community has committed to increase climate finance to \$100 billion per year by 2020 to support developing countries’ efforts to address climate change. To achieve this, funding will need to come from both public and private sector sources. The way that international financial support is deployed over the next few years will have a profound effect on whether the level of mitigation action achieved in developing countries increases to the scale needed to meet international climate mitigation goals. Nationally appropriate mitigation actions (NAMAs) and the emerging Green Climate Fund offer new opportunities to meet this challenge. (See the Center for Clean Air Policy’s [The NAMA Opportunity](#))

The speakers will discuss

- The State of International Climate Finance and Developing-Country Climate Actions
 - Overview of international state of play on climate finance (broader than just the carbon market)
 - The NAMA opportunity in developing countries (contributing to global climate solutions, advancing development goals, the need for international support to overcome barriers, leveraging private investment, etc.)
 - Concrete NAMA examples, including the finance piece, and Germany/UK NAMA Facility as the first NAMA implementation funding (Colombia TOD)
- The Green Climate Fund (GCF) – GCF’s future role in providing support for developing countries’ paradigm shift towards low-emission and climate-resilient development pathways and climate change adaptation

- The Role of Multilateral Development Banks in Financing Climate Actions – the role of development banks in financing climate change and low-carbon development projects, including how financial instruments play an important role in addressing risks and barriers in developing countries’ sectors
- What the Private Sector Looks For in Investing in Climate Change Infrastructure
 - New opportunities for private investment in emerging markets – both domestic and international private sector (no longer just a matter of offsets)
 - Private sector makes up 75% of climate finance, has billions to invest
 - Need for government policies that promote transparency, longevity and certainty

Speakers:

- Moderator: Benoit Lefevre, Director, Transportation and Climate, Initiative, EMBARQ, World Resources Institute
- Leila Yim Surratt, Director, International Programs, Center for Clean Air Policy
- Shally Venugopal, Project Manager, Climate Finance and the Private Sector, World Resources Institute
- Walter Vergara, Chief, Climate Change and Sustainability Division, Infrastructure and Environmental Sector, Inter-American Development Bank (IDB)
- Ethan Zindler, Head of Policy Analysis, Bloomberg New Energy Finance

28. CLIMATE ADAPTATION + MITIGATION SYNERGIES: PURSUING IMPLEMENTATION PILOTS

Organizers: Steve Winkelman, Director, Transportation and Adaptation and Shana Udvardy, Climate Adaptation Policy Analyst, Center for Clean Air Policy (CCAP) and Emily Seyller, Program Manager, Inform Decisions and Adaptation Science, U.S. Global Change Research Program

Summary: This session will identify innovative partnerships for implementation of Adaptation + Mitigation pilot projects. Together we will Ask the Climate Question: How can we maximize the return on our infrastructure and climate investments – mitigation and adaptation – while also maximizing economic, social, and environmental benefits? The “A+M” sessions, focused on urban resilience, will enable practitioners and decision makers at all scales to learn about best practices and discuss opportunities for achieving synergies among actions that both cut carbon pollution (mitigation) and prepare for and respond to climate impacts (adaptation). Panelists will: (1) review the current and planned state of practice on integrating mitigation and adaptation; (2) identify actionable research and information needs; and (3) explore policy and implementation opportunities.

Symposium Speakers:

- Steve Winkelman, Director of Transportation and Adaptation, CCAP – *Overview of the A+M Concept*
- Susan Ruffo, Deputy Associate Director for Climate Change Adaptation, Council on Environmental Quality – *Overview of the State of the Nation for A+M*
- Clay Nesler, Vice President of Global Energy and Sustainability, Johnson Controls International – *Efficient and Resilient Buildings*
- Emily Seyller, Program Manager, Inform Decisions and Adaptation Science, U.S. Global Change Research Program (USGCRP) – *Research & Capacity Building*

Workshop Lead Discussants:A+M Strategic Framing – Investment, Policy and Capacity Building Opportunities

- John Nordgren, Senior Program Officer for Environment, The Kresge Foundation
- Jessica Grannis, Adaptation Program Manager, Georgetown Climate Center
- Emily Seyller, Program Manager, Inform Decisions and Adaptation Science, USGCRP

A+M Sector Case Studies:

- Energy: Shalom Flank, Chief Technology Officer and Microgrid Architect, Pareto Energy
- Water: Laurens van der Tak, Vice President, Water Resources & Ecosystem Management, CH2M HILL
- Buildings: Debra Ballen, General Counsel and Senior Vice President of Public Policy, IBHS
- Cities: Brian Swett, Boston Mayor's Office of Environmental and Energy Services
- Cities: Brendan Shane, Chief, Office of Policy and Sustainability, District of Columbia Department of the Environment

Goals:

- Identify actionable opportunities for A+M pilot projects in 2014 in multiple sectors; and
- Provide input to the National Climate Assessment “AMNex” affinity group (Adaptation + Mitigation Nexus), the State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience and the Climate Resilient LEDES working group (co-chaired by Ecosynergy Brazil and CCAP).

Outcomes:

- Identify at least two focused and innovative partnership opportunities for implementation of pilot projects in 2014;
- A symposium summary whitepaper with concrete examples of adaptation and mitigation integrated strategies;
- An initial list of recommendations on ways to integrate adaptation + mitigation for the Council and State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience established in Executive Order 13653; and
- Prioritized next steps, including plan for follow-up discussions.

Building Climate Solutions Exhibition

January 28-30, 2014

Tuesday Hours – 9:00 a.m. to 6:30 p.m.

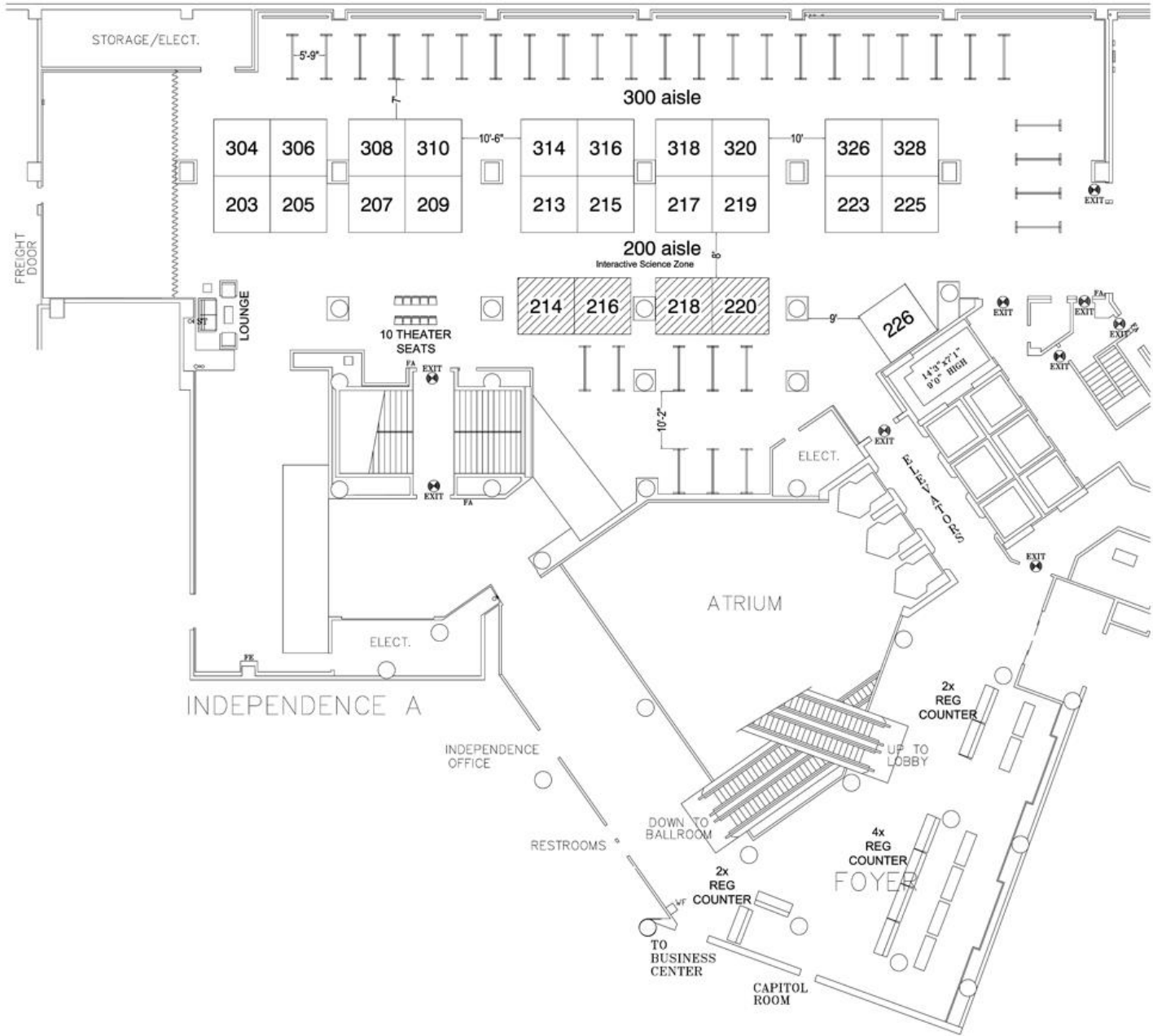
Wednesday Hours – 8:00 a.m. to 8:00 p.m.

Thursday Hours – 8:00 a.m. to 1:30 p.m.

Note: Exhibits will be held in the Independence Hall

- 203 National Aeronautics and Space Administration (NASA)
- 205 National Institute of Standards and Technology (NIST)
- 207 U.S. Forest Service
- 213 Esri
- 214 Sky Truth
- 215 U.S. Geological Survey (USGS)
- 216 Public Lab
- 217 National Oceanic and Atmospheric Administration (NOAA)
- 218 EcoAdapt
- 219 United Nations Environment Programme (UNEP)
- 220 Azavea
- 223 U.S. Department of Agriculture (USDA)
- 225 U.S. Environmental Protection Agency (EPA)
- 226 Webs Edge
- 306 American Meteorological Society (AMS)
- 308 Environmental Law Institute
- 310 National Council for Science and the Environment (NCSE)
- 314 Island Press
- 318 Centers for Disease Control and Prevention (CDC)
- 326 Diesel Technology Forum

Map of the Building Climate Solutions Exhibition and Poster Session



Poster Session

Note: Posters will be up for the duration of the conference from Tuesday through Thursday in the Independence Hall (please see map on previous page).

1. **Delineating Urban-enhanced Lightning Production: An approach using Flash-defined Thunderstorm Tracks**
Mace L. Bentley, J. Anthony Stallins
James Madison University, The University of Kentucky
2. **Carbon Disulfide as a Contributor to Formation of Carbon Dioxide in the Atmosphere from Natural Gas Extraction and Processing Operations**
Alisa L. Rich, Jay T. Patel
University of North Texas Health Science Center, UNT Health Science Center
3. **Examining Our Changing Climate through AMS Climate Studies**
James A. Brey, Ira W. Geer, Chad M. Kauffman, Elizabeth W. Mills, Kira A. Nugnes
American Meteorological Society
4. **Slow Trends in Climate Change Impacts: The Danger in Getting Used to the Trends**
Hans-Peter Plag, Larry Atkinson, Shelley Jules-Plag
Old Dominion University, Tiwah, Inc.
5. **Reducing Disaster Risk and Social Vulnerabilities through Social Capital**
Hans-Peter Plag, Joshua Behr, Rafael Diaz, David Earnest, Shelley Jules-Plag
Old Dominion University, Tiwah, Inc.
6. **Voluntary Carbon Market for Higher Education: Ball State University and Chevrolet Provide an Example**
Gwendolen B. White, Robert J. Koester
Ball State University
7. **Analysis of Effects of Climate Change Adaption on Crop Processing and Preservation in South-East Nigeria**
Emeka Celestine Nzeh
Enugu State University of Science and Technology
8. **Cost-Effective Energy and Emissions Reductions in Residential Buildings**
Robert Brecha, Kevin Hallinan, R. Villoria-Siegert, P. Brodrick
University of Dayton
9. **Center for Ocean Solutions and Natural Capital Project, Incorporating Natural Capital into Climate Adaptation Planning**
Eric Hartge, Suzanne Langridge, Erin Prahler, Sarah Mooney, Meg Caldwell, Mary Ruckelshaus, Anne Guerry
Center for Ocean Solutions, Stanford Woods Institute for the Environment
10. **Transforming Gas-Fired and Coal-Fired CCS Power Plants and Gas-Fueled Transportation into Primary Engines for Global Warming Reversal**
Robert Fry, Madeline Ison, Sambhudas Chaudhuri, Kenneth Klabunde, Michael Routh, Barry Wroobel, Steven Hughes, and Grant Gower.
Climate Restoration Technologies Inc.
11. **Historical Ecology for Risk Management: Youth Sustainability (HERMYS)**
Natalya Sousa, Simone Balog, Michael Brady, Hollis Yenna, Anne Garland
University of Maryland, Kings College, Rutgers University, PolarTREC, University of Maryland and Angelo State University, ARIES

12. **SAGE: Sustainable Adaptive Gradients for Coastal Environments**
 Elisabeth Hamin, Greg Lewis
University of Massachusetts
13. **Climate Action through Conservation: A Sonoma County Model Climate Strategy for Land Conservation**
 Tom Robinson, Karen Gaffney, Michelle Passero, Dick Cameron, Alex Leumer
Sonoma County Agricultural Preservation and Open Space District, The Nature Conservancy
14. **What Shapes Local Resilience to Unexpected Climate and Economic Shocks?**
 Melissa Julie Saunders, Peter B. Meyer
Department of Urban and Public Affairs, University of Louisville
15. **Impacts of Climate Mitigation on Food Prices and Trade in an Integrated Assessment Model**
 Le Page, Y., Thomson, A.M., Calvin, K., Wise, M., Clarke, L., Hurtt, G.
Joint Global Change Research Institute
16. **Climate Science Investigations (CSI): Using Evidence-Based Argumentation to Address Skeptics' Claims**
 Brian Soden, Robert Bleicher, Alana Edwards, Anne Henderson
University of Miami, California State University Channel Islands, Florida Atlantic University, FAU Pine Jog Environmental Education Center
17. **Do Higher Spatial Resolution Regional Climate Models Provide Better Products for Impact Assessments?**
 V. Rao Kotamiarthi, Jiali Wang
Argonne National Laboratory
18. **Using Straight Vegetable Oil from Poppy Seeds to Improve Livelihoods of Rural Farmers in Afghanistan: Proposing a Humanitarian Approach to the Environment and Counter-Narcotics**
 Phoenix Mourning-Star, Kenneth Reardon
The George Washington University, Colorado State University
19. **An Evaluation and Application of the Community Rating System in Unincorporated Charleston County, South Carolina**
 Melanie Campos, Martin Erbele, Jo Ann Ewalt
College of Charleston, Charleston County Government
20. **Changing Climate, Changing Behavior: Setting the Stage for Coastal Communities**
 C. Rubin, P. Rubinoff, I. Ginis, V. Lee, N. Mundorf, J. Prochaska, J. Swift, H. McGee, C. Young, A. Paiva, K. Meier, R. Williams, N. Rohr
University of Rhode Island
21. **Indoor Environments, Climate Change, Resilient Building Design and Moisture Control: New Practical Moisture Control Solutions for Healthy Indoor Environments**
 Sarany Singer, Lauren Burton, Greg Brunner
Environmental Protection Agency
22. **Students Curb Climate Change, Boost Bottom Lines: Two Case Studies**
 Gwendolen B. White, Alicia C. White
Ball State University, Willdan Energy Solutions
23. **A Multi-Scale Social-Ecological Framework to Support Climate Adaptation Planning for Marine Fisheries**
 Katherine E. Mills, Andrew J. Pershing, Jonathan M. Labaree, Jonathon M. Peros
University of Maine, Gulf of Maine Research Institute

24. **Preparing for the Possible Consequences of Climate Change: The Public's Perspective**
Bo MacInnis, Jon Krosnick, Margaret R. Caldwell, Adina Abeles
Stanford University
25. **Leveraging Carbon Offsets to Fund Forest Restoration: The Policy Puzzle**
Spencer Plumb, Katharyn Woods
University of Idaho, Northern Arizona University
26. **Impacts of Biomass Burning Organic Acids and Aerosols on Climate over the African Continent**
Solomon Bililign, James Patrick Sherman
North Carolina A&T State University, Appalachian State University
27. **The Agricultural Impact Reporter, A New Online Tool for Agriculture in Canada**
Patrick Cherneski, Trevor Hadwen
Agriculture & Agri-Food Canada, National Agroclimate Information Service
28. **Building Sustainable Climate Solutions Locally: Beyond AASHE at Colgate University**
Samantha Leroy, Sara Reese and Jessica Graybill
Colgate University
29. **Tools for Building Resilience in Fish Populations and Fishing Communities**
Andrew J. Pershing, Katherine E. Mills, Graham Sherwood, Lisa Kerr
Gulf of Maine Research Institute
30. **Characterizing Fishery Access to Species Experiencing Climate-Induced Range Shifts in the Northwest Atlantic: Insights into Management Needs for a Changing Climate**
Jonathon M. Peros, Katherine E. Mills, Jonathan M. Labaree, Andrew J. Pershing, Mary Hudson
Gulf of Maine Research Institute, University of Maine, University of Rhode Island
31. **Climate Change Impacts and Adaptations for Water and Agriculture in South Asia**
Gauthier Pitois, Tingju Zhu, Claudia Ringler
International Food Policy Research Institute (IFPRI)
32. **Measuring CO₂ and CH₄ Emissions from Indianapolis: A Test Bed for Urban Greenhouse Gas Emissions Monitoring**
Kenneth J. Davis, Maria Cambaliza, Kevin R. Gurney, Michael Hardesty, Anna Karion, Thomas Lauvaux, Natasha L. Miles, Kuldeep Prasad, Igor Razlivanov, Scott J. Richardson, Daniel P. Sarmiento, Paul B. Shepson, Colm Sweeney, Jocelyn Turnbull, James Whetstone
The Pennsylvania State University
33. **Bridges, Roads, and Transportation Infrastructure: Accelerating Resilience to Climate Change**
Jennifer M. Jacobs, Jo Sias Daniel, Ellen Douglas, Katharine Hayhoe, Jack Kartez, Paul Kirshen, Cameron Wade
University of New Hampshire, University of Massachusetts Boston, Texas Tech University, University of Southern Maine
34. **EnergyVision: A Pathway to a Modern, Sustainable Low Carbon Economic and Environmental Future**
Daniel L. Sosland, Jamie Howland
Environment Northeast (ENE)
35. **US NEON: Open Data and Information for Large-Scale Ecological Sciences**
Brian Wee
National Ecological Observatory Network (NEON) Inc.
36. **Assessing Woody Biomass Potential with the Global Forest Products Model**
Sijia Zhang, J. Keith Gillespie, William Stewart
University of California, Berkeley

37. **Developing Systems Solutions for Climate Change in the Built and Natural Environments**
Elise Barrella, Justin Henriques, Samuel Morton, Jacquelyn Nagel, Adebayo Ogundipe, Kurt Paterson,
Olga Pierrakos, Bradley Striebig
James Madison University
38. **Island Institute's Community Development Approach to Climate Change: Providing Scientific, Technical, Economic, and Political Support to Maine's Fishing Communities As They Face Climate Change**
Heather Deese, Rob Snyder, Shey Conover, Nick Battista
Island Institute
39. **Solar UV Disinfection of Open Channel Flowing Water**
Venkata D. Gullapalli, Mark N. French
University of Louisville
40. **Student and Faculty Perceptions of Learning about Climate on a Spherical Display System**
Christie-Joy Hartman, Joy Ferenbaugh, Kristen St. John
James Madison University
41. **The Energy Paradox in West Africa: Energy Poverty and Energy Abundance**
Brittany Croll
Earth Resources Technology, Inc.
42. **The Greater Carlisle Project: A College-Community Collaboration for Sustainability**
Neil Leary
Dickinson College
43. **How an Inconvenient Truth Expanded the Climate Change Dialogue and Reignited an Ethical Purpose in the United States**
Laura Johnston
Conservation International & Georgetown University.
44. **Climate and Energy Knowledge and Knowhow: Maximizing Collective Impact Through Integrated Education, Communications and Outreach**
Mark McCaffrey
National Center for Science Education
45. **Sustainable Adaptive Gradients in the Coastal Environment (SAGE): Pilot Study of a Framework for Resilient Infrastructure Policy**
Elisabeth Hamin, Greg Lewis
University of Massachusetts Amherst
46. **Building Capacity to Integrate NASA Earth Science into Environmental Management in the Context of a Changing Climate**
Ana I. Prados, Amita V. Mehta, Cindy Schmidt, Brock Blevins
University of Maryland Baltimore County, NASA, Bay Area Environmental Research Institute, University of Maryland Shady Grove
47. **Landscape-scale Responses to a Stormier Climate: Green Infrastructure Challenges and Lessons**
Mary Ann Cunningham, Alistair Hall, Thomas Porcello
Vassar College
48. **Coastal Vulnerability Due to Sea-Level Rise Under Climate Change: Integrated Natural and Social Science Framework Towards Mitigation and Adaptation**
C. K. Shum, Craig J. Jenkins
The Ohio State University

49. **Introducing IMOLD: A New Tool for Teaching About Carbon Cycling and Decomposition**
Michael N. Weintraub, Daryl L. Moorhead
University of Toledo
50. **Facilitating Landscape Conservation Design and Climate Adaptation through a Network of LCC Conservation Planning Atlases**
Tosha Comendant, James R. Strittholt, Brendan C. Ward, Dominique Bachelet
Conservation Biology Institute
51. **Climate Change in Voyageurs National Park**
Dr. Mark W. Seeley
University of Minnesota
52. **Sustainability and Liberal Arts Education: Climate Change Solution**
Tolessa Deksissa, Jon Cooper, Pradeep Behera, Lily Liang, Suzan Harkness
University of District of Columbia
53. **Assessing the Inclusion of Marine Conservation Initiatives within the Caribbean Biological Corridor**
Sondra L. Eger, Dr. Brent Doberstein
University of Waterloo
54. **Educating the Design and Construction Industry on Regional Climate Change to Foster Change**
Carol Considine
Old Dominion University
55. **Climate Education Solutions for the US Corn Belt**
Richard Moore, Dennis Todey, Wade Miller, Kristi Lekies, Nsalambi Nkongolo
Ohio State University, South Dakota State University, Iowa State University, Lincoln University
56. **New Downscaled Climate Projections Suitable for Resource Management**
Bridget Thrasher, Jun Xiong, Weile Wang, Forrest Melton, Andrew Michaelis, Rama Nemani,
Climate Analytics Group, Northern Arizona University, NASA ARC-CREST / CSUMB, NASA Ames Research Center
57. **A Research Vessel for a Zero Carbon Emissions World**
John C. Van Leer
University of Miami
58. **Carbon Stocks of Community-Managed Mangrove Forests on Mexico's Pacific Coast: A Long-Term Solution Example to Avoid Deforestation and Enhance Carbon Sequestration**
Paola Fajardo
McGill University
59. **Bio-mimicry in Architecture - Building for the Future**
Anna Doneven, Zuzanna Drewniak, Melissa Harvey, Kaitlyn McGlade and Sarah Serhan
Sir Stanford Fleming College
60. **Building the 'Green Way': Parks Over Highways**
Whitney Brennan, Stephen James, Daniel Jang, Kate Powell, Sarah Sinasac
Sir Sandford Fleming College
61. **Urban Forests: Mitigating the Impacts of Invasive Pests and Diseases in a Changing Climate**
Nathan De Carlo, Justin Dew, Kasper Franciskiewisz, Keegan McKitterick, & Charlie Sikkema
Sir Sandford Fleming College
62. **Turning up the Heat: Canadian Inuit and the Challenges of a Warmer Climate**
Robin Brand, Emma Dennis, Michelle Dollmaier, and Hannah Windatt
Sir Sandford Fleming College

63. **Race Against the Rising Water: Climate Change and the Importance of Effective Stormwater Management in the Greater Toronto Area**
Holly-Anne Bertino, Wade Forrest, Cassandra Holland, Caitlin Sutherland
Sir Sandford Fleming College
64. **Urban Heat Island: Solutions in Light of Impending Climate Change**
Ryan Burns, Sarah Hubbert, Leanne Miller, Nick Ponomarev, Alex Vnukovsky
Sir Sandford Fleming College
65. **Assessing Impacts of Environmental Engagement of Students using the New Ecological Paradigm (NEP) Scale**
Jessica Sherman, Daryl Moorhead, Todd Crail
University of Toledo
66. **Drowned Forests and Buried Salt Marshes: Reconstructing Local Relative Sea Level Change for the New Jersey Coastline Along the Delaware Estuary**
Anna S. Jaworski, Kenneth J. Lacovara
Drexel University
67. **Lessons from the International Stage: Making Adaptation Policy and Case Studies Relevant at the Regional Level**
Diane W. Husic
Moravian College
68. **Earth Futures: A General Education Sustainability Course at The Pennsylvania State University**
Timothy Bralower and David Bice
Pennsylvania State University
69. **The Peace Corps Master's International Program at the College of Charleston: Resource Management Studies in Regions Heavily Impacted by Climate Change**
Cheryl Carmack, Timothy Callahan
College of Charleston
70. **Preparing Students With a Climate Science Concentration for Internships, the Workplace, and Further Academic Studies**
Tianna A. Bogart, Tracy Edwards
Frostburg State University
71. **Opportunities for Climate Science Students**
Tianna A. Bogart, Tracy Edwards
Frostburg State University
72. **EPA's New National Centers for Innovative and Sustainable Water Research, Incorporating a Systems View of Nutrient Management**
Mazdak Arabi, James Shortle, James Mihelcic, Daniel Woltering
Colorado State University, Pennsylvania State University, University of South Florida, Water Environment Research Foundation
73. **Characterizing Anthropogenic Heat Flux in New York City**
Ke Zhang, Runci Ma
Cornell University
74. **Earth: The Operators Manual**
Geoff Haines-Stiles and Erna Akuginow
GHS Productions, Passport to Knowledge

Collaborating Organizations

NCSE extends a special thank-you to the following collaborating organizations for their generous participation in the conference program and assistance in spreading the word about our conference.

American Geophysical Union

American Meteorological Society

American Society of Adaptation Professionals

Applied Research in Environmental Sciences Nonprofit, Inc.

Ball State University

Bard Center for Environmental Policy

BigBadBank

Center for Clean Air Policy

Center for Energy Research and Education

Climate Action Liaison Coalition

Climate Resolve

Department of Natural Resources and Environmental Management, University of Hawaii

EcoAdapt

Institute for Sustainable Communities

Natural Hazard Mitigation Association

Sensors & Systems

University of the District of Columbia

U.S. Global Change Research Program

Youth Arctic Coalition

Staff and Volunteers

NCSE thanks our volunteers, session organizers and chairs, note-takers, reporters, assistants, and discussants for their generous support.

NCSE Staff:

Peter Saundry, Executive Director

Lawrence Langley, Conference Intern

Lyle Birkey, Director of Communications

Kevin McAleese, Communications Intern

David Blockstein, Senior Scientist and Director of Education

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Climate Statement from the NCSE Board of Directors

The global consequences of climate change loom as the largest and most consequential environmental and humanitarian crises of the millennium. The burning of coal, oil, and gas, and clearing of forests have increased the concentration of heat trapping gases, such as carbon dioxide in the atmosphere by more than 40% since the industrial revolution. Methane and nitrous oxide emissions, along with usage of fluorinated gases and black carbon depositions, biomass burning and other human activities add to the atmospheric burden of heat-trapping gases. As a consequence, global average temperatures have increased $0.74 \pm 0.18^{\circ}\text{C}$ in the past 100 years, and the velocity of climatic changes associated with temperature rise has accelerated markedly in recent decades.

Extreme weather events, many of which are becoming more frequent and intense, are the primary way in which most people will experience climate change in the short and medium term. Some types of extreme weather events can be linked to observed climate changes. But other more insidious impacts of climate change are wide-ranging and permanently disruptive not only to the earth's natural systems, but also to urban and other human environments. Heat-trapping gases already in the atmosphere have committed us to a hotter future with more climate-related impacts over the next few decades. The magnitude of climate change beyond the next few decades depends primarily on the amount of heat-trapping gases emitted globally, now and in the future. The direction of adverse change and consequence is evident today, even if the timing and velocity of climatic changes are as yet unknown—the risks of catastrophic or cascading changes in the earth's ecosystems cannot be ruled out.

Prolonged periods of extreme heat, heavy downpours, floods and droughts are stressing our social and economic systems, disproportionately affecting our most vulnerable populations. Cumulatively, such ravages of climate change threaten to undermine the integrity of many of the planet's most critical ecosystems, and to lead to dramatic declines in the inherent productivity of soils, forests, fresh water resources and even the ocean environment. Surface and groundwater supplies in many parts of the world are already stressed by increasing demand for water as well as declining runoff and groundwater recharge. Climate change is also increasing the risks of heat stress, respiratory stress from poor air quality, and the spread of water-related and vector-borne diseases. Further, sea level is rising, Arctic Ocean ice and Greenland's snow mass are melting, and oceans are becoming more acidic as they absorb carbon dioxide. In addition to human populations, ongoing and projected impacts of climate change on biodiversity include increased risk of species extinction, substantial range shifts of many species, and alteration of the timing of critical biological events such as spring bud burst. These changes could cause massive social, cultural, and economic disruptions, which could spawn turmoil and conflict among human populations, and overburden the capacities of national and even international economies to adapt.

There are many aspects of climate change that require continued study. More extensive and accurate data combined with improved modeling will undoubtedly provide a better understanding of the Earth's complex climate system.

The National Council for Science and the Environment believes strongly that:

- (1) the consequences of climate change, where they have been studied, are, on balance, overwhelmingly adverse to human societies and the Earth's ecosystems; and
- (2) the current level of climate change science already provides compelling reasons for humankind to take serious prophylactic steps to mitigate the human-drivers of climate change and to put in place long-term measures to combat and adapt to the consequences of climate change that are already occurring.

The National Council for Science and the Environment urges a holistic science-based approach to addressing climate change that draws upon and integrates all fields of physical, biological, economic, and social sciences, and engineering in a manner most effective to each part of the overall issue being studied.

The National Council for Science and the Environment urges governments and people throughout the world; working at all levels of societies to advocate for greatly increased scientific research on:

- all aspects of the Earth's climate system;
- the impacts of human-caused climate change at all geographic and temporal scales;
- policies and technologies that can reduce the emissions of greenhouse gases to a level that does not perturb the Earth's energy balance as they do now;
- strategies and technologies to minimize the adverse consequences of climate change on human communities, natural ecosystems, ecosystem services, and the biodiversity of the earth;
- well-researched and carefully considered geoengineering strategies and technologies that can remove greenhouse gases and alter the earth energy balance without adverse side effects.

The National Council for Science and the Environment urges governments at all levels to adopt policies that mitigate the causes of climate change, such as adopting technologies that promote increased energy efficiency, and alternative sources of energy that alleviate greenhouse gas emissions. Policies and incentives that reduce the wasteful destruction of the world's tropical forests are also urgently needed.

Further, governments and the international community must agree upon and implement, by treaty or protocols, policies and economic instruments that encourage dramatic reductions in unwise and wasteful uses of energy and natural resources that unnecessarily contribute to climate change. The National Council for Science and the Environment also urges governments to take steps to adapt to impacts of climate change and make their communities resilient to its consequences.

NATIONAL COUNCIL FOR SCIENCE AND THE ENVIRONMENT

Connecting scientists, educators, business and policy makers,
bridging the gap between science and policy,
to resolve critical environmental challenges.



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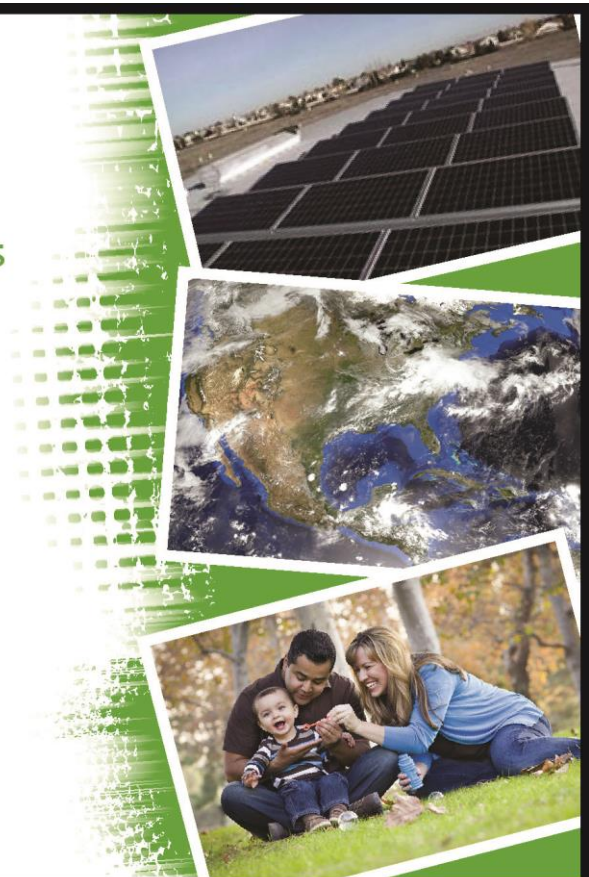
Climate change is a serious threat to the health of all families. The solutions exist and the time to act is now.

“Reducing carbon pollution, investing in clean energy, wasting less energy, and building climate resilience—these are concrete steps we’re taking to address a changing climate and move us toward a more sustainable and healthy environment today and in the future.”

— EPA Administrator **Gina McCarthy**

Find out what the Agency is doing to address climate change: epa.gov/climatechange/

Learn about EPA’s research on climate change: epa.gov/science matters



Climate Science Matters: Responding to Global Change

U.S. Department of the Interior
U.S. Geological Survey

IN MEMORIAM: DR. DAVID JHIRAD

NATIONAL COUNCIL FOR SCIENCE AND THE ENVIRONMENT BOARD MEMBER



As the Director of the Energy, Resources and Environment (ERE) Program at Johns Hopkins University's School of Advanced International Studies, Dr. Jhirad was renowned for his life-long contributions to the field of energy and power technology, infrastructure investment, science and policy. His work focused on resilient and sustainable solutions to climate stability, energy security and poverty reduction innovation. Dr. Jhirad also served as senior advisor to the Secretary of the U.S. Department of Energy during the Clinton Administration.

Beyond his scientific and academic contributions, Dr. Jhirad touched the lives of countless members of the NCSE community and will be remembered in the highest regard .



National Council for Science and the Environment

Improving the scientific basis for environmental decisionmaking

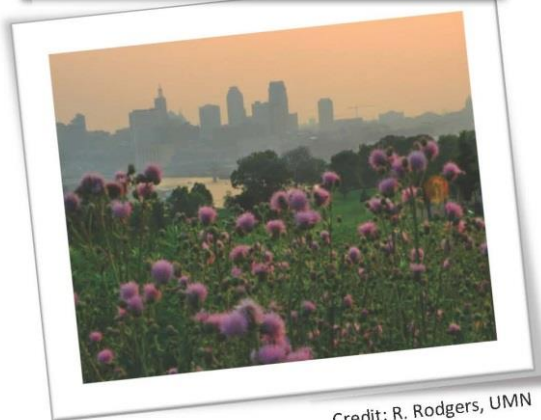


Science, Engineering, and Education for Sustainability (SEES)

<http://www.nsf.gov/sees>

The National Science Foundation (NSF) has a unique role in helping society address the grand challenges of achieving sustainability, through support for interdisciplinary research and education. Through the Science, Engineering and Education for Sustainability (SEES) portfolio, NSF has a vision *to advance science, engineering, and education to inform the societal actions needed for environmental and economic sustainability and sustainable human well-being.*

Credit: K. Mantell



Credit: R. Rodgers, UMN

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- Arctic SEES
- Coastal SEES
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- Dimensions of Biodiversity
- Dynamics of Coupled Natural and Human Systems (CNH, SEES track)
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- Ocean Acidification
- SEES Fellows
- Sustainability Research Networks
- Sustainable Chemistry, Engineering, and Materials (SusChEM)
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- **Build the knowledge base.** Support interdisciplinary research and education that can facilitate the move towards global sustainability.
- **Grow the workforce of the future.** Develop a workforce trained in the interdisciplinary scholarship needed to understand and address the complex issues of sustainability.
- **Forge critical partnerships.** Build linkages among existing projects and partners and add new participants in the sustainability research enterprise.

NCSE is proud to acknowledge support from the National Science Foundation's Directorate for Geosciences for the 14th National Conference on Science, Policy and the Environment, Building Climate Solutions.