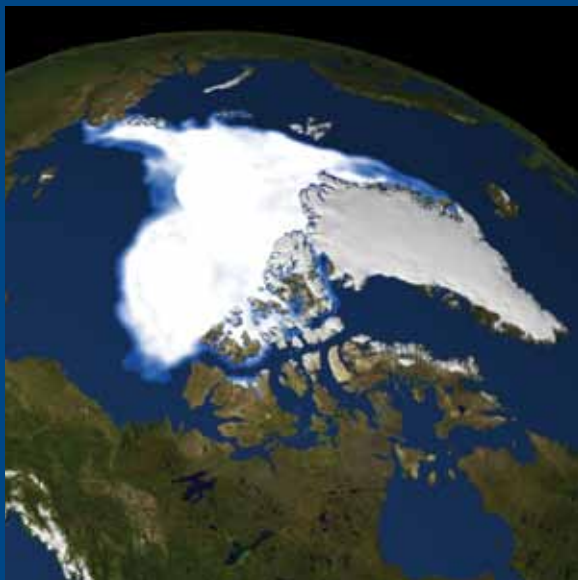


# MICHIGAN



## U.S. SCIENTISTS AND ECONOMISTS' CALL FOR SWIFT AND DEEP CUTS IN GREENHOUSE GAS EMISSIONS



MARCH 2010

*Physicists tend to be supercritical of strong conclusions, but the data on global warming now indicate the conclusions are not nearly strong enough.*

**LEON M. LEDERMAN**

Director Emeritus, Fermi National Accelerator Laboratory, Batavia, IL; Nobel Prize Winner in Physics; National Medal of Science Recipient; Member, National Academy of Sciences

*Global warming is one of the most pressing problems of our time. If we fail to address it, the costs to adapt our infrastructure and agricultural systems will be overwhelming. Dealing effectively with the problem of climate change could help keep us fully employed for a generation.*

**JAMES K. GALBRAITH**

Lloyd M. Bentsen Jr. Chair in Government/Business Relations, University of Texas, Austin

*Over the last 30 years I've watched many glaciers shrink in South America. It's also happening in Europe, North America, China, and the Himalayas. More than 90 percent of the world's glaciers are receding—they have no political agenda. Science is about what is, not about what any of us believe.*

**LONNIE G. THOMPSON**

Distinguished University Professor, School of Earth Sciences; Research scientist and glaciologist, Byrd Polar Research Center, The Ohio State University; National Medal of Science Recipient; Member, National Academy of Sciences; Tyler Prize for Environmental Achievement

*The message from California to federal policy makers is encouraging—we know that a combination of political will and smart policies that promote energy conservation and technological innovation can cost-effectively reduce global warming emissions.*

**MICHAEL HANEMANN**

Chancellor's Professor, Agricultural and Resource Economics Department, Goldman School of Public Policy, University of California, Berkeley; Director, California Climate Change Center

*The climate system is telling us a consistent story of human influence. We can read that story in records of temperature, rainfall, ice, snow, sea level, and even in the behavior of extreme events. The message in this story: natural causes alone simply cannot explain all these changes.*

**BENJAMIN SANTER**

Research Scientist, Program for Climate Model Diagnosis and Intercomparison, Lawrence Livermore National Laboratory; MacArthur Fellow; Second and Fourth Assessment Reports of the Intergovernmental Panel on Climate Change

*Preventing dangerous climate change is a great investment. It will cost between one and two percent of GDP, and the benefits will be between 10 and 20 percent. That's a return of 10 to 1—attractive even to a venture capitalist.*

**GEOFFREY HEAL**

Paul Garret Professor of Public Policy and Corporate Responsibility, Columbia Business School, New York, NY; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

*Only a very few years remain in which drastic reductions in global emissions must begin if warming is to be limited to 2°C or any other reasonable level. The world is squandering valuable time, and time is running out.*

**RICHARD C.J. SOMERVILLE**

Distinguished Professor Emeritus and Research Professor, Scripps Institution of Oceanography, University of California, San Diego; Fourth Assessment Report of the Intergovernmental Panel on Climate Change

*Adaptation for both human and natural ecosystems will likely be more difficult and costly for a faster rate of warming than for slower rates. Delaying action is an extremely risky path to continue on.*

**STEPHEN H. SCHNEIDER**

Professor, Department of Biological Sciences, Stanford University, CA; Co-Director, Center for Environmental Science and Policy; Co-director, Interdisciplinary Program in Environmental Resources; Member, National Academy of Sciences; MacArthur Fellow; Lead Author, Second Assessment Report of the Intergovernmental Panel on Climate Change (IPCC); Coordinating Lead Author of the Third and Fourth Assessment Reports of the IPCC; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

## U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

**W**e call on our nation's leaders to swiftly establish and implement policies to bring about deep reductions in heat-trapping emissions. The strength of the science on climate change compels us to warn the nation about the growing risk of irreversible consequences as global average temperatures continue to increase over pre-industrial levels (i.e., prior to 1860).<sup>1,2</sup> As temperatures rise further, the scope and severity of global warming impacts will continue to accelerate.

The 2007 report of the Intergovernmental Panel on Climate Change<sup>2</sup> unequivocally concluded that our climate is warming, stating with at least 90 percent certainty that the warming of the last several decades is primarily due to human activities. Global average temperatures have already risen ~ 0.7°C (1.3°F) over the last 100 years, and impacts are now being observed worldwide.<sup>1,2</sup> Human-caused emissions to date have locked in further changes including sea-level rise that will intensify coastal flooding, and dramatic reductions in snowpack that will disrupt water supplies in the western United States.<sup>1,3</sup> If emissions continue unabated, our nation and the world will face more sea level rise, heat waves, droughts, wildfires, snowmelt, flood risk, and public health threats, as well as increased rates of plant and animal species extinctions.<sup>1,4</sup>

The longer we wait, the harder and more costly it will be to limit climate change and to adapt to those impacts that will not be avoided. Many emissions reduction strategies can be adopted today that would save consumers and industry money while providing benefits for air quality, energy security, public health, balance of trade, and employment.<sup>5,6</sup>

All nations must commit to a goal designed to limit further harm. The United States, the European Union, and a number of other countries have recognized the need for limiting global warming to no more than 2°C (3.6°F) above pre-industrial levels.<sup>7</sup> Emerging science must be regularly evaluated to assess whether this goal is sufficient.

The UN Framework Convention on Climate Change recognizes that all nations have a responsibility to curb global warming, consistent with their respective contribution to emissions and capacity to act. Recent analyses indicate the United States—even with aggressive action by other nations—would need to reduce its emissions on the order of 80 percent below 2000 levels by 2050 to have a reasonable chance of limiting warming to 2°C.<sup>8</sup>

A strong U.S. commitment to reduce emissions is essential to drive international climate progress. Voluntary initiatives to date have proven insufficient. **We urge U.S. policy makers to put our nation onto a path today to reduce emissions on the order of 80 percent below 2000 levels by 2050. The first step on this path should be reductions on the order of 15-20 percent below 2000 levels by 2020, which is achievable and consistent with sound economic policy.**<sup>5,6</sup>

There is no time to waste. The most risky thing we can do is nothing.

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  - 8 Luers, A.L., M.D. Mastrandrea, K. Hayhoe, and P.C. Frumhoff. 2007. How to Avoid Dangerous Climate Change: A Target for U.S. Emissions Reductions. Cambridge, MA: Union of Concerned Scientists ([www.ucsusa.org/global\\_warming/science/emissionstarget.html](http://www.ucsusa.org/global_warming/science/emissionstarget.html)). This report assesses the U.S. contribution needed to stabilize atmospheric concentrations of greenhouse gases at a level <450 CO<sub>2</sub> equivalent (CO<sub>2</sub>eq, the concentration of all greenhouse gases expressed in terms of CO<sub>2</sub>), under conservative assumptions. These include developing nations' average annual emissions peak between 2020 and 2025 –10 to 15 years after those of industrialized nations. Developing nations follow the Energy Information Agency (EIA) "low-growth" emissions trajectory up to their peak followed by average annual reductions rates that match those of industrialized nations. Report assumptions also include allowing atmospheric concentrations to briefly go above (i.e. "overshoot") the target before returning to it by the end of the century. Stabilizing atmospheric concentrations at 450 ppm CO<sub>2</sub>eq provides a roughly 50-50 chance of limiting global average temperatures from rising more than 2°C above pre-industrial temperatures (M. Meinshausen, W.L. Hare, T.M.L. Wigley, D.P. van Vuuren, M.G.J. den Elzen, and R. Swart. 2006. Multi-gas emission pathways to meet climate targets. *Climatic Change* 75: 151-194). Literature estimates for global emissions reductions required to achieve a specific temperature or stabilized atmospheric concentration goal may vary as a result of whether or not concentrations are allowed to overshoot and return to the stabilization target and to representation of results in terms of different reference base years (e.g., 1990, 2000, 2005). See footnote 2 above with references therein and the 2007 Bali Climate Declaration by Scientists (online at <http://www.climate.unsw.edu.au/bali>; accessed December 2007).

## Michigan Institutional Affiliations of Endorsers

The endorsers of the U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions are based at a wide variety of institutions, including universities and colleges, government agencies, businesses, and nonprofit organizations. The endorsers have included their institutional affiliation for identification purposes only, and the listing below should not be construed to imply any institutional endorsement.

Albion College  
Central Michigan University  
Grand Valley State University

Great Lakes Environmental  
Center  
Michigan State University

Michigan Technological University  
University of Michigan, Ann Arbor

University of Michigan, Dearborn  
Wayne State University  
Western Michigan University

## The 60 Michigan Endorsers of the U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions

**Norman A. Andresen, Ph.D.**  
Ypsilanti, MI

**Catherine Badgley, Ph.D.**  
Research Scientist  
Museum of Paleontology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Suzanne Bergeron, Ph.D.**  
Associate Professor  
Department of Women's and Gender Studies  
University of Michigan, Dearborn  
Dearborn, MI

**Steve Bertman, Ph.D.**  
Western Michigan University  
Kalamazoo, MI

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*We need to act expeditiously.  
A decade of delay will have  
a century of consequence.*

**HENRY N. POLLACK**  
Professor Emeritus of Geophysics, Department  
of Geological Sciences, University of Michigan,  
Ann Arbor

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**Goran E. Blomberg, Ph.D.**  
Lansing, MI

**Catherine E. Bolten**  
Doctoral Candidate  
Ann Arbor, MI

**Donald J. Brown, Ph.D.**  
Professor Emeritus  
Department of Chemistry  
Western Michigan University  
Kalamazoo, MI

**Stephen C. Brown, Ph.D.**  
Plymouth, MI

**Robyn J. Burnham, Ph.D.**  
Associate Professor  
Department of Ecology and Evolutionary  
Biology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Amy B. Canevello, Ph.D.**  
Research Investigator  
Institute for Social Research  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Charles P. Cabbage, Ph.D.**  
Paw Paw, MI

**Mick DeGraeve, Ph.D.**  
Director  
Great Lakes Environmental Center  
Traverse City, MI

**Andrew S. Flies**  
Doctoral Candidate  
Department of Zoology  
Michigan State University  
East Lansing, MI

**Johannes Foufopoulos, Ph.D.**  
Assistant Professor  
School of Natural Resources and  
Environment  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Valerie J. Fuchs, M.S.**  
Doctoral Candidate  
Department of Civil and Environmental  
Engineering  
Michigan Technological University  
Houghton, MI

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*After 20 years of success with  
the market incentives in the Clean  
Air Act, which have reduced air  
pollution at a much lower cost  
than anyone predicted, we know  
that only a strict and enforceable  
emissions cap that covers as many  
sources as feasible will spur the  
kind of industrial innovation and  
growth that will be essential to  
cost-effectively reduce green-  
house gas emissions.*

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**BARRY SOLOMON**  
Professor of Geography and Environmental  
Policy, Michigan State University

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**Margaret R. Gale, Ph.D.**  
Professor and Dean  
School of Forest Resources & Environment  
Science  
Michigan Technological University  
Houghton, MI

**Gerald T. Gardner, Ph.D.**  
Professor Emeritus  
Department of Behavioral Sciences  
University of Michigan, Dearborn  
Dearborn, MI

**Thomas M. Gehring, Ph.D.**  
Associate Professor  
Department of Biology  
Central Michigan University  
Mount Pleasant, MI

**Awards Key** 1 = Nobel 2 = NAS 3 = NAE 4 = NMS 5 = MacArthur 6 = IPCC

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**Harold Glasser, Ph.D.**  
Kalamazoo, MI

**Sarah A. Green, Ph.D.**  
Professor and Chair  
Department of Chemistry  
Michigan Technological University  
Houghton, MI

**Eldon D. Greij, Ph.D.**  
Holland, MI

**Katherine L. Gross, Ph.D.**  
W.K. Kellogg Biological Station  
Michigan State University  
Hickory Corners, MI

**Jay R. Harman, Ph.D.**  
Department of Geography  
Michigan State University  
East Lansing, MI

**Gloria E. Helfand, Ph.D.**  
Associate Professor  
School of Natural Resources and  
Environment  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**David R. Hickey, Ph.D.**  
Retired  
Lansing, MI

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*Immediate action is necessary to avoid the worst consequences of global warming on Michigan's economy and environment, including the Great Lakes. While slowing the damaging effects of climate change is an enormous challenge, it also presents Michigan with real opportunities to reinvigorate our economy and improve our quality of life.*

**DONALD SCAVIA**

Graham Family Professor of Environmental Sustainability, Professor of Natural Resources and Environment, and Professor of Civil and Environmental Engineering at the University of Michigan; Director, Graham Environmental Sustainability Institute; Special Counsel to the University of Michigan President for Sustainability

---

**Geoffrey P. Horst**  
Doctoral Candidate  
Department of Fisheries and Wildlife  
Michigan State University  
East Lansing, MI

**David N. Karowe, Ph.D.**  
Professor  
Department of Biological Sciences  
Western Michigan University  
Kalamazoo, MI

**George W. Kling, Ph.D.**  
Professor  
Department of Ecology and Evolutionary  
Biology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Jasper F. Kok**  
Doctoral Candidate  
Applied Physics Program  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Stephen B. Malcolm, Ph.D.**  
Department of Biological Sciences  
Western Michigan University  
Kalamazoo, MI

**Philip P. Micklin, Ph.D.**  
Department of Geography  
Western Michigan University  
Kalamazoo, MI

**Michael R. Moore, Ph.D.**  
Professor  
School of Natural Resources and  
Environment  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Knute J. Nadelhoffer, Ph.D.**  
Professor  
Department of Ecology & Evolutionary  
Biology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Gayl D. Ness, Ph.D.**  
Professor Emeritus  
Department of Sociology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Thomas L. Noland, Ph.D.**  
Adjunct Professor  
Department of Biological Sciences  
Michigan Technological University  
Houghton, MI

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*The impacts of increases in temperature and carbon concentration on Michigan corn productivity alone are estimated to be more than \$30 million per year. A policy that promotes clean energy is likely to protect agricultural productivity, save energy and transportation costs, create jobs, and increase national security.*

**ROBERT RICHARDSON**

Assistant Professor, Department of Community, Agriculture Recreation and Resource Studies, School of Agriculture and Natural Resources, Michigan State University

---

**Erik E. Nordman, Ph.D.**  
Assistant Professor  
Department of Biology  
Grand Valley State University  
Allendale, MI

**Stella Papasavva, Ph.D.**  
Warren, MI

**Edward A. Parson, Ph.D.<sup>6</sup>**  
Professor  
Law School  
School of Natural Resources and  
Environment  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Henry N. Pollack, Ph.D.<sup>6</sup>**  
Professor  
Department of Geological Sciences  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Robert B. Richardson, Ph.D.**  
Assistant Professor  
Department of Community, Agriculture  
Recreation and Resource Studies  
School of Agriculture and Natural Resources  
Michigan State University  
East Lansing, MI

**Catherine Riseng, Ph.D.**  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Karel L. Rogers, Ph.D.**  
Retired  
Department of Biology  
Grand Valley State University  
West Olive, MI

**Alvin M. Saperstein, Ph.D.**  
Professor  
Wayne State University  
Detroit, MI

**Donald Scavia, Ph.D.**  
Director  
Graham Environmental Sustainability  
Institute  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Elke Schoffers, Ph.D.**  
Professor  
Department of Chemistry  
Western Michigan University  
Kalamazoo, MI

**Shanna Shaked**  
Doctoral Candidate  
Applied Physics Program  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Jacob Silver, Ph.D.**  
Negaunee, MI

**Gerald Ray Smith, Ph.D.**  
Professor Emeritus  
Department of Ecology and Evolutionary  
Biology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Barry D. Solomon, Ph.D.**  
Professor  
Department of Geography and  
Environmental Policy  
Michigan Technological University  
Houghton, MI

**Alan D. Steinman, Ph.D.**  
Annis Water Resources Institute  
Grand Valley State University  
Muskegon, MI

**R. Jan Stevenson, Ph.D.**  
Professor and Co-Director  
Center for Water Sciences  
Michigan State University  
East Lansing, MI

**Chris S. Vogel, Ph.D.**  
Research Scientist  
Biological Station  
University of Michigan  
Pellston, MI

**Maarten J. Vonhof, Ph.D.**  
Assistant Professor  
Department of Biological Sciences  
Western Michigan University  
Kalamazoo, MI

**Douglas W. White, Ph.D.**  
Department of Biology  
Albion College  
Albion, MI

**Anne E. Wiley**  
Doctoral Candidate  
Department of Zoology  
Michigan State University  
East Lansing, MI

**Mark L. Wilson, Ph.D.**  
Professor  
Department of Epidemiology  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Heather Elizabeth Wright**  
Doctoral Candidate  
Houghton, MI

**Donald R. Zak, Ph.D.**  
Professor  
School of Natural Resources and  
Environment  
University of Michigan, Ann Arbor  
Ann Arbor, MI

**Jinhua Zhao, Ph.D.**  
Associate Professor  
Department of Economics  
Michigan State University  
East Lansing, MI

**Xie Zhu, Ph.D.**  
Rochester, MI

*The climate system is sufficiently complex that no one can say with certainty what is going to happen. We can say—with certainty—that without action to reduce emissions enormous risks are being run.*


#### **CARL WUNSCH**

Cecil and Ida Green Professor of Physical Oceanography, Department of Earth, Atmospheric, and Planetary Sciences, Massachusetts Institute of Technology; Member, National Academy of Sciences

**Endorser Criteria:** Ph.D. or doctoral candidate professionals with expertise relevant to our understanding of the scientific and economic dimensions of climate change, its impacts, and solutions.

#### **Key to Awards and Honors**

- 1 Nobel Laureate: Nobel Prize winner in Chemistry, Economics, or Physics (<http://nobelprize.org>)
- 2 NAS: Member of the United States National Academy of Sciences of the National Academies (<http://www.nasonline.org>)
- 3 NAE: Member of the United States National Academy of Engineering of the National Academies (<http://www.nae.edu>)
- 4 NMS: Recipient of the United States National Medal of Science (<http://www.nsf.gov/od/nms/medal.jsp>)
- 5 MacArthur: Recipient of the MacArthur Fellowship Award (<http://www.macfound.org>)
- 6 IPCC: Intergovernmental Panel on Climate Change. Lead author, contributing author, or review editor on an assessment or special report. The IPCC shares the 2007 Nobel Peace Prize. (<http://www.ipcc.ch>)

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Back Cover Photos: Rotunda (Jupiter Images), White House (Photos.com)

*The United States worked with other nations to take on the ozone threat; so, too, must we lead the international effort to reduce heat-trapping emissions that cause climate change.*

**MARIO J. MOLINA**

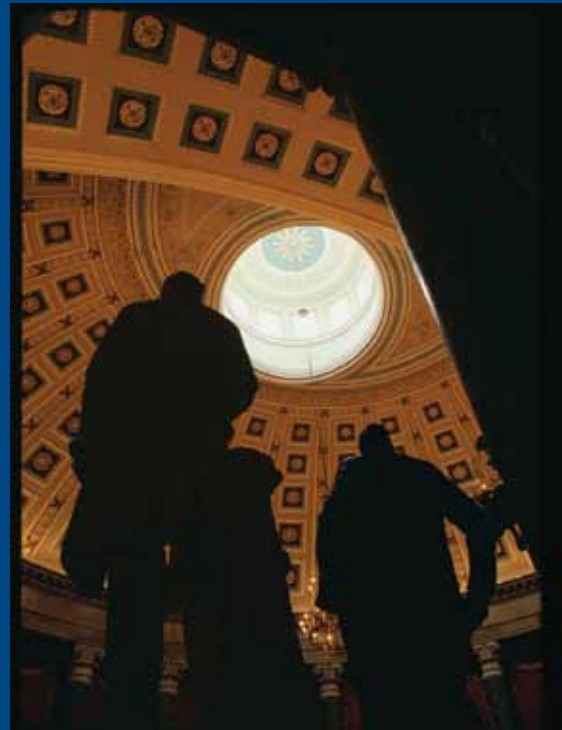
Professor of Chemistry and Biochemistry, Center for Atmospheric Sciences, Scripps Institution of Oceanography, University of California, San Diego; Nobel Prize Winner in Chemistry; Member, National Academy of Sciences; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions



*In the economic emergency we are experiencing, some people think that we cannot afford to address the problem of climate change. It's the other way around: If we don't act now we will run into even greater economic problems in the future.*

**ELINOR OSTROM**

Professor, Indiana University, Bloomington; Nobel Prize Winner in Economics; Member, National Academy of Sciences



*The economic and social costs of global warming could be huge. We need to act now to limit them.*

**ERIC MASKIN**

Albert O. Hirschman Professor of Social Science, Institute for Advanced Study, Princeton, NJ; Nobel Prize Winner in Economics; Member, National Academy of Sciences; Kempe Award in Environmental Economics

*Economists now join climate scientists in a unified call for action to address the causes of climate change. Failure to act now is the most risky and most expensive thing we could do.*

**JAMES J. MCCARTHY**

Alexander Agassiz Professor of Biological Oceanography, Department of Organismic and Evolutionary Biology and Department of Earth and Planetary Sciences, Harvard University, MA; Co-chair, Third Assessment Report of the Intergovernmental Panel on Climate Change; Lead Author, Arctic Climate Impact Assessment; Past President, American Association for the Advancement of Science; Co-organizer, U.S. Scientists and Economists' Call for Swift and Deep Cuts in Greenhouse Gas Emissions