



MIT Joint Program on the Science and Policy of Global Change

XLV GLOBAL CHANGE FORUM

23–24 March, 2023

MIT Samberg Conference Center

50 Memorial Drive, 7th Floor, Building E52

The Morris and Sophie Chang Building

Sloan School of Management, Cambridge, MA USA

**SAVE THE DATE:
28–29 MARCH, 2024
GLOBAL CHANGE FORUM XLVI**

**Location: MIT Samberg Conference Center
50 Memorial Drive, Cambridge MA**

A word from the Director:

As the world simultaneously confronts multiple crises—war, supply chain disruptions, inflation, climate extremes and a pandemic, among others—we remain committed to improving our understanding of and responses to major global and regional change challenges. To address these challenges, we are continuing to identify science-based, sustainable solutions, and communicating them to decision-makers in the public and private sectors.

This steadfast, systematic approach is reflected in the theme of this year's Global Change Forum—*Staying the course: Achieving climate change goals in turbulent times*. Over the next two days, we look forward to enlightening presentations and vigorous discussions in six sessions:

- Climate and Energy Geopolitics
- Water Security and Conflict
- Impacts on Food Security/Health/Equity
- Decarbonization and Energy Security
- Impacts on Vulnerable Countries
- Policy: The Path Forward

I hope that by the end of this conference you will emerge with new, actionable insights that you can apply to help solve critical problems from the organizational to the societal level.

–Ronald G. Prinn, MIT Joint Program Director

Agenda

Thursday 23 March 2023

8:00 CHECK-IN AND LIGHT BREAKFAST

9:00 Opening Remarks

Prof. Ronald G. Prinn • MIT Joint Program • *Director*

9:15 Session 1: Climate and Energy Geopolitics

Moderator: Anne Slinn • MIT Joint Program • *Executive Director for Research*

Sergey Paltsev • MIT Joint Program • *Deputy Director and Senior Research Scientist*

James Stock • Harvard University • *Vice Provost for Climate & Sustainability; Professor of Political Economy*

10:30 COFFEE BREAK

11:00 Session 2: Water Security and Conflict

Moderator: Xiang Gao • MIT Joint Program • *Principal Research Scientist*

Adam Schlosser • MIT Joint Program • *Deputy Director and Senior Research Scientist*

Kenneth Strzepek • MIT Joint Program • *Research Scientist*

12:15 LUNCH

13:15 Session 3: Impacts on Food Security, Health and Equity

Moderator: Horacio Caperan • MIT Joint Program • *Executive Director of External Affairs*

James Thurlow • International Food Policy Research Institute • *Director of Foresight and Policy Modeling*

Sebastian Eastham • MIT Joint Program • *Principal Research Scientist*

Elena Naumova • Tufts University Friedman School of Nutrition Science and Policy • *Professor*

14:45 COFFEE BREAK

15:15 Session 4: Decarbonization and Energy Security

Moderator: Sergey Paltsev • MIT Joint Program • *Deputy Director; Sr. Research Scientist*

Jennifer Morris • MIT Joint Program • *Principal Research Scientist*

Angelo Gurgel • MIT Joint Program • *Research Scientist*

David Hone • Shell • *Chief Climate Advisor*

Thursday 23 March 2023

16:30 RECEPTION

17:00 Dinner and Keynote

Henry Jacoby • MIT Joint Program • *Founding Co-Director Emeritus*

Friday 24 March 2023

8:00 CHECK-IN AND LIGHT BREAKFAST

8:45 Session 5: Impacts on Vulnerable Countries

Moderator: Adam Schlosser • MIT Joint Program • *Deputy Director; Sr. Research Scientist*

Urvashi Narain • World Bank • *Lead Economist for Environment, Natural Resources and Blue Economy*

Donella Rapier • BRAC USA • *President and CEO*

10:00 COFFEE BREAK

10:30 Session 6: PANEL: Policy Session on the Path Forward

Moderator: Henry Jacoby • MIT Joint Program • *Professor Emeritus; Co-Director Emeritus*

Joseph E. Aldy • Harvard University • *Professor of the Practice of Public Policy*

Siddharth Aryan • US India Strategic Partnership Forum • *Director of Climate, Energy and Sustainability*

Vicky Pollard • European Commission, Directorate General for Climate Action • *Head of Unit: Foresight, Economic Analysis and Modelling*

Claudia Octaviano • National Institute for Ecology and Climate Change, Federal Government of Mexico • *General Coordinator for Climate Change Mitigation*

12:30 Closing Remarks

Prof. Ronald G. Prinn • MIT Joint Program • *Director*

12:45 LUNCH

Biographies

Opening Remarks

Prof. Ronald G. Prinn



Director, MIT Joint Program on the Science and Policy of Global Change

Director, MIT Center for Global Change Science

[Prof. Prinn](#) works with social scientists to link science, economics and policy aspects of global change. He co-led the development of the MIT Integrated Global System Modeling ([IGSM](#)) framework, which is used to estimate uncertainty in climate predictions and analyze proposed climate policies. He leads the [Advanced Global Atmospheric Gases Experiment](#), in which the rates of change of the concentrations

of the greenhouse and ozone-depleting gases have been measured continuously over the globe for more than 40 years to determine their emissions, lifetimes in the atmosphere, and radiative forcing of climate change. A past Head of the MIT [EAPS](#) Department, Prof. Prinn is a Fellow of the [AGU](#) and [AAAS](#), a recipient of the AGU's Macelwane Medal, and past Chair of the AAAS Atmospheric and Hydrospheric Sciences. He has twice given invited testimony to Congress on climate change. He was the inaugural Chairman of the Steering Committee of the International Global Atmospheric Chemistry Project, a member of the NAS/NRC Space Science Board, and Chairman of its Committee on Earth Sciences.

Session 1

Ms. Anne Slinn, Moderator



Executive Director for Research, MIT Joint Program on the Science and Policy of Global Change

[Ms. Slinn](#) has over 30 years of experience at MIT facilitating cooperative interdisciplinary research, and multi-institutional and international collaborations that address global challenges at the nexus of the environment, energy and economics. An engineer by training and an alumna of MIT, she serves as Executive Director for Research at the [MIT Center for Global Change Science](#) and the [MIT Joint Program](#). She manages a diverse portfolio of sponsored research supported by federal agencies, industry, foreign ministries,

foundations and private donors. Her key roles involve alignment of priorities and resources, oversight of finances, administration and communication, and coordination of collaborative efforts.

Dr. Sergey Paltsev



Deputy Director and Senior Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Paltsev](#) is the lead modeler in charge of the MIT Economic Projection and Policy Analysis ([EPPA](#)) model of the world economy. He is an author of more than 100 peer-reviewed publications in scientific journals and books in the area of energy economics, climate policy, transport, advanced energy technologies, and international trade. He was a Lead Author of the Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), and a recipient of the 2012 Pyke Johnson Award (by the Transportation

Research Board of the National Academies, USA, for the best paper in the area of planning and environment).

Prof. James Stock



Vice Provost for Climate and Sustainability and Harold Hitchings Burbank Professor of Political Economy, Harvard University

[Prof. Stock](#) is Vice Provost for Climate and Sustainability, Harvard University; the Harold Hitchings Burbank Professor of Political Economy, Faculty of Arts and Sciences; and a member of the faculty at the Harvard Kennedy School. His current research includes energy and environmental economics with a focus on fuels and on U.S. climate change policy. He is co-author, with Mark Watson, of a leading undergraduate econometrics textbook. In 2013-2014 he served as Member of President Obama's Council of Economic Advisers, where

his portfolio included macroeconomics and energy and environmental policy. He was Chair of the Harvard Economics Department from 2007-2009. He holds an MS in statistics and a PhD in economics from the University of California, Berkeley.

Session 2

Dr. Xiang Gao, Moderator



Principal Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Gao's](#) research focuses on understanding the role of land in shaping weather, climate, hydrology, biogeochemistry and water resources at local to global scales using powerful methodologies such as supercomputing model simulations and satellite remote sensing. This research encompasses a wide range of topics, including the development and application of land-surface models, remote sensing of vegetation biophysical parameters, characterizing climate extremes and their responses to shifts in climate regimes, the global

hydrological cycle, arctic permafrost degradation and associated biogeochemistry impacts, and

risk-based water resource assessment. She has been actively involved in several national and international projects, including the NASA Earth Observing System (EOS) Moderate Resolution Imaging Spectroradiometer (MODIS), the 2nd Global Soil Wetness Project (GSWP-2), the NASA Energy and Water Cycle Study (NEWS), and Science Utilization of Soil Moisture Active Passive (SUSMAP), and serves as a member of Permafrost Carbon Network.

Dr. C. Adam Schlosser



Deputy Director and Senior Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Schlosser](#) was previously an Associate Research Scientist at the NASA Goddard Space Flight Center and a research scientist at the Center for Ocean Land Atmosphere Studies. He conducted his postdoctoral work at NOAA's Geophysical Fluid Dynamics Laboratory. His primary interests are the modeling, prediction and risk assessment of natural, managed and built water-energy-land systems using the MIT [IGSM](#) framework, which includes model development of the Global Land System and Water Resource System.

Dr. Schlosser has also undertaken studies of hydrology, weather and climate and their predictability and limits-to-prediction, and participated in and led international experiments aimed at assessing the performance of Earth-system model simulations and predictions. His current research activities also include: the study of extreme events and associating their potential changes and risks for natural, managed and built environments; water-resource assessments to inform mitigation and adaptation strategies; and renewable energy resource and intermittency assessments.

Dr. Kenneth Strzepek



Research Scientist, MIT Joint Program on the Science and Policy of Global Change

At MIT, [Dr. Strzepek](#) is a Research Scientist at both the Joint Program and the Abdul Latif Jameel Water and Food Systems Lab (J-WAFS), and a Faculty Fellow at the Office of Sustainability. He is also a Visiting Fellow at the Martin School, Oxford University, and Professor Emeritus at the University of Colorado. Dr. Strzepek's research and practice is at the nexus of engineering, environmental and economics systems. He was a Maass-White Fellow at the USACE Institute for Water Resources, received the Department of Interior Citizen's Award

and, as a lead author for the IPCC, was a co-recipient of the 2007 Nobel Peace Prize. He graduated from MIT with an S.B. in 1975, an S.M. in 1977, and a PhD in Water Resource Engineering, and also earned an MA in Economics in 2004 from the University of Colorado. He is currently a PhD Candidate in Economics at the University of Hohenheim.

Session 3

Mr. Horacio Caperan, Moderator



Executive Director of External Affairs, MIT Joint Program on the Science and Policy of Global Change

[Mr. Caperan](#) has over 20 years of experience in strategic planning, marketing, business development and program management for organizations in the transportation, agroindustry, life sciences and technology sectors in the U.S. and international markets. He is an alumnus of the MIT Sloan School of Management where he earned an MBA with honors. Previously he received a Fellowship in the Management of Clean Energy Ventures from Boston University and the New England Clean Energy Council. He holds a dual Master's

degree in Biology and Biotechnology from Tufts University. He earned a BS in management and economics in Chile, where he later held positions as a professor of economics and finance.

Dr. James Thurlow



Senior Research Fellow, International Food Policy Research Institute (IFPRI)

[Dr. Thurlow](#) is a development economist whose research focuses on the interactions between policies, economic growth and poverty, primarily using computable general equilibrium and micro-simulation modeling. Past research focuses on evaluating public investments and policies; rural, regional and urban development; and climate change and other external risks. He has worked with governments and researchers throughout Sub-Saharan Africa, and in Bangladesh, Peru, Tunisia and Vietnam.

Dr. Sebastian Eastham



Principal Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Eastham](#)'s research focuses on understanding and reducing the atmospheric impacts of anthropogenic emissions using high-resolution computational models of the atmosphere in concert with Earth observations. This includes improving our understanding of interactions between the climate, air quality and human health, and translating this understanding into rapid assessment models which can be made readily available to the public and policymakers alike. His research also benefits from the application of machine learning methods to Earth observation

data, providing hard observational constraints on the projections generated by models. The long-term goal of his work is to enable near-real-time integration of observational data into computational models of the environment, supporting unprecedented accuracy and insights with regards to environmental decision-making for impact mitigation and environmental justice. He previously served as a research scientist at MIT's Laboratory for Aviation and the Environment (where he's now an associate director), and completed a PhD in Aeronautical Engineering at MIT.

Prof. Elena Naumova



Professor and Chair, Division of Nutrition Epidemiology and Data Science, The Friedman School of Nutrition Science and Policy, Tufts University

[Prof. Naumova](#) earned her PhD in computer sciences and immunology, and completed postdoctoral training in artificial intelligence and expert systems. She has co-authored nearly 300 publications, leads several large-scale projects to facilitate international collaborations for mitigating the effects of climate change, and serves as Editor-in-Chief of the *Journal of Public Health Policy*. In 2022, the Boston Chapter of the American Statistical

Association named her recipient of the Statistical Outreach & Literacy Award for innovative use of data analytics and information technology in public health research, contributions to understanding the health hazards of extreme weather, effective academic leadership, and developing international partnerships to address public health issues nationally and abroad.

Session 4

Dr. Sergey Paltsev, Moderator - See Session 1, page 5

Dr. Jennifer Morris



Principal Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Morris](#)' research focuses primarily on [risk analysis](#), uncertainty analysis, and decision-making under uncertainty in energy and environmental systems. This work involves quantifying key uncertainties (e.g. changes in world markets, policies, technologies, climate, etc.), and applying different methodological approaches to models in order to formally represent such uncertainties and explore how they impact near-term decisions. A key focus is evaluating risks to different investment options in energy and water and identifying

those that are robust to potential risks. Dr. Morris also works on the assessment of energy technologies and energy/climate policies, and contributes to the development of the Joint Program's computable general equilibrium model, the [EPPA](#) model. She holds a PhD in Engineering Systems and an MS in Technology and Policy from MIT.

Dr. Angelo Gurgel



Research Scientist, MIT Joint Program on the Science and Policy of Global Change

[Dr. Gurgel](#) develops economic modeling and applied research on climate policy, climate change, land-use change, bioenergy, agricultural and environmental economics. In Brazil he served as Professor at the Sao Paulo School of Economics, Fundacao Getulio Vargas (FGV), and the University of Sao Paulo. He coordinated the FGV master's program on Agribusiness and the FGV Observatory of the Plan on Low-Carbon Emissions in Agriculture, and was a recipient of the Best Policy Analysis Paper of 2012 in *Environmental*

Science and Technology. He has served as consultant or advisor in projects for institutions as the World Bank, the Climate and Land Use Alliance, the California Air Resource Board, the Research Association of the Large Scale Experiment of Biosphere-Atmosphere in the Amazon, the Brazilian Development Bank, and the National Industry Confederation of Brazil, among others. He holds a BS in Agricultural Engineering and PhD in Applied Economics from University of Viçosa – Brazil.

Mr. David Hone



Chief Climate Adviser, Shell Scenarios Team, Shell International Ltd

[Mr. Hone](#) joined Shell in 1980 after graduating as a Chemical Engineer from the University of Adelaide in South Australia. He worked for Shell as a refinery engineer in Australia and The Netherlands before becoming the supply economist at the Shell refinery in Sydney. In 1989 he transferred to London to work as an oil trader in Shell Trading, where he held several senior positions until 2001, when he became Group Climate Change Adviser. He serves on the boards of the Centre for Climate and Energy Solutions and

the Global Carbon Capture and Storage Institute. He was Chairman of the International Emissions Trading Association from 2011-2013, a global business organization of over 200 companies, and a Board member until 2023. He posts regularly on his energy and climate change blog (<http://blogs.shell.com/>), and is the author of a 2017 book 'Putting the Genie Back: Solving the Climate and Energy Dilemma'.

Keynote

Prof. Henry D. Jacoby - See Session 6, page 11

Session 5

Dr. C. Adam Schlosser, Moderator - See Session 2, page 6

Dr. Urvashi Narain



Lead Economist, Environment, Natural Resources and Blue Economy, World Bank

[Dr. Narain](#) has over 20 years' experience on issues at the intersection of environment and development policy, and her expertise spans climate change adaptation, air pollution management, watershed management, and nature-based tourism. In recent years she led the *Malawi Country Climate and Development Report*, a new diagnostic on the interplay between development and climate change, and *The Cost of Air Pollution: Strengthening the Economic Case for Action*, which influenced World Bank operations in air

quality management across multiple world regions. For the past ten years she has developed a partnership with the Natural Capital Project to bring innovative tools to World Bank operations on watershed management mapping, valuing and prioritizing investments in ecosystem services. She previously led the Nature-based Tourism Community at the World Bank, and currently leads the Environmental Economics Community, a group of 40 environmental economists at the World Bank. She has published widely in peer-reviewed journals.

Ms. Donella Rapier



President and CEO, BRAC USA

BRAC USA is the North American affiliate of BRAC. Founded in 1972 in Bangladesh, BRAC has grown to become one of the largest and most effective nongovernmental organizations in the world—the only one of its scale to have originated in the Global South. BRAC's programs in Asia and Africa now reach more than 100 million people, providing them with tools to move from poverty into secure, resilient livelihoods. Previously, [Ms. Rapier](#) served as the Chief Development and Administrative Officer at Accion, a global leader in financial inclusion, and as CFO at Partners In Health, a healthcare organization

working in remote places such as Haiti, Rwanda and Malawi. Earlier, she spent more than a decade in senior leadership roles at Harvard University, including Vice President for Alumni Affairs and Development and CFO for Harvard Business School, where she received her MBA. She began her career at Price Waterhouse.

Session 6 - Panel

Prof. Henry D. Jacoby, Moderator



William F. Pounds Professor of Management, Emeritus, MIT Sloan School of Management

Founding Co-Director, Emeritus, MIT Joint Program on the Science and Policy of Global Change

At MIT [Prof. Jacoby](#) has served as Founding Co-Director of the Joint Program, Director of [CEEPR](#), Associate Director of the Energy Laboratory, and Chair of the Faculty. He has also served on the U.S. National Petroleum Council, the Scientific Committee of the International Geosphere-Biosphere Program, and on several National Academy Committees (NACs). Recent NACs include one on Approaches to Updating the Social Cost of Carbon, and another to advise the U.S. Global Change Research Program. Prof. Jacoby holds a BA in Engineering from the University of Texas, Austin, a PhD in Economics from Harvard University, and a Doctorats Honoris Causa from the University of Geneva.

Prof. Joseph E. Aldy



Professor of the Practice of Public Policy, Harvard University

Joseph E. Aldy is a Professor at the Harvard Kennedy School, a University Fellow at Resources for the Future, a Faculty Research Fellow at the National Bureau of Economic Research, and a Senior Adviser at the Center for Strategic and International Studies. His research focuses on climate change policy, energy policy, and regulatory policy. He also serves as the Faculty Chair of the Mossavar-Rahmani Center for Business and Government Regulatory Policy Program. In 2009-2010, he served as the Special Assistant to the President for Energy and Environment at the White House. Aldy previously served as a Fellow at Resources for the Future, Co-Director of the Harvard Project on International Climate Agreements, Co-Director of the International Energy Workshop, and worked on the staff of the President's Council of Economic Advisers. He earned his doctorate in economics from Harvard University and MEM and bachelor's degrees from Duke University.

Mr. Siddharth Aryan



Director - Climate, Energy and Sustainability, US India Strategic Partnership Forum (USISPF)

Based in Houston, [Mr. Aryan](#) designs, develops and executes policy advocacy programs to mitigate political risk for leading energy and infrastructure companies in India and the United States. He leads various US-India Energy High-Level Working Groups on renewables, biofuels, hydrogen, clean mobility, and infrastructure finance. Prior to joining USISPF, he served as a Senior Manager of Energy and Infrastructure at the U.S. India Business Council, where he worked

with the U.S. and Indian governments to eliminate trade and investment barriers. He also spent six years with Baker Hughes, where he worked as an engineer, project manager and strategy consultant in India, Africa, the Middle East and North America. He earned his Master's degree in International Business from the Fletcher School, Tufts University, and has a bachelor's degree in Mechanical Engineering from Manipal University India.

Ms. Vicky Pollard



**Head of Unit, Foresight, Economic Analysis and Modelling,
European Commission, Directorate General for Climate Action**

[Ms. Pollard](#) focuses on modelling and economic analysis for climate policy, the greenhouse gas inventory and reporting of climate action. She has worked on climate change for the European Commission since 2006, covering a number of issues over time including international negotiations, climate cooperation with OECD countries, the implementation of the EU emissions trading system, cooperation on ETS design, international carbon markets and work on just transition. From 2014 to 2019, she was Counsellor for Environmental

and Climate at the EU's delegation to China in Beijing. She has a Master's degree in Environmental Economics and worked in a number of posts in consultancy, the EU wind energy association and the UK government, before joining the European Commission in 2004.

Dr. Claudia Octaviano



**General Coordinator for Climate Change Mitigation, Nat'l Institute
for Ecology and Climate Change, Federal Government of Mexico**

[Dr. Octaviano](#) oversees scientific and technical research that supports climate mitigation policy in Mexico, including the UNFCCC climate negotiations on mitigation, carbon markets and technology development and transfer; NDC design and implementation; emissions projections; and low-carbon development pathways. Prior to this appointment, she was a postdoctoral associate at the MIT Joint Program, where she studied the economics of large-scale integration of renewable energy. She has also worked on the design

of environmental regulations for the electricity and oil sectors, as former Deputy Director for Oil Refining and Electricity at the Ministry of Environment and Natural Resources of Mexico. She has consulted for the World Bank and the United Nations on energy policy and climate policy in Latin America. She holds a PhD in Engineering Systems: Technology, Management and Policy from MIT, a Masters in Environmental Science from Yale University, and a BA in Economics from the Monterrey Institute of Technology.

Closing Remarks

Prof. Ronald G. Prinn - See Opening Remarks, page 4