NATIONAL ACADEMIES Sciences Engineering Medicine

BOARD ON ENERGY AND ENVIRONMENTAL SYSTEMS | BOARD ON ATMOSPHERIC SCIENCES AND CLIMATE

Roundtable on Artificial Intelligence and Climate Change

Executive Meeting – Open Session

Artificial Intelligence (AI) is a powerful tool that has the potential to revolutionize the approach to many climate-related actions—from optimizing energy use to predicting extreme weather. As we harness and expand the applications for AI technologies, it is essential to ensure these models are accurate and reliable and find ways to mitigate the climate impacts of AI data center energy use. The National Academies' Roundtable on Artificial Intelligence and Climate Change will foster ongoing discussions, shared learning, and nimble coordination around emerging issues related to AI and climate change. This Roundtable will explore both how AI can combat climate change and the environmental impact of AI itself. It will also examine the energy consumption and climate effects of AI technologies and strategies for mitigating those impacts.

The Roundtable invites you to join them for an open session to introduce the membership and tasking of the new National Academies' Roundtable, announce the release of the Roundtable's first workshop proceedings, and discuss how new advances in artificial intelligence can help solve climate challenges. Tune in to watch the livestream here: https://vimeo.com/event/5067313. Join the conversation and send in questions through Slido: https://app.sli.do/event/o8zXVkeHBxXRfprxhdGkjG.

MONDAY, MAY 5, 2025

Purpose

- Introduce the National Academies Roundtable on Artificial Intelligence and Climate Change and its statement of task
- Announce the release of the proceedings for the Roundtable's first workshop and reflect on how the Roundtable can build on from the activity
- Discuss new applications of artificial intelligence in climate mitigation and related fields, and future topics of interest to the Roundtable
- Hear from ex officio members about desired outcomes for the Roundtable and what topics are of interest to the activity's sponsors

10:00 AM[1] **Welcome & Opening Remarks**

Kasia Kornecki, Responsible Staff Officer, National Academies Board on Energy and Environmental Systems

10:05 AM **Introduction of National Academies Roundtable on Artificial Intelligence and Climate Change**

The National Academies Roundtable on Artificial Intelligence and Climate Change will focus on AI applications in climate-related areas, such as: (1) optimizing energy systems and other climate-influencing infrastructures; (2) aiding effective and impactful climate-related research and decision-making; and (3) developing assessments, policies, regulations, and markets related to climate change. The Roundtable's Chair **Ann Bostrom** (University of Washington) will introduce the Roundtable's membership and summarize the activity's statement of task.

[1] All times in Eastern

10:20 AM **Panel on Implications of Artificial Intelligence-Related Data Center Electricity Use and Emissions**

The National Academies Roundtable on Artificial Intelligence and Climate Change hosted a 2-day workshop in which workshop attendees considered the available evidence on current and future trends in AI adoption; discussed technical and policy solutions that could help to mitigate AI data centers' large energy demands; and identified data and modeling gaps and needs relevant to improving the understanding of these challenges. Roundtable members will reflect on what they learned from the event and highlight opportunities for the Roundtable to expand on key takeaways.

Moderator: Constatine Samaras, Carnegie Mellon University

Speakers:

- Prashant Shenoy, University of Massachusetts Amherst
- Prakhar Mehrotra, PayPal
- Line Roald, University of Wisconsin - Madison
- Yury Dvorkin, Johns Hopkins University

11:00 AM **Break**

11:10 AM **Advancing AI to Accelerate Scientific Discovery and Improve Decision-Making for a Sustainable Future**

Carla Gomes (Cornell University) will present how artificial intelligence can be utilized to accelerate scientific discovery and improve decision-making for a sustainable future. Q&A with the audience will follow.

11:25 AM **Message from Roundtable Sponsors**

A guided Q&A session will have ex officio members discuss the importance of the Roundtable and its activities to create partnerships across sectors to address challenges at the nexus of AI and climate change.

Moderator: Kasia Kornecki, Responsible Staff Officer, National Academies Board on Energy and Environmental Systems

Speakers:

- Ali Douraghy, Google Climate and Energy Advocacy
- Tamar Eilam, IBM
- Amy Luers, Microsoft Sustainability Science and Innovation
- Jonathan Pershing, William and Flora Hewlett Foundation
- Alicia Seiger, Chan Zuckerberg Initiative Climate

11:55 AM **Concluding Remarks**

Ann Bostrom, Chair, National Academies Roundtable on Artificial Intelligence and Climate Change

12:15 PM **ADJOURN OPEN SESSION**

ROUNDTABLE ON ARTIFICIAL INTELLIGENCE AND CLIMATE CHANGE
MEMBER BIOGRAPHIES

Ann Bostrom, University of Washington (Chair)
Ann Bostrom is the Weyerhaeuser Endowed Professor in Environmental Policy at the Evans School of Public Policy and Governance, University of Washington. Until 2007 she was Professor of Public Policy and Associate Dean for Research at the Ivan Allen College of Liberal Arts at Georgia Institute of Technology, and co-directed the Decision, Risk, and Management Science Program at the National Science Foundation (NSF) from 1999 to 2001. Bostrom studies how people understand and make decisions under uncertainty about, for example, climate change and artificial intelligence, focusing on risk perceptions, communication, and mental models. Bostrom co-directs the NSF-funded Cascadia Coastlines and Peoples Hazards Research Hub and co-leads risk communication in the NSF Artificial Intelligence (AI) Institute for Research on Trustworthy AI in Weather, Climate and Coastal Oceanography. She is a Fellow and former President of the Society for Risk Analysis, and a Fellow of the American Association for the Advancement of Science. She also serves on the Washington State Academy of Sciences Board of Directors. Bostrom received her Ph.D. in policy analysis from Carnegie Mellon University, M.B.A. from Western Washington University, and B.A. in English from the University of Washington. She co-chaired the National Academies of Sciences, Engineering, and Medicine consensus report on *Integrating Social and Behavioral Sciences Within the Weather Enterprise* (2017) and contributed to *Communicating Science Effectively: A Research Agenda* (2016).

Ali Douraghy, Google (Ex Officio Member)
Dr. Ali Douraghy is currently Director of Energy & Climate Advocacy at Google where he leads a team engaged in research and advocacy to advance system-level goals for 24/7 Carbon-Free Energy and Net Zero. Previously, Ali served as Principal Deputy Under Secretary (PDUS) for Science & Innovation at the U.S. Department of Energy (DOE). As PDUS, he was responsible for day-to-day activities across a $15B portfolio covering DOE's Office of Science, Applied Energy programs and National Laboratories, and priorities including the Energy Earthshots, Office of Critical and Emerging Technologies, fusion, carbon removal, critical materials, and research security. Ali has held leadership roles at Lawrence Berkeley National Lab, The National Academies, and the U.S. Agency for International Development. He received his Ph.D. in Biomedical Physics from the University of California, Los Angeles School of Medicine and is an elected fellow of the American Association for the Advancement of Science.

Nick Cain, Patrick J. McGovern Foundation (Ex Officio Member)
Nick has 15 years of experience working at the intersection of technology, philanthropy, and the nonprofit sector. As Vice President of Strategy & Innovation at the Patrick J. McGovern Foundation (PJMF), Nick oversees the Foundation's programmatic efforts to advance a human-centered technological future. He leads a team of grantmakers, technologists, and program leads who advance AI- and data-driven solutions to global challenges through a $60M hypothesis-driven grants portfolio, AI product development, nonprofit capacity building, and storytelling. Before he joined PJMF, Nick was a Principal and Climate Lead at Google.org. He helped build and scale a tech nonprofit that provided innovative education finance solutions for students in low- and middle-income countries. Nick earned a bachelor's degree from Columbia University and an MBA with honors from the Berkeley-Haas School of Business.

Yury Dvorkin, Johns Hopkins University
Yury Dvorkin is an Associate Professor at the Johns Hopkins University, where he is affiliated with the Ralph O'Connor Sustainable Energy Institute and serves as the U.S. Director of the National Science Foundation (NSF) Center on Electric Power Innovation for a Carbon-free Society. Dvorkin develops modeling and algorithmic solutions to integrate clean and smart grid technologies—such as renewable generation, demand response, energy storage, and cyber infrastructure—using multidisciplinary approaches from engineering, operations research, economics, and policy analysis. This research seeks to identify, enable, or compare the most efficient, reliable, and resilient pathways to a low-carbon society and to provide actionable insights for energy and climate planning and policy choices. Dvorkin is the recipient of multiple prestigious research, leadership, and service awards, including the inaugural Scientific Achievement Award by the Clean Energy Institute (2016), NSF CAREER Award (2019), Goddard Faculty Fellow (2019), Discovery Award (2023), Institute of Electrical and Electronics Engineers (IEEE) Power & Energy Society Prize Paper Award (2023), Outstanding Editor Award at the IEEE Transactions on Energy Markets, Policy and Regulation (2024), and Johns Hopkins University Provost's Public Engagement Fellowship (2025). Dr. Dvorkin earned his Ph.D. from the University of Washington in 2016 and, as a Ph.D. intern, conducted research at Los Alamos National Laboratory.

Tamar Eilam, IBM T.J. Watson Research Center (Ex Officio Member)
Dr. Tamar Eilam is an IBM Fellow and Chief Scientist for Sustainable Computing in the IBM T. J. Watson Research Center, New York. Tamar is leading research aiming at drastically reducing the carbon footprint associated with computing across infrastructure, systems, and software, data and artificial intelligence. Tamar completed a Ph.D. degree in Computer Science in the Technion, Israel, in 2000. She joined the IBM T.J. Watson Research Center in New York as a Research Staff Member that same year. She was awarded an IBM Fellow in 2014.

Carla Gomes, Cornell University
Carla Gomes is the Ronald C. and Antonia V. Nielsen Professor of Computing and Information Science, the director of the Institute for Computational Sustainability at Cornell University, and co-director of the Cornell University AI for Science Institute. Gomes received a Ph.D. in computer science in artificial intelligence from the University of Edinburgh. Her research area is Artificial Intelligence with a focus on large-scale constraint reasoning, optimization, and machine learning. Recently, Gomes has become deeply immersed in research on scientific discovery for a sustainable future and, more generally, in research in the new field of Computational Sustainability. Computational Sustainability aims to develop computational methods to help solve some of the key environmental, economic, and societal challenges to help put us on a path toward a sustainable future. Gomes was the lead PI of two NSF Expeditions in Computing awards. Gomes has (co-)authored over 200 publications, which have appeared in venues spanning Nature, Science, and a variety of conferences and journals in AI and Computer Science, including several best paper awards. Gomes was named the "most influential Cornell professor" by a Merrill Presidential Scholar (2020). Gomes was also the recipient of the Association for the Advancement of Artificial Intelligence (AAAI) Feigenbaum Prize (2021) for "high-impact contributions to the field of artificial intelligence, through innovations in constraint reasoning, optimization, the integration of reasoning and learning, and through founding the field of Computational Sustainability, with impactful applications in ecology, species conservation, environmental sustainability, and materials discovery for energy" and of the 2022 ACM/AAAI Allen Newell Award, for contributions bridging computer science and other disciplines. Gomes is a Schmidt AI2050 Senior Fellow, a Fellow of the Association for the Advancement of Artificial Intelligence (AAAI), a Fellow of the Association for Computing Machinery (ACM), and a Fellow of the American Association for the Advancement of Science (AAAS).

Anna Biagi Harper, University of Georgia
Dr. Harper is an Associate Professor in Geography and Atmospheric Sciences at the University of Georgia, where she has worked since 2023. Before that, she was a senior lecturer in climate science in the Department of Mathematics at the University of Exeter in the UK, where she contributed to developments in the UK Earth System Model. Her research focuses on terrestrial carbon cycle responses to climate. Through using Earth system models and data from satellite and ground measurements, she aims to better understand how ecosystems respond to a changing environment and human management, and how these responses feed back to affect the climate.

Amy Lynd Luers, Microsoft (Ex Officio Member)
Dr. Amy Luers is the senior global director for sustainability science and innovation at Microsoft. In this role she leads Microsoft's artificial intelligence and sustainability work, and informs the company's sustainability strategies, investments, and policies. Previously, she served as executive director of Future Earth, assistant director for climate resilience and information at the White House Office of Science and Technology Policy during the Obama administration, director of climate at the Skoll Global Threats Fund, and senior environment manager at Google. Dr. Luers spent the first decade of her career working in Latin America, where she co-founded Agua Para La Vida, a nonprofit organization that works with rural communities to enhance access to potable water. Currently, she serves on the advisory board of Veolia Institute, the Stanford Woods Institute for the Environment, and the Gund Institute for Environment. Dr. Luers is a member of the Council on Foreign Relations. She has a Ph.D. in environmental science and an M.A. in international policy studies from Stanford University, B.S. and M.S. degrees in environmental systems engineering from Humboldt State University, and a B.A. in philosophy from Middlebury College. She has published widely on topics including societal vulnerability and resilience, climate impact and policy, science communication, and digitalization and sustainability.

Prakhar Mehrotra, PayPal
Prakhar Mehrotra serves as Senior Vice President and Head of AI at PayPal. He is responsible for companywide AI-related efforts. He has extensive experience applying AI to address climate change and business challenges at scale. Previously, Prakhar served as Managing Director of AI at Blackstone, leading AI implementation across over 200 portfolio companies spanning industries including real estate, private equity, infrastructure, and growth equity while providing strategic guidance for the firm's AI-related data center and energy investments. As Vice President & Officer of AI at Walmart, he led 450+ data scientists across Merchandising, Supply Chain, Store Operations, and Energy business units. During the critical period of COVID-19, his team's AI initiatives were instrumental in keeping Walmart's stores open and supply chains running efficiently. His team won the 2023 Franz Edelman Prize and INFORMS Prize for breakthrough work in retail truck routing and pricing optimization, which reduced carbon emissions by 98.6 million pounds while helping consumers save on costs during high inflation. He also participated in the United States Centers for Disease Control and Prevention (CDC) COVID-19 Forecast Hub initiative, contributing to national pandemic response efforts. Earlier at Uber, he built and led a global team developing ML solutions for supply-demand planning and autonomous vehicle economics. He started his career as a Senior Data Scientist for recommendation systems at Twitter's Sales & Monetization team.

Jonathan Overpeck, University of Michigan
Professor Jonathan Overpeck is an interdisciplinary climate scientist and the Samuel A. Graham Dean of the School for Environment and Sustainability at the University of Michigan. He has a Ph.D. and master's degree from Brown University and a bachelor's degree from Hamilton College. He has written over 230 published works that have been cited over 60,000 times, including serving as a Coordinating Lead Author for the Nobel Prize winning Intergovernmental Panel on Climate Change (IPCC) 4th Assessment (2007). Other awards include the US Dept. of Commerce Gold Medal, a Guggenheim Fellowship, the Walter Orr Roberts award of the American Meteorological Society, and the Quivira Coalition's Radical Center Award. Overpeck has led two major programs focused on regional climate adaptation and serves on the State of Michigan Governor's Council on Climate Solutions, as well as the City of Ann Arbor, Michigan's Energy Commission. He has appeared and testified before Congress multiple times, is a Fellow of the American Geophysical Union (AGU) and the American Association for the Advancement of Science and is a member of the U.S. National Academy of Sciences.

Jonathan Pershing, William and Flora Hewlett Foundation (Ex Officio Member)
Dr. Jonathan Pershing is the Program Director of Environment at the William and Flora Hewlett Foundation. Previously, he served as Deputy to Presidential Envoy John Kerry, and earlier, as Special Envoy for Climate Change at the U.S. Department of State. Earlier in his career, he was Climate Advisor and Deputy Assistant Secretary at the U.S Department of Energy; the Director of the Climate, Energy and Pollution Program at the World Resources Institute; the Head of the Environment Division at the International Energy Agency in Paris; and Science Advisor and Deputy Director of the Office of Global Change in the U.S. Department of State. He has deep expertise in climate and energy policy and technology at the national and international level. He holds a Ph.D. in geology and geophysics from the University of Minnesota, has taught at the University of Minnesota and at American University, and has published and lectured widely on climate and energy issues. He was part of the team at the Intergovernmental Panel on Climate Change that was awarded the Nobel Prize in 2007. In addition, he lived and worked for several years in Alaska in the energy and mining industry.

Line Roald, University of Wisconsin - Madison
Line Roald is an Associate Professor in the Department of Electrical and Computer Engineering at University of Wisconsin—Madison. Her research interests center around modeling and optimization of energy systems, with a particular focus on managing uncertainty and risk from extreme weather, renewable energy variability and grid integration of large loads such as data centers. She is a member of the Institute of Electrical and Electronics Engineers (IEEE) and Institute for Operations Research and the Management Sciences (INFORMS), and the recipient of a National Science Foundation (NSF) CAREER award, the Vilas Early Career Investigator Award and several best paper awards. She received her Ph.D. in Electrical Engineering (2016) from ETH Zurich, Switzerland, and was a postdoctoral research fellow at Los Alamos National Laboratory.

Stephan Sain, Jupiter Intelligence
Stephan (Steve) Sain is a Senior Principal Data Scientist and Senior Director at Jupiter Intelligence, where he heads the data sciences team and is responsible for operational aspects of the broader Jupiter science organization. Jupiter provides data and analytics services to better predict and manage risks from weather and sea level rise, storm intensification and changing temperatures caused by medium- to long-term climate change. Steve is an experienced data science leader and applied statistician who has long worked at the intersection of climate research, applied statistics, and machine learning, including a focus on spatial methods for large datasets, extremes, uncertainty quantification, and climate risk analytics. From 2006 to 2014, he was the head of the Geophysical Statistics Project and a scientist in the Institute for Mathematics Applied to Geosciences at the National Center for Atmospheric Research in Boulder, CO. Steve is a Fellow of the American Statistical Association (ASA) and is a past recipient of the Distinguished Achievement Award from the American Statistical Association's Section on Statistics and the Environment. Steve also serves as chair for the ASA's newly formed Caucus of Industry Representatives, is a past member of the ASA's committee on climate change policy, is an affiliate faculty in the University of Colorado's Department of Applied Mathematics and is a member of the advisory board for the Institute for Mathematical and Statistical Innovation (IMSI) at the University of Chicago.

Constantine Samaras, Carnegie Mellon University
Dr. Constantine (Costa) Samaras is the Director of Carnegie Mellon University's Scott Institute for Energy Innovation, and the Trustee Professor of Civil and Environmental Engineering. He is an affiliated faculty member in the Department of Engineering and Public Policy and in the Heinz College of Information Systems and Public Policy. He analyzes how technologies and policies affect energy and emissions pathways, security, climate resilience, and economic and equity outcomes. From 2021-2024, he served in the White House Office of Science and Technology Policy (OSTP) as Principal Assistant Director for Energy, OSTP Chief Advisor for Energy Policy, and then OSTP Chief Advisor for the Clean Energy Transition. He assessed technologies and policies to achieve national climate commitments, co-led the White House report "U.S. Innovation to Meet 2050 Climate Goals", co-led the climate and clean energy efforts of the President's Executive Order on Artificial Intelligence, and led the White House report on the climate and energy implications of digital assets. He was previously a Senior Researcher at the RAND Corporation as well as a megaprojects engineer in New York City. He received a joint Ph.D. in Civil and Environmental Engineering and Engineering and Public Policy from Carnegie Mellon.

Gavin Schmidt, NASA Goddard Institute for Space Studies
Dr. Gavin Schmidt is the Director of the National Aeronautics and Space Administration Goddard Institute for Space Studies (NASA GISS) and an Adjunct Senior Researcher at the Columbia University Climate School. His research is focused on the development of large-scale climate models of the Earth System, and their application to climate change in the past, present and possible futures. As the principal investigator for the NASA GISS climate model, he is working to adapt legacy models to new computational environments and to utilize machine learning in model calibration, development and application. He has published more than 160 peer-reviewed articles and the book “Climate Change: Picturing the Science” with Joshua Wolfe in 2009. He is a fellow of the American Geophysical Union (AGU) and the American Association for the Advancement of Science (AAAS), and in 2011 was the inaugural recipient of the AGU Climate Communication Prize. He has a Ph.D. in Applied Mathematics (UCL, 1994) and B.A. (Hons) (Oxon, 1988) in Mathematics.

Alicia Seiger, Chan Zuckerberg Initiative (Ex Officio Member)
Alicia Seiger is an expert in climate-related market innovation and development. She is the Director of Climate at the Chan Zuckerberg Initiative (CZI) and a Visiting Scholar at Stanford Doerr School of Sustainability (SDSS). Prior to joining CZI, Alicia was a lecturer at Stanford Law School and led climate and energy finance initiatives at Stanford Law, Graduate School of Business, and SDSS. Alicia has been at the forefront of technology and climate for three decades. A native of Silicon Valley, she began her career pioneering the web advertising industry. She has been innovating climate solutions at the intersections of technology, policy and finance since 2005. Her first book, "Settling Climate Accounts: Navigating the Road to Net Zero" examines the rough edges of net zero in practice and makes recommendations for the road ahead. Alicia has served as an advisor to state Governors and pension funds on data sources, tools and frameworks for managing climate risk and opportunity. She is a member of the editorial board of the Oxford Open Climate Change Journal. Alicia holds a B.A. from Duke University in a self-designed curriculum focused on environmental science and policy and cultural anthropology, and an M.B.A. from the Stanford Graduate School of Business.

Prashant Shenoy, University of Massachusetts - Amherst
Prashant Shenoy is currently a Distinguished Professor and Associate Dean in the College of Information and Computer Sciences at the University of Massachusetts Amherst. His research interests lie in distributed systems and networking, with a recent emphasis on cloud and sustainable computing. He has been the recipient of several best paper awards at leading conferences, including a Sigmetrics Test of Time Award. He serves on editorial boards of the several journals and has served as the program chair of over a dozen Association for Computing Machinery (ACM) and Institute of Electrical and Electronics Engineers (IEEE) conferences. He is a fellow of the ACM, the IEEE, the American Association for the Advancement of Science (AAAS), and the Asia-Pacific Artificial Intelligence Association (AAIA). He received the B. Tech degree in Computer Science and Engineering from the Indian Institute of Technology, Bombay and the M.S. and Ph.D. degrees in Computer Science from the University of Texas, Austin. He recently served on the planning committee of the National Academies of Sciences, Engineering, and Medicine workshop on the Implications of Artificial Intelligence-Related Data Center Electricity Use and Emissions.

Abigail Snyder, Pacific Northwest National Laboratory
Abigail Snyder is an Earth Scientist at the Joint Global Change Research Institute, Pacific Northwest National Laboratory, where she has been for the last eight years. Her research revolves around the coupled human and Earth system, and methods for uncertainty characterization within sectors of that system. She co-leads an experiment of the Global Change Intersectoral Modeling System Scientific Focus Area focused on compounding influences within this system. She has led and contributed to publications focused on the energy, water, land, economic, and climate sectors and their interactions, with a focus on methodology and development. She co-led the software development of the STITCHES emulator for earth system model outputs. She also served on the recently completed Coupled Model Intercomparison 7 (CMIP7) Strategic Ensemble Design Task Team. Several manuscripts she has contributed to or led have been highlighted by their editors, most recently “Uncertainty-informed selection of Coupled Model Intercomparison 6 (CMIP6) Earth System Model subsets for use in multisectoral and impact models” in Earth System Dynamics and “The need for carbon-emissions-driven climate projections in CMIP7” in Geoscientific Model Development. She holds a Ph.D. in Mathematics from the University of Pittsburgh and completed her postdoctoral research at the Joint Institute.

Devra Wang, Heising-Simons Foundation (Ex Officio Member)
Devra is the Director of the Climate and Clean Energy program at the Heising-Simons Foundation where she crafts strategy and leads a team guiding philanthropic support for impactful organizations to advance climate and clean energy policies and markets. Her prior roles have included serving as a Program Director at the Energy Foundation, focusing on strategies to reduce pollution from the U.S. power sector. Devra also directed the California Energy Program at the Natural Resources Defense Council for more than a decade, where she was instrumental in securing several groundbreaking policies including California's statewide greenhouse gas emissions limit (AB 32) and the state's leading utility energy efficiency commitments. She holds an M.A. in Energy and Resources, and a B.S. in bioengineering, both from the University of California, Berkeley.