NATIONAL ACADEMIES Sciences Engineering Medicine

NATIONAL ACADEMIES ROUNDTABLE ON ARTIFICIAL INTELLIGENCE & CLIMATE CHANGE

Advanced AI for Earth Systems Forecasting

AI for Weather & Climate Forecasting Webinar Series

Artificial intelligence (AI) is rapidly advancing frontiers in weather and climate forecasting, transforming how information is modeled, interpreted, and used to inform decision-making. Earth systems forecasting is a combination of short-term predictions and long-term projections about climate conditions for a particular location. The outputs of Earth system forecasting models can predict and project the climate for a specific location at a particular time. However, there exist challenges regarding the collection of sufficient data for particular scales and filling gaps between modeled scenarios. Through technical presentations, subject-matter experts will provide an overview of the history of Earth systems forecasting. A moderated discussion will elevate innovative approaches that integrate advanced AI.

Join the livestream at this link and submit your questions and comments using this link. Speaker materials and a recording of the webinar will be made publicly available on this page.

This is the second of a 4-part educational webinar series, which is an activity of the National Academies Roundtable on Artificial Intelligence & Climate Change. The Roundtable seeks to foster ongoing discussions, shared learning, and nimble coordination around emerging issues related to AI and climate change, including: how AI can combat climate change; the environmental impact of AI itself; and strategies for mitigating the impacts of AI energy consumption and climate effects. See the Roundtable's Statement of Task here.

TUESDAY, OCTOBER 21, 2025

11:30 AM (ET)[1] **Welcome**
April Melvin, National Academies Roundtable on Artificial Intelligence & Climate Change

11:35 AM **Technical Presentation: AI for Climate Modeling: Present and Future**
Christopher S. Bretherton, University of Washington

11:45 AM **Technical Presentation: Future(s) of Climate Simulations: Leveraging the AI revolution**
Pierre Gentine, Columbia University

[1] All time in Eastern

12:00 PM **Discussion**
Moderator: Ann Bostrom, University of Washington

12:20 PM **Audience Q&A**

12:30 PM **ADJOURN**

Speaker Biographies

Ann Bostrom, **University of Washington, National Academies AI & Climate Roundtable 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).

Chris Bretherton, University of Washington
Chris Bretherton directs a climate modeling team at Ai2 in Seattle which uses AI trained on global climate and global storm-resolving model output and observational data to improve climate model simulations. He is an Emeritus Professor of the Atmospheric Science and Applied Mathematics Departments at the University of Washington, where for 35 years he studied cloud formation and turbulence and improved their simulation in atmospheric models. He is an American Meteorological Society Charney Award winner, IPCC author, AMS and AGU Fellow, and a member of the National Academy of Sciences.

Pierre Gentine, Columbia University
Pierre Gentine investigates the continental hydrologic cycle using multi scale modeling and big data (machine learning, remote sensing, high-resolution turbulent simulations) in the context of rising CO2 concentrations. Gentine hopes to answer questions such as what will be the future of droughts and extreme dryness/precipitations with a changing climate, and how will they impact ecosystems? Pierre Gentine received his undergraduate degree from SupAéro, the French National Aeronautical and Space Engineering School in Applied Mathematics in Toulouse, France. He obtained an MSc and PhD in civil and environmental engineering from Massachusetts Institute of Technology (MIT) in 2006 and 2010, respectively. He joined the faculty of the Department of Applied Mathematics and Applied Physics at Columbia Engineering in 2010. He is the recipient of the NASA, DOE, and NSF Early Career Award, as well as American Geophysical Union Macelwane medalist.