

Workshop on Macroeconomics and Climate-related Risks and Opportunities

June 14th–15th, 2023

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Meeting Logistics

The National Academies are hosting the Roundtable on Macroeconomics and Climate-related Risks and Opportunities executive meeting in a hybrid format. In-person participants will convene at the National Academy of Sciences (NAS) building in Washington, DC. Remote participants will convene on a ZoomGov platform. Please review the meeting details provided below.

DATES & TIMES

- Wednesday, June 14th, 2023: 10:00 am–4:45 pm ET
- Thursday, June 15th, 2023: 9:30 am–4:15 pm ET

MEETING CONTACTS

- Bridget McGovern (BAMcGovern@nas.edu, (614) 886-2767)
- Lindsay Moller (LMoller@nas.edu, (912) 675-2414)

IN-PERSON LOCATION

- The NAS building is located at 2101 Constitution Ave. NW, Lecture Room, Washington DC 20418 (Parking and Driving Instructions are included below).

ZOOM CONNECTION

- Please see page 9 for ZoomGov links for each day.
- **In-person participants should bring a laptop to the meeting**, since we will be using personal cameras to push each person's video out (see hybrid meeting guidance on next page).

FOOD NOTES

- Light breakfast, lunch, and a tea/coffee service with snacks will be served in the building. Vegetarian/vegan and gluten free options will be available. If federal participants are responsible for covering the costs of their meals, please contact Lindsay Moller with questions.

Incorporating Climate into Macroeconomic Modeling

A Workshop

CLICK HERE TO JOIN

Meeting ID
161 775 6224
Passcode
356665

Phone Only
Find your local
number [here](#).

NAS Building
2101 Constitution Ave. NW
Washington, DC 20418

Purpose

- Consider current macroeconomic models and how their inputs may or may not be affected by climate.
- Discuss the economic impacts and risks of climate change.
- Consider the relevant aspects of the energy transition and risk responses for the macroeconomy.
- Synthesize workshop information and identify avenues to advance current macroeconomic models.

WEDNESDAY, JUNE 14, 2023 | 10:00 AM–4:45 PM | LECTURE ROOM, NAS BUILDING

9:30–10:00 **Coffee and Light Breakfast Available**
East Court

10:00–10:15 **Welcome and Opening Remarks**
Bob Kopp

10:15–11:00 **Opening Keynote: Macroeconomic Assumptions and Considerations**
25 min presentation + 20 min Q&A
Jim Stock

11:00–12:00 **Session 1: Current Federal Macroeconomic Modeling Examples and Pathways by which climate enters (or not) into Macroeconomic Models**
10–15 min presentation + ~30 min Q&A
Moderator: Jim Stock

Speakers:

- **Bob Arnold**, Unit Chief, Macroeconomic Analysis Division, Congressional Budget Office
- **John Lindner**, Economist, Economic Policy, Office of Management and Budget
- **Fran Moore**, Senior Economist, Council of Economic Advisers

12:00–12:15 Dedicated Work Time

In-person and online workshop participants work independently and together to add ideas/additional questions on Slido: <https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

12:15–1:00 LUNCH

1:00–2:30 Session 2: Climate and Macroeconomic Modeling Research Landscape

20 min presentation + ~45 min Q&A

Moderator: Adele Morris

Speakers:

- **Lars Hansen**, David Rockefeller Distinguished Service Professor and the Director of Becker Friedman Institute's Macro Finance Research Program, University of Chicago
- **Pete Wilcoxon**, Professor in the Department of Public Administration and International Affairs Department and Director of the Policy Studies Program, Syracuse University

2:30–2:45 Dedicated Work Time

In-person and online workshop participants work independently and together to add ideas/additional questions on Slido: <https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

2:45–3:15 BREAK

3:15–4:30 Session 3: Economic Impacts, Damages, and Risks of Climate Change

10 min presentation + ~45 min Q&A

Moderator: Solomon Hsiang

Speakers:

- **Marshall Burke**, Associate Professor, Doerr School of Sustainability, Stanford University
- **Tamma Carleton**, Assistant Professor, Bren School of Environmental Science and Management, University of California, Santa Barbara
- **Jeremy Martinich**, Chief, Climate Science and Impacts Branch, Climate Change Division, U.S. Environmental Protection Agency

4:30–4:45 Dedicated Work Time

In-person and online workshop participants work independently and together to add ideas/additional questions on Slido: <https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

END OF DAY 1

THURSDAY, JUNE 15, 2023 | 9:30 AM–4:15 PM | LECTURE ROOM, NAS BUILDING

9:00–9:30 Coffee and Light Breakfast Available

East Court

9:30–9:35 Opening Remarks

Jim Stock

Brief recap from Day 1 and outline of Day 2's agenda.

9:35–10:35 Session 4: Projecting economic and financial impacts of a transition to a low-GHG economy

10 min presentation + ~45 min Q&A

Moderator: Emi Nakamura

Speakers

- **Emanuele Campiglio**, Associate Professor, Department of Economics, University of Bologna
- **John Larsen**, Partner, Rhodium Group
- **Neil Mehrotra**, Assistant Vice President and Policy Advisor, Federal Reserve Bank of Minneapolis

10:35–10:45 Dedicated Work Time

In-person and online workshop participants work independently and together to add ideas/additional questions on Slido: <https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

10:45–11:00 BREAK

11:00–12:00 Session 5: Public and Financial Sector Climate Risks and Responses, and their Macroeconomic Implications

10 min presentation + ~30 min Q&A

Moderator: Rachel Cleetus

Speakers

- **Laura Bakkensen**, Associate Professor, School of Government & Public Policy, University of Arizona
- **Daryl Fairweather**, Chief Economist, Redfin
- **YanJun (Penny) Liao**, Fellow, Resources for the Future

12:00–12:15 Dedicated Work Time

In-person and online workshop participants work independently and together to add ideas/additional questions on Slido: <https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

12:15–1:00 LUNCH

1:00–2:00 Breakout Discussion

Online participants to self-select among four breakout session themes.

1. Climate and macroeconomic modeling.
2. Modeling economic damages of physical climate risks.
3. Economic and financial impacts of the energy transition.
4. Public and financial sector risks and responses.

2:00–2:30 **TRANSITION/BREAK**

Rapporteurs prepare 1 slide with key takeaways.

2:30–3:00 **Report Back**

3-minute report back from each breakout group.

3:00–4:00 **Session 6: Next Steps – Applying Insights**

Moderator: Bob Kopp

Panelists

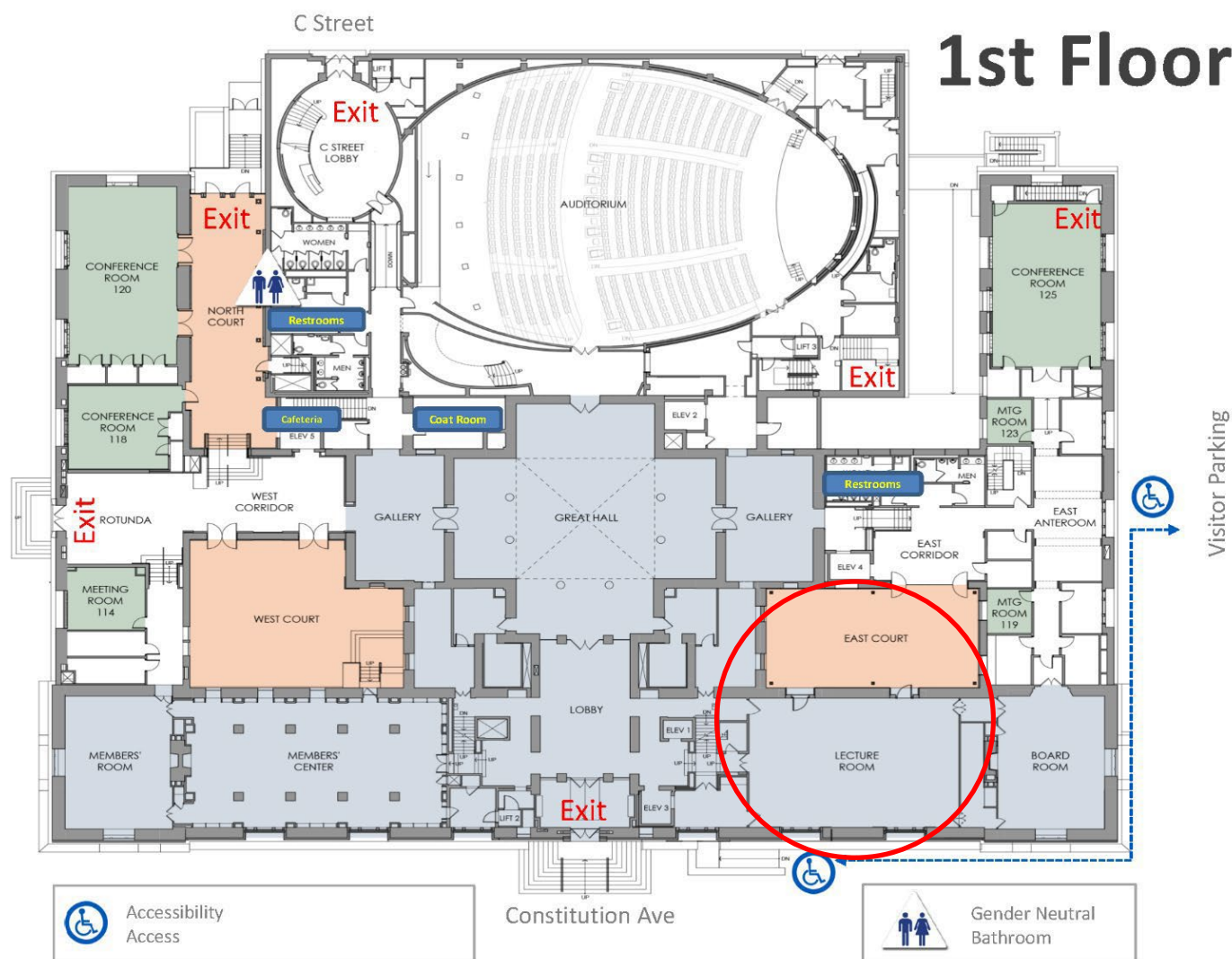
- **Emi Nakamura**, Chancellor's Professor of Economics, University of California, Berkeley
- **Chris Varvares**, Vice President and co-Head of U.S. Economics, S&P Global
- **James Rising**, Assistant Professor, School of Marine Science and Policy, University of Delaware

4:00–4:15 **Wrap-Up Remarks**

MEETING ADJOURNS

NAS Building Map, Location, Parking, and Metro

The Roundtable executive meeting will take place in the Lecture Room, which is located on the east side of the building on the 1st floor.



LOCATION & PARKING

- The National Academy of Sciences building is located at 2101 Constitution Ave NW, Washington DC.
 - The main entrance is in the Front of the building (2101 Constitution Ave).
 - A secondary entrance is located at 2100 C Street.
 - There is a ramp at the C Street entrance and an elevator at the Constitution Avenue entrance to accommodate wheelchairs and the physically challenged.
- Limited parking is available for meeting participants in the visitors parking area of the NAS building. Parking is provided on a first-come basis, and overflow is directed to public parking garages. Parking entrance is at the intersection of 21st and C Streets NW.
- The public parking facilities closest to the NAS Building are Colonial Parking (20th Street, NW, between E and F Streets) and Columbia Plaza (23rd and Virginia Avenue, NW).

BY METRO

- Take the Orange or Blue Line to Foggy Bottom-GWU Metro stop.
- Turn right when you exit the station.
- Walk south down 23rd Street NW for approximately 7 blocks.
- Turn left onto C Street NW (after the State Department).
- Cross 22nd Street NW.
- The main entrance is the Front of the building (2101 Constitution Ave). A secondary entrance is located at 2100 C Street.



ZoomGov Links

Wednesday, June 14, 2023 (10:00 am–4:45 pm EDT)
Thursday, June 15, 2023 (9:30 am–4:15 pm EDT)

[Enter ZoomGov Meeting](#)

Meeting ID: 161 775 6224

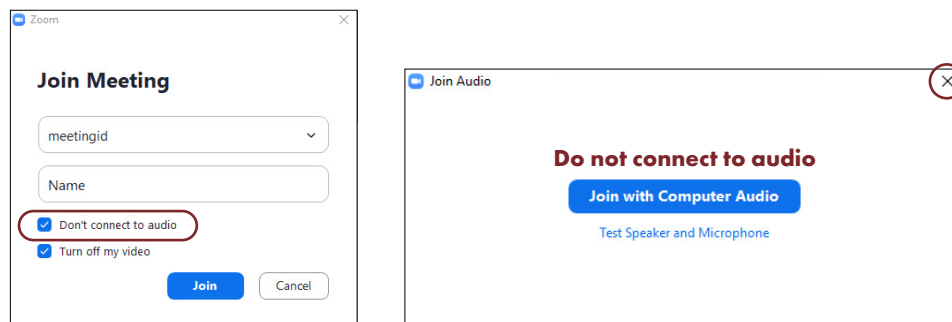
Password: 356665

[Local Numbers to Join by Phone](#)

Thank you for participating in our event! For the best meeting experience, please follow this guide when setting up your laptop or tablet for in-room participation.

CONNECTING TO ZOOM

All participants in the room will be connected to Zoom. This will help us keep our virtual participants engaged by allowing them to see who is raising their hand and who is speaking in the room.



Before connecting to the Zoom meeting, please **mute your speakers**. When you connect to Zoom, please **do not connect to the audio**. This will cause loud feedback in the room. You will be connected to the Zoom audio automatically in the room via the table microphones.

USE OF WEBCAMS

The use of your webcam is very important for our remote participants. This allows them to better see who is speaking in the room and make it easier to engage with everyone. During today's event your webcam may be spotlighted when you speak. Remember, do not connect to the audio—even if you are prompted to.

If you do not have a device or webcam available, please let the staff know so they can make alternative arrangements.

PARTICIPATING IN THE MEETING

We will be using Zoom's raise hand feature for both remote participants and for those in the room. Please **use your raise hand feature** when giving a comment or asking a question. This will help the moderator know the order in which hands were raised.

Summary

- Connect to Zoom using the information provided by the Academies staff.
- Do NOT connect to Zoom Audio. Muting your speakers is also preferred.
- Use the raise hand feature in Zoom for comments/questions.

Contributing Meaningfully in a Virtual Setting

INTRODUCTION

Occasionally, some National Academies meetings will be held virtually. Virtual meeting technology allows us to continue our important work of providing independent, objective advice to inform policy, spark progress and innovation, and confront challenging issues for the benefit of society, even when in-person meetings are not possible. The skills and practices that help you successfully contribute to an in-person meeting are just as important in a virtual setting, but some additional adaptations can help improve the virtual meeting experience.

BEFORE THE MEETING

Make time before your meeting for the following essential types of preparation:

- **Intellectual Preparation:**
 - Review the agenda, the Statement of Task, and any other provided materials.
 - Develop a list of questions you have or points you want to discuss.
 - If possible, familiarize yourself with the list of meeting participants and their expertise.
- **Technology Preparation:**
 - Ensure you have a reliable high-speed internet connection.
 - Install the latest version of the virtual meeting platform installed (Zoom, Microsoft Teams, etc.).
 - Gain familiarity with the basic features of the platform. Check out our *Training on Systems and Tools* PDF for more information on the specific platform you'll be using.
 - If possible, close all other computer programs and turn off notifications to minimize distractions and interruptions.
- **Location and Logistics Preparation:**
 - Choose a private location to ensure the confidentiality of the meeting.
 - Minimize potential disruptions and background noise.
 - Clean up the space behind you or use a virtual background.
 - Dress appropriately for the formality of the meeting.
 - To make a great impression, ensure your face is clearly lit.
 - Login a few minutes early to check your audio, headphones, camera, and microphone. Arriving early helps the meeting organizers begin on time and minimizes distractions for other participants.

DURING THE MEETING

The success of the virtual meeting is up to you and the other participants. Each volunteer at the meeting was chosen because they have valuable expertise and insight to contribute. To make the most of this unique opportunity to share your expertise and learn from other volunteers, try to:

- Be deliberate and assertive in sharing your own insights and questions – no one else can do this for you.
- Take a lead in encouraging discussion. If you notice someone hasn't spoken up yet, ask their opinion.
- Avoid interrupting others – in a virtual setting, this is especially disruptive to the flow of a meeting. If you want to build on or respond to a comment, write down your ideas and share them when the other speaker has finished, or share your insights via chat.
- Remember that the chat transcript can become an important record of the meeting, and use it to share information, ideas, and responses to comments. As much as possible, post in complete sentences and clearly note which comments you are replying to, to make the transcript clearer.
- When possible, leave your camera on to create an inclusive, consistent experience for all.
- Ensure your name is displayed to others.
- Consider adding your pronouns to your name display.
- Be aware of your mute button. Muting your audio improves the audio experience for others, but make sure to unmute yourself as you speak up.
- When screen sharing, ensure you do not have distracting, unnecessary, or unprofessional tabs and programs open.
- Don't multitask. Treat this meeting as you would an in-person meeting and devote your attention fully to the discussion.
- Avoid personal grooming while on camera.
- Acknowledge and deal with any personal interruptions, such as from children or pets.

Following this guidance will enable you to make meaningful contributions to the meeting, which will lead to a more impactful final product.

Guidance for Slido

How to join the conversation

Access the link directly:

<https://app.sli.do/event/bWTaJobtHn1UED235TJvaP>

OR

Go to slido.com and enter the event code:

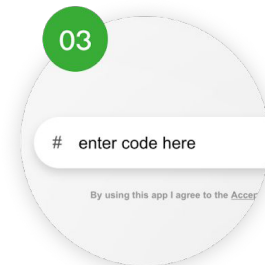
#ClimateMacroWorkshop



Open browser

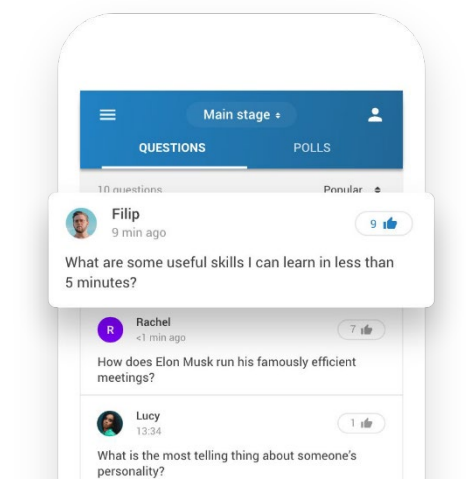


Go to slido.com

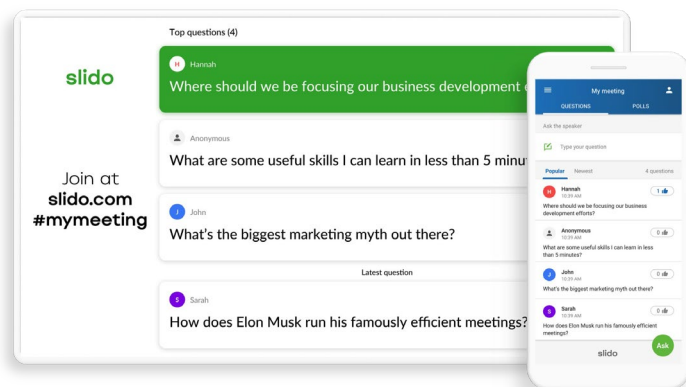


Enter event code:
ClimateMacroWorkshop

Upvote comments you like



Comments, replies, and votes will appear in real-time on an interactive wall



For more information: <https://community.sli.do/>

Statement of Task

The National Academies of Sciences, Engineering, and Medicine will convene an ad hoc planning committee to organize a 2-day hybrid workshop to improve understanding of the relationships between the macroeconomy and climate change and climate-related impacts. This workshop will focus on how the differential effects of climate change on critical human systems (e.g., energy, food, water, infrastructure, public health) are incorporated into macroeconomic analyses. The workshop will gather experts and practitioners to consider the state of the science, foster transdisciplinary dialogue, and set the stage for future workshops organized by the Roundtable on Macroeconomics and Climate-related Risks and Opportunities. Subsequent workshops will focus on themes such as transition risks, macroeconomic modeling, and policy options.

Specific topics to address could include:

- Current understanding of climate-related impacts on the macroeconomy, and how these impacts are represented or incorporated in macroeconomic models;
- Complexity of interactions between climate and macroeconomy (e.g., regional and temporal variability, cascading and compound effects, interconnections), and approaches for incorporating these interactions in models; and
- Deep uncertainties associated with future climate risks, and how these uncertainties are considered in macroeconomic analyses.

Speaker Bios

Robert W. Arnold, Ph.D., is Chief of the Projections Unit in the Macroeconomic Analysis Division at the Congressional Budget Office. In that capacity, he oversees and contributes to analyses of economic developments that influence the economic outlook, including the preparation of the semi-annual macroeconomic forecast. Prior to becoming Unit Chief, Arnold was a Principal Analyst in the Projections Unit, where he specialized in medium-term projections, including potential output, productivity, and the natural rate of unemployment. His research includes papers that analyze the relationship between inflation and unemployment, that examine how spending for research and development influences productivity growth and that assess the macroeconomic effects of a possible avian flu pandemic. In addition, he is a regular contributor to CBO's semi-annual report, *The Economic and Budget Outlook*. Before joining CBO, Arnold worked in the Business Operations Analysis division at AT&T's corporate headquarters, where he consulted with various internal clients and forecasted demand for new services. Arnold received his B.A., M.A., and Ph.D. in economics from Rutgers University.

Laura Bakkensen is an Associate Professor at the University of Arizona's School of Government and Public Policy. She utilizes applied microeconomic and econometric techniques to study the economics of natural disasters, identifying current and future risks and evidence of adaptation to damages and fatalities across the globe. Her research informs policy on insurance regulation, post-disaster aid, warnings and risk information, and public adaptation projects. Dr. Bakkensen received a Ph.D. in Environmental and Natural Resource Economics from Yale University, an M.Sc. in Environment and Development from the London School of Economics, and a B.A. in Economics from Whitman College. In 2017, she was awarded a National Academies of Sciences, Engineering, and Medicine Gulf Research Program Early-Career Research Fellowship. Dr. Bakkensen was previously a visiting researcher at the Euro-Mediterranean Center for Climate Change in Venice, Italy and received a Fulbright Teaching Grant to South Korea.

Marshall Burke is an Associate Professor of Global Environmental Policy in the Doerr School of Sustainability, and Deputy Director at the Center on Food Security and the Environment, at Stanford University. He is also Research Fellow at the National Bureau of Economic Research. His research focuses on social and economic impacts of environmental change, and on measuring and understanding economic livelihoods across the developing world. He holds a PhD in Agricultural and Resource Economics from UC Berkeley, and a BA in International Relations from Stanford. He is also co-founder of [AtlasAI](#), a start-up using satellites and machine learning to measure livelihoods.

Emanuele Campiglio is Associate Professor at the University of Bologna. He is also Scientist at the RFF-CMCC European Institute on Economics and the Environment (EIEE) and Visiting Fellow at the London School of Economics and Political Science (LSE). Previously, he was Assistant Professor at the Vienna University of Economics and Business (WU). His research focuses on the links between climate change, macro-financial systems and sustainability transitions. He is the Principal Investigator of the 5-year SMOOTH project (Sustainable finance for a smooth low-carbon transition) funded by the European Research Council and the SMOOTHER project funded by the Italian Government. He was also a principal investigator in the CASCADES (H2020), WINDOW (OeNB) and GreenMacro (Mistra) projects.

Tamma Carleton is an Assistant Professor at the Bren School of Environmental Science and Management at the University of California, Santa Barbara. Her research combines economics with remote sensing, data science, and climate science to quantify how environmental change and economic development shape one another. She focuses on climate change, water scarcity, and the use of remote sensing for environmental and socioeconomic monitoring. Carleton is a Fellow at the [Climate Impact Lab](#), a research associate at the [Environmental Markets Lab](#), a research affiliate at [CEGA](#), a Beijer Young Scholar, a faculty research fellow

at the National Bureau of Economic Research, and a member of the National Academy of Sciences Environmental Health Matters Initiative Standing Committee. Carleton holds a PhD in Agricultural and Resource Economics from the University of California, Berkeley.

Daryl Fairweather is the Chief Economist of Redfin where she leads economic research about the housing market. Prior to joining Redfin, she was a senior economist at Amazon working on problems related to employee engagement and managing a team of analysts. During the housing crisis, Daryl worked as a researcher at the Boston Fed studying why homeowners entered foreclosure. Daryl received her Bachelor's of Science from the Massachusetts Institute of Technology and received her Ph.D. and Master's degrees in Economics at the University of Chicago, where she specialized in behavioral economics.

Lars Peter Hansen (NAS) is the David Rockefeller Distinguished Service Professor and the Director of Becker Friedman Institute's Macro Finance Research Program at the University of Chicago. He was the Director of Milton Friedman and the Becker Friedman Institute for Economics, 2009–2017; Co-Chair of the Macro Financial Modeling Project, 2012–2019; President of the Econometric Society, 2007; Chairman of the Economics section of the National Academy of Sciences, 2009–2012; and Chairman of the Department of Economics at the University of Chicago, 1998–2002. Dr. Hansen is a leading expert in economic dynamics who works at the forefront of economic thinking and modeling, drawing on approaches from macroeconomics, finance, and statistics. His research has focused on ways to capture broadly based notions of uncertainty in economic models with applications to the study of climate change policy and asset market fluctuations. He was the co-recipient of the 1984 Frisch Medal of the Econometric Society, recipient of the 2006 Erwin Plein Nemmers Prize, the 2010 BBVA Foundation Frontiers of Knowledge Award in Economics, Finance and Management, and the 2013 Nobel Prize in Economic Sciences. Previous NRC service includes the report entitled, "Strengthening the Linkages Between the Sciences and the Mathematical Sciences," published by the National Academies Press in 2000. Dr. Hansen received his Ph.D. in economics from the University of Minnesota in 1978.

John Larsen is a Partner at Rhodium Group and leads the firm's US energy system and climate policy research. He specializes in analyzing energy and climate policy, market trends, and emerging clean technologies, and manages a multidisciplinary team to focus on accelerating America's transition to a net-zero economy. Previously, John served as an electric power policy advisor to the US Department of Energy's Office of Energy Policy and Systems Analysis and prior to this, led federal and congressional policy analysis in the World Resources Institute's Climate and Energy Program. John is also a non-resident Senior Associate in the Energy and National Security Program at the Center for Strategic and International Studies, and serves as an adjunct professor in the Energy and Climate Program at the Krieger School of Arts and Sciences, Advanced Academic Programs at Johns Hopkins University. He holds a bachelor's degree in Environmental Science from University of Massachusetts, Amherst, and a master's degree in urban and environmental Policy and Planning from Tufts University.

Yanjun (Penny) Liao is an economist and Fellow at Resources for the Future. Her research primarily focuses on issues of natural disaster risk management and climate adaptation. She has studied the impacts of disasters on local government budgets, housing markets, and demographic changes. Her ongoing work investigates how disaster insurance interacts with the housing and mortgage sector, as well as the economic and fiscal impacts of adaptation policies on local communities.

John Lindner is an Economist in the Economic Policy Division at the Office of Management and Budget. His research interests include public economics, applied microeconomics, and labor economics. He holds a B.A. in Economics with Honors, with a Math Concentration from Oberlin College, and an M.A. and Ph.D. in Economics from Boston College.

Jeremy Martinich is Chief of the Climate Science and Impacts Branch within U.S. Environmental Protection Agency's (EPA's) Climate Change Division (OAR), where he has worked for nearly 20 years. The branch's work includes developing [indicators](#) tracking the observed effects of climate change, developing the climate science and economic analyses supporting U.S. EPA regulations, and coordinating the [CIRA project](#), a collaborative modeling effort to quantify and monetize the impacts of climate change in the United States.

Neil Mehrotra is an Assistant Vice President and Policy Advisor at the Federal Reserve Bank of Minneapolis, where he was previously a junior scholar from 2016-17. He served as Deputy Assistant Secretary for Macroeconomic Analysis in the Office of Economic Policy at the US Treasury Department from March 2021 to November 2022. Prior to joining Treasury, Neil was senior economist at the Federal Reserve Bank of New York (2019-2021) and an assistant professor in economics department at Brown University (2013-2019). Neil received an A.B. in economics from Princeton University in 2005 and a Ph.D. in economics from Columbia University in 2013. His research focuses on declining interest rates and secular stagnation, including implications for monetary and fiscal policy. He also studies financial frictions and firm dynamics. His work has been published in the *American Economic Review*, the *Journal of Monetary Economics*, and *American Economic Journal: Macroeconomics*.

Frances C. Moore is currently serving as a Senior Economist at the Council of Economic Advisers, on leave from the University of California Davis where she is an Associate Professor in the Environmental Science and Policy Department. Her research bridges climate science and economics and focuses on quantifying the effects of climate change for human wellbeing and implications for mitigation and adaptation policy. Past work has included estimating effects of climate change on macroeconomic outcomes, natural capital, and agricultural productivity. She holds a PhD in Environment and Resources and a Masters in Economics from Stanford University, a MEd from the Yale School of Forestry and Environmental Studies, and a BA, *summa cum laude* in Earth and Planetary Sciences from Harvard University.

Emi Nakamura is the Chancellor's Professor of Economics in the Berkeley Economics department. Her research focuses on monetary and fiscal policy, business cycles and macroeconomic measurement. She is a co-editor of the *American Economic Review*, a member of the American Academy of Arts and Sciences, and co-director of the Monetary Economics program at the National Bureau of Economic Research. Dr. Nakamura serves on the Congressional Budget Office's Panel of Economic Advisers and the Executive Committee of the American Economics Association. She is a recipient of the John Bates Clark medal, the Elaine Bennett Research Prize, the NSF Career Grant, and the Sloan Research Fellowship. She holds a Ph.D. from Harvard University and an A.B. from Princeton University and taught at the Columbia economics department and business school before joining the Berkeley economics department in 2018.

James Rising is an Assistant Professor at the University of Delaware in the School of Marine Science and Policy. His research interests include impacts of climate change bringing together empirical estimates and integrated assessment models, modeling of social-environmental systems focusing on complex systems, food, and fisheries, and resource management. Prior to joining UD, James was a researcher at the Grantham Research Institute at London School of Economics and postdoctoral research positions at the Energy & Resources Group at UC Berkeley and the Energy Policy Institute at the University of Chicago. James holds a B.S. in Philosophy from the Massachusetts Institute of Technology, and received an M.A., M.Phil., and Ph.D. in Sustainable Development from Columbia University.

Chris Varvares is co-head of US Economics at IHS Markit and has nearly 40 years of experience in macroeconomic modeling, forecasting and policy analysis, as co-head of US Economics at IHS Markit, and in his previous roles as a principal of Macroeconomic Advisers and as a member of the staff of the President's Council of Economic Advisers (1981-1982). Chris served as a member of the US delegation to the OECD in April 1982. With IHS Markit, widely recognized as among the most accurate forecasters of the US Economy,

he serves as a consultant to key agencies of the US and foreign governments, major trade associations, and private corporations, and is widely quoted in the business and financial media. Chris is a recent past president and a former director of the National Association for Business Economics (NABE). He served as president of the NABE Gateway chapter in St. Louis and is a member of the American Economic Association. He serves as a member of the New York State Economic and Revenue Advisory Board and has participated in the meetings of the Outside Consultants to the CBO, has been a panelist for the World Economic Forum, and he sits on advisory boards for the Olin Business School at Washington University and the Walker School of Business and Technology at Webster University. He holds a Bachelor of Arts in Economics from The George Washington University and received his graduate training (ABD) in Economics from Washington University in St. Louis, where he was also a member of the adjunct faculty in both the economics department and the Olin School of Business.

Peter J. Wilcoxon is a Professor in the Department of Public Administration and International Affairs at Syracuse University's Maxwell School and Director of the Policy Studies Program. He is also a Laura J. and L. Douglas Meredith Professor for Teaching Excellence, Director of Maxwell's Center for Environmental Policy and Administration, and a Nonresident Senior Fellow at the Brookings Institution. In addition, he has been a member of the U.S. Environmental Protection Agency's (EPA's) Chartered Science Advisory Board, a member of the US EPA's Environmental Economics Advisory Committee, and a Review Editor for the Intergovernmental Panel on Climate Change. Dr. Wilcoxon's work focuses on environmental and energy policy, particularly as it relates to climate change or the electric grid. He has published more than 70 papers and has co-authored three books: one on the design of an international policy to control climate change, one on the design and construction of large-scale economic models, and one on using environmental taxes as part of fiscal reform in the United States. Wilcoxon is a Fellow of the National Academy of Public Administration. He holds a Ph.D. in economics from Harvard University and a B.A. in physics from the University of Colorado.

Committee Bios

James H. Stock (*Chair*) is Vice Provost for Climate and Sustainability, Harvard University; the Director of the Salata Institute for Climate and Sustainability, Harvard University; and the Harold Hitchings Burbank Professor of Political Economy at Harvard University. 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 Advisors, where his portfolio included macroeconomics and energy and environmental policy. He was Chair of the Harvard Economics Department from 2007–2009. He holds a M.S. in Statistics and a Ph.D. in Economics from the University of California, Berkeley.

Rachel Cleetus is the policy director with the Climate and Energy program at the Union of Concerned Scientists. She leads the program’s efforts in designing and advocating for effective and equitable policies to address climate change. Dr. Cleetus has over twenty years of experience working on policies to promote clean energy, drive deep cuts in heat-trapping emissions, and promote climate resilience. She also researches the risks and costs of climate impacts on people and the economy. She has co-authored numerous reports and articles including *Compound climate risks in the COVID-19 pandemic*; *Killer Heat in the United States: Climate choices and the future of Dangerously Hot Days*; *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*; *Surviving and Thriving in the Face of Rising Seas*; and *A Transformative Climate Action Framework: Putting People at the Center of Our Nation’s Clean Energy Transition*. She is also an expert on the United Nations Framework Convention on Climate Change (UNFCCC) process and has been attending international climate negotiations since 2009. Dr. Cleetus has testified several times before Congress, including before the House Select Committee on the Climate Crisis, the Senate Committee on Banking, Housing and Urban Affairs and the House Committee on Financial Services. She has also been quoted widely in the media. Dr. Cleetus holds a Ph.D. and an M.A. in economics from Duke University and a B.S. in economics from West Virginia University.

Robert Kopp is a Professor in the Department of Earth & Planetary Sciences and Co-Director of the University Office of Climate Action at Rutgers University. His research spans sea-level change, the interactions between physical climate change and the economy, and the use of climate risk information to inform decision-making. He directs the Megalopolitan Coastal Transformation Hub, a National Science Foundation-funded consortium that advances coastal climate adaptation and the scientific understanding of natural and human coastal climate dynamics. He is also a director of the Climate Impact Lab, a collaboration of economists, data scientists, climate scientists, and policy experts that works to assess the economic risks of climate change. Professor Kopp was a lead author of the Intergovernmental Panel on Climate Change’s 2021 Sixth Assessment Report and of the U.S. Global Change Research Program’s 2017 Fourth National Climate Assessment. He is a fellow of the American Geophysical Union (AGU), a recipient of AGU’s James B. Macelwane medal, a past Leopold Leadership Fellow, and a past AAAS Science & Technology Policy Fellow. He received his Ph.D. in Geobiology from the California Institute of Technology and his undergraduate degree in Geophysical Sciences from the University of Chicago. He is currently a member of the National Academies’ Board of Atmospheric Science and Climate (2017–2023) and was a member of the study committee on Assessing Approaches to Updating the Social Cost of Carbon (2015–2017).

Adele C. Morris is a Senior Adviser in the Division of Financial Stability at the Board of Governors of the United States Federal Reserve System. She works with the Federal Reserve’s Financial Stability Climate Committee, which is charged with incorporating climate considerations into the Federal Reserve’s financial stability framework. Before joining the Federal Reserve in October 2021, Dr. Morris was the Joseph A. Pechman senior fellow in Economic Studies and policy director for the Climate and Energy Economics

Project at the Brookings Institution. Her academic research relates to climate change, energy, and tax policy, and she is a leading global expert on the design and analysis of carbon pricing policies. She joined Brookings in July 2008 from the Joint Economic Committee of the U.S. Congress, where she advised members and staff on economic, energy, and environmental policy. Prior to that, Dr. Morris was the lead natural resource economist for the U.S. Treasury Department for nine years. On assignment to the U.S. Department of State in 2000, she led negotiations on land use and forestry issues in the international climate change treaty process. Prior to Treasury, she served as the senior economist for environmental affairs at the President's Council of Economic Advisers during the development of the Kyoto Protocol. Morris began her career at the Office of Management and Budget, where she oversaw rulemaking by agriculture and natural resource agencies. Dr. Morris holds a Ph.D. in Economics from Princeton University, an M.S. in Mathematics from the University of Utah, and a B.A. from Rice University.

Emi Nakamura is the Chancellor's Professor of Economics in the Berkeley Economics department. Her research focuses on monetary and fiscal policy, business cycles and macroeconomic measurement. She is a co-editor of the *American Economic Review*, a member of the American Academy of Arts and Sciences, and co-director of the Monetary Economics program at the National Bureau of Economic Research. Dr. Nakamura serves on the Congressional Budget Office's Panel of Economic Advisers and the Executive Committee of the American Economics Association. She is a recipient of the John Bates Clark medal, the Elaine Bennett Research Prize, the NSF Career Grant, and the Sloan Research Fellowship. She holds a Ph.D. from Harvard University and an A.B. from Princeton University, and taught at the Columbia economics department and business school before joining the Berkeley economics department in 2018.

COVID-19 Vaccination Policy for Non-Staff Access to National Academies Facilities

COVID-19 Vaccination Policy for Non-Staff Access to National Academies Facilities

Guidance for Visitors

In accordance with the organization's commitment to provide a safe and healthy workplace, the National Academies are establishing a COVID-19 Vaccination Policy for any persons that are not officially staff members to permit access to our facilities. Beginning March 10, 2022, all visitors to NASEM facilities—including volunteers, Academy members, invited guests, fellows, sponsors, presenters, vendors, contractors, consultants, temporary workers, and other nonstaff— must be up-to-date on their vaccinations against COVID-19 (as defined by the CDC). Visitors must show their official COVID-19 Vaccination Record Card (or a digital photo of the card) to the security staff at the Keck Center or the NAS Building, or to the management staff at the Beckman Center, when they enter the facility. A visitor's vaccination information will not be recorded or stored by the National Academies; the information will simply be verified to allow them to access the facility. Anyone who fails to present a vaccination card (or its copy) will not be allowed access to our facility; no exemptions or exceptions will be accommodated. Children under the age of 6 months are currently ineligible for a COVID-19 vaccine, but may still enter National Academies' facilities. All visitors from a temp agency or contracting service with whom the National Academies have contract will be screened for vaccination compliance by their agency. The vaccination compliance requirements will be stated in contracts with those agencies.

Vaccination

Consistent with the CDC's guidance, the National Academies are adopting this policy to support preventing the infection and spread of the COVID-19 virus, and as an integral measure towards the safety and health of everyone in our buildings.

Operating Status

The National Academies' Operating Status webpage provides the current information regarding access to the Academies' facilities. This information will be updated to be consistent with applicable government mandates and Academies policies. The operating status will include any requirements regarding vaccinations, masks/respirators, social distancing, and occupancy limits.

Requirements for Meetings and Activities

Non-staff participants are not obligated to travel to participate in meetings being held at one of National Academies facilities during this time. Remote attendance is encouraged to the meeting for anyone who is not comfortable traveling to or participating in an in-person meeting. The National Academies have made investments in new equipment in our meeting rooms to accommodate interactive, hybrid meetings so that the experience for those not in the room will be as engaging as possible. In certain circumstances, such as for meetings involving classified or controlled information or events of significance importance, a request for participants to attend in-person may be extended. These events should still provide accommodations for those that cannot attend in-person, if possible. Vaccination and masking/respirator requirements for non-staff participants in National Academies activities that take place in an off-site location are subject to the requirements of the offsite facility and based on the local guidance and requirements.

Revised: 09/26/2022

Meeting Conduct*

We are committed to fostering a professional, respectful, inclusive environment where all participants can participate fully in an atmosphere that is free of harassment and discrimination based on any identity-based factors.

DO

- **Show respect and consideration** for all people, and do not dominate discussions.
- **Listen to others.** Make room for a diversity of voices in group discussions, on panels, and the like without pressuring those who choose not to speak.
- **Be collegial and collaborative.** Be mindful of your tone and the potential impact your position, experience, and/or privilege may have on others.
- **Show that you value differing perspectives.** Communicate openly and civilly—critique ideas, not people.
- **Be inclusive** and intentional about welcoming a diversity of individuals and their perspectives and identities when leading sessions or inviting others to share ideas.
- **Act professionally and responsibly.**
- **Report concerns immediately** so that we can act quickly to address and resolve issue (see below for details on how to report concerns).
- **Respect confidentiality** of the identities of any individuals involved in a conduct concern while it is being reviewed and addressed.
- **Comply with requests to stop behavior.** If any NASEM staff, Roundtable member, or other person in a facilitation or leadership role asks you to stop a behavior deemed unacceptable, please immediately and respectfully comply.

DO NOT

- **Intentionally talk over or interrupt others.**
- **Engage in conduct or make comments that are biased, demeaning, intimidating, coercive, or harassing/hostile**, whether seriously or in jest (examples include derogatory, exclusionary behaviors or comments toward others based on gender, sexual orientation, disability, physical appearance, body size, race, religion, national origin, or any identity-based factors).
- **Engage in personal attacks or bullying.**
- **Comment on personal appearance**, seriously or in jest, unless you know such comments are welcome.
- **Display nudity and/or sexual images** in public spaces or presentations.
- **Disrupt or engage in violence or abuse, threats of violence, harm, or threats of harm of any kinds.** Do not create/contribute to a safety threat or unsafe or exclusionary situation.
- **Drink or use other legal intoxicants** to the extent that your ability to act professionally is compromised.
- **Take or distribute pictures or recordings without approval.**
- **Retaliate against or disadvantage anyone for reporting a concern** or cooperating in an investigation. Do not make bad faith accusations.

How to Report Misconduct

If you experience or witness behavior that appears to violate this Code of Conduct, please notify us immediately so we can take appropriate steps to address your concerns. Feel free to use any of the following options:

- Contact NASEM event staff: Bridget McGovern, BAMcGovern@nas.edu.
- Contact NASEM Office of Human Resources, HRServiceCenter@nas.edu.

**This code of conduct was adapted from the Geological Society of America's Events Code of Conduct, found here: <https://www.geosociety.org/GSA/Events/EventConductCode/GSA/Events/Conduct.aspx>*

PREVENTING DISCRIMINATION, HARASSMENT, AND BULLYING: POLICY FOR PARTICIPANTS IN NASEM ACTIVITIES

The National Academies of Sciences, Engineering, and Medicine (NASEM) are committed to the principles of diversity, inclusion, integrity, civility, and respect in all of our activities. We look to you to be a partner in this commitment by helping us to maintain a professional and cordial environment. **All forms of discrimination, harassment, and bullying are prohibited in any NASEM activity.** This policy applies to all participants in all settings and locations in which NASEM work and activities are conducted, including committee meetings, workshops, conferences, and other work and social functions where employees, volunteers, sponsors, vendors, or guests are present.

Discrimination is prejudicial treatment of individuals or groups of people based on their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws.

Sexual harassment is unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature that creates an intimidating, hostile, or offensive environment.

Other types of harassment include any verbal or physical conduct directed at individuals or groups of people because of their race, ethnicity, color, national origin, sex, sexual orientation, gender identity, age, religion, disability, veteran status, or any other characteristic protected by applicable laws, that creates an intimidating, hostile, or offensive environment.

Bullying is unwelcome, aggressive behavior involving the use of influence, threat, intimidation, or coercion to dominate others in the professional environment.

REPORTING AND RESOLUTION

Any violation of this policy should be reported. If you experience or witness discrimination, harassment, or bullying, you are encouraged to make your unease or disapproval known to the individual at the time the incident occurs, if you are comfortable doing so. You are also urged to report any incident by:

- Filing a complaint with the Office of Human Resources at 202-334-3400 or hrservicecenter@nas.edu, or
- Reporting the incident to an employee involved in the activity in which the member or volunteer is participating, who will then file a complaint with the Office of Human Resources.

Complaints should be filed as soon as possible after an incident. To ensure the prompt and thorough investigation of the complaint, the complainant should provide as much information as is possible, such as names, dates, locations, and steps taken. The Office of Human Resources will investigate the alleged violation in consultation with the Office of the General Counsel.

If an investigation results in a finding that an individual has committed a violation, NASEM will take the actions necessary to protect those involved in its activities from any future discrimination, harassment, or bullying, including in appropriate circumstances **the removal of an individual from current NASEM activities and a ban on participation in future activities.**

CONFIDENTIALITY

Information contained in a complaint is kept confidential, and information is revealed only on a need-to-know basis. NASEM will not retaliate or tolerate retaliation against anyone who makes a good faith report of discrimination, harassment, or bullying.

Updated December 2, 2021

A GUIDE TO THE Harassment Complaint Process for Participants AT THE NATIONAL ACADEMIES

Review the Policy [here](#).



Complaints regarding violations of the National Academies anti-harassment policies should be reported by:

- Filing a complaint with the Office of Human Resources at 202-334-3400 or hrrservicecenter@nas.edu or
- Reporting the incident to an employee involved in the activity in which you are participating.

Complaints of harassment, discrimination, or bullying should be filed as soon as possible after an incident. The Office of Human Resources will investigate the alleged violation in consultation with the Office of the General Counsel.



When reporting an incident, please provide as much of the following information as is possible and applicable:

- Name and role of the person or persons allegedly causing the harassment;
- Description of the incident(s), including the dates, locations and the presence of any witnesses;
- Steps taken to try to stop the harassment; and
- Any other information that may be relevant.



If the National Academies determines that a participant in a National Academies activity has violated this policy, the National Academies will take action as it deems appropriate to address the situation and to prevent the participant from engaging in future discrimination, harassment, or bullying in National Academies activities, up to and including banning that individual from current or future participation in National Academies activities.



All inquiries, complaints, and investigations are confidential, and information is revealed only on a need-to-know basis. Information contained in a complaint is kept confidential. The National Academies will not retaliate or tolerate retaliation against anyone who makes a good faith report of discrimination, harassment, or bullying, or participates in a complaint investigation.



For more information, please watch the following videos from our Expert Volunteer Orientation:

- Making a Commitment to Diversity, Equity, and Inclusion
- Preventing Discrimination, Harassment, and Bullying