

Development of a Framework for Evaluating Global Greenhouse Gas Emissions Information for Decision Making: A Workshop

June 27-28, 2022

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Development of a Framework for Evaluating Greenhouse Gas Emissions Information for Decision Making: A Workshop

June 27–28, 2022 | 9:00–17:00 (EDT) | Virtual and In-person

Purpose

The fast-track consensus study, [Committee on Development of a Framework for Evaluating Greenhouse Gas Emissions Information for Decision Making](#), will examine emerging, independent approaches to development and evaluation of global anthropogenic greenhouse gas (GHG) emissions inventories in order to develop a framework to support decision making.

This workshop will engage the international community to inform this consensus study, and will specifically identify needs, challenges, and opportunities related to:

- developing global emissions inventories for all anthropogenic greenhouse gas emissions;
- the independence, transparency, granularity, internal consistency, comparability, and completeness of data sources;
- measures of accuracy and uncertainty of the modeling and analytic tools used to interpret and extrapolate available data;
- potential biases introduced by limitations in data availability, model design, or analytic frameworks;
- and synthesis, integration, and dynamic updates of the best available information.

MONDAY, JUNE 27, 2022

9:00–9:25

Opening Remarks

Don Wuebbles, University of Illinois, *Committee Chair*

9:25–10:40

Session 1: Meeting the Needs of Users and Decision Makers

9:25–10:25

Lightning talks

Committee Moderators: Gabby Dreyfus and Fiji George

- **Shuaib Lwasa**, Global Center on Adaptation
- **Deborah Gordon**, Rocky Mountain Institute
- **Abhilasha Purwar**, Blue Sky Analytics
- **Yann Robiou du Pont**, Open Earth Foundation
- **Leehi Yona**, Stanford
- **Jorn Herner**, California Air Resources Board

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- **Filomena Nelson**, Secretariat of the Pacific Regional Environment Programme

10:25–10:40

Independent work time

Workshop participants work independently on asynchronous document on meeting the needs of decision makers and stakeholders.

10:40–10:55

Break

10:55–11:45

Session 2: Developing Greenhouse Gas Emissions Inventories

10:55–11:45

Lightning talks

Committee Moderators: Don Wuebbles and Irène Xueref-Remy

- **Sekou Keita**, Université Péléforo-Gbon-Coulibaly
- **Daniel Moran**, Norwegian Institute of Science and Technology
- **Arlyn Andrews**, National Oceanic and Atmospheric Administration
- **Kristina Wyatt**, Persefoni
- **Jocelyn Turnbull**, GNS Science

11:45–12:45

Lunch

12:45–13:55

Session 3: Data Independence, Transparency, Comparability, and More: Perspectives from Two Communities

12:45–13:25

Perspectives from the Generation and Use of Data

Committee Moderators: Annmarie Eldering and Kevin Gurney

- **Shamil Maksyutov**, National Institute for Environmental Studies
- **Lena Höglund-Isaksson**, International Institute for Applied Systems Analysis
- **Abhishek Chatterjee**, NASA-JPL
- **Daniel Zavala-Araiza**, Environmental Defense Fund

13:25–13:55

Perspectives from the Application of Data for Policy

Committee Moderators: Annmarie Eldering and Kevin Gurney

- **Molly White**, Greenhouse Gas Management Institute
- **Takeshi Kuramochi**, NewClimate Institute
- **Aarti Gupta**, Wageningen University

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13:55–14:05	Break
14:05–15:40	World Café 4 20-minute rounds 4 topics
15:40–16:10	Break
16:10–16:35	Debrief from World Café
16:35–17:00	Wrap up Day 1, Agenda for tomorrow
17:00	ADJOURN

TUESDAY, JUNE 28, 2022

9:00–9:20	Opening Remarks Don Wuebbles, University of Illinois, <i>Committee Chair</i>
9:20–12:00	Session 4: Accuracy, Uncertainty, and Potential Biases of Modeling, Data, and Analytical Tools
9:20–10:05	Lightning talks <i>Committee Moderators: Heather Graven and Tomohiro Oda</i> • Rostyslav Bun, Lviv Polytechnic National University, WSB University • Steven Smith, Pacific Northwest National Laboratory • Dong-Gill Kim, Hawassa University • Lauren Maffeo, Steampunk
10:05–10:25	Break
10:25–12:00	World Café 4 20-minute rounds 4 topics
12:00–13:00	Lunch

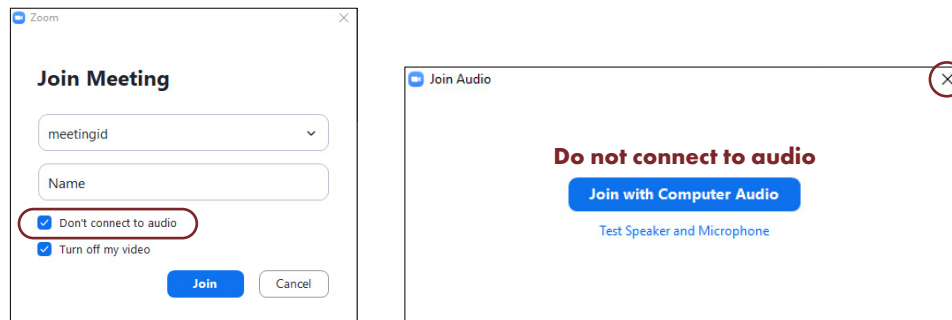
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13:00–13:25	Debrief from Session 4
13:25–16:10	Session 5: Synthesis, Integration, and Dynamic Updates for Information
13:25–14:20	Lightning talks <i>Committee Moderators: Angel Hsu and Kamal Bawa</i> • Christine Wiedinmyer, CIRES • John Lin, University of Utah • Greet Janssens-Maehout, European Commission Joint Research Centre • Zhu Liu, Tsinghua University • Ian Tout, UNFCCC
14:20–15:55	World Café 4 20-minute rounds 4 topics
15:55–16:20	Break
16:20–16:50	Debrief from Session 5
16:50–17:00	Closing Remarks
17:00	WORKSHOP ADJOURNS

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.

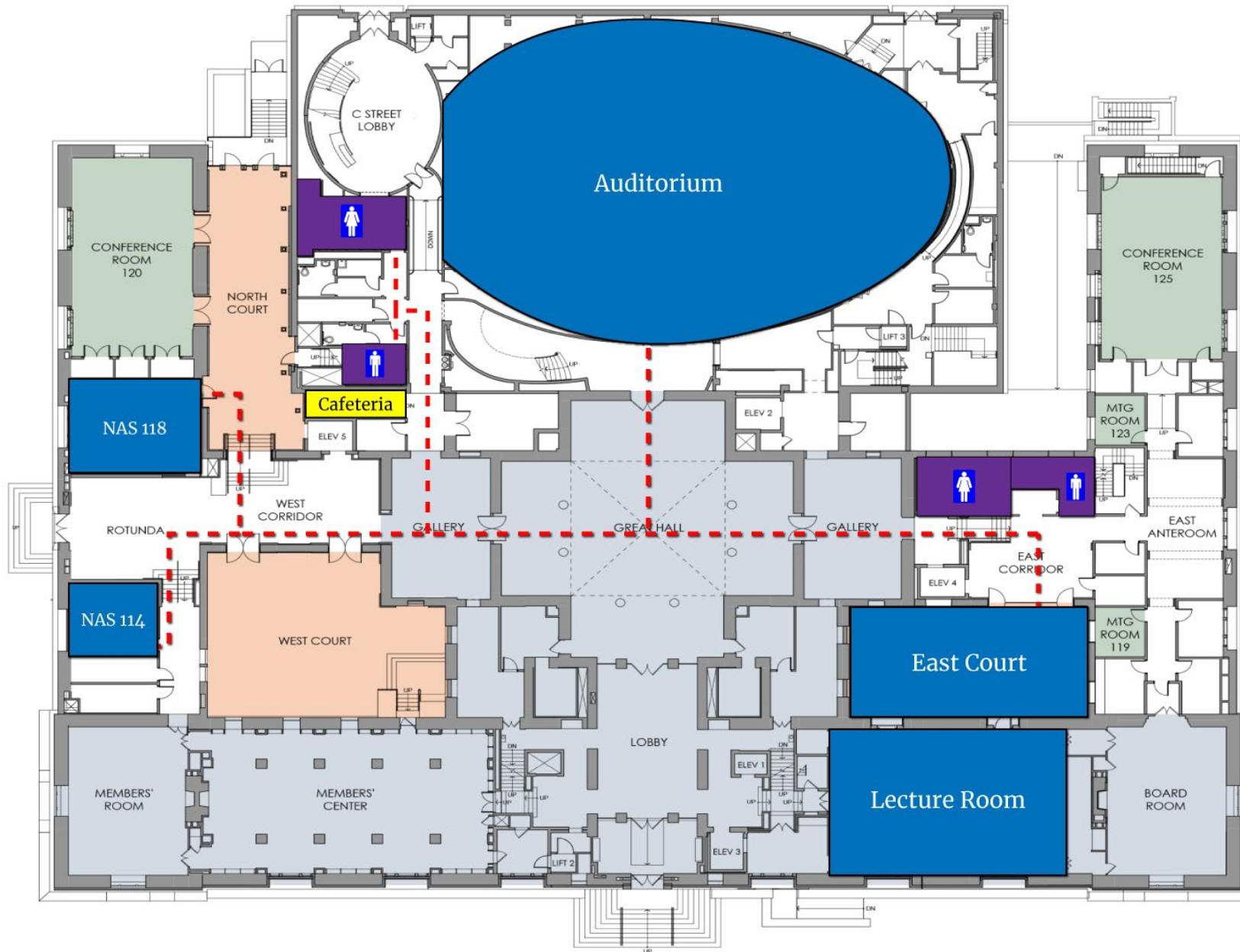
DURING THE MEETING

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.

Day 1



Day 2



GUIDANCE FOR ASKING QUESTIONS VIA SLIDO

How to join the conversation

Access the link directly: <https://app.sli.do/event/imYoeqG8TjCXngBhQpS8PS>

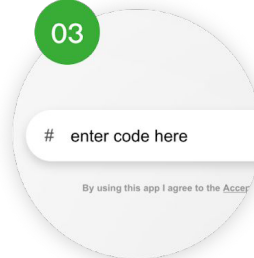
OR Go to slido.com and enter the event code: **#6664 843**



Open browser



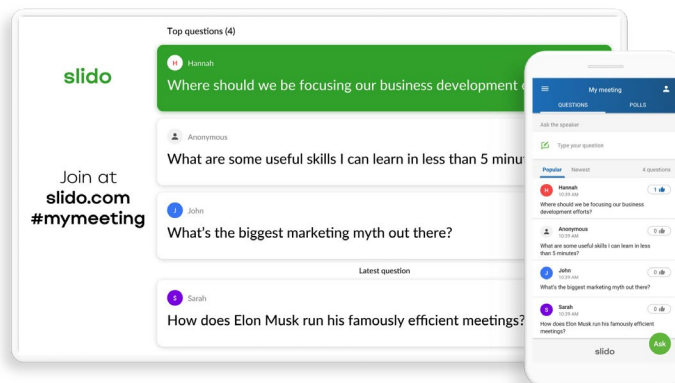
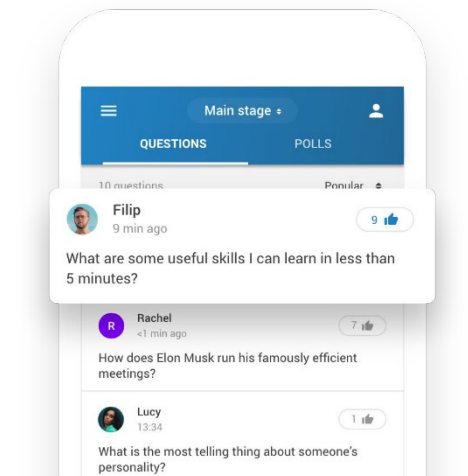
Go to slido.com



Enter event code: **6664 843**

Upvote questions you like

Questions and votes will appear in real-time on an interactive wall



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

Statement of Task

An ad hoc committee of the National Academies of Sciences, Engineering and Medicine will develop a framework for evaluating global anthropogenic greenhouse gas information to support decision making. Specifically, the committee will:

- Describe approaches used to develop global anthropogenic greenhouse gas emissions inventories, including the use of surveys, continuous emissions monitoring systems, monitoring fuel sales, self-reported data, ground- and airborne-based measurements, satellite-based remote sensing data, artificial intelligence and computer vision, proxy and activity data, crowd sourcing, inverse modeling, additional sources of emissions information, and data fusion approaches.
- Discuss the potential uses and limitations of these approaches, including issues related to:
 - developing global emissions inventories for all anthropogenic greenhouse gas emission;
 - the independence, transparency, granularity, internal consistency, comparability, and completeness of data sources;
 - measures of accuracy and uncertainty of the modeling and analytic tools used to interpret and extrapolate available data;
 - potential biases introduced by limitations in data availability, model design, or analytic frameworks; and,
 - synthesis, integration, and dynamic updates of the best available information.
- Provide a framework to evaluate emissions information and inventories, including guidance for policy makers about their use in decision making.
- Present several case studies to demonstrate how the framework could be applied to evaluate emissions information and inventory approaches and identify strengths and opportunities for improvement for each case study.
- To the extent possible, identify ways to improve methodological transparency, sustainability and continuity of relevant observations, and product confidence in global anthropogenic greenhouse gas emissions inventories, including key data gaps that could be addressed, improvements needed in models and analytical tools, and opportunities for collaboration among data providers, researchers, regulatory agencies, and decision-makers.

Speaker Bios

Arlyn Andrews leads the Carbon Cycle Greenhouse Gases group within NOAA's Global Monitoring Laboratory. She has measured carbon dioxide from Earth's surface to the stratosphere using a variety of diverse platforms, including NASA's ER-2 aircraft -- a modified U-2 spy plane, high-altitude balloons, and very tall broadcast towers. Arlyn earned her Ph.D. in Earth and Planetary Science from Harvard University in 2000 and then spent a few years at NASA Goddard Space Flight Center, where she contributed to the initial development of concepts for active and passive CO₂ satellite sensors. Arlyn joined the NOAA Global Monitoring Laboratory in 2003 and assumed responsibility for in situ measurements from tall towers within the NOAA Global Greenhouse Gas Reference Network. She developed the NOAA's CarbonTracker-Lagrange regional modeling framework for estimating greenhouse gas emissions and removals, with a particular emphasis on understanding uptake of carbon dioxide by terrestrial ecosystems. Arlyn has been an active participant in the U.S. Interagency North American Carbon Program since its inception. She served on the Climate Variability and Change panel supporting the Decadal Survey for Earth Science and Applications from Space (ESAS 2017), and she is a member of the NASA Carbon Monitoring System Science Team and the NASA Orbiting Carbon Observatory Science Team.

Rostyslav Bun is a professor at Lviv Polytechnic National University (Ukraine) and WSB University (Poland). Scientific Interests: high resolution spatial inventory of greenhouse gas emissions at the level of point-, line-, and plane-type emission sources at the national, regional and local levels, particularly in the sectors of energy, industry, transport, agriculture, forestry and land use change; uncertainty analysis in greenhouse gas inventories; gridded inventories and mapping greenhouse gas emissions.

Abhishek Chatterjee has deep experience in carbon cycle science, Earth system models, and development of novel geostatistical and data assimilation techniques for tackling large-scale environmental problems. Dr. Chatterjee has applied these techniques to model source-sink distributions of greenhouse gases at global to regional scales, studying linkages between the carbon cycle and climate in key regions of change such as the Northern high-latitudes, and understanding interactions between the carbon-water-energy cycles at various space and time scales. Dr. Chatterjee is part of multiple NASA mission and science Teams -- the Orbiting Carbon Observatory-2 & 3 (OCO), the Arctic and Boreal Vulnerability Experiment (ABOVE), the Soil Moisture Active-Passive (SMAP) mission and NASA's Carbon Monitoring System (CMS). He has also authored and/or led chapters in various national assessment reports, such as the Second State of the Carbon Cycle Report (SOCCR-2) and the Fifth National Climate Assessment (NCA5). Dr. Chatterjee is currently the Project Scientist for the OCO-3 mission and the Deputy Project Scientist for the OCO-2 mission.

Deborah Gordon is a senior principal in the Climate Intelligence Program at RMI. She also serves as a senior fellow at the Watson Institute of International and Public Affairs and is an affiliate at the Brown Climate Solutions Lab. Her research spearheaded the development of the Oil Climate Index plus Gas (OCI+), a first-of-its-kind model that analyzes the life-cycle climate impacts of global oil and gas resources. The OCI+ is the topic of Gordon's book, *No Standard Oil: Managing Abundant Petroleum in a Warming World* (Oxford University Press: New York), 2022. Trained as a chemical engineer and

policy analyst, Gordon is the former director of the Energy and Climate Program at the Carnegie Endowment for International Peace. She began her career with Chevron and directed the Energy Policy Program at the Union of Concerned Scientists. Gordon has taught at the Yale School of Environmental Studies and Brown University and guest lectures globally. She is a stakeholder in NASA's Carbon Monitoring System, the Carbon Mapper consortium, and Climate TRACE. Gordon has testified before Congress and served on National Academy of Sciences panels. Gordon is the author of three books, numerous peer-reviewed journal articles, book chapters, media articles, op-eds, and interviews on energy and climate change.

Aarti Gupta is a Professor of Global Environmental Governance in the Department of Social Sciences at Wageningen University in the Netherlands. Her research is in the field of global environmental and climate governance, with a focus on transparency and accountability and the challenges of anticipatory governance of novel technologies (including biotechnology and climate engineering). She has published extensively in these fields, including the edited volume, *Transparency in Global Environmental Governance: Critical Perspectives*, published by MIT Press. At Wageningen University, Aarti coordinates the Governing Climate Futures research theme. She is principal investigator of 'The Transformative Potential of Climate Transparency (TRANSGOV)' project funded by the Dutch research council, and co-leads the international REIMAGINE consortium project on anticipatory climate governance in the global South. She is also co-founder of the university-wide REDD@WUR network, consisting of over 80 researchers working on climate-forest interactions. Aarti holds a PhD in environmental studies from Yale University.

Jorn Herner is Chief of the Research Planning and Emission Mitigation Branch in the Research Division at the California Air Resources Board. He oversees the Division's extramural research program, the implementation of state's greenhouse gas monitoring network, the vehicle emissions research program, and the use of new sensors and measurement methods to quantify pollutant exposure. Dr. Herner has a B.A. and M.S. from the University of California at Berkeley and a Ph.D. in Civil and Environmental Engineering from the University of California, Davis.

Lena Höglund-Isaksson is a senior research scholar at the International Institute for Applied Systems Analysis (IIASA) in Austria, which she joined in 2004 and where she has developed the methane module in the GAINS model and coordinates various policy applications on non-CO₂ greenhouse gases. These include contributions of non-CO₂ emissions and mitigation scenarios to EU's energy and climate policy packages (2008, 2010, 2012, 2013, 2016, 2021) and various global assessments of mitigation potentials for methane and non-CO₂ greenhouse gases used to identify cost-effective mitigation strategies and/or used as input to climate models. She has authored over 60 peer-reviewed publications and contributed to several flagship policy reports such as the Global Methane Assessment, the UNEP Emissions Gap Reports, IPCC's Special Report on 1.5 degrees. She is interested in understanding how barriers for emission reductions can be overcome, be it technical, behavioral, institutional, or political barriers. She holds a PhD in environmental economics from Gothenburg University, Sweden.

Greet Janssens-Maenhout holds a Master of Science degree in physical engineering from the University Ghent (Belgium), and she obtained her PhD in computational thermo-fluid dynamics at the

Fachhochschule Karlsruhe (Germany) - Maschinenbau Fakultät in 1998, while being employed at the Forschungszentrum Karlsruhe as “exzellente Nachwuchswissenschaftlerin” until she moved to the European Commission Joint Research Centre in Ispra (Italy) in 2001. After having led the Solution Monitoring Laboratory, and while 10% teaching at the University Ghent, she joined in 2007 the Climate Change unit, where she took over the lead of the Emissions Database for Global Atmospheric Research. She is member of the Steering Committee of the Global Emissions Initiative, contributed to the IPCC Assessment Report 5 and was review editor for the IPCC 2019 Refinement. In 2015 she participated in the CO₂ Monitoring Task Force, later to the Mission Advisory Group and is meanwhile co-chairing the Task Force activities with the Copernicus Unit in Brussels. In 2018 she became Deputy Head of the Knowledge Management unit for Sustainable Development and Food Security, where she focuses even more on Copernicus activities. In June 2021 she became Head of the Bioeconomy Unit, focusing in particular on forests, biogenic carbon, LULUCF sink. She has an h-index of 22, (co-) authoring of over 120 peer-reviewed articles and of 2 patents. Her main interest is the development of an operational anthropogenic CO₂ monitoring and verification support capacity, building upon a collaboration of the European Commission with the European Space Agency, the European Organisation for the Exploitation of Meteorological Satellites and the European Centre for Medium-range Weather Forecasting.

Sekou Keita is an associate professor at Péléforo GON COULIBALY University (Côte d'Ivoire) and he works in close collaboration with the Laboratoire d'Aérodynamique (Toulouse) in the framework of Copernicus CO₂ project where he is developing a mosaic of anthropogenic CO₂ and CH₄ emissions inventories with a focus on data-scarce regions (Africa and Asia). Dr. Keita is PhD in Atmospheric Physics and Chemistry and his research area is the development of emission inventories. He has participated in various measurement campaigns in Africa within the framework of research programs such as INDAAF (International Network to study Deposition and Atmospheric chemistry in Africa), DACCWA (Dynamics-Aerosol-Chemistry-Cloud interactions in West Africa) and PASMU (Air Pollution and Health in urban areas) projects. He is the lead author of a paper on pollutant emission factors published in ACP, another on the emission inventory of pollutants from combustion in Africa published in ESSD and co-author of 14 other papers. Proposed to the UNFCCC as a national expert, he participated in the first updated biennial report (BUR) of Côte d'Ivoire on greenhouse gases emissions. Recently, he was named as one of the co-chairs of GEIA (Global Emissions Initiative) Africa working group.

Dong-Gill Kim received his Ph.D at Iowa State University, Iowa, USA in 2008 and completed two post-doctoral research projects in University College Cork, Ireland and Landcare Research, New Zealand from 2008 to 2012. Since May 2012, he has been working as Assistant/Associate Professor at Hawassa University, Ethiopia. He currently serves as a coordinator for Climate Change Graduate Program at the university and offers courses related to climate change adaptation and mitigation and energy issues. Throughout his academic and professional career, he has conducted research on climate change adaptation and mitigation (e.g., carbon sequestration and greenhouse gas emissions) in natural and agricultural lands dealing with field measurements, laboratory analysis, modelling, inventory and scenario analysis, and developing mitigation strategies. He has obtained funding for research and education activities from various source including UN, EU, Sweden, Germany, Italy, UK, and South-Korea. He has been managing various international collaboration projects for research and education on climate change adaptation and mitigation with European (Spain, Germany and Italy), Latin American

(e.g., Bolivia, Chile, Cuba and Ecuador) and North American (USA, Canada) institutes and UN agency such as FAO and IAEA. With the results from various activities, he has published over 55 peer-reviewed papers and two book chapters and regularly serves as a reviewer for various scientific journals and grant proposal evaluation communities. He has supervised 6 MSc students and 8 PhD students. Additionally, he was awarded as 'Ecologist in Africa' from the British Ecological Society in 2013. In 2014, and his paper was selected as Top 10 best paper by Biogeosciences journal.

Takeshi Kuramochi is a senior climate policy researcher at NewClimate Institute based in Cologne, Germany. Takeshi leads projects that analyse greenhouse emission scenarios for major emitting economies as well as subnational and non-state actors. Since 2016, Takeshi contributes to the annual UNEP Emissions Gap Reports as a lead author on the chapter assessing G20 countries' progress on emission reductions. Takeshi is a long-time contributor to the Climate Action Tracker project. Externally, Takeshi serves as a member of the UNFCCC Race to Zero campaign's External Peer Review Group and Science Base Targets initiative's Scientific Advisory Group. Prior to joining NewClimate Institute, Takeshi worked at the Institute for Global Environmental Strategies (IGES, Japan) and at the Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands, where he is currently a visiting researcher. Full list of his publications can be found on Google Scholar.

John Lin is currently a Professor at University of Utah's Department of Atmospheric Sciences. Lin's research is focused on air quality and greenhouse gases in the Western U.S., and around the world. He obtained his Ph.D. at Harvard University's Dept. of Earth and Planetary Sciences, in which he carried out research on trace gases, interpreting aircraft data with atmospheric and biospheric models. Lin has expertise in modeling of greenhouse gases, pollutants, and the use of atmospheric data to infer surface fluxes for over 20 years. He was among the first to integrate continental atmospheric CO₂ concentrations with land surface observations to estimate regional scale carbon sources/sinks. In recent years, Lin has been engaged in efforts to understand urban carbon emissions based on both ground-based and satellite data. He was a contributing author to the North American Carbon Program (NACP) and a member of NACP's Science Leadership Group. Since 2018 he has also been a Science Team member of the WMO Integrated Global Greenhouse Gas Information System (IG3IS). He is serving on the Science Teams of NASA's Carbon Monitoring System and Orbiting Carbon Observatory-2/-3.

Zhu Liu is an Associate Professor at Department of Earth System Science, Tsinghua University. Zhu Liu takes integrated approach to assess the human impacts on the earth system in terms of greenhouse gas emissions. Zhu co-leads the Carbon Monitor, an international initiative aims to provide near-real-time dataset for global GHG emissions. Zhu hold Ph.D. from the Chinese Academy of Sciences with joint training by University of Cambridge. Zhu conducted postdoctoral research at Harvard University and California Institute of Technology, and before join Tsinghua Zhu was Assistant Professor at Tyndall Centre for Climate Change Research, University of East Anglia. Zhu authored about 60 academic publications (See Google citation page). Zhu is the global highly cited researcher the awardee of the 35 Innovators Under 35 by MIT Technology Review.

Shuaib Lwasa is a principal researcher on adaptation, governance and transformation at the Global Center on Adaptation. Shuaib has over 22 years of experience in university teaching and research as

Professor of Urban Sustainability at Makerere University, Uganda. He has worked extensively on interdisciplinary research projects focused on African cities but also in South Asia. His publications are in the areas of urban mitigation of and adaptation to climate change, urban environmental management, spatial planning, and disaster risk reduction, urban sustainability. Shuaib is a Coordinating Lead Author of the IPCC WG III Chapter 8 “Urban Systems and Human Settlements” and Lead Author for the IPCC Special report on Land and Climate Change. He is the Past-Chair of the interdisciplinary research programme on Integrated Research on Disaster Risk.

Lauren Maffeo is an award-winning designer and analyst whose expertise is reducing bias within the datasets used to train machine learning algorithms. She has presented her research on bias in AI at venues including Princeton and Columbia Universities, Google DevFest DC, and Twitter’s San Francisco headquarters. Today, Lauren works as a service designer at Steampunk, a human-centered design firm serving the federal government. She is also a founding editor of Springer’s AI and Ethics journal and an area editor for Data and Policy, an open access journal with Cambridge University Press. Prior to joining Steampunk, Lauren was an associate principal analyst at Gartner, where she covered the impact of emerging tech like AI and blockchain on small business owners. Lauren has written for Harvard Data Science Review, Financial Times, and The Guardian, among other publications. She has also peer reviewed technology research and books published by the GovLab at NYU, O’Reilly Media, and the Atlantic Council. Lauren is a fellow of the Royal Society of Arts, a member of the Association for Computing Machinery’s Distinguished Speakers Program, and a member of the International Academy of Digital Arts and Sciences, where she helps judge the Webby Awards.

Shamil Maksyutov is an Expert at the National Institute for Environmental Studies, Tsukuba, Japan and works on estimating emissions of the greenhouse gases using data observed by the GOSAT satellite. He has more than 30 years of experience in atmospheric greenhouse gas observation and modeling and is now focusing on developing high-resolution models for atmospheric greenhouse gas transport and inverse models for use of satellite observations for emission estimates, focusing on country-scale emissions. He oversaw development of the GOSAT Level 4 product – regional flux estimates of CO₂ and methane based on GOSAT observations. Dr. Maksyutov graduated from Moscow Institute of Physics and Technology and got PhD in chemical physics. He published more than 150 research papers and is a regular contributor to Global Methane Budget of GCP. He served as lead author for 2019 Refinement to 2006 IPCC Guidelines on national emission inventories.

Daniel Moran is a Senior Researcher in industrial ecology and environmental economics at NTNU. He is a contributor to the development and application of input-output models to track resource flows embodied in supply chains and the PI of the OpenGHGMap project providing Scope 1 emissions estimates for 100,000 European cities. Prior to joining NTNU Daniel was with MSCI in New York pricing ESG risk in investment portfolios. He has also worked with the Nobel laureate Paul Romer developing an economics MOOC, at the Responsible Investment Association of Australasia developing courses on carbon risk pricing, with the Global Footprint Network and WWF developing the original ecological footprint, and before that for several dot-com startups in his native California.

Filomena Nelson is the Climate Change Adaptation Adviser at the Secretariat of the Regional Environment Programme since October 2017. Prior to this, she was the former Assistant Chief

Executive Officer responsible for Samoan Government's Disaster Management Office under the Ministry of Natural Resources and Environment. She was the National Response Coordinator for the 2009 Pacific tsunami that affected Samoa, American Samoa and Tonga and 2012 Tropical Cyclone Evan. She holds a Bachelor of Arts Degree in Financial Management and Public Administration from the University of the South Pacific, Fiji and a Postgraduate Certificate in Humanitarian Partnership from Deakin University in Melbourne Australia.

Abhilasha Purwar is the Founder and CEO of Blue Sky Analytics, a Climate-Tech start-up using satellite data and AI to build environmental monitoring and climate-risk assessment products. She is a Fulbright scholar, Yale and IIT alum with over 8 years of work experience in private equity, big data analytics, product development and environmental policy. She began her career as a Research Associate at J-PAL, working on air pollution regulation with the Ministry of Environment, India. After her Masters in Environmental Management from Yale, she went on to work on building flexible solar cells in Dublin, kickstarting a solar products and asset financing startup at PEG Africa and clean energy investing as an Associate at GoldenSet Capital. Upon her return to India, Abhilasha founded Blue Sky Analytics in 2018 as she believes that "data has the capacity to change an entire ecosystem". She deems Blue Sky as a focal point of enabling global climate action with high quality, accessible environmental data.

Yann Robiou du Pont leads academic research quantifying ambition metrics to assess the alignment of the emissions and finance pledges of state and non-state actors with the Paris Agreement. His research informs IPCC and UNEP reports, governmental targets (including the UK NDC and net-zero target) and civil society (interactive website paris-equity-check.org). Outside academia, Yann advises diplomatic teams at UN negotiations and courts for litigation cases against countries and companies. At the OpenEarth foundation, Yann is supporting the development of the OpenClimate platform that gathers verified climate data and provides key decarbonation indicators to track climate action. With the input of the Climate Action Data 2.0 community, OpenClimate will enable an intuitive and trusted access to climate data and track progress of state and non-state actors towards their climate targets and the global climate objectives.

Steven Smith's research has focused on long-term socioeconomic scenarios, the interface between socioeconomic systems and the climate system, and the interactions between air pollution and climate. Smith is principal investigator of the Community Emissions Data System (CEDS) project that produces global historical air pollutant emissions over the industrial era (1750-present). Smith also works with the Global Change Assessment Model (GCAM), which he and collaborators are currently using to examine multi-sector interactions between the energy system and air-pollutant emissions from global to regional scales. Prior to joining PNNL in 1999, Dr. Smith worked with Dr. T.M.L. Wigley as a project scientist at the National Center for Atmospheric Research and was a lead author for the Intergovernmental Panel on Climate Change Special Report on Emissions Scenarios.

Ian Tout is a programme officer within the Communications and Engagement division of the United Nations Framework Convention on Climate Change. His work focuses on the recognition and tracking of non-Party stakeholder climate action, primarily through the UNFCCC Global Climate Action portal - an

online platform featuring nearly 30,000 actors from 170 countries. Ian grew up in the United Kingdom and holds an MSc in Geographical Information Science

Jocelyn Turnbull holds joint appointments at GNS Science, New Zealand the University of Colorado, USA, and co-chairs the WMO Integrated Global Greenhouse Gas Information System (IG3IS) initiative. Jocelyn leads the GNS Science Rafter Radiocarbon Laboratory, which maintains expertise in a wide range of radiocarbon applications. Her research investigates the modern carbon cycle, particularly fossil fuel derived CO₂. She uses atmospheric greenhouse gas observations as well as radiocarbon and related tracers to understand the sources and sinks of greenhouse gases at the local, urban and regional scales. Connecting emissions science to policy outcomes is a key component of Jocelyn's research. Current projects include: CarbonWatch-NZ evaluating New Zealand's natural and anthropogenic carbon budget; INFLUX, the Indianapolis Flux Project evaluating urban greenhouse gas emissions; and SOAR Southern Ocean Atmospheric Radiocarbon investigating Southern Ocean carbon exchange.

Molly White is the Director of the Education Program at the Greenhouse Gas Management Institute (GHGMI), where she leads GHG management curriculum and training development and delivery. She also provides monitoring and evaluation expertise across a number of GHGMI's capacity-development initiatives and projects. Currently she conducts research on developing GHG MRV frameworks and indicators for improving climate change interventions in majority-world countries. In 2020, Molly co-led the development of a Global Database of National GHG Inventory Capacity in Developing Countries with co-collaborators at the Institute for Global Environmental Strategies (IGES) and with funding from the United Nations Development Programme (UNDP). Molly has been recognized for her work by the U.S. EPA, City of Missoula Mayor's Office, New Leaders Council, and Women's Voices for the Earth.

Christine Wiedinmyer is the Associate Director for Science at the University of Colorado Boulder's Cooperative Institute for Research in Environmental Sciences (CIRES). A former scientist at the National Center for Atmospheric Research (NCAR), Dr. Wiedinmyer holds a Bachelor of Science in Chemical Engineering from Tulane University and a Masters and PhD in Chemical Engineering from the University of Texas at Austin. Dr. Wiedinmyer's research focuses on the identification and quantification of various emission sources and modeling the transport and fate of emitted pollutants in the atmosphere. She is the creator of the Fire INventory from NCAR (FINN) model that estimates emissions of pollutants from open burning globally; the FINN emissions estimates have been applied in numerous air quality and climate studies to evaluate their impacts. Further, Dr. Wiedinmyer is an expert in interdisciplinary research to connect her research to other areas of societal relevance, such as public health, land management, and climate. She is the recipient of the Walter Orr Roberts Lecturer for Interdisciplinary Sciences from the American Meteorological Society in 2014 "for research on biomass burning and its impact on the atmosphere and terrestrial biosphere, and bridging atmospheric science, biology, engineering, public health and other disciplines." Dr. Wiedinmyer is also a founding member and a current Board member of the Earth Science Women's Network (ESWN). Dr. Wiedinmyer was a member of the National Academies Committee on the Future of Atmospheric Chemistry Research, January 2015 – August 2016.

Kristina Wyatt is the deputy general counsel and SVP of Global Regulatory Climate Disclosure at Persefoni, a global software company that enables organizations and financial institutions to create regulatory-grade carbon footprint inventories and climate disclosures. Her recent experiences include serving as the senior counsel for climate and ESG to the Director of the Division of Corporation Finance at the U.S. Securities & Exchange Commission, and as the director of sustainability for Latham & Watkins. She received her BA in Philosophy from Duke University, and continued to receive her JD from the University of Colorado and an MBA from Yale University. Her recent publications include, “Environmental, Social, and Governance Matters: The Rapidly Evolving ESG Reporting Landscape” in *Emerging Trends in Securities Law* and “Recent Developments in ESG Reporting” in *Values at Work*.

Leehi Yona, (she/her) is a JD-PhD candidate at Stanford University, where she is a Pierre Elliott Trudeau Foundation Scholar and a Knight-Hennessy Scholar. Her research centers on the intersections between climate change science, policy, and justice, studying the global carbon cycle and how greenhouse gas emissions are (mis)counted. She is particularly interested in the ways greenhouse gas inventories can be improved to further motivate effective climate policy. In addition to her ongoing JD-PhD research at Stanford, Leehi holds a Master’s in Environmental Science from Yale University, where she studied the Intergovernmental Panel on Climate Change’s greenhouse gas inventory methodologies.

Daniel Zavala-Araiza is a senior scientist at Environmental Defense Fund. His current work focuses on characterizing methane emissions from fossil fuels. Daniel is a scientific advisor to the International Methane Emissions Observatory (IMEO) and a visiting researcher at Utrecht University.

Committee Bios

Donald J. Wuebbles (*Chair*) is Emeritus Professor of Atmospheric Science at the University of Illinois. He is also Director of Climate Science for Earth Knowledge. From 2015 to 2017, Dr. Wuebbles was Assistant Director with the Office of Science and Technology Policy at the Executive Office of the President. After many years at Lawrence Livermore National Laboratory, Dr. Wuebbles came to the University of Illinois as Professor and Head of the Department of Atmospheric Sciences in 1994. He also led the development of the School of Earth, Society, and Environment at the University, and was its first director. Dr. Wuebbles is an expert in atmospheric physics and chemistry, with over 500 scientific publications related to the Earth's climate and atmospheric composition. He also provides analyses and development of metrics for translating science to policy and societal responses. He has been a leader in many international and national scientific assessments, including as a coordinating lead author on international climate assessments led by the Intergovernmental Panel on Climate Change (IPCC), thus contributing to IPCC being awarded the Nobel Peace Prize in 2007. He co-led Volume 1 of the 2017 4th U.S. National Climate Assessment. Amongst his major awards, Dr. Wuebbles has received the Cleveland Abbe Award from the American Meteorological Society, the Stratospheric Ozone Protection Award from the U.S. Environmental Protection Agency, and the Bert Bolin Global Environmental Change Award from the American Geophysical Union. He is a Fellow of three major professional science societies, the American Association for the Advancement of Science, the American Geophysical Union, and the American Meteorological Society. Dr. Wuebbles holds a B.S. and M.S. in electrical engineering from the University of Illinois and a Ph.D. in atmospheric sciences from University of California, Davis. He was a member of the joint U.S. National Academy of Science and UK Royal Society Committee on Climate Change that wrote *Climate Change: Evidence and Causes* in 2014 and updated in 2020.

Kamal Bawa (NAS) is Distinguished Professor Emeritus at the University of Massachusetts Boston, and Founder-President of the Ashoka Trust for Research in Ecology and the Environment (ATREE), Bengaluru, India. His main area of expertise is sustainability science. Among the many awards he has received are the Pew Award in Conservation and the Environment, Giorgio Ruffolo Fellowship at Harvard University, the Gunnerus Prize in Sustainability Science from the Royal Norwegian Society of Letters and Sciences, the international MIDORI Prize in Biodiversity from the Aeon Foundation in Japan, the Linnean Medal from the Linnean Society, and honorary doctorates from the University of Alberta and Concordia University in Montreal. He is an elected Fellow of the US National Academy of Sciences, the Royal Society, the American Philosophical Society, and the American Academy of Arts and Sciences. Dr. Bawa is the founding Editor-in-Chief of *Conservation and Society* and Editor of *Ecology, Economy and Society*. Dr. Bawa received his Ph.D. in botany from Punjab University, India. He recently served on the National Academies' Committee on Developing a Booklet on Biodiversity for the Public and Policy Makers.

Gabrielle Dreyfus is chief scientist at the Institute for Governance & Sustainable Development (IGSD), Washington, DC and Paris, and an adjunct faculty at Georgetown University. She joined IGSD in 2017 after nearly a decade of working at the science and policy interface with the US Department of Energy, rising to deputy director for the Office of International Climate and Clean Energy, and previously with the National Oceanic and Atmospheric Administration, and US Senate. In addition to dozens of scientific and technical publications, Dr. Dreyfus worked as the lead coordinating author on a synthesis report by the International Energy Agency and United Nations Environment Programme on the intersection of energy efficiency and the

phasedown of hydrofluorocarbons in the cooling sector. Dr. Dreyfus is a member of the Montreal Protocol's Technology and Economic Assessment Panel Foams Technical Options Committee and Energy Efficiency Task Force, and was a member of the technical review committee of the Global Cooling Prize. She also contributed to the design and implementation of the \$50 million Kigali Cooling Efficiency Program (now Clean Cooling Collaborative), a philanthropic collaboration housed at the ClimateWorks Foundation. She was a 2021 Honoree of Environment+Energy Leader 100. Dr. Dreyfus holds a B.A. in Earth and Planetary Sciences from Harvard University, and a masters and Ph.D. from Princeton University and Sorbonne Université in Geosciences.

Annmarie Eldering has over 30 years of experience in the fields of air pollution, greenhouse gases, and remote sensing. She retired from NASA's Jet Propulsion Laboratory (JPL) in 2022. Her early work at Caltech focused on measuring and modeling the aerosols that form in the Los Angeles Basin and drastically reduce visibility. Dr. Eldering developed advanced computer models to simulate these processes and evaluate possible strategies for emissions reductions and improvement in air quality. At the JPL, she was the Project Scientist on satellite projects to measure tropospheric air pollution (TES) and later carbon dioxide (the Orbiting Carbon Observatories (-2 and -3)). Through these satellite projects, she has worked closely with the modeling community that is combining ground-based measurements, emissions inventories, and satellite measurements in atmospheric models to create the most complete understanding of the carbon cycle and the state of Earth's atmospheric composition including greenhouse gases. She was also a deputy section manager and section manager in Earth Atmospheric Science at JPL for 5 years, guiding and organizing a cohort of near 100 scientists, technical staff, and postdocs. Dr. Eldering received her B.E. in chemical engineering from Cooper Union and her Ph.D. in Environmental Engineering Science from Caltech.

Fiji George has more than 27 years of experience covering corporate climate and sustainability strategy, fundamental science, regulatory and policy experience along natural gas value chain- exploration/production, gas processing, transmission & storage, and liquefied natural gas (LNG). His expertise focuses on researching and implementing sustainable solutions for prudent development and use of natural gas and LNG in a low-carbon economy, and integrating corporate environmental, social & governance (ESG) programs to support the energy transition. Mr. George was a member of the National Academies of Sciences, Engineering and Medicine Committee on Anthropogenic Methane Emissions in the United States: Improving Measurement, Monitoring, Reporting, and Development of Inventories. He is a co-author on multiple peer-reviewed scientific papers, and the architect of the ONE Future Coalition voluntary methane inventory and mitigation program design. He has participated at Intergovernmental Panel on Climate Change (IPCC) Expert Meetings for Technical Assessment of IPCC Inventory Guidelines and provided feedback to the US Environmental Protection Agency on annual US national greenhouse gas inventories. At Cheniere, he leads the development of corporate policies and positions on climate and sustainability issues, including integration of climate considerations into corporate strategies and novel energy transition business plans such as the Cargo Emissions (CE) Tag, Quantification Monitoring Reporting & Verification (QMRV), and Lifecycle Analysis (LCA).

Heather Graven is a Reader in the Department of Physics and the Grantham Institute at Imperial College London, UK. She earned her Ph.D. in earth sciences from Scripps Institution of Oceanography at the University of California, San Diego and she worked previously at ETH Zurich, Switzerland. Her research focuses on the use of atmospheric measurements to understand the global carbon cycle and its response to human activities and climate change. She uses radiocarbon and stable carbon isotopes to distinguish fossil fuel and biogenic influences on carbon dioxide and methane, and to investigate carbon cycling in the ocean and land biosphere.

Kevin Gurney is an Atmospheric Scientist, Ecologist and Policy scientist currently working in the areas of carbon cycle science, climate science, and climate science policy at Northern Arizona University where he is a Professor in the School of Informatics, Computing, and Cyber Systems. Dr. Gurney is a co-founder of a for-profit business, Crosswalk Labs, which licenses a product that generates estimates of CO₂ emissions at fine scales across the United States to provide high-resolution CO₂ emissions to businesses, media, states, and local jurisdictions. Gurney's current University research involves understanding elements of the global carbon cycle using a variety of data/model fusion approaches. Over the last two decades Dr. Gurney has focused on quantification of fossil fuel CO₂ emissions at the global ("FFDAS"), national ("Vulcan") and urban ("Hestia") scales. Using data mining and assimilation algorithms, these very high-resolution greenhouse gas quantification products are being used by analysts, scientists, and governments for emissions mitigation planning, tracking and assessment. The US work, in particular, is anchoring efforts at National Oceanic and Atmospheric Administration and the National Institute of Standards and Technology to develop prototypes of a multiscale greenhouse gas information system. He has degrees from UC Berkeley, MIT, and Colorado State University. He previously held faculty positions at Purdue University and Arizona State University. Gurney is an IPCC lead author, an NSF CAREER award recipient, Sigma Xi Young Scientist recipient, a Fulbright scholar, NAU Research and Creativity awardee, and has published over 150 peer-reviewed scientific articles with multiple papers in journals such as Nature and Science and a book from MIT Press, Mending the Ozone Hole.

Angel Hsu is an Assistant Professor of Public Policy and the Environment at UNC Chapel Hill and Founder/Director of the Data-Driven EnviroPolicy Lab, an interdisciplinary research group that innovates and applies quantitative approaches to pressing environmental issues. Her research explores the intersection of science and policy and the use of data-driven approaches to understand environmental sustainability, particularly in the areas of climate change and energy, urbanization and air quality. Dr. Hsu has provided expert testimony to the U.S. Senate Committee on Energy and Natural Resources, US-China Economic Security and Review Commission and is a member of the National Committee on US-China Relations and a Public Intellectual Program Fellow. She is a lead and contributing author to global climate science assessments, including the IPCC Sixth Assessment Report and the United Nations Environment Programme (UNEP) Emissions Gap Report. She previously held a joint appointment as Assistant Professor of Environmental Studies at Yale-NUS College in Singapore and the Yale School of Forestry and Environmental Studies as an adjunct. She holds a Ph.D. in environmental policy from Yale University, an M.Phil. in environmental policy from the University of Cambridge, and a B.S. in biology and B.A. in political science from Wake Forest University in Winston-Salem, NC.

Tomohiro Oda is a senior scientist at the Universities Space Research Association and an adjunct professor at the Department of Atmospheric and Oceanic Science, University of Maryland, College Park. Prior to the current positions, Dr. Oda held positions at NASA Goddard Space Flight Center, Colorado State University, NOAA Earth System Research Laboratory, and Japan's National Institute for Environmental Studies. Dr. Oda is a pioneer of the use of Earth Observations in development of high-resolution carbon spatial emission estimates. During his career, he has advanced spatial carbon emission modeling and the associated error and uncertainty quantification. Dr. Oda has also advanced and matured the carbon emission quantification using new space-based carbon observation. Dr. Oda is the Principal Investigator and developer of the Open-source Data Inventory for Anthropogenic CO₂ (ODIAC) emission inventory data product. He is a science team member of NASA's Orbiting Carbon Observatory mission as well as a key contributor to Japan's Greenhouse gas Observing Satellite (GOSAT) mission. Dr. Oda holds a Ph.D and a master's degree in engineering from Osaka University, Japan and an undergraduate degree in physics from Kwansei Gakuin University, Japan.

Irène Xueref-Remy is Physicist of the National Council of Astronomers and Physicists (CNAP), France, and Principal Investigator of the atmospheric activities at the Center for Scientific Research (CNRS) Observatoire de Haute Provence. She is a Professor at the University of Aix-Marseille (AMU) and she directs research programs at the Mediterranean Institute of Biodiversity and marine and continental Ecology (IMBE) at Aix-en-Provence. Her research focuses on assessing the variability of atmospheric greenhouse gases at different spatiotemporal scales; improving knowledge of emission inventories and natural greenhouse gas fluxes through atmospheric measurements and modeling techniques; and, bridging the gap between science and society by communicating her knowledge through conferences and collaborating with local air quality agencies and stakeholders within her research projects. Her current research focuses on the construction of scenarios for reaching carbon neutrality by 2050 in the Aix-Marseille metropolis in collaboration with local stakeholders. Among others, she is a member of the Scientific Council of the Regional Air Quality Agency and a member of the WMO IG3IS international program (Integrated Global Greenhouse Gas Information System) dedicated to help guiding stakeholders for taking valuable GHG emission-reduction actions in response to climate change. Dr. Xueref-Remy has a diploma of Engineer from the Ecole Centrale de Lyon, obtained her Ph.D. at the University of Grenoble and performed three postdoctoral positions at the Juelich Research Center in Germany, at Harvard University, and at Laboratoire des Sciences du Climat et de l'Environnement in France.

World Café Method

The World Cafe is a method which makes use of an informal cafe setting for participants to explore an issue by discussing it in small table groups.

Discussion is held in 4 rounds of 20 minutes, with the cafe ambiance intended to allow for more relaxed and open conversations to take place.

DESCRIPTION

The World Cafe is an engagement process designed to take place in a cafe setting (or a room set up to resemble one as much as possible) so that participants are seated around small tables with tablecloths and tea, coffee and other beverages. The idea behind this is to create a space that supports 'good conversation', where anybody is able to talk about things that matter to them.

The method is based on the assumption that people already have within them the wisdom and creativity to confront even the most difficult challenges and rests on two key principles:

1. humans want to talk together about things that matter to them
2. and if they do, they can create collective power.

The process is distinguished by a number of [core design principles](#). These include making sure that the space is hospitable space, everyone's contribution counts and that participants take responsibility for listening and exploring insights together.

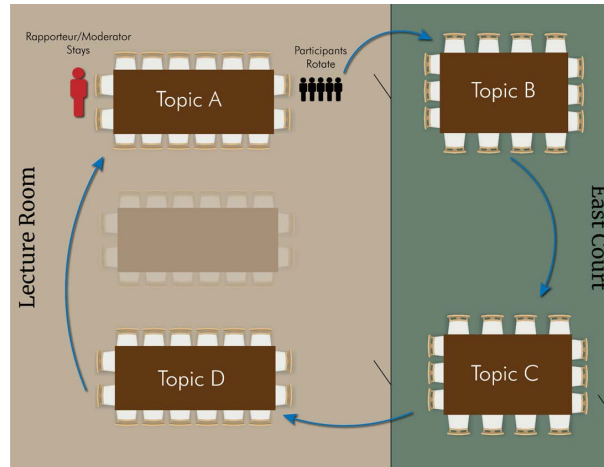
THE PROCESS

- Each round is initiated with a specific question related to the overall purpose of the event. The same questions can be used for more than one round or they can build upon one another.
- During the event participants discuss the questions at their table, before moving on to a new table/group for each new round. Often participants are provided with pens and are encouraged to draw and record their conversations on the paper tablecloths to capture free flowing ideas as they emerge.
- One participant (the table host) remains and summarises the previous conversation to the newly arrived participants. By moving participants around the room the conversations at each table are cross-fertilised with ideas from other tables, resulting in a collective intelligence. At the end of the process the main ideas are summarised in a plenary session and follow-up possibilities are discussed.

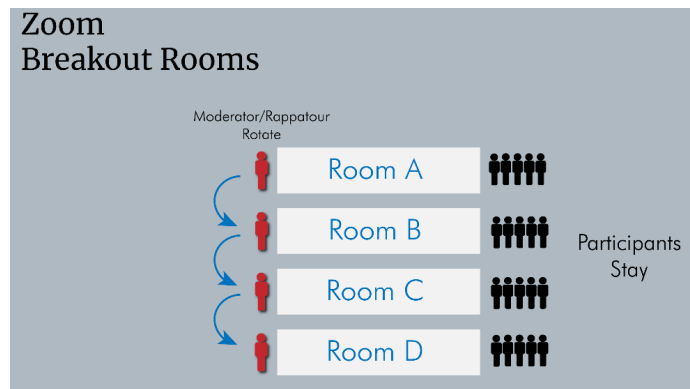
Source: <https://www.involve.org.uk/resources/methods/world-cafe>

Our Workshop Format

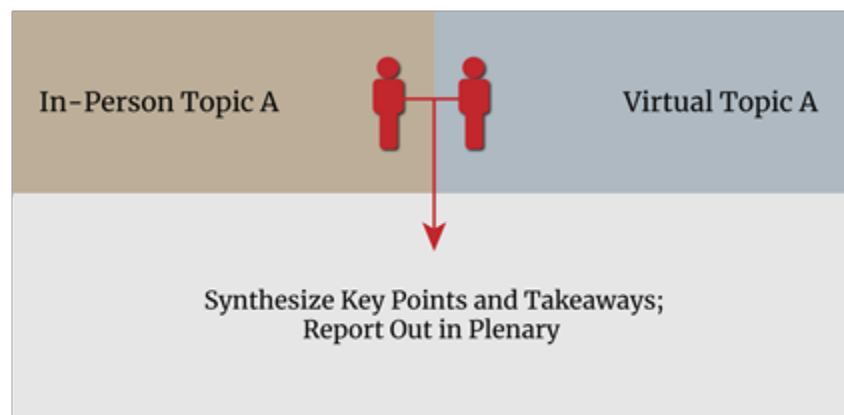
In-person World Café: Participants rotate through tables



Virtual World Café: Rapporteurs/Moderators rotate through breakout rooms

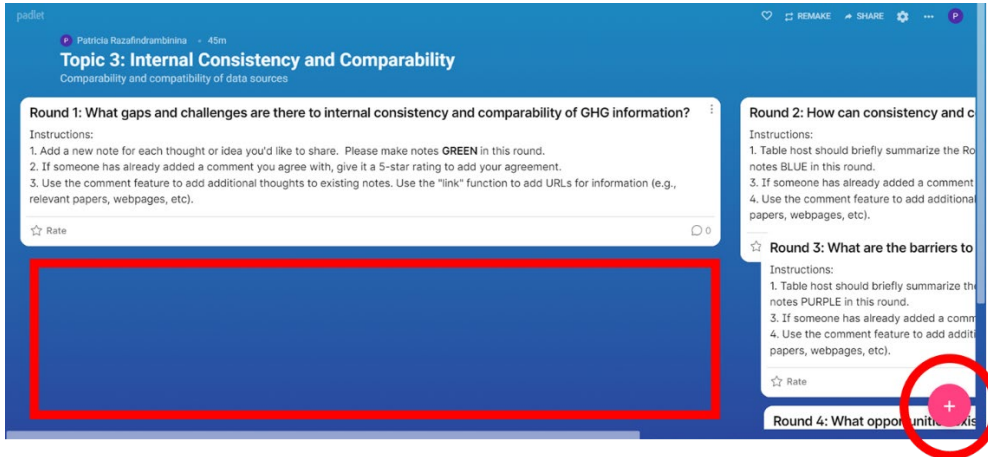


Synthesis: Results are reported

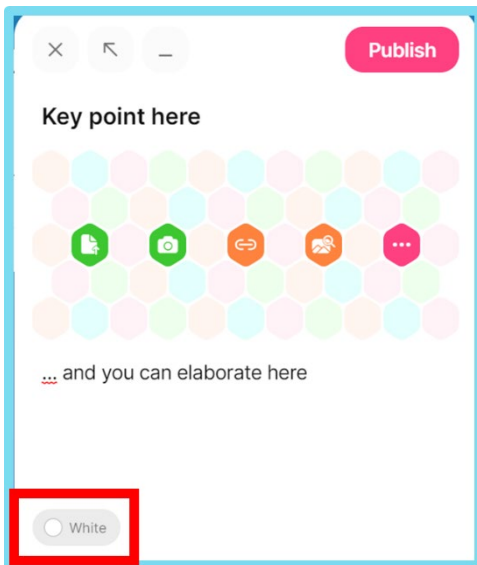


Tips for your World Café discussions

1. Navigate to the appropriate Padlet: Each round in a World Café session will have its own Padlet page

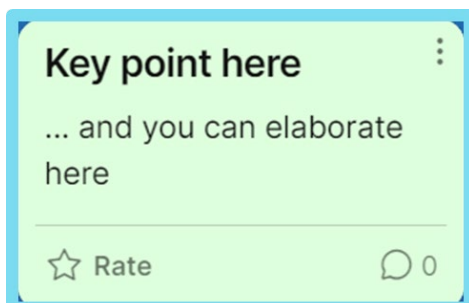


2. Use the “+” button at the bottom right corner or **double-click** anywhere in the open space to add your post



3. **Type your input.** Padlet also allows you to add attachments (links, documents, etc.)

4. Each round is color coded, so make sure you **color your post accordingly** with the button on the bottom left corner



5. To react to the input of others, use the **star** rating or **comment** function

[Start Exploring Padlet Here](#)

Padlet Links:

Session 3:

[Topic 1](#)

[Topic 2](#)

[Topic 3](#)

[Topic 4](#)

Session 4:

[Topic 1](#)

[Topic 2](#)

[Topic 3](#)

[Topic 4](#)

Session 5:

[Topic 1](#)

[Topic 2](#)

[Topic 3](#)

[Topic 4](#)

Workshop 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 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 issues (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, workshop committee 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 kind.** 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: Rachel Silvern, rsilvern@nas.edu
- Contact NASEM Office of Human Resources, hrrservicecenter@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