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Identifying New Community-Driven Science Themes for NSF's Support of Paleoclimate Research: A Workshop

Briefing Materials

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Identifying New Community-Driven Science Themes for NSF's Support of Paleoclimate Research: A Workshop

June 21-23, 2021 | 12:00-5:00 pm (All times EDT)

Agenda

Workshop Goal: This workshop seeks to identify potential future paleoclimate research directions that will help advance understanding of current and future change in the Earth's climate system. Drawing upon broad community input collected via an online questionnaire, workshop discussions will address gaps in our current understanding of past climate variability and processes, and new research strategies and technological capabilities that could practically be undertaken to effectively fill these knowledge gaps.

Day 1: Monday, June 21, 2021
Understanding Past Climate Forcings and Sensitivity

12:00 pm **Welcome and Opening Remarks**
Andrea Dutton, Planning Committee Chair, University of Wisconsin-Madison, and introduction of BEAJEDI asynchronous session with session host Aradhna Tripati, UCLA
Soumaya Belmecheri, Program Director, NSF Paleoclimate Program (P2C2)

Session 1: Understanding Drivers of Past Climate Change

12:20 pm **Panel: The Knowns and Unknowns of Climate Forcings**
Moderator: Isabel Montañez, Planning Committee Member, UC Davis

- Bärbel Hönisch, Columbia University (CO_2)
- Natalie Mahowald, Cornell University (aerosols forcing)
- Ilya Bindeman, University of Oregon (volcanic forcing, tephra)
- Chris Poulsen, University of Michigan (paleogeographic forcing, orbital forcing)
- Ed Brook, Oregon State University (methane and other GHGs)

1:00 pm **Transition to Breakout Rooms**

1:10 pm **Breakout Discussions: Gaps and Strategies**

Breakout Room	Moderators
Greenhouse Gas Proxies	Yige Zhang, Texas A&M University Gordon Inglis, University of Southampton Committee members: Isabel Montañez, Tripti Bhattacharya
Volcanic Forcing and Aerosol Forcing	Sarah Aarons, Scripps Clay Tabor, University of Connecticut Committee members: Kau Thirumalai, Natalie Burls

Orbital Forcing	Lorraine Lisiecki, UCSB Zhengyu Liu, OSU Committee members: Andrea Dutton, Christo Buizert
Paleogeographic and Tectonic Forcing	Jung-Eun Lee, Brown University Kate Huntington, University of Washington Committee members: Sarah Feakins, Julie Brigham-Grette

1:55 pm **Summary of Breakout Discussions**

2:20 pm Break

Session 2: Reconstructing Global Climate Change and Climate Sensitivity

2:50 pm **Panel: The Knowns and Unknowns of Reconstructing Global Climate Change and Climate Sensitivity**
Moderator: Natalie Burls, Planning Committee Member, George Mason University

- Gavin Schmidt, NASA (policy connections)
- Jess Tierney, University of Arizona (large-scale temperature patterns, Bayesian calibration)
- Shaun Marcott, University of Wisconsin-Madison (terrestrial surface temperature patterns, data synthesis)
- Gabe Bowen, University of Utah (cyberinfrastructure, Bayesian proxy intercomparison)
- Jiang Zhu, NCAR (clouds, aerosol indirect effects and feedbacks)

3:30 pm **Transition to Breakout Rooms**

3:35 pm **Breakout Discussions: Gaps and Strategies**

Breakout Room	Moderators
Ocean Temperatures (Cenozoic)	Aradhna Tripati, UCLA Committee members: Isabel Montañez, Tripti Bhattacharya
Terrestrial Surface Temperature Patterns	Katherine Glover, University of Maine Ben Laabs, North Dakota State University Committee members: Sarah Feakins, Christo Buizert
Temperature Response to Volcanic Forcing	Kevin Anchukaitis, University of Arizona Christina Karamperidou, University of Hawaii Committee members: Kau Thirumalai, Julie Brigham-Grette
Climate Sensitivity	Cristi Proistosescu, University of Illinois Dan Lunt, University of Bristol Committee members: Natalie Burls, Andrea Dutton

4:20 pm **Summary of Breakout Discussions**

4:45 pm **Key Takeaways and Plans for Day 2**
Committee Members

5:00 pm Break

5:15 pm **Breakout Discussion for Early Career Researchers**
This session is pitched towards post-docs and late-stage PhD students

6:00 pm Adjourn

Day 2: Tuesday, June 22, 2021
Glacial, Ocean, and Land Processes and Feedbacks

12:00 pm **Welcome and Opening Remarks**
Andrea Dutton, Committee Chair, University of Wisconsin-Madison

Session 1: Ice Sheet and High-Latitude Proxies and Feedbacks

12:10 pm **Panel: Knowledge Gaps in Glacial Feedbacks, Sea Level, and Ocean Feedbacks**
Moderator: Christo Buizert, Planning Committee Member, Oregon State University

- Jacky Austermann, Columbia University (GIA, sea level, PALSEA)
- Jason Briner, University at Buffalo (ice sheets, GIS)
- Tom Cronin, USGS (Arctic Ocean, sea ice)
- Erich Osterberg, Dartmouth College (ice core records)
- Amelia Shevenell, University of South Florida (Antarctic history)

1:00 pm Break

Session 2: Ocean Proxies and Feedbacks

1:20 pm **Panel Discussion**
Moderator: Julie Brigham-Grette, Planning Committee Member, U Mass Amherst

- Mo Walczak, Oregon State University (ocean circulation)
- Kassandra Costa, WHOI (radiotracers, paleoproductivity, ocean circulation)
- Kira Lawrence, Lafayette College (marine biomarkers, SST)
- Andreas Schmittner, Oregon State University (models)
- Alex Gagnon, University of Washington (biomineralization)

2:10 pm Break

Session 3: Terrestrial Proxies and Feedbacks

2:30 pm **Panel Discussion**
Moderator: Andrea Dutton, Planning Committee Chair, University of Wisconsin-Madison

- Jack Williams, University of Wisconsin-Madison (vegetation-climate, database)
- Joe McConnell, Desert Research Institute (black carbon, fire history)
- Katey Walter Anthony, University of Alaska Fairbanks (permafrost extent)
- Andy Ridgwell, UC Riverside (modeling, global carbon cycling)
- Grant Harley, University of Idaho (tree ring, temperature, blue light)

3:20 pm **Transition to Breakout Rooms**

3:25 pm **Breakout Discussions: High Latitudes, Ocean, and Terrestrial Proxies and Processes**

Breakout Room	Moderators
Sea Level, Ice Sheets, GIA	Paul Bierman, UVM Andrea Hawkes, UNCW Committee member: Andrea Dutton
Arctic Ocean, Arctic Borderlands	Beth Caissie, USGS Joseph Ortiz, Kent State Committee member: Julie Brigham-Grette
Antarctica and Southern Ocean Processes	Julia Wellner, UH Liz Sikes, Rutgers Committee member: Christo Buizert
Ocean Circulation, Deepwater Formation	Jerry McManus, LDEO Andrew Thompson, Cal Tech Committee member: Tripti Bhattacharya
Fire and Vegetation	Cathy Whitlock, Montana State University Mary Edwards, University of Southampton Committee member: Sarah Feakins
Ocean Productivity, Biochemistry	Christopher Hayes, University of S. Miss. Summer Praetorius, USGS Committee member: Kau Thirumalai
Terrestrial and Ocean Carbon Cycle	Matthew Winnick, U Mass Amherst Committee members: Isabel Montañez, Natalie Burls

4:10 pm **Summary of Breakout Discussions**

4:45 pm **Key Takeaways and Plans for Day 3**
Committee members

5:00 pm Adjourn

Day 3: Wednesday, June 23, 2021
Resolving Regional Climate Change: Advancing and Synthesizing Knowledge

12:00 pm **Welcome and Opening Remarks**
Andrea Dutton, Committee Chair, University of Wisconsin-Madison

Session 1: Hydroclimate and Habitability

12:10 pm **Panel: Paradigms and Applications of Paleohydrology**
Moderator: Tripti Bhattacharya, Planning Committee Member, Syracuse University

- Christopher Skinner, U Mass Lowell (biosphere-atmosphere interactions)
- Matt Huber, Purdue University (monsoons)
- Juan Lora, Yale (water isotopes, modeling, hydrologic cycles, atmospheric dynamics)
- Connie Woodhouse, University of Arizona (tree rings)
- Elizabeth Thomas, University of Buffalo (plant wax, Arctic)
- Naomi Levin, University of Michigan (novel isotopes, outcrop archives)

1:00 pm **Transition to Breakout Rooms**

1:05 pm **Breakout Discussions: Accessing Hydroclimate Archives and Fostering Proxy Innovation**

Breakout Room	Moderators
Ocean Coring and Drilling	Yair Rosenthal, Rutgers Melissa Berke, Notre Dame Committee members: Sarah Feakins, Natalie Burls
Continental Drilling and Lake Coring	James Russell, Brown Sherilyn Fritz, U of Nebraska-Lincoln Committee member: Julie Brigham-Grette
Outcrops and Paleosols	Katie Snell, University of Colorado Jeremy Caves Rugenstein, Colorado State Committee member: Isabel Montañez
Ice	Brad Markle, University of Colorado Boulder Mathias Vuille, SUNY Albany Committee member: Christo Buizert
Tree Rings	Valerie Trouet, University of Arizona Rosanne D'Arrigo, LDEO Committee member: Tripti Bhattacharya
Speleothems	Kathleen Johnson, UC Irvine Jessica Oster, Vanderbilt Committee member: Kau Thirumalai
Human Infrastructure	Deborah Khider, USC Amy Myrbo, Science Museum of Minnesota Committee member: Andrea Dutton

1:50 pm **Summary of Breakout Discussions**

2:15 pm Break

Session 2: Modes of Oceanic and Atmospheric Variability

2:45 pm **Panel: Modes of Paleoceanographic and Paleoclimate Variability: From Observations to Theory**

Moderator: Kau Thirumalai, Planning Committee Member, University of Arizona

- Sam Stevenson, UC Santa Barbara (climate modeling, coral and tree-ring records, megadrought)
- Pedro DiNezio, University of Colorado Boulder (climate dynamics, modeling, ENSO)
- Christina Ravelo, UC Santa Cruz (stable isotope geochemistry, paleoceanography, marine sediments)
- Kim Cobb, Georgia Tech (coral and cave records, isotope geochemistry, multiproxy reconstructions, Holocene paleoclimate modeling)
- Hali Kilbourne, University of Maryland (coral records, isotope geochemistry, paleoclimate data assimilation and modeling)

3:25 pm **Transition to Breakout Rooms**

3:30 pm **Breakout Discussions: Challenges of Chronology, Inter-site, and Proxy-model Comparison**

Breakout Room	Moderators
Deep Time (>200Ma on Land)	Francis Macdonald, UC Santa Barbara Matthew Clapham, UC Santa Cruz Committee members: Isabel Montañez, Natalie Burls
Cenozoic (IODP, ICDP)	Celli Hull, Yale Lisa Tauxe, Scripps Committee members: Sarah Feakins, Julie Brigham-Grette
Glacial Climates and Abrupt Change	David McGee, MIT Bryan Shuman, University of Wyoming Committee members: Christo Buizert, Tripti Bhattacharya
Late Holocene	Julie Cole, University of Michigan Sloan Coats, University of Hawaii Committee member: Andrea Dutton
Instrumentation and Analytical Innovations	Claudia Czimczik, UC Irvine Marissa Tremblay, Purdue Committee member: Kau Thirumalai

4:15 pm **Summary of Breakout Discussions**

4:40 pm **Reflections from the Early Career Breakout Discussion**

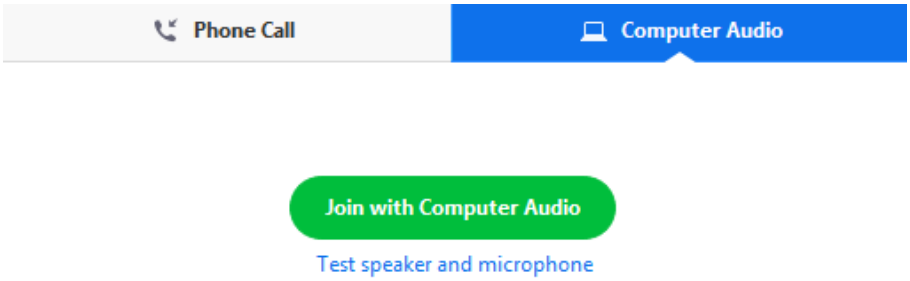
Kau Thirumalai, Planning Committee Member, University of Arizona
Tripti Bhattacharya, Planning Committee Member, Syracuse University

4:50 pm	**Closing Remarks** Andrea Dutton, Committee Chair, University of Wisconsin-Madison Soumaya Belmecheri, Program Director, NSF Paleoclimate Program (P2C2)
5:00 pm	Adjourn

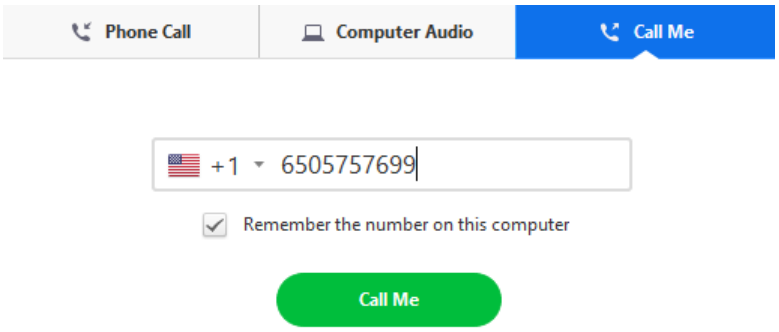
Detailed Zoom Instructions

Connecting to the Audio Portion of the Meeting – You may join the zoom audio via your computer (laptop or desktop) or via phone.

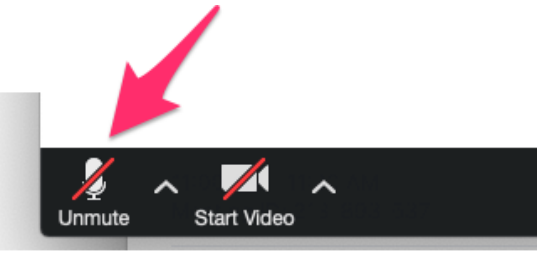
To join via the computer, choose the Computer Audio tab then click on Join with Computer Audio. Depending on your computer, you might need a headset or earphone with a microphone. *Note: if you don't have the fastest internet connection or are having problems with the computer audio, we suggest connecting via phone (see instructions below).*



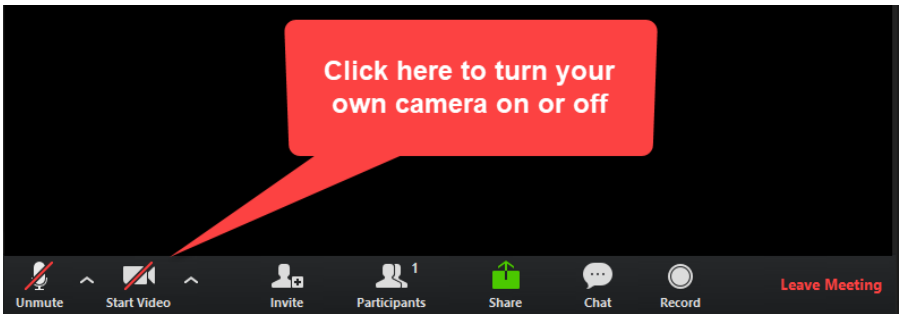
To connect to audio via the phone, you can select the "phone call" tab to call-in yourself (call one of the phone numbers and follow the prompts) or click on the Call Me Tab, then enter the number of the phone you wish to be connect to during the meeting. You will be called and all you need to do is answer to be connected to the audio of the meeting.



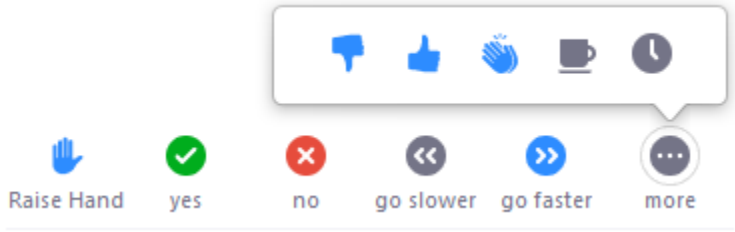
Muting and Unmuting Yourself - We ask that everyone remain muted during the meeting, until they are called on to speak (you can "raise your hand" if you have a question or comment - directions below). You will find your microphone mute/unmute at the bottom of your Zoom screen on the far left – click it once and you will get a red line through it to indicate you are mute, click again to unmute. All microphones will be put on mute during breaks. *Note: if you are using phone audio and wish to speak, make sure that you have unmuted on BOTH your phone and Zoom to make sure we can hear you.*



Turning On and Off Your Video -- right next to the Microphone icon is the Video Icon. You can turn your video off/on the same way. We are asking that all committee members leave their videos on, if possible.

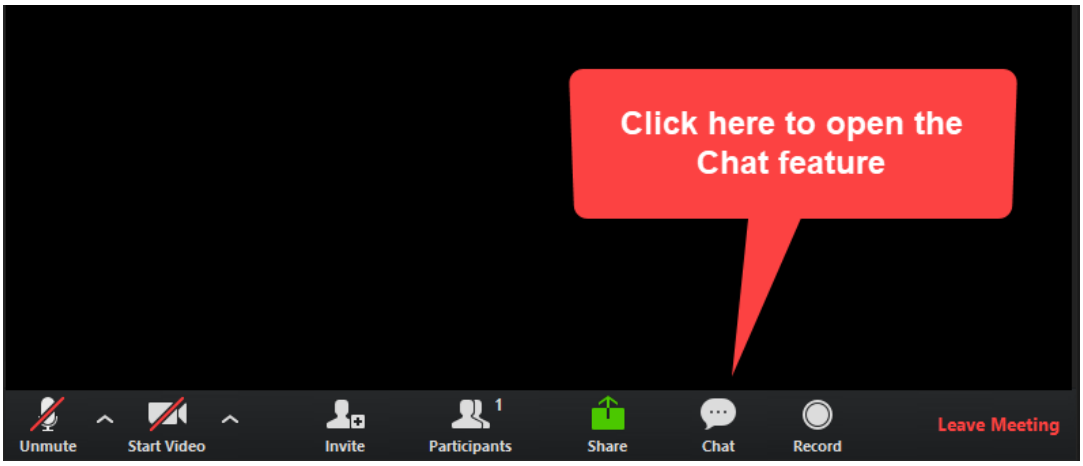


Raising Your Hand - to raise your hand, click on Participants icon at the bottom of the Zoom screen. In the Participants window, at the bottom, on the left hand side, will be the Raise Hand icon. You can also click the More button to see additional options.

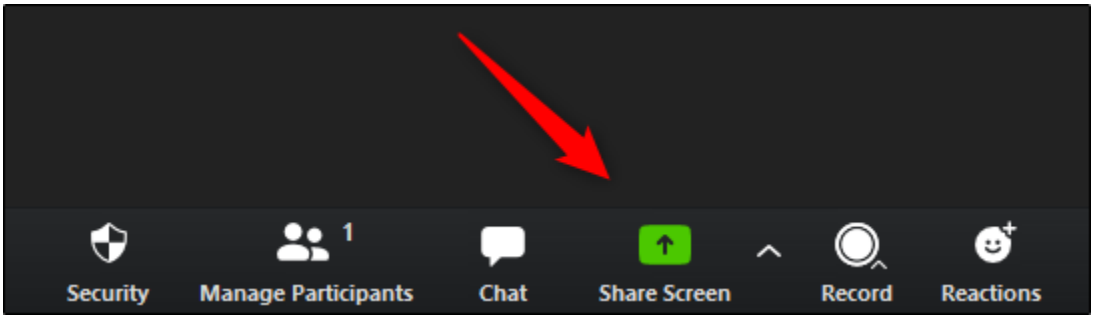


Changing your Name – When you sign in make sure you put in your full name, so you can be identified easily. To do this, click the Participants icon at the bottom of the zoom screen. Where you see your name or phone number, click on the corresponding arrow for more options. Select “rename” and type in your full name.

Chatting – you can use the chat feature, located at the bottom of your Zoom screen, to chat with the entire group or use for private, one-on-one chats. The group chat will be saved after the meeting, but not private chats.



Sharing Your Screen – to share your screen the host will need to make you a cohost for that period of time. Once that happens you find the Share icon in the bottom part of your Zoom screen. Once you share your screen you can show any application or document that you have open on your computer. We suggest that you choose to share a specific file (e.g., Word document) instead of sharing your entire screen. *Note: a file must be currently open for you to be able to share it.*



Other Zoom Suggestions

- During the Zoom meeting, close out all/most other programs on the computer so zoom runs smoothly.
- Download and Install Zoom from: https://zoom.us/support/download/ (not necessary as you can run zoom via your browser, but may make using zoom easier for you). Once you install zoom on your computer, you get some additional capabilities. For example, depending on your system setup, you can add virtual backgrounds (see this link for instructions on how to do this) and preview your video via the "Settings" option.

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Identifying New Community-Driven Science Themes for NSF's Support of Paleo Perspectives on Climate Change (P2C2): A Workshop

Statement of Task

The National Academies of Sciences, Engineering, and Medicine will organize a workshop that seeks to identify potential future paleoclimate research directions that will help advance understanding of Earth's climate system. Drawing upon broad community input collected via an online questionnaire, workshop discussions will address the following questions:

- What gaps exist in our current understanding of past climate variability and processes?
- What new research strategies and technological capabilities could practically be undertaken to effectively fill these knowledge gaps?
- How can paleoclimate science be relevant to the nexus of science and decision making?

The National Academies of
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Identifying New Community-Driven Science Themes for NSF's Support of Paleoclimate Research: A Workshop

Workshop Planning Committee Bios

Andrea Dutton (Chair) is a professor at the University of Wisconsin-Madison. Dr. Dutton is an international expert in the study of past climate and sea level change using carbonate sedimentology and isotope geochemistry. Her research program focuses on understanding the rates, magnitudes, sources, and drivers of past sea level change to facilitate improved understanding of the climate system and of projections for the future. Dr. Dutton has served in leadership positions for several disciplinary working groups, served on the NASEM committee for the Earth in Time community consensus report (2020), and has an active role in science communication on climate change and sea-level rise. She is a MacArthur Fellow, a Fulbright Scholar, and a fellow of the Geological Society of America. Dr. Dutton received her M.S. and Ph.D. from the University of Michigan in Ann Arbor and was a postdoctoral fellow and research fellow at the Australian National University and a faculty member at the University of Florida before relocating to Wisconsin.

Tripti Bhattacharya is an early-career Asian American geoscientist specializing in paleoclimate dynamics and data-model integration. Dr. Bhattacharya received her BS degree in Environmental Science in 2010 from Georgetown University and her PhD in Geography in 2016 from the University of California Berkeley. She subsequently was a postdoctoral researcher at the University of Arizona from 2016 to 2018. She has been an Assistant Professor at Syracuse University since August 2018. Her work focuses on using paleoclimate data, especially organic geochemical proxies of hydroclimate and temperature, to understand the drivers of regional climate change and to constrain sources of uncertainty in future climate projections. She has published in journals including Nature Geoscience, Science, and Proceedings of the National Academy of Sciences.

Julie Brigham-Grette served 6 years as Department Head of Geosciences (2013-2019) and Chair of the Polar Research Board of the US National Academy of Sciences (2014-2020). She is now President of the AGU Global Environmental Change section. And President of the Quaternary Division of the Geological Society of America. She has been conducting research in the Arctic for 40+ years, including eight field seasons in remote parts of northeast Russia since 1991. After graduating with a BA in Geology from Albion College, she completed her MSc and PhD at the University of Colorado. Julie served as a postdoctoral fellow in Bergen Norway and then at the University of Alberta before taking a faculty position at the University of Massachusetts-Amherst in 1987. Her research expertise is in Arctic marine and terrestrial sediment records of climate change over the last few million years, especially the history of Arctic sea ice, sea level, and western Arctic landscape change. This research directly addresses global climate change, the most critical problem facing species survival in our century. Professor Brigham-Grette is an elected Fellow of both the Geological Society of America and the American Geophysical Union.

She led the $10M International Continental Scientific Drilling Program at Lake El'gygytgyn in NE Russia collecting a record of Arctic change over the past 3.6 million years. She has also been involved in the development of sea ice proxies and the sea ice history of the Bering Strait Region of the western Arctic. For several years Julie and collaborators have run a Research Experience for Undergraduates on Svalbard studying modern processes in front of tidewater glaciers. Julie has new interests in public engagement, using science to inform policy on coastal management challenges with rising sea level. For this reason she is also engaged with indigenous people of Alaska via the NSF Navigating the New Arctic Program.

Christo Buizert is an assistant professor in the College of Earth, Ocean and Atmospheric Sciences at Oregon State University. His work aims to reconstruct and understand past climate change and atmospheric composition, using deep ice cores from Greenland and Antarctica. One of his main research interests is abrupt climate change of the last ice age (the so-called Dansgaard-Oeschger cycle), and its impact on global climate, atmospheric circulation, and biochemistry. In 2012, Dr. Buizert obtained a PhD in geophysics from the Niels Bohr Institute at the University of Copenhagen, Denmark. He has been awarded research grants through the NSF Paleo Perspectives on Climate Change (P2C2) program, and has published many scientific papers on topics relevant to the program.

Natalie J. Burls is an Associate Professor at George Mason University. Dr. Burls' research is focused on improving our understanding of the key processes determining Earth's climate and climate variability on a variety of timescales ranging from seasonal, to decadal, to much longer geological timescales. In particular, she is interested in the climatic role of ocean general circulation, ocean-atmosphere interaction and cloud dynamics. Her research efforts acknowledge that, to fully understand, model and predict changes in climate characteristics that have a large impact on the Earth system and society (e.g. temperature and precipitation patterns), a coupled ocean-atmosphere perspective is needed – one that accounts for changes in important variables such as the thermal structure of the slowly-adjusting ocean. Complementing observations with theory, she endeavors to accompany complex simulations of climate phenomena with simple models capturing the essential dynamics required to explain unanswered questions within climate science. Dr. Burls received her PhD in Physical Oceanography from the University of Cape Town in 2010. From 2011 to 2014, she worked as a postdoctoral associate in the Department of Geology and Geophysics at Yale University. She joined George Mason in January 2015.

Sarah Feakins is a Professor of Earth Sciences at the University of Southern California. Her research focuses on past climate and vegetation change, using organic geochemical techniques. She has used knowledge of modern plants and sedimentary systems to document changes in ecosystems over millions of years using samples collected by the International Ocean Discovery Program. She obtained her undergraduate degree in Geography at the University of Oxford, her PhD in Earth Sciences from Columbia University's Lamont Doherty Earth Observatory and she was a National Oceanic and Atmospheric Administration Global and Climate Change Postdoctoral Research Fellow at the California Institute of Technology. Dr. Feakins has authored

over 60 peer reviewed papers and book chapters, and she has five years' experience as an Associate Editor (Geochimica et Cosmochimica Acta, Geophysical Research Letters, and Paleoceanography and Paleoclimatology). She participated in an NAS workshop "Earth System Context for Hominin Evolution" in 2008.

Isabel P. Montañez (NAS) is a Distinguished Professor and Chancellor's Leadership Professor in the Department of Earth and Planetary Sciences, University of California, Davis. Dr. Montañez is a paleoclimatologist whose research focuses on geologic archives of past atmospheric gas and ocean geochemical compositions and their linkages to climate and ecosystem changes. She received her Ph.D. from Virginia Polytechnic Institute in 1990 and has received several awards, including the James Lee Wilson Medal for Excellence by a Young Scientist, the Laurence L. Sloss Award from the The Geological Society of America, the Jean-Baptiste Lamarck Medal from the European Geosciences Union, and the Francis J. Pettijohn Medal from the Society of Sedimentary Geology (SEPM). She is a Fellow of several professional societies (AGU, GSA, AAAS), a past Fellow of the John Simon Guggenheim Memorial Foundation and a Fellow of the California Academy of Sciences. She served as President of The Geological Society of America from 2017 to 2018. In 2021, she was elected to the National Academy of Sciences.

Kaustubh Thirumalai is an assistant professor at the University of Arizona in the Department of Geosciences. His primary professional expertise is in the area of paleoceanography and climate change/dynamics. He obtained his Ph.D. and M.S. at the University of Texas at Austin in 2016 and 2012 respectively, where he focused on Holocene paleoceanography of the Gulf of Mexico for his doctoral work and on statistical evaluations of El Niño Southern Oscillation reconstructions from individual foraminifera for his MS thesis. Dr. Thirumalai subsequently spent a year as the Institute for Geophysics Institutional Postdoctoral Fellow from 2016-17, and then as a Presidential Postdoctoral Research Associate at Brown University from 2017-2019. He started as an assistant professor at Arizona in 2019 July, and is the director of the Paleoceanography Laboratory. He serves as an Associate Editor for Paleoceanography & Paleoclimatology (AGU Wiley Journal) and has experience nominating individuals for awards.

Identifying New Community-Driven Science Themes for NSF's Support of Paleoclimate Research: A Workshop

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 the Workshop Committee Chair, Andrea Dutton, dutton3@wisc.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: EXPECTATIONS FOR PARTICIPANTS IN NASEM ACTIVITIES

The National Academies of Sciences, Engineering, and Medicine (NASEM) are committed to the principles of diversity, 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 commitment 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, 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
- 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.

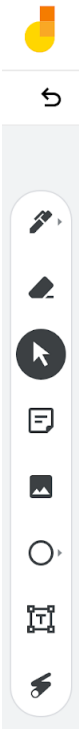
CONFIDENTIALITY

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 June 7, 2018

Tips for Using Google Jamboard

JamBoards allow you to interact with content in creative ways. The task bar on the far left of the JamBoard (from top to bottom) allows you to do the following:



(1) the pen allows you to draw or write on the board

(2) the eraser allows you to erase what you write with the pen tool

(3) the arrow “pointer” allows you to select sticky notes and textboxes and move them

(4) the sticky note icon allows you to create and type notes of different colors

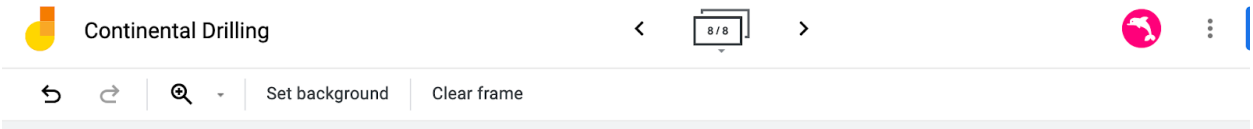
(5) the image button allows you to upload and share files and images from your computer and Google Drive

(6) the circle icon allows you to drag a circle onto the canvas to draw attention to an area

(7) the text box icon allows you to create a textbox and type into it

(8) the laser icon allows you to highlight your cursor as you move within the JamBoard.

NOTE: At the very top left corner of each JamBoard is an undo (curved back arrow) and a re-do (curved forward arrow), which are useful tools to know as well.



Finally, in the top middle of your JamBoard screen you will see an area where you can move back and forth between JamBoard pages (see above). As you see here, there were 8 pages on this JamBoard and the screenshot was taken while on page 8 of 8. There is also a small down carrot under the slide box itself, which allows you to add and rearrange slides, although this feature will likely not be necessary in our meetings.

Check out this short video to see JamBoards in action:
https://www.youtube.com/watch?v=f1nVeBHEAaI

Tips for Participating in Zoom Breakout Rooms

Overview

Breakout rooms are sessions that are split off from the main Zoom meeting. They allow the participants to meet in smaller groups, and are completely isolated in terms of audio and video from the main session. Breakout rooms can be used for collaboration and discussion of the meeting.

Prerequisites

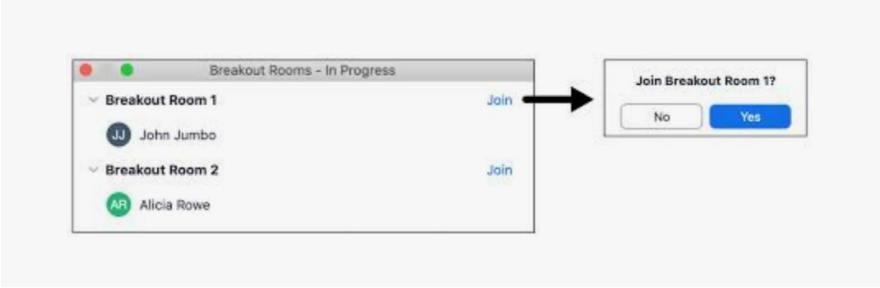
- Self-select breakout rooms:
  - Desktop client or mobile app: version **5.3.0** or higher.
  - ChromeOS: version **5.0.0 (4241.1207)** or higher
- Users joined into the Zoom meeting from the following platforms can be assigned to and participate in breakout rooms:
  - Zoom desktop client
  - Zoom mobile app
  - Chrome OS client
  - Web client
  - Phone dial-in
  - H.323/SIP devices
  - Zoom Room

Self-selecting a breakout room

If the host has allowed participants to self-select and join breakout rooms of their choosing, participants will be able to view and select from a list of breakout rooms the host has created. They will be able to enter and leave breakout rooms freely.

Note: Participants not joined with the desktop or mobile app (version **5.3.0** or higher) will not be able to self-select a breakout room. The host will need to facilitate moving these participants manually.

1. Click **Breakout Rooms** in your meeting controls.
   This will display the list of open breakout rooms created by the host.
2. Hover your pointer over the number to the right of breakout room you wish to join, click **Join**, then confirm by clicking **Yes**.

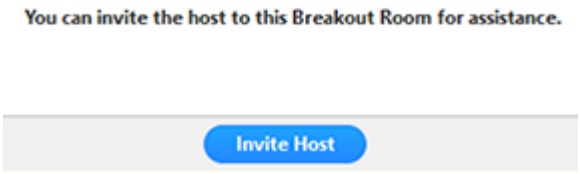


3. Repeat as necessary to join other breakout rooms, or click **Leave Room** to return to the main session.

Asking for help

If you click **Ask for Help**, it will notify the meeting host that you need assistance and they will be asked to join your breakout room.

1. Click **Ask for Help** in the meeting controls.
2. Confirm that you would like assistance by clicking **Invite Host**.



Leaving the breakout room

You can leave the breakout room and return to the main meeting session at any time, or you can leave the meeting entirely from the breakout room.

1. Click **Leave Breakout Room.**
2. Choose if you want to leave the breakout room or the entire meeting.
3. When the host ends the breakout rooms, you will be notified and given the option to return to the main room immediately, or in 60 seconds.