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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 Tripathi, 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 (CO₂)
- 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

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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 Tripathi, 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**

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

12:10 pm	Panel: Knowledge Gaps in Glacial Feedbacks, Sea Level, and Ocean Feedbacks <i>Moderator: Christo Buizert, Planning Committee Member, Oregon State University</i> <ul style="list-style-type: none">• 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)
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1:00 pm	Break
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Session 2: Ocean Proxies and Feedbacks

1:20 pm	Panel Discussion <i>Moderator: Julie Brigham-Grette, Planning Committee Member, U Mass Amherst</i> <ul style="list-style-type: none">• 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)
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2:10 pm	Break
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Session 3: Terrestrial Proxies and Feedbacks

2:30 pm	Panel Discussion <i>Moderator: Andrea Dutton, Planning Committee Chair, University of Wisconsin-Madison</i>
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- 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

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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**

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Session 2: Modes of Oceanic and Atmospheric Variability

2:45 pm

Panel: Modes of Paleooceanographic 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

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- 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