

Exploring Key Research Topics for the Fifth International Polar Year – A Workshop

May 20-21, 2025

[Register here](#) to receive the Zoom login information to join virtually.

2030 in the Polar Regions:

Setting the Stage for the Fifth International Polar Year (IPY5)

To complement workshop presentations and discussions, a series of short, recorded presentations were invited. These videos can be found on the [workshop website](#) and include overviews from different areas of science that explain what the polar regions are expected to look like as we approach IPY5 as well as other related topics.

Workshop Purpose:

- Identify and discuss key research areas and operational needs for IPY5, with some focus on U.S. researcher engagement.
- Highlight advances in approaches and technologies that can be or already are used in polar regions to address pressing research questions.
- Identify existing, emerging, and anticipated capabilities that could contribute to fostering research in the polar regions.
- Identify partnership and collaboration opportunities that can be strengthened or facilitated to benefit a wide range of groups interested in participating in IPY5 efforts.
- Provide a forum for early career researchers to contribute to shaping possible focus areas for IPY5.

MAY 20, 2025 | 10:00 AM–5:30 PM ET (ALL TIMES EDT)

10:00 AM

Welcome and Introduction

Craig Lee, Planning Committee Chair, University of Washington

Session 1: Polar Science for Society

How does Arctic environmental change impact the lives of northern residents, and how do changes in both poles affect lives at lower latitudes? Polar research provides understanding and data products to inform decisions across a wide range of sectors, including human health (e.g. predictions of harmful algal blooms, vectors of infectious disease), zoning and property insurance in coastal regions (through refined estimates of sea level rise), predictions of communications disruptions (by providing data to constrain space weather models), and understanding how ecosystem shifts impact both commercial and subsistence hunting and fishing, among many others. This session will provide an overview of some of the ways in which society is impacted by polar sciences.

Moderator: Andrew Lloyd, Planning Committee Member, Lamont-Doherty Earth Observatory/Columbia University

10:15 AM **Overview of the Polar Regions**
Richard Alley, The Pennsylvania State University (virtual)

10:45 AM **Panel 1: Applications of Polar Science**

Robert McCoy, University of Alaska, Fairbanks, (in person)
Alisa Alexander, University of Alaska, Fairbanks (in person)
Jeremy Wilkinson, British Antarctic Survey (virtual)

Discussion Questions:

- What data/information do you rely on in your position? How do you use this data/information?
- Are there any areas/issues that impact where IPY5 might offer an opportunity to fuel a significant advance in understanding or data delivery that could ease your work and/or improve the quality of the services you provide?

Session 2: Scientific Questions and Science to Meet Multi-domain Operations Needs

Understanding of the polar regions, their role in the broader Earth system, and linkages to space, have advanced through decades of research and prior IPYs, yet questions remain. As we approach 2032-33, the polar regions are experiencing rapid change, with severe impacts to local ecosystems and communities and global implications in areas that include sea level rise, weather, food security, shipping and societal well-being. Refined understanding of these changes can provide improved predictions to help society plan for and adapt to the future.

This session sets the stage for workshop focus centered on identifying and exploring ambitious research goals that could leverage the span and scope of IPY5 to achieve transformative advancements in understanding of the polar regions, their role in the broader Earth system, and the impacts of polar environmental change on society. Discussions in this section and throughout the meeting will aim to identify “big picture” problems that span multiple disciplines, as well as large, multi-domain operational needs, such as observing systems or forecast centers, meant to inform decision-making across a range of spatial and temporal scales.

Moderator: Scott Goetz, Planning Committee Member, Northern Arizona University

11:35 AM **Panel 2: Key Scientific Questions and Science to Meet for Multi-domain Operations**

Jacqueline Austermann, Columbia University (virtual)
Allison Jaynes, University of Iowa (in person)
Ted Schuur, Northern Arizona University (virtual)
Sheyna Wisdom, Alaska Ocean Observing System (virtual)
Jacqueline Grebmeier, University of Maryland (virtual)
Michelle LaRue, University of Canterbury (recorded remarks)

Discussion Questions:

- What aspects of these example areas can be uniquely explored during IPY5? What are the roles of in situ observing, remote sensing and numerical modeling in advancing understanding in these areas?

- What research areas could meet multi-domain operational needs (i.e. have multiple uses across research disciplines and/or applications)?
- What technologies and capabilities are currently available, or expected to be available in 2032, to enable addressing these questions? What opportunities might exist for international collaboration and coordination to facilitate addressing these questions?
- Are there other specific needs/foci within these broad examples that should be brought to the forefront of our thinking?
- **Question to participants:** what are other key topics could be explored during IPY5, and what operational needs might they address?

12:45 PM Networking Lunch and Time to Contribute to Key Questions “Wall”

**1:45 PM Session 2: Interactive Activity
Scientific Questions and Science for Multi-domain Operations Needs**

Detailed guidance for this interactive activity will be provided during the workshop and shared as in separate document on the [event webpage](#).

Discussion Questions:

1. What critical **research questions** do you think should be considered for IPY5? These could build on examples discussed in the talks or be different. What societal implications/interests might these research questions inform? What types of experts/groups would be involved in addressing these questions?
2. What **bi-polar** research questions can best be addressed through an approach that links the Arctic and Antarctic? What societal implications/interests would this inform? What types of experts/groups would be involved in addressing these questions?
3. What **environmental services/operational needs** might an IPY5-driven effort aim to address? What structures would need to be built to provide those services? What types of experts/groups would be involved in addressing these questions?
4. Are there **different research questions that could be addressed synergistically**, utilizing the same/similar infrastructure or data sets? What might a collaboration of this type entail?

**2:30 PM Interactive Activity Plenary Report Out
Moderator: Craig Lee, Planning Committee Chair, University of Washington**

3:00 PM Networking Break

Session 3: Approaches and Capabilities to Support IPY5

The remote, harsh environment of the polar regions presents unique challenges for observational research, complicating the task of collecting sustained measurements of the necessary spatial and temporal scales and scope. Polar research often requires highly specialized equipment and infrastructure (e.g. ice-strengthened vessels, ice core drilling rigs) built to withstand extremely cold conditions. Extensive, costly logistical capabilities are required to deploy and sustain researchers and equipment in remote locations. Though largely free from the environmental challenges faced by in situ observing,

remote-sensing and numerical modeling rely on in situ measurements, and are thus constrained by sparse data availability, temporal and spatial resolution challenges, and other issues such as frequent cloud cover and seasonal darkness interfering with satellite-based sensing.

Rapid changes in technologies and approaches have occurred since IPY4, with advancements continuing to emerge that may enable new and expanded efforts in field, remotely-based, and modeling research for IPY5. In this session, we will discuss how to harness new technologies, capabilities, and approaches for IPY5, and how emerging research goals for IPY5 could, in turn, inform further near-term development of these technologies and approaches.

Moderator: Britney Schmidt, Planning Committee Member, Cornell University

3:15 PM Panel 3: Approaches and Capabilities

Matthew Siegfried, Colorado School of Mines (virtual)

Brendan Rogers, Woodwell Climate Research Center (virtual)

Esme Van Wijk, Commonwealth Scientific and Industrial Research Organization (virtual)

Charles Koven, Lawrence Berkley National Laboratory (virtual)

Terry Wilson, The Ohio State University (in person)

Discussion Questions:

- What new approaches, capabilities, and technologies are available (or are anticipated to be available by 2032) that could help facilitate research advancements during IPY5?
- Are there opportunities for new interdisciplinary approaches or synergistic use of capabilities/technologies among disciplines that could be leveraged?
- Are there other capabilities or technologies that do not yet exist that are fundamental to addressing any of the priority research areas discussed? Is there a path to reaching these capabilities/technologies?

4:20 PM Session 3: Interactive Activity
Approaches and Capabilities to Support IPY5

Detailed guidance on this interactive activity will be provided during the workshop and shared as in separate document on the [event webpage](#).

Discussion Questions:

1. What **new or emerging technologies or capabilities** could be utilized to address the research areas discussed in this session?
2. Are there any **novel tools or approaches** to consider (including from other disciplines/applications not typically used in polar research)?
3. What is the role of **international collaboration** in fostering the development and use of new capabilities and approaches? What types of experts/groups would need to be involved in fostering these relationships?
4. Are there any **technologies or approaches** where researchers may be able to help **inform development** so as to support polar research/IPY5?

5:00 PM **Interactive Activity Plenary Report Out**
Moderator: Mike Hartinger, Planning Committee Member, Space Science Institute

5:30 PM **Adjourn Day 1 and Depart for No Host Social Hour (in person attendees)**
Clyde's of Chevy Chase
5441 Wisconsin Ave, Chevy Chase, MD 20815

DAY 2

MAY 21, 2025 | 10:00 AM–4:35 PM ET (ALL TIMES EDT)

10:00 AM **Welcome and Recap of Day 1**

Session 4: Human Capacity and Collaboration

Advancements in our understanding of the polar regions are underpinned by expansive teams that extend well beyond the principal investigator(s)/core team for any given project. This can include community members, tourists, and the general public who contribute to data collection in their communities or aboard cruise ships; coordinators who manage complex logistics for deploying personnel and equipment; pilots, captains, and drivers who transport researchers to remote sites; and engineers and technicians that build and maintain specialized equipment and models, among others. Together, these groups provide the human capacity needed to advance polar sciences and will be essential leaders and contributors to IPY5. Within these teams and groups, collaborations—crossing national, international, disciplinary, and cross-sectoral boundaries—are critical for enabling and supporting polar research. Identifying and strengthening partnerships will be an essential element of a successful IPY5.

This session will consider how polar science is accomplished, highlighting many of the types of individuals and teams that enable and contribute to research. It will also look at some specific examples of how research is conducted and the practicalities/logistics required.

10:30 AM **Panel 4: Strengthening Human Capacity**
Moderator: Lil Alessa, Planning Committee Member, University of Idaho

Ed Brook, Oregon State University (virtual)

Twila Moon, National Snow and Ice Data Center (virtual)

Hannah-Marie Garcia-Ladd, Indigenous Sentinels Network (virtual)

Discussion Questions

- What do you see as the primary strengths and challenges of supporting polar research today?
- Do you envision supporting IPY5? If yes, what might that look like? Do you expect strengths and challenges to change moving forward to IPY5?

11:15 AM **Panel 5: Strengthening Research Capacity – Building on Lessons Learned**
Moderator: Mike Hartinger, Planning Committee Member, Space Science Institute

Matthew Shupe, University of Colorado Boulder (in person)
Ryan Venturelli, Colorado School of Mines (virtual)
Katherine Cariglia, Massachusetts Institute of Technology (in person)
Andrew Kliskey, University of Idaho (virtual)

Discussion Questions:

- What are the primary strengths and challenges to the current approach to conducting research and supporting early career researcher development? What lessons can be learned from prior campaigns?
- These activities require many skilled individuals beyond the researchers themselves. Are there key areas where capacity development will be required to support IPY5-level activity? How might we do this?
- What opportunities does the ramp up period to IPY5 provide to strengthen this capacity?
- Are there mechanisms to help sustain the needed capacity over time?

12:15 PM **Networking Lunch**

1:15 PM **Session 4: Interactive Activity**
Human Capacity and Collaboration

Detailed guidance on this interactive activity will be provided during the workshop and shared as in separate document on the [event webpage](#).

Discussion Questions:

1. Among the research questions discussed during this workshop, what do you see as key areas where **broadening community/public engagement in research** would strengthen the science?
2. How can we **foster Indigenous and/or community-led science**, beyond public engagement? How do we empower local voices to shape polar research?
3. What is the role of **international collaboration** in fostering the next generation of U.S. polar researchers? Are there mechanisms in place that can help to facilitate career development/training?
4. **How can the lessons learned from the campaigns** discussed (or other campaigns) be addressed to strengthen human capacity and collaboration moving forward? Are there **other personnel capacity** and/or required **skill sets** that are needed to support/enable IPY5 that have not yet been discussed?

1:55 PM **Interactive Activity Plenary Report Out**
Moderator: Jenny Baeseman, Planning Committee Member, Polar Consultant

2:25 PM Networking Break

2:55 PM Panel 6: International Coordination and Collaboration – Moving the Science Forward for IPY5

Moderator: Jamin Greenbaum, Planning Committee Member, Scripps Institution of Oceanography

Julia Wellner, University of Houston (virtual)

Allison Cusick, Scripps Institution of Oceanography (virtual)

Andrew Luke King, Norwegian Institute for Water Research (in person)

Won Sang Lee, Korea Polar Research Institute (virtual)

Jason Roberts, Australian Antarctic Division (virtual)

Discussion Questions:

- How do we develop internationally coordinated research questions and partnerships, from idea development, funding, to operations/implementation?
- Are there new/emerging opportunities to promote and implement this coordination (e.g. remote and/or share technologies)?
- How can we overcome known challenges (e.g. formal bilateral national agreements)
- What role might overarching non-government organizations (e.g. the World Meteorological Organization, Intergovernmental Ocean Commission, Global Ocean Observing System) play?
- What is the role of international committees (e.g. International Arctic Science Committee and Scientific Committee on Antarctic Research) and ongoing priority setting activities (e.g. Fourth International Conference on Arctic Research Planning).
- **Question to participants:** where do you see opportunities to support enhanced international collaboration and coordination

4:00 PM Forming the Vision for the Future: Meeting Takeaways and Reflections on Next Steps

Workshop participants will be invited to provide brief comments on their key takeaways from the meeting and what they view as opportunities to take the research questions discussed and move us toward action and scientific advancement for IPY5. Preference will be given first to early career researchers interested in sharing their reflections.

Moderator: Craig Lee, Committee Chair, University of Washington

4:30 PM Closing Remarks

Craig Lee, Committee Chair, University of Washington

4:35 PM Workshop Adjourns