

Technology Developments to Advance Antarctic Research A Workshop

May 3–5, 2022 | 12:00–4:00 pm (EDT) | Virtual (online)

Purpose

To solicit broad community ideas and input regarding how technological innovation can:

- advance, expand, and transform Antarctic and polar research, and facilitate improvements to science support logistics;
- increase the reach of Antarctic and polar scientific investigations while reducing the logistics and environmental footprint of these operations;
- and facilitate broader, more diverse participation in Antarctic and polar research.

TUESDAY, MAY 3, 2022

12:00–12:30

Opening Remarks

- **Diane McKnight**, University of Colorado Boulder, Planning Committee Chair
- **Allen Pope**, NSF Office of Polar Programs
- **Mark Seefeldt**, University of Colorado, Co-lead organizer of the Polar Technology Conference

12:30–2:45

Session 1: Technologies for Research and Observational Instrumentation

12:30–12:45

Opening Discussion

Session goals; focus of the different parallel groups [Diane McKnight, committee Chair]
Illustrative example of an instrument R&D development arc [Craig Lee, committee member]

12:45–2:45

Parallel Sessions

Each group will discuss examples of cutting-edge instrument/sensor developments currently being explored in particular areas of research; insights on how those technological advances have come about; and thoughts on needed advances that might allow us to address research questions currently constrained by technological limitations.

Ocean-focused Research

Moderators: Dan Costa and Keith Nicholls, Planning Committee Members

- **Clive McMahon**, Sydney Institute of Marine Science
- **Maaten Furlong**, UK National Oceanography Center
- **Samuel Laney**, Woods Hole Oceanographic Institute
- **Arvind Varsani**, Arizona State University
- **Britney Schmidt**, Cornell University

Important links

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Earth- and Ice-focused Research

Moderators: Paul Winberry and Sharon Robinson, Planning Committee Members

- **Terry Wilson**, The Ohio State University
- **Pedro Elosegui**, Massachusetts Institute of Technology
- **Fernando Rodriguez-Morales**, University of Kansas, CRESIS
- **Mary Albert**, Dartmouth College
- **Beth Shapiro**, University of California, Santa Cruz
- **Sarah Johnson**, Georgetown University

Atmosphere, Solar-Terrestrial, Astronomy/Astrophysics Research

Moderators: Amy Bender and Minghui Diao, Planning Committee Members

- **Gijs de Boer**, University of Colorado Boulder
- **Taneil Uttal**, NOAA Physical Sciences Laboratory
- **Andrew Gerrard**, New Jersey Institute of Technology
- **Aya Ishihara**, Chiba University
- **Johanna Nagy**, Washington University in St. Louis

2:45–3:05

Break

3:05–4:00

Plenary Discussions

Consider key issues and common threads arising among the three groups

4:00

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WEDNESDAY, MAY 4, 2022

12:00–12:05

Welcome, Goals for the Day

Diane McKnight, Committee Chair

12:05–1:25

Session 2: Power and Energy for Polar Research

12:05–12:45

Perspectives on Current Capabilities, Challenges, and Needs for Polar Research

Moderator: Hyomin Kim, Planning Committee Member

- **Robert Clauer**, Virginia Tech
- **Craig Kulesa**, University of Arizona
- **Caitlin Callaghan**, Cold Regions Research and Engineering Laboratory
- **Matt Lazzara**, University of Wisconsin-Madison
- **Robyn Verrinder**, University of Cape Town

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12:45–1:00	Perspectives on Energy Technology Advances with Potential for Greater Polar Science Application <i>Moderator: Kristen Schell, Planning Committee Member</i> <ul style="list-style-type: none">• Eric Wachman, University of Maryland• Yi Chao, Seatrec
1:00–1:25	Questions and Answers <i>Moderators: Hyomin Kim and Kristen Schell, Planning Committee Members</i>
1:25–1:35	Break
1:35–2:55	Session 3: Data and Communications for Polar Research
1:35–1:50	Potential Game-changers for Connectivity <i>Moderator: Michael Ashley, Planning Committee Member</i> <ul style="list-style-type: none">• Anthony Lyscio, Starlink• Matt Fouch, Subsea Data Systems
1:50–2:20	Instrument Data Communication: Current Capabilities and Needs <i>Moderator: George Blaisdell, Planning Committee Member</i> <ul style="list-style-type: none">• Elizabeth Bagshaw, Cardiff University• Lee Freitag, Woods Hole Oceanographic Institute• Melinda Holland, Wildlife Computers• Mike Rose, British Antarctic Society
2:20–2:35	Advanced Data Analytics Developments <i>Moderator: Maryam Rahnemoonfar, Planning Committee Member</i> <ul style="list-style-type: none">• Krithika Manohar, University of Washington, AI Institute in Dynamic Systems• Maryam Rahnemoonfar, University of Maryland, Baltimore County
2:35–2:55	Questions and Answers <i>Moderators: Michael Ashley and George Blaisdell, Planning Committee Members</i>
2:55–3:45	Breakout Discussions To explore and share ideas on the Session 2 and 3 themes
3:45–4:00	Plenary Recap Discussions
4:00	ADJOURN

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Technology Developments to Advance Antarctic Research: A Workshop

THURSDAY, MAY 5, 2022

12:00–12:05 **Welcome, Goals for the Day**

Diane McKnight, Committee Chair

12:05–1:25 **Session 4: Technology Advances to Expand Participation in Polar Research**

12:05–12:55 **Technologies/Strategies to Expand “Remote” Research Engagement**

Moderator: Sharon Robinson, Planning Committee Member

- **Melissa Battler**, Mission Control Space Services. Software for Earth, Moon, and Mars
- **Alia Khan**, Western Washington University. Polar Space & Place Program
- **Jason Cervenec**, The Ohio State University. Virtual Ice Explorer
- **Seth Finkel**, Matterport. Virtual Antarctica VR360
- **Diana King**, University of Wallongong. ECO Antarctica Program
- **Michelle LaRue**, University of Canterbury. Spying on Seals from Space citizen science program

12:55–1:10 **Balancing Opportunities for Remote-based and In-person Research**

Moderator: Jacqueline Goordial, Planning Committee Member

- **Deneb Karentz**, University of San Francisco. International Training Program in Antarctic Biology
- **Erin Pettit**, Oregon State University. “Inspiring Girls Expedition” program

1:10–1:25 **Questions and Answers**

Moderators: Sharon Robinson and Jacqueline Goordial, Planning Committee Members

1:25–1:35 **Break**

1:35–2:45 **Session 5: Partnerships and Mechanisms to Facilitate Development and Application of New Research Technologies**

1:35–2:25 **Examples of different models being used to facilitate partnerships between scientists, engineers, and technology developers in advancing R&D innovations**

Moderator: Ted Scambos, Planning Committee Members

- **Bernadette Garcia Galvez**, Colorado Space Grant program
- **Alana Sherman**, Monterey Bay Aquarium Research Institute
- **Scott Harper**, Arctic and Global Prediction, Office of Naval Research
- **Scott Tyler**, University of Nevada Reno, Center for Transformative Environmental Monitoring Programs
- **Carolyn Mercer**, Science Mission Directorate-NASA Program
- **Zoe Courville**, Cold Regions Research and Engineering Laboratory

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Technology Developments to Advance Antarctic Research: A Workshop

2:25–2:45

Questions and Answers

Moderators: Ted Scambos, Planning Committee Member

2:45–3:30

Breakout Discussions

To explore and share ideas on the Session 4 and 5 themes

3:30–4:00

Plenary Recap Discussions and Closing Remarks

4:00

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