Message from the Chair

The earth is changing, and the polar regions, as usual, are changing faster and by larger amounts than the global average. To any student of the planet, this is old news. Old in the sense that it has long been clear that change is happening today, and old in the sense that the earth is always changing. What is new is that there is a new dominant agent of change, one that can think, plan, and understand that it is responsible for change. The explosion of humans on the planet, both in numbers and in resource needs, has created a collision of sorts between our awesome ability to change the earth, and our fledgling ability to responsibly manage that power.

Because the polar regions typically experience magnified changes, the Polar Research Board frequently finds itself dealing with the major environmental issues of the day — issues such as the loss of Arctic sea ice (perhaps the most visible abrupt change of our time), the increase in tourism at both poles, species extinction, the fate of the massive carbon stockpiles in Arctic soils and sediments, resource extraction in newly opened Arctic waters, how the inherently unstable West Antarctic ice sheet will behave, and how fast and how far sea levels will rise.

The role of the National Academy of Sciences is to provide independent, objective advice to the nation on matters related to science and technology. Arguably at no time in our nation's history has such advice been more needed in matters of the earth's polar regions. So the PRB is understandably busy these days (see list of recently published and ongoing studies below).

One major event on our horizon is the upcoming transfer of the chairmanship of the Arctic Council to the United States in 2015. The Arctic Council is the high level intergovernmental forum that provides a means for promoting cooperation, coordination and interaction among the Arctic States (Canada, the United States, Russia, Finland, Sweden, Norway, Iceland and Denmark (Greenland)) - as well as six indigenous organizations.. As the Arctic is transforming in real time, the role of the Arctic Council in ensuring that the "New Arctic" works sustainably for everyone is both critical and extremely challenging.
So there is much to do, and we will need the best people in our community to accomplish the tasks ahead. The PRB is always transforming as new members join and old members transition off. This year, my time on the PRB (first as a Board member and then as Chair) will come to an end in July. I am proud of what the PRB has accomplished in my time as Chair, but honestly, whatever credit there is should go to the many fine members I have had the honor to work with over the past six years, and just as importantly, to the incredible staff at the NAS.

If you are interested in helping to shape the future of the Polar regions, note that the Board is currently taking nominations for the next membership rotation. I can personally vouch that anyone volunteering with the Board will find the experience gratifying, challenging, informative, and yes, even fun.

James W. C. White
PRB Chair

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**Upcoming Report Releases and Webinars**

**Emerging Research Questions: The Arctic in the Anthropocene**

This activity is designed to provide guidance on future research questions in the Arctic over the next 10-20 years, identifying the key scientific questions that are emerging in different realms of Arctic science and exploring both disciplinary realms (e.g., marine, terrestrial, atmosphere, cryosphere, social sciences, and health) and cross-cutting realms (e.g., integrated systems science and sustainability science). Based on the emerging research questions, the study will also help identify research infrastructure needs (e.g., observation networks, computing and data management, ship requirements, shore facilities, etc.) and collaboration opportunities. [More info](#)

This report will be released Tuesday, April 29, and a public webinar will take place on that date. [Register for the webinar here](#).

**Oil Spills in Arctic Marine Environments**

The National Research Council will assess the current state of science and engineering regarding oil spill response and environmental assessment in the Arctic region (with a specific focus on the Bering Strait and north), with emphasis on potential impacts in U.S. waters. [More info](#)

This report will be released on April 23. A public webinar will take place May 12. [Register for the webinar here](#).

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**Recently Released Reports**

**Linkages Between Arctic Warming and Mid-Latitude Weather Patterns: Summary of a Workshop** – The Arctic has been undergoing significant changes in recent years. Average temperatures are rising twice as fast as they are elsewhere in the world. The extent and thickness of sea ice is rapidly declining. Such changes may have an impact on atmospheric conditions outside the region. *Linkages Between Arctic Warming and Mid-Latitude Weather Patterns* is the summary of a workshop convened in September.
2013 by the National Research Council to review our current understanding and to discuss research needed to better understand these proposed linkages.

**Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics: Report of a Workshop** -- In the discontinuous permafrost region, where ground temperatures are within 1-2 degrees of thawing, permafrost will likely ultimately disappear as a result of ground thermal changes associated with global climate warming. Permafrost thaw stands to have wide-ranging impacts, such as the draining and drying of the tundra, erosion of riverbanks and coastline, and destabilization of infrastructure (roads, airports, buildings, etc.), as well as potential implications for ecosystems and the carbon cycle in the high latitudes. **Opportunities to Use Remote Sensing in Understanding Permafrost and Related Ecological Characteristics** summarizes a workshop convened by the National Research Council to explore opportunities for using remote sensing to advance our understanding of permafrost status and trends and the impacts of permafrost change.

**Abrupt Impacts of Climate Change: Anticipating Surprises** – Climate is changing, forced out of the range of the past million years by levels of carbon dioxide and other greenhouse gases not seen in the Earth's atmosphere for a very long time. Lacking action by the world's nations, it is clear that the planet will be warmer, sea level will rise, and patterns of rainfall will change. But there is considerable uncertainty about how we will arrive at that different climate. Will the changes be gradual, allowing natural systems and societal infrastructure to adjust in a timely fashion? Or will some of the changes be more abrupt, crossing some threshold or "tipping point" to change so fast that orderly adaptation is not possible? **Abrupt Impacts of Climate Change** is an updated look at this issue, focusing on abrupt climate changes and impacts that have the potential to severely affect the physical climate system, natural systems, or human systems, often affecting multiple interconnected areas of concern.

**Climate Change: Evidence and Causes** – The leadership of the U.S. National Academy of Sciences and the U.K.'s Royal Society convened a UK-US team of leading climate scientists to produce this brief, readable reference document for decision makers, policy makers, educators, and other individuals seeking authoritative information on some of the questions that continue to be asked. The publication makes clear what is well-established and where understanding is still developing. It echoes and builds upon the long history of climate-related work from both national academies, as well as on the newest climate-change assessment from the United Nations' Intergovernmental Panel on Climate Change. It touches on current areas of active debate and ongoing research, such as the link between ocean heat content and the rate of warming.

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**Studies in Progress**

**Development of a Strategic Vision and Implementation Plan for the U.S. Antarctic Program at the National Science Foundation** – The Committee will identify priorities and strategic steps forward for Antarctic research and observations for the next decade, in the context of the current state of knowledge, ongoing research...
activities, and resource availability. The Committee's report will present a compelling research strategy for increased understanding of Antarctica and the Southern Ocean. It will articulate a strategic vision commensurate with U.S. national interests in Antarctica and identify a prioritized suite of science questions or topical areas that the USAP should consider. The report will also outline a roadmap through which the vision and these priorities can be met.

**Geoengineering Climate: Technical Evaluation and Discussion of Impacts** — This study will conduct a technical evaluation of a limited number of proposed geoengineering techniques, including examples of both solar radiation management (SRM) and carbon dioxide removal (CDR) techniques, and comment generally on the potential impacts of deploying these technologies, including possible environmental, economic, and national security concerns.

**Decadal Survey of Ocean Sciences** -- This study will develop a list of the top ocean science priorities for the next decade in the context of the current state of knowledge, ongoing research activities, and resource availability. The committee's report will present a compelling research strategy for increased understanding of the oceans over the decade 2015-2025.

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**PRB Call for Nominations**

The PRB is seeking nominations of potential new members. Our goal is to have a board that is diverse and broad-thinking. We are seeking candidates with extensive Arctic or Antarctic research, or other types of relevant, practical experience. Nominees can be from any relevant discipline, but we are especially looking for nominees with expertise in the following:

- Social sciences (e.g., sociology/anthropology, political science, economics)
- AK native perspectives (particularly related to adaptation issues)
- Polar-based astronomy/astrophysics/space weather
- Paleoclimate studies
- Glaciology and ocean/ice interactions
- Marine mammals/population-level ecology

Deadline for Nominations: Please send your nominations by Friday, May 9. Include the candidate's name, affiliation, area of expertise, and a few sentences about why the nominee is appropriate. Send your suggestions to Rita Gaskins: rgaskins@nas.edu.

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**Passing of Martha Muse**

The PRB joins the Scientific Committee on Antarctic Research (SCAR), the Selection Committee for the Martha T Muse Prize for Antarctic science and policy, and the Tinker Foundation in mourning the passing of Martha T. Muse on 9th February 2014. Martha was a founding director of the Tinker Foundation. She served as its president for 27 years and its chairman for 33 years, retiring in 2008. It was under her direction that the Foundation became a leading funder of Latin American-related activities, providing support for educational, environmental, security, economic, legal and governance issues. One of her final directives to the Tinker
Foundation was incorporating Antarctica-related subjects under its funding mandate. Her passion for Antarctica was recognised with the Tinker Foundation establishing the Muse Prize for Science and Policy in Antarctica, an award for mid-career Antarctic scientists and policy makers, recognised as leaders of tomorrow.

Muse Prize Call for Nominations

Nominations are open for the 2014 Martha T. Muse Prize for Science and Policy in Antarctica. The prize is a USD $100,000 unrestricted award presented to an individual in the fields of Antarctic science or policy who has demonstrated potential for sustained and significant contributions that will enhance the understanding and/or preservation of Antarctica. The Prize is inspired by Martha T. Muse's passion for Antarctica and is intended to be a legacy of the International Polar Year 2007-2008.

The prizewinner can be from any country and work in any field of Antarctic science or policy. The goal is to provide recognition of the important work being done by the individual and to call attention to the significance of understanding Antarctica in a time of change. The Prize is awarded by the Tinker Foundation and administered by the Scientific Committee on Antarctic Research (SCAR).

Nomination deadline: 22 May 2014. For further information or to submit a nomination, please go to http://www.museprize.org.

SCAR Meetings

The XXI SCAR Biennial Meetings, including the 2014 Open Science Conference, are scheduled for August 23 to September 3 in Auckland, New Zealand. Please see http://www.scar2014.com/ for additional information, and contact US SCAR Delegation members with any input or suggestions for these meetings: http://usscar.org/us-scar-office/us-scar-team.

IASC Meetings

The 2014 Arctic Science Summit Week and Arctic Observing Summit were held April 5 through April 11 in Helsinki, Finland. Additional information can be found here: http://www.assw2014.fi/.

At the meeting, the Executive Council reviewed an invitation to host ASSW 2016 and the third AOS in Fairbanks, AK, and recommended acceptance to the council. Planning for these meetings will begin shortly.

About the PRB

The Polar Research Board (PRB) is a unit of the National Academies dedicated to enhancing understanding of the Arctic, Antarctic, and high-latitude regions and providing guidance to Congress, federal agencies, and the nation on cold region issues. The PRB facilitates participation of U.S. scientists in two international, nongovernmental polar scientific organizations—the Scientific Committee on Antarctic Research (SCAR) and the International Arctic Science Committee (IASC). The Board
accomplishes its mission by:

- providing a forum for the polar science community to address research needs and policy issues;
- conducting studies and workshops on emerging scientific and policy issues in response to requests from federal agencies and others;
- providing program reviews, guidance, and assessments of priorities, and;
- facilitating communication on polar issues among academia, industry, and government.

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