

UNH Strategy for Arctic Research and Scholarship

The University of New Hampshire, already internationally recognized for strong discipline-specific research at Arctic sites, is well positioned to become a leader in interdisciplinary pan-Arctic research and education. Following a series of meetings, seminars, and workshops engaging scholars from across the university, *UNH has developed a collective vision for Arctic research and scholarship, with the goals of building a more vibrant and interdisciplinary network of Arctic researchers and increasing UNH visibility within the national Arctic dialogue.*

The rapid amplification of warming in the Arctic is already having powerful and enduring impacts, not only for the 4 million Arctic residents but also for non-Arctic populations around the world. Given the urgency to prepare people to respond to change in the Arctic, UNH is developing the resolve and capacity to identify, understand, and communicate the critical science necessary to address the emerging question: **“What do changes in the Arctic mean for human communities?”**

UNH will organize its interdisciplinary Arctic research around understanding the complex interactions involved in two broad themes:

I. Arctic Feedbacks: Humans, the Water Cycle, and Carbon Cycles

Human activities are increasing the amount of carbon in the atmosphere, especially greenhouse gases and carbonaceous aerosols which all act to heat the planet. In the Arctic this warming is causing frozen water (snow, sea ice, glaciers, and permafrost) to melt sooner and more extensively than at any other time in history. The changes in Arctic water and carbon cycles, and follow-on impacts, have global implications but will likely be felt first and most strongly by people living in coastal areas.

II. Where People Live: Land-Coast Connections

Within the Arctic, coastal communities are already threatened by increasing erosion, threats to subsistence hunting, cultural challenges from tourism, and pollutants and hazards associated with increased vessel traffic and exploitation of resources. Outside the Arctic, coastal communities are already experiencing sea-level rise caused by accelerating loss of mass from the Greenland ice sheet, and predictions that a warmer Arctic will modify circulation patterns in both the atmosphere and ocean.

To achieve these goals, UNH is pursuing strategies to grow convergence research, an interdisciplinary and purpose-driven approach to problem solving that strategically tackles the technical, organizational, and logistical challenges of collaboration in order to enable sustained collaboration across disciplines. The university will also promote existing existing and new connections and strategic relationships with state, national, and international partners.

While UNH retains the character of a small liberal arts university, as New Hampshire’s flagship land-grant, sea-grant and space-grant university, it boasts world-class research, providing ample opportunities for graduate and undergraduate research experiences. This strategic vision includes plans for a Minor in Arctic Studies, a Cognate in Science Communication, and the expansion of graduate opportunities through an Arctic research traineeship programs called “Connecting Arctic Research Perspectives and Education (CARPE),” aimed at providing transformative opportunities for students and stimulating convergent interactions throughout the university. These activities will prepare students for careers that address challenging societal problems.

For more information, please visit unharctic.net



Examples of Arctic Research at UNH

UNH participates in field studies across the Arctic through diverse projects such as:

- Mapping the Arctic seafloor in support of establishing the limits of the U.S. continental shelf under the Law of the Sea Treaty, mapping submarine glacial landscapes, paleoceanography, methane seeps, acoustics, ocean thermal structure, coastal processes, ocean acidification, and oil spill response. *Larry Mayer, Nancy Kinner, Jennifer Miksis-Olds, Joseph Salisbury, Diane Foster, Thomas Lippmann, Jennifer Dijkstra, Kai Ziervogel, Brian Calder, Anthony Lyons, Thomas Weber, Joel Johnson, David Mosher, Kerri Seger, Dale Chayes, Robert Letscher, David Divins.*
- Glaciology, snow photochemistry, atmospheric chemistry and transport, and paleoclimatology. *Jack Dibb, Cameron Wake, Mark Twickler, Elizabeth Burakowski, Joseph Souney, Eric Scheuer,*
- Pan-Arctic hydrology, nutrient cycling, permafrost, and peatland carbon dynamics. *Ruth Varner, Jessica Ernakovich, Alexander Shiklomanov, Steve Frolking, Michael Palace, William McDowell, Wil Wollheim, Richard Lammers, Alex Prusevich, Florencia Fahnstock, Jingfeng Xiao.*
- Improving methods for prediction of Arctic sea ice. Social perspectives on Arctic ice melt, climate-linked migration, living resources, sustainable futures, local and indigenous communities, co-production of knowledge, and jurisdiction. *Larry Hamilton, Catherine Ashcraft, Jennifer Brewer, Michael Swack, Meghan Howey*
- Space weather, space physics, ice core proxies for solar activity, magnetometers, sounding rocket observations of aurora. *Harlan Spence, Marc Lessard, Katharine Duderstadt, Chia-Lin Huang, Charles Smith, Nathan Schwadron.*
- Ecosystems, climate impacts on physiology, habitats, species range and distribution, food-web dynamics and phenology of Arctic flora and fauna. *Erik Hobbie, Rebecca Rowe, Alix Contosta, Rebecca Sanders-DeMott*
- U.S. general-public knowledge and perceptions of the Arctic. *Jaed Coffin, Tom Haines, Siobhan Senior, Marcos Del Hierro, Elizabeth Burakowski, Ruth Varner, Julie Bryce, Cameron Wake.*

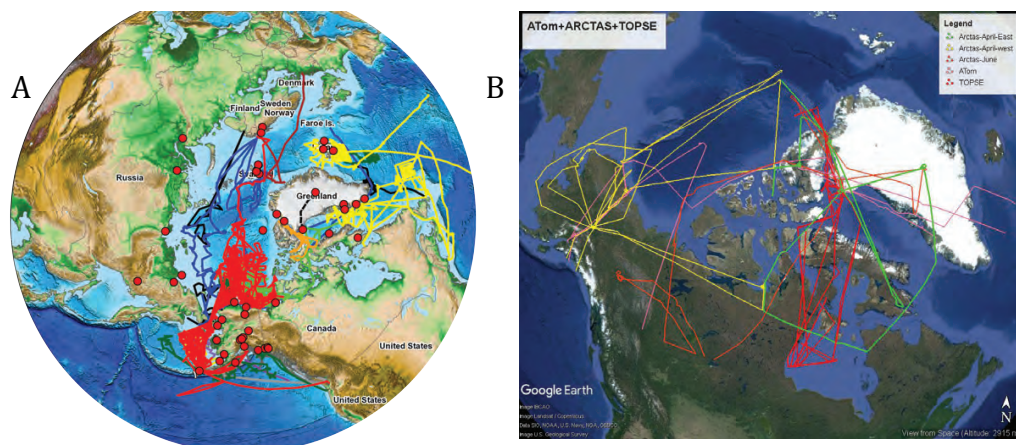


Figure 1. Locations of NSF, NOAA, and NASA funded research from select UNH researchers. A) Dots represent sites. Lines represent ship tracks. <http://www.armap.org>. B) Flight tracks from ATom, ARCTAS, and TOPSE.