

**Arctic System Synthesis Workshop:
New Perspectives through Data Discovery and Modeling
Seattle, WA
2–4 April 2007
Prospectus**

Last Updated: 19 January 2007

RATIONALE: The National Science Foundation's **Arctic System Science Program (ARCSS)** has become a major focal point for synthesis studies of the Arctic. This requires that the program actively engage the community in developing improved data and modeling approaches to advance system-level, interdisciplinary understanding of the state and changes in the Arctic. Recent activities led by the ARCSS Committee have highlighted the need for such thinking; for example, through the reconstitution of its *Data and Modeling Working Group* and an online community data meeting. How to most effectively develop these new data/modeling approaches for system-wide synthesis, however, remains unclear. This is not only a concern for ARCSS, but for other NSF programs as well. The multi-agency *Study of Environmental Arctic Change (SEARCH)* Implementation Plan (2005) also identifies the need to detect and understand arctic change by effectively synthesizing a wide array of data sets. The new NSF CyberInfrastructure Directorate has a natural interest in these issues. The **International Arctic Research Center (IARC)** in Fairbanks—a major national center for arctic science—is revising its research agenda to maximize its contributions toward arctic observation, modeling, and synthesis.

Our scientific community has unprecedented technical capabilities to describe the past, present, and future states of the pan-Arctic. However, a data management and modeling strategy that capitalizes on initiatives including the International Polar Year (IPY), Arctic Observing Network (AON), and International Study of Arctic Change (ISAC) has yet to materialize. *NSF-ARCSS*, *SEARCH*, and *IARC* have therefore joined forces to begin designing a coordinated data and modeling strategy to enhance arctic system synthesis. This workshop is timed to address all of these developing initiatives and develop a data management strategy that enhances data sharing, facilitates collaborative analyses, and ensures that products are relevant for addressing the major public policy questions surrounding arctic system change.

WORKSHOP ORGANIZING COMMITTEE:

- Charles Vörösmarty, co-chair (Water Systems Analysis Group, University of New Hampshire; ARCSS Committee Member)
- A. David McGuire, co-chair (Department of Biology and Wildlife, University of Alaska Fairbanks; member of SEARCH Data Working Group)
- Larry Hinzman (International Arctic Research Center)
- Marika Holland (National Center for Atmospheric Research; ARCSS Committee Member)
- Janet Intrieri (Office of Polar Programs, National Science Foundation)
- Maribeth Murray (Department of Anthropology, University of Alaska Fairbanks; ARCSS Committee Member)
- Josh Schimel (*ex officio*) (Department of Ecology, Evolution, and Marine Biology, University of California, Santa Barbara; ARCSS Committee Chair)
- John Weatherly (Cold Regions Research and Engineering Laboratory; Past Chair of ARCSS Data Working Group)

WORKSHOP GOAL: The primary goal of this workshop is to:

- *Bring together representatives of the data provider and data user communities to identify: innovative approaches for uniting data management and assimilation, recent developments in technology, and modeling activities that will advance synthesis studies of the arctic system and broadly disseminate knowledge of the Arctic.*

COMMUNITY REPRESENTATION: Participation is sought from a wide array of perspectives, with participants drawn from four major categories:

Data Providers: *Scientists and agency representatives who make available to others operational and/or benchmark data sets, thereby supporting the further processing of information for a variety of end uses.*

Technology and Information Technology Experts: *Developers of innovation in sensor and sensor network design, including in situ and remote technologies, as well as data-serving, scientific visualization, and modeling frameworks.*

Data Consumers: *"Power users" of data, scientists who routinely ingest raw and/or processed data streams, who synthesize and use this information to produce value-added products.*

Knowledge Brokers: *"Downstream" data consumers including policy-makers, environmental managers, and outreach personnel, who use high level distillations of Earth system science data sets.*

WORKSHOP STRUCTURE: We anticipate a 3-day workshop with approximately 40 participants. The workshop will consist of plenary talks and discussion, breakout groups, and poster sessions on the state-of-the-art in data-modeling-synthesis fusion. The workshop will consider a set of supporting discussion points:

- *What are the data and modeling needs to advance synthesis-focused arctic system science?*
- *What's currently working and what is not in terms of applying data and modeling for analysis to advance science? What are the existing impediments limiting the assimilation of disparate data sources needed to advance arctic synthesis studies, and what are the keys to success?*
- *What are the practical steps forward as far as mechanisms, approaches, tools and procedures, organization, standards, and related issues?*

The smaller breakout group interactions will tackle a set of broad scientific challenges, each of which requires the innovative linkage of technology development, data base management, modeling, and IT fusion—a set of "worked examples". To ensure a still broader set of perspectives, updates will be provided to, and feedback solicited from, the community prior to the workshop as well as after each day of the meeting through teleconferencing and/or online tools.

WORKSHOP PRODUCT: The workshop will result in a community-reviewed report summarizing key issues, common challenges, general lessons and ideas for steps forward that emerged during the workshop; the workshop report will include recommendations for NSF investments in this arena.

PROSPECTIVE PARTICIPANTS: Invitees have been selected to ensure broad community participation across disciplines and expertise. A limited number of additional participants will be solicited from the broader community through a self-nomination process; this process will include completion of an online form, which will include questions focused on the applicants experience, perspective, and potential contributions to the workshop, and also will require submission of a paper or poster abstract.