

January 31, 2005

Dear Colleague:

It has now been over two years since Neil Swanberg became director of the NSF-ARCSS Program and Jonathan Overpeck chair of the ARCSS Committee (AC). When Neil assumed leadership of the program at NSF, one of the changes he initiated immediately was to invite the AC to take a more proactive role in the development and guidance of the ARCSS Program on behalf of the research community.

There was and is plenty to be proactive about. The science presented at the ARCSS All-Hands Workshop in 2002, attended by more than 300 investigators, demonstrated that the community has a well-established strength in its disciplinary research agenda and that ARCSS science strongly supports a view of the Arctic as an interactive system, with important roles in the larger Earth system. Discussions catalyzed by the workshop argued for major changes to the ARCSS structure in order to reflect this system view and to prioritize new research themes; this has taken on added importance given the reality of emerging limits on funding. Based on the discussions before, during, and after the All Hands Workshop, the NSF leadership and the ARCSS Committee worked collaboratively to develop a concept for restructuring the program accordingly. The purpose of this letter is to present this concept and to solicit input from the community-at-large.

The AC agreed to lead a number of tasks relating to this reassessment of ARCSS:

1. Identify near-term ARCSS research priorities;
2. Synthesize and disseminate current ARCSS research results;
3. Develop a new ARCSS planning and oversight structure that would enhance community involvement, foster greater interdisciplinary collaboration, make the priority-setting process clear and objective, promote the development of new research efforts designed to meet the overarching ARCSS goal of improved arctic system understanding; and
4. Evaluate and revise the ARCSS science plan.

As ARCSS moves forward, it will benefit greatly from the broader community dialogue and input that has characterized the program from its inception. Communication between and among the ARCSS research community, the AC, and NSF is critical for the program's success.

Several processes, discussed at the end of this letter, will be used to catalyze and facilitate discussion on synthesis issues in the ARCSS community, including synthesis activities within focused research groups and communities, online science-focused workshops, and face-to-face community meetings.

### **Near-term ARCSS Research Priorities and System Synthesis**

ARCSS still includes a major commitment to field-oriented science, including the on-going Freshwater (<http://arcticchamp.sr.unh.edu/projects.shtml>) and Shelf-Basin Interactions (SBI) (<http://sbi.utk.edu/>) efforts, as well as the new Study of the Northern Alaska Coastal System (SNACS) projects described below. At the same time, however, ARCSS is becoming increasingly oriented towards a system and synthesis approach.

The past research components of ARCSS, including Land-Atmosphere-Ice Interactions (LAII), Ocean-Atmosphere-Ice Interactions (OAI), Paleoenvironmental Arctic Sciences (PARCS), and Human Dimensions of the Arctic System (HARC), have contributed an abundance of data and have advanced our knowledge of the arctic system. Each of these efforts has undergone various community-driven synthesis and integration activities over the years. Targeted interdisciplinary efforts such as the ARCSS Freshwater research activity have furthered system-level understanding through unifying research themes. These analysis and integration activities provide a compelling foundation for a major synthesis enterprise.

In a concerted effort to bring ARCSS researchers from a spectrum of disciplines together in an interdisciplinary mode to construct conceptual models of the entire arctic system, ARCSS sponsored a synthesis workshop during the summer of 2003 in Big Sky, Montana. Discussions focused around the question, "Is the arctic system moving to a new state outside the envelope of the natural glacial-interglacial cycle?" Workshop participants have submitted a paper describing insights into the future state of the arctic system. Additional information, including an annotated bibliography of readings related to the workshop topic, is available at: [http://www.arcus.org/ARCSS/2003\\_Retreat/index.html](http://www.arcus.org/ARCSS/2003_Retreat/index.html).

In early 2004, in an important step toward a more system-oriented program, an ARCSS announcement of opportunity (AO) was released by NSF. This AO focused on the integration of key elements of the Land-Shelf Interactions (LSI) and Pan-Arctic Cycles, Transitions, and Sustainability (PACTS) science plans into a new short-term (3-year) research focus. This opportunity formed within an ARCSS budget that was not sufficient to implement either LSI or PACTS alone and in their entirety at the same time that it was supporting SBI and the Freshwater effort. The resulting group of projects, the Study of the Northern Alaska Coastal System (SNACS), focuses on the arctic coastal zone of Alaska as a locus of research that naturally integrates knowledge and provides a testbed for a true systems approach. Six projects—ranging from topics involving Iñupiat subsistence whaling to halomethane gas exchange—are underway; SNACS investigators met in December 2004 to coordinate among themselves and within the larger ARCSS synthesis initiative. More information about the SNACS projects will be available soon via the ARCSS website (<http://www.arcus.org/arcss/>).

To develop further ARCSS synthesis strategies and conceptual models of the arctic system, a second synthesis retreat was held in summer 2004 at Lake Tahoe, California. Workshop groups discussed a model of a two-state (modern and future seasonally ice free) arctic system, and are continuing their efforts to prepare papers and disseminate the results of this workshop. Additional information, including an annotated bibliography of readings related to the workshop, is available at: [http://www.arcus.org/ARCSS/2004\\_Retreat/index.html](http://www.arcus.org/ARCSS/2004_Retreat/index.html). Both synthesis workshops were successful beyond expectations in energizing the participants and raising their vision from the level of their own research to a broader synthesis approach. The AC has a keen desire to spread this vigorous scientific excitement and enthusiasm to as broad a segment of the community as possible.

The recent ARCSS synthesis AO ("Synthesis of Arctic System Science"; <http://www.nsf.gov/pubs/2005/nsf05525/nsf05525.htm>), announced in November 2004, was viewed by the NSF and AC as a timely opportunity to build on the maturity in the disciplinary science and scientific enthusiasm, with potential for major advances in our understanding of the Arctic. The AO articulates the program goal to gain a system-wide understanding:

*"This solicitation is for research that synthesizes our understanding of the arctic system. The arctic system is a set of interconnected and interacting physical, biological, and human components and processes in the northern region influenced by the existence of perennial ice (sea ice, ice sheets, glaciers, permafrost, etc.). Research efforts supported will build on and integrate the wealth of existing data and knowledge to advance our understanding of the behavior of the arctic system or key subsets of the system and to understand the role it plays in the global system and society."*

This research focus is crucial in furthering the overall goals of ARCSS and also offers research opportunities for a broad spectrum of ARCSS scientists. Synthesis activities through other funding mechanisms, existing projects, and future announcements and activities will contribute to the integration of current knowledge and improve our ability to predict arctic environmental change.

### **Development of a New ARCSS Structure**

Developing a new structure for ARCSS that will reflect the new program focus, enhance community involvement, foster interdisciplinary collaboration, and promote the development of new research initiatives aimed at system understanding is clearly one of the most important tasks in terms of the long-term success of the program. The planning infrastructures that supported the separate ARCSS component efforts have run their course, and most have been allowed to expire:

- LAII office and Science Steering Committee (SSC) funding expired 31 December 2004;
- OAIL office and SSC funding expires 30 June 2005;
- RAISE/LSI office funding expires 31 July 2005;
- PARCS office and SSC funding expires 31 October 2005;
- A HARC core office was recently created and funded for a limited period to help the social science community incorporate its research into the overall ARCSS agenda.

ARCSS has been working to develop a well-integrated structure that will:

- Promote interdisciplinary research initiatives of all types while allowing disciplinary groups to maintain contacts within their communities;
- Foster communication in the ARCSS community;
- Allow flexibility and rapid response in a difficult budget environment;
- Maximize the effectiveness of the ARCSS Program; and
- Enable ARCSS to work closely with other efforts, such as SEARCH.

To meet the above goals, we are working on developing a structure composed of "Communities of Practice," through which disciplinary and interdisciplinary groups of investigators self-organize to lead topical aspects of science coordination and planning. These groups of investigators will not be organized by formal infrastructure, membership, or duties, but will be able to receive a nominal level of support (as funding allows) to facilitate communications, such as teleconferences, website resources, and similar assistance from a centralized ARCSS Science Management Office (SMO, currently at ARCUS). The ARCSS SMO, in addition to acting as a conduit of communication between the broad community, the various "Communities of Practice", the AC, other programs and NSF, will provide support to the AC and to the synthesis process. The new ARCSS structure will also contribute to the development of an updated ARCSS science plan in 2006.

The details of this structure will be further developed over the coming months, with input and guidance from the broader community. We hope that once in place this structure will be flexible to

changing needs and emerging scientific priorities, while providing all with a supportive environment to develop new ideas, and to communicate across disciplinary boundaries and with ARCSS and other scientific communities.

### **Community Input on ARCSS Program Structure and Focus**

A variety of activities and tools are now available or in the planning stages to solicit input on a new ARCSS structure and priority needs:

- *Online community feedback form* – an online form soliciting your comments about the proposed ARCSS structure, communications, and related themes is now available. Please go to: [http://www.arcus.org/ARCSS/survey\\_feedback.html](http://www.arcus.org/ARCSS/survey_feedback.html) and provide your input.
- *ARCSS electronic listserv* – an email list has been created to broadcast announcements about research initiatives, funding opportunities, meetings, and related activities focused on the ARCSS Program. To subscribe, go to <http://www.arcus.org/ARCSS/list/>.
- *Winter 2005 web seminar* – we are in the early stages of planning an online seminar, as early as February, to provide an open forum to answer questions, comments, and concerns regarding any aspect of the ARCSS program planning and development.
- *Fall 2005 Community workshop* – in early Fall 2005 a combined in-person/electronic workshop is being planned to further develop ARCSS synthesis and program integration.
- *Synthesis survey* – this survey, launched August 2004, focuses on key components of the arctic system and related themes: [http://www.arcus.org/ARCSS/survey\\_synthesis.html](http://www.arcus.org/ARCSS/survey_synthesis.html).

More information about planned community activities will be announced on the ARCSS website and through various means as details become available. Direct communication to the AC, or members of the AC, is also encouraged. You may contact any member of the AC via email, phone, letter, fax, or through ARCSS SMO personnel at ARCUS (<http://www.arcus.org/ARCSS/contact.html>). We welcome suggestions from the community on other ways to facilitate communication.

These are exciting times scientifically for ARCSS and arctic system science. ARCSS Program researchers are breaking new ground in finding ways of doing interdisciplinary work and gaining a better understanding of the arctic as a system. We see great challenges ahead but we also take heart in the tremendous spirit and enthusiasm of our community. ARCSS research and the ARCSS Program will be what we all make it. We hope that you will feel free to contact any of us with questions or suggestions to help in developing a new ARCSS Program structure and research planning process that is optimal for the ARCSS research community.

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