Arctic Research Opportunities

Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; Arctic Research Support and Logistics; Arctic Research and Policy; and Arctic Research and Education Programs

Program Solicitation

NSF 03-574

Replaces Document NSF 00-96

National Science Foundation
Office of the Director
Office of Polar Programs

REVISIONS AND UPDATES

FULL PROPOSAL DEADLINES

Arctic Natural Sciences: August 30 and February 15 of each year
Beginning August 2003, proposals will not be accepted to the Arctic Natural Sciences Program after the Deadline Date for each August 30 and February 15 competition.

FULL PROPOSAL TARGET DATES

Arctic Social Sciences: August 30 and February 15 of each year
Arctic System Science: August 30 and February 15 of each year
Arctic Research Support and Logistics: August 30 and February 15 of each year
Arctic Research and Policy: August 30 and February 15 of each year
Arctic Research and Education: August 30 and February 15 of each year

GROUP PROPOSALS: Unless otherwise stipulated in a specific program solicitation, group proposals will be subject to the 15-page Project Description limitation. Please see the NSF Grant Proposal Guide for more information.

FIELD WORK: Proposals that include fieldwork should be submitted well in advance. For example, for fieldwork in summer 2005, proposals should be submitted preferably by February 15, 2004, but no later than August 30, 2004.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Arctic Research Opportunities
Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; Arctic Research Support and Logistics; Arctic Research and Policy; and Arctic Research and Education Programs

Synopsis of Program:

The National Science Foundation (NSF) invites investigators at U.S. institutions to submit proposals to perform research in the Arctic and to perform related research and data analysis. The goal of the NSF Arctic Research Programs is to gain a better understanding of the Earth's physical, biological, geological, chemical, social and cultural processes, and the interactions of ocean, land, atmosphere, biological, and human systems. Arctic research is supported at NSF by the Office of Polar Programs (OPP) (http://www.nsf.gov/od/opp) in the Office of the Director, as well as by a number of other disciplinary programs within the Foundation. Program representatives from OPP and other NSF programs that support arctic research coordinate across NSF, including joint review and funding of arctic proposals, as well as mutual support of special projects with high logistical costs. Researchers interested in submitting proposals should consult this announcement and plan proposals in accordance with OPP's Guidelines and Award Conditions for Scientific Data (http://www.nsf.gov/cgi-bin/getpub?opp991).

Cognizant Program Officer(s):

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Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.078 --- Office of Polar Programs

Eligibility Information

- **Organization Limit:** None Specified.
- **PI Eligibility Limit:** None Specified.

- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 130 to 160 - per year, pending availability of funds.
- **Anticipated Funding Amount:** $66 million per year approximately, pending availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Additional award conditions apply. Please see the full text of this solicitation for further information.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Arctic Sciences Section in the Office of Polar Programs (OPP) offers both focused multidisciplinary and broad interdisciplinary programs that emphasize the uniqueness of the Arctic for special scientific studies as well as its importance to the global system. Models indicate that the arctic regions are among the most sensitive to environmental change. Climate records and human settlement spanning thousands of years as well as vast landscapes and partially ice-covered oceans provide a unique basis for integrated research on global systems and human adaptation.

OPP disciplinary interests encompass the atmospheric, biological, physical, earth, ocean, and social sciences. Interdisciplinary research in the biosciences, geosciences, and social sciences is linked in the Arctic System Science Program. In addition to supporting research on long-term human-environment interactions, OPP encourages the study of contemporary socioeconomic, cultural, and demographic issues. OPP also encourages research relevant to both polar regions, especially glaciology, permafrost, sea ice, oceanography, ecology, and aeronomy. Increasing emphasis is being given to the integration of research and education. Scientific programs that partner with schools, students (K-12 and higher), and communities in the north and that improve the public's understanding of science and basic research are strongly encouraged.

The United States Arctic Research and Policy Act of 1984 defines the Arctic as all areas north of the Arctic Circle and all United States territory north and west of the boundary formed by the Porcupine, Yukon, and Kuskokwim Rivers; all contiguous seas including the Arctic Ocean and the Beaufort, Bering, and Chukchi seas; and the Aleutian chain. Field projects falling outside these boundaries but directly related to arctic science and engineering conditions or issues, such as laboratory and theoretical studies, are appropriate, although OPP recommends contacting the program director to verify the appropriateness of the proposed study.

The Foundation is one of twelve Federal agencies that sponsor or conduct arctic science, engineering, and related activities. As mandated by the Arctic Research and Policy Act of 1984, Federal interagency research planning is coordinated through the Interagency Arctic Research Policy Committee (IARPC), which is chaired by NSF.

As the Arctic is the homeland of numerous Native peoples, special attention must be given to all aspects of research and education that may potentially impact their lives. An interagency statement of "Principles for the Conduct of Research in the Arctic" has been developed and all arctic research grantees are expected to abide by these guidelines. These guidelines can be found at http://www.nsf.gov/od/opp/arctic/conduct.htm.

In fiscal year 2002 NSF spent $85.99 million on awards for Arctic science, education, and infrastructure projects. Of this, $62.43 million was from the OPP Arctic Research Program.

A compilation of all NSF arctic and related research grants for each fiscal year is available. Information for FY2002 will be available in summer 2003. Information for FY1997 is available online (NSF 97-101 or http://www.nsf.gov/cgi-bin/getpub?nsf98101). The current NSF Guide to Programs should be consulted for additional program information. Arctic research and education projects have been funded in many of the Crosscutting programs (http://www.nsf.gov/home/crssprgm/) at NSF as well.

II. PROGRAM DESCRIPTION

RESEARCH PROGRAMS

Listed below are the principal programs in the Arctic Sciences Section of OPP that support arctic research and education. There are three integrated science programs: Arctic Natural Sciences, Arctic Social Sciences, and Arctic System Science. The Arctic Research Support and Logistics program and the Arctic Research and Policy program support the collection, management and dissemination of data and information where there are implications for the broader arctic research community. The Arctic Research and Education program exists to support small-scale education projects integrated with research projects. Special solicitations provide additional opportunities. These programs and their components are described below.

Arctic Natural Sciences Program

The OPP Arctic Natural Sciences (ANS) Program supports research in glaciology and in the atmospheric, biological, earth, and ocean sciences. This program provides core support for disciplinary research in the Arctic and coordinates its support of arctic research with the Directorates for Geosciences, Mathematical and Physical Sciences, Social and Behavioral, and Biological Sciences. Areas of special interest include marine and terrestrial ecosystems, arctic adaptations, atmospheric chemistry, exploration of the Arctic Ocean, as well as arctic geological and glaciological processes.

Atmospheric Sciences

Research in arctic atmospheric sciences focuses on stratospheric and tropospheric processes as well as arctic climate and meteorology. Research on past climates and atmospheric gases preserved in snow and ice is encouraged. The program also supports research on atmosphere-sea and atmosphere-ice interactions.

In upper atmospheric and space physics, research interests include auroral studies, atmospheric dynamics and chemistry, as well as magnetosphere-ionosphere coupling. Conjugate studies are considered jointly with the Antarctic Aeronomy and Astrophysics Program in OPP and the Division of Atmospheric Sciences in the Geosciences Directorate.

Biological Sciences

OPP supports projects that emphasize understanding of the adaptation of organisms to the arctic environment. Biological studies in the Arctic include research in freshwater, marine, and terrestrial biology; organismal biology; ecology; microbiology; ecosystem structure and processes; and the biological consequences of ultraviolet radiation.

Earth Sciences

Research supported by OPP includes all sub-disciplines of terrestrial and marine geology and geophysics. Of greatest interest is a better understanding of Arctic geological processes that are important for improving our ability to interpret the

geologic record of environmental change in the polar regions, particularly in the Late Cretaceous and Cenozoic. Also of high interest is a better understanding and reconstruction of the plate tectonic history of the Arctic Ocean.

Glaciology

OPP is the focal point for glaciological research within the Foundation. Glaciological research focuses on the history and dynamics of all naturally-occurring forms of snow and ice, including seasonal snow, glaciers, and the Greenland ice sheet. The Arctic Natural Sciences Program also supports modeling of mass balance, glacial geology, and remote sensing studies of ice sheets.

Ocean Sciences

The goal of oceanographic research in the Arctic is to develop knowledge of the structure of the Arctic Ocean and adjacent seas, their physical and biological interactions with the global hydrosphere, and the formation and persistence of the arctic sea-ice cover. Areas of special interest are: the distribution of life in high latitude oceans; low temperature life processes; the formation, movement, and mixing of arctic water masses; the growth and decay of sea ice; the exchange of salt and heat with the Atlantic Ocean and the Bering Sea; geographical anomalies; sedimentary history and the role of the Arctic Ocean and adjacent seas in global climate. Proposals concerned with the interdependencies of chemical and physical processes and marine organisms and productivity are encouraged.

Arctic Social Sciences Program

The OPP Arctic Social Sciences Program (ASSP) encompasses all social sciences supported by NSF. These include, but are not limited to anthropology, archaeology, economics, geography, linguistics, political science, psychology, science and technology studies, sociology, traditional knowledge and related subjects.

Although unsolicited proposals in any of the social sciences mentioned above are welcome, areas of particular interest include culture and environment, resources and economic change, development of social and political institutions, ethnic (cultural) and regional identities, and knowledge systems. These five research areas are identified and explained in the report, *Arctic Social Sciences: Opportunities in Arctic Research* (Arctic Research Consortium of the United States, June 1999, Fairbanks, Alaska. Available through the Arctic Research Consortium at http://www.arcus.org).

The Arctic Social Sciences Program especially encourages projects that are circumpolar and/or comparative; involve collaborations between researchers and those living in the Arctic; or form partnerships among disciplines, regions, researchers, communities, and/or students (K-12, undergraduate, or graduate). Dissertation research proposals will be accepted. Please consult the "Dissertation Panel Advice to Students" guidelines in the Division of Behavioral and Cognitive Sciences (DBCS)(http://www.nsf.gov/sbe/bcs/anthro/cultdadv.htm). These guidelines are to provide the applicant with a basic outline for their proposals. Applicants should apply to this announcement/solicitation number and talk to the ASSP program director about funding limits, which vary from those in DBCS.

Projects involving research with human subjects must ensure that subjects are protected from research risks in conformance with the Common Rule (Federal Policy for the protection of Human Subjects, 45 CFR para. 690). Before issuance of an NSF award, all projects involving human subjects must either have approval from the organization's Institutional Review Board (IRB) or identify the applicable subsection exempting the proposal from IRB review, as established in section 101(b) of the Common Rule. The box for "Human Subjects" should be checked on the Cover Sheet with the IRB approval date (if available) or exemption subsection from the Common Rule identified in the space provided. If letters of permission or approval are included, such as those from Native organizations or communities in which the work will take place, please contact the program director for instructions on how to include them.

The Arctic Social Sciences Program considers joint review and funding within OPP and with other NSF programs, when appropriate. Special funding opportunities may also be available through the human dimensions component of the Arctic System Science (ARCSS) Program (see below).

Arctic System Science (ARCSS) Program

The Arctic comprises a complex, tightly coupled system of air, ice, ocean, land and people. The Arctic System Science (ARCSS) Program supports interdisciplinary research with the goal of understanding the physical, geological, chemical, biological and socio-cultural processes of the arctic system that interact with the total Earth system and contribute to, or are influenced by, global change. The purpose of this endeavor is to advance the scientific basis for predicting environmental variability and change on a time scale from seasons to centuries, to facilitate better decision-making by Arctic stakeholders, and to enable formulation of policy options in response to the anticipated impacts of global change.

ARCSS Questions

Research funded through the ARCSS Program is increasingly thematic rather than disciplinary in nature, and some interdisciplinary aspects of the system are beginning to emerge in detail. To achieve truly broad and deep understanding of the working of the arctic system as a whole however, the program still faces the challenging task of further integrating and coordinating ARCSS science across even the broadest of disciplinary boundaries. The community is in the process of refining the ARCSS science questions, synthesizing ARCSS knowledge and finalizing a new plan for the organization of the ARCSS Program.

Over the seven years since the 1996 ARCSS All-Hands Workshop (http://www.arcus.org/ARCSS/hands_info.html), the ARCSS research community has been moving towards a more theme-based, interdisciplinary approach to studying the arctic system. The 1998 ARCSS science plan, *Toward Prediction of the Arctic System* (http://www.arcus.org/ARCSS_Plan/ARCSS_Plan.html), introduced five broad questions designed to promote a more integrative research structure. These questions arose from ARCSS research and were developed in planning discussions in open meetings of the ARCSS community. At the 2002 ARCSS All-Hands Workshop (http://www.arcus.org/ARCSS/allhands2002/presentations.html), there was consensus to continue moving toward highly integrated research and to coordinate ARCSS research around very broad questions, rather than the existing disciplinary components. The following three thematic questions, which have been distilled from the five questions in the 1998 ARCSS Science Plan, are emerging to provide a scientific basis for organizing ARCSS Program research:

I. How do human activities interact with changes in the Arctic to affect the sustainability of ecosystems and societies?

II. What are the limits of arctic system predictability?

III. How will changes in arctic cycles and feedbacks affect arctic and global systems?

These questions emphasize three concepts fundamental to research on arctic change: predictability, sustainability, and feedbacks. The ARCSS Program supports research focusing on these three interrelated concepts to improve our understanding of the arctic system as whole. Focusing the ARCSS Program on the concepts of predictability, sustainability, and feedbacks reflects the increased ARCSS emphasis on integrative, interdisciplinary research that weaves disciplinary knowledge into system science. An important assumption underlying these questions is that many changes in the global climate system affect the arctic system. Changes in the Arctic may, in turn, feed back on the global system.

ARCSS Structure and focus

In recent years ARCSS has had four components: Ocean/Atmosphere/Ice Interactions (OAII); Land/Atmosphere/Ice Interactions (LAII); Human Dimensions of the Arctic System (HARC), and Paleoenvironmental Arctic Sciences (PARCS), under which research activities have been developed. PARCS proposals are considered within the Earth System History competition of the United States Global Change Research Program and are solicited under a different NSF announcement with separate submission dates. ARCSS is in transition, and as the ARCSS Program continues to develop its questions, it is anticipated that these components will change substantially, become woven into a structure more nearly reflecting the questions, and ultimately disappear, and that each of the ARCSS research efforts will contribute primarily to the three thematic questions above. Nevertheless, the new thematic ARCSS Program will not be a prescriptive structure; a given project or research effort may produce data and results that address more than one of the research questions.

ARCSS has directed most available support to large integrated research projects that are proposed and implemented in response to science plans developed by the scientific community through the Science Steering Committees (SSCs) for each component of ARCSS. However, global change proposals with focus on the arctic system are also welcome from individual investigators or small groups of investigators. While science steering committees and science management offices will continue to guide focused research efforts, existing science steering committees (OAII, LAII, PARCS, etc.) may be replaced gradually by more integrative theme-based oversight committees. Regardless of the developing structure of the ARCSS Program, the ARCSS Committee, which will expand its membership, will continue to provide close oversight and direction to the community of ARCSS.

A report describing the current thinking of the ARCSS Program is available on the ARCSS web site (http://www.arcus.org/ARCSS/allhands2002/AHW_Proceedings.html). It is expected that future special announcements for funding opportunities in ARCSS will draw on ideas presented in more than one individual science plan. Some of the areas identified at the 2002 All Hands Meeting as being likely to have high priority in ARCSS in the coming years were:

- Arctic-CHAMP: pan-Arctic Community-wide Hydrological Analysis and Monitoring Program (http://nsidc.org/arcss/projects/champ.html)
- Nearshore and Coastal Processes (expanded from RAISE: http://nsidc.org/arcss/projects/raise.html)
- Pan-Arctic Cycles, Transitions and Sustainability (http://www.laii.uaf.edu/pubs/PACTS-Oct02.pdf)

The Science Plans for the existing ARCSS components are also available, though it is anticipated that these will undergo significant change in the near future:

LAII (http://www.laii.uaf.edu/),
OAII (http://www.arcus.org/Marine_Science/index.html),
HARC (http://www.arcus.org/HARC/index.html), and
PARCS (http://www.arcus.org/parcs/fr_parcs.html).

Synthesis in ARCSS

The arctic system includes physical, chemical, geological, biological, and cultural factors that may respond to global change. Some models that predict the climatic response to global change show greater change in the Arctic than any other region. The predicted climatology, however, may not consider the largely unknown interannual to centennial variability in the Arctic. The presence of cultural institutions in a region subject to possibly large perturbations, however, makes it important that scientists understand better the interactions of the global and arctic systems. Therefore, the research supported in ARCSS extends beyond purely observational studies to those studies that predict and analyze the consequences of environmental variability and global change important to wise stewardship of renewable resources and development of decision and policy options for resource managers and residents.

To achieve this, ARCSS also supports the integration of research results across components within ARCSS as well as with any other arctic research program through a Synthesis, Integration and Modeling Studies (SIMS) effort (see ARCSS Data Coordination Center, http://arcss.colorado.edu/). As ARCSS ventures into its first program-wide synthesis, the program is increasingly interested in efforts that expand on the existing data-oriented SIMS effort and propose to synthesize knowledge

of how the arctic system works, including focus on the linkages between parts of the system, and better articulation of the implications for the future.

Defining an ARCSS Proposal

The interdisciplinary nature of system science can make it difficult to determine whether a proposal is or is not suitable for the ARCSS program. A proposal suitable for competition in the ARCSS program will normally be expected to have several or all of the following characteristics:

- Has a direct connection to some suite of existing ARCSS-funded research projects
- Fills a significant gap in our understanding of the arctic system (e.g. as identified by the advisory committee synthesis exercise)
- Makes connections between parts of the arctic system
- Helps explain the range of states for the arctic system
- Focuses on explaining cause-and-effect

Successful proposals have been funded by the Office of Polar Programs, the Divisions of Atmospheric Sciences and Ocean Sciences within the Directorate for Geosciences, by the Division of Environmental Biology within the Directorate for Biological Sciences and, in some cases jointly with other federal agencies.

For more information on how a research proposal might best fit the programs and themes of ARCSS, contact the program director.

OTHER ARCTIC SUPPORT

Arctic Research Support and Logistics

The Arctic Research Support and Logistics (RSL) program supports the logistics components of field research projects and a variety of activities considered to be research support, most notably, the support of long-term observations.

The RSL program supports field components of research funded by the Arctic Sciences Section, other directorates at NSF and occasionally other federal agencies. Support includes, but is not limited to, providing transportation, food and shelter while conducting field work, user and day-rate fees at field camps, salaries of staff hired specifically for field work, activities such as travel to coordinate projects with permitting agencies and Native peoples. More detailed information is available on the RSL web site (http://www.nsf.gov/od/opp/arctic/suplog.htm).

Access to logistical support from the RSL program is through the regular proposal process. All fieldwork should be described in the proposal. We strongly recommend preparing a brief outline of the field plan within the proposal body, including a schedule and describing the associated costs in the budget explanation. Costs for field support should not be included in the budget if they are to be provided through a support organization, e.g. the Arctic logistics contractor VECO Polar Resources (VPR; http://vecopolar.com); however, these activities must be noted in the budget justification.

The RSL program was created to improve access and safety in the Arctic for scientists. Investigators are encouraged to propose effective and efficient use of logistics resources to reach research goals, for example, using fixed-wing aircraft, helicopters and wireless relay of data for autonomous sensors. The Arctic Logistics Information And Support (ALIAS) website (http://alias.arcus.org) is an online resource of information about logistics access throughout the Arctic, including ship resources. Information and logistics support are also available from NSF's logistics contractor VPR, who may refer you to other logistics providers as appropriate. To improve the safety of field researchers, investigators are encouraged to have research team members take training including first-aid and wilderness medical training and aircraft safety (several courses are sponsored each year by VPR) and hire experienced field assistants, particularly for high altitude projects and projects that use aircraft and boats. Researchers are strongly encouraged to consider using the expertise found in the local communities near research areas as well. Satellite-based global phones and radios are available through the logistics

contractor as are a number of other services. Please consult their web site for further information. Another goal of the program is to encourage appropriate cooperation with Arctic residents during the term of the project. For further information, see the document "Principles for the Conduct of Research in the Arctic" (http://www.nsf.gov/od/opp/arctic/conduct.htm).

The science program director for each project, in consultation with the RSL program director, will determine the level of support that can be provided from the logistics program. In some cases, OPP may determine that several unrelated proposals can derive significant cost-benefit from a centrally managed resource. If so, an appropriate research support organization will be tasked to coordinate the support with the principal investigators, consistent with the agreements between the investigators and their program directors. In other cases, the work can be proposed as a large coordinated activity to be supported at some level by a support contractor.

The RSL program also supports the collection, management and dissemination of data that can be considered in the service of the broad arctic research community. Examples are:

- The establishment or maintenance of long-term observations. They should be justified in the context of providing critical data to regional or global modeling efforts and/or as a framework for process studies. Investigators are encouraged to show strong community support to these measurements. Development of robust instrumentation approaches is encouraged.
- The support of aspects of collecting underway data from ships. This includes documentation, quality control and archiving. Proposals need not address all possible data streams, but they should address the end-to-end management of any covered data stream to the point that properly archived data are accepted into a suitable archive. The researchers are required to develop a website or alternative venue that advertises the existence of the data, and how the data can be obtained. Researchers wishing to propose an underway data project are encouraged to review the posted correspondence noted above that is available on the AICC website (http://www.unols.org/aicc/). It is envisioned that proposals may be received to cover the acquisition of multibeam and other bathymetric data, acoustic Doppler current profiler data, and meteorological data.
- The acquisition of satellite and airborne imagining and mapping data and the production and dissemination of user-friendly data products.

The RSL program works with several organizations to meet the needs of arctic field research. Please review the RSL program and ALIAS websites and web links therein for more information about available services.

There are special requirements for fieldwork in Greenland. Principal investigators contemplating work in Greenland should obtain the Danish Polar Center application form for research in Greenland. Application forms are available on the World Wide Web at http://www.dpc.dk. A copy of the application should be included in the supplementary documents submitted with the proposal to OPP.

Researchers intending to use a vessel from the University-National Oceanographic Laboratory System (UNOLS) or the U.S. Coast Guard (USCG) vessels *Healy*, *Polar Sea* or *Polar Star* should follow the UNOLS procedure (http://www.unols.org).

Arctic Research and Policy

OPP will support proposals to make arctic data and information more readily available to researchers. Specific areas of emphasis include: metadata documentation, standards development and implementation, and geographic information system coordination. Proposals to integrate data and information management and to build the infrastructure necessary to effectively discover, access, share, manage, and use digital data and information are especially encouraged.

Arctic Research and Education

The integration of research with outreach and education is important to OPP. Investigators are encouraged to include these activities in their research proposals in accordance with the broader impacts review criterion. Some education and outreach activities may develop during the course of a research grant or warrant a separate proposal specifically for the education and

outreach activities. The Arctic Research and Education program supports these activities in concert with funded research grants and agreements through supplement requests or as separate proposal requests to support new ventures in arctic research and education. Proposals to this program may include formal or informal education or outreach to students K-12 and higher or to the broader public. Most commonly these awards are made as supplements to research grants or small grants. The Arctic Research and Education program seeks to collaborate with other directorates at NSF to promote the integration of research and education.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

Approximately 130-160 awards are expected to be made each year, with a combination of standard and continuing grants, contracts and cooperative agreements. Award sizes will vary widely depending on the type of work proposed. Funding for the Arctic research programs will total approximately $66 million, per year, pending availability of funds.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

Researchers should conform to the Principles for the Conduct of Research in the Arctic, prepared by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC) and approved by IARPC in 1990. These principles are listed at http://www.nsf.gov/od/opp/arctic/conduct.htm.

Proposals that include fieldwork should be submitted well in advance. For example, for fieldwork in summer 2005, proposals should be submitted preferably by February 15, 2004, but no later than August 30, 2004.

A brief section in the proposal and budget justification should outline the field plan and associated costs (see Section II, "Arctic Research Support and Logistics").

Principal investigators contemplating work in Greenland should obtain the Danish Polar Center application form for research in Greenland. Application forms are available at http://www.dpc.dk. A copy of the application should be included in the supplementary documentation with the proposal submitted to OPP (in the Supplementary Documents section of Fastlane).

Researchers intending to use a vessel from UNOLS or the USCG should follow the UNOLS procedure (http://www.unols.org).

Proposers are reminded to identify the program announcement/solicitation number (03-574) in the program announcement/ solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

C. Due Dates

Proposals must be submitted by the following date(s):

None Specified.

The Arctic Natural Sciences Program has implemented Deadlines rather than Target Dates on August 30 and February 15 of each year. Beginning in August 2003, proposals will not be accepted to the Arctic Natural Sciences program after the Deadline Dates. The Arctic Natural Sciences program receives a high proposal load that is better managed when proposals are received by the established deadline dates. If you have difficulties with FastLane during submittal, contact FastLane Help and they will assist you.

The Arctic Social Sciences, Arctic System Science, Arctic Research Support and Logistics, Arctic Research and Policy and Arctic Research and Education programs have retained the flexibility of Target Dates. Proposals received after the established Target Dates of August 30 and February 15 of each year may miss a particular panel or committee meeting, but will still be reviewed.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed

research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education
One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc and/or panel review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit

NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at http://www.gpo.gov.

Special Award Conditions:

OPP, in conformance with NSF policy, expects investigators to share with other researchers, at no more than incremental cost, and within a reasonable time, the data, derived data products, samples, physical collections, and other supported materials gathered or created in the course of a research project. For further details on this policy, please see "Guidelines and Award Conditions for Scientific Data" at http://www.nsf.gov/cgi-bin/getpub?opp991.

Principle Investigators are expected to follow the Principles for the Conduct of Research in the Arctic, prepared by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC) and approved by IARPC in 1990. These principles are listed at http://www.nsf.gov/od/opp/arctic/conduct.htm.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- William J. Wiseman, JR., Arctic Natural Sciences Program Manager, Office of the Director, Office of Polar Programs, 740 S, telephone: (703) 292-4750, fax: (703) 292-9082, email: wwiseman@nsf.gov

- Jane V. Dionne, Arctic Natural Sciences Program Director, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-7427, fax: (703) 292-9082, email: jdionne@nsf.gov

- Anna Kerttula, Arctic Social Sciences Program Director, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-8029, email: akerttul@nsf.gov

- Neil R. Swanberg, Arctic Systems Sciences Program Director, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-8029, email: nswanber@nsf.gov

- Luis M. Tupas, Arctic System Sciences Associate Program Manager, Office of the Director, Office of Polar Programs, 740 S, telephone: (703) 292-8029, fax: (703) 292-9082, email: ltupas@nsf.gov

- Simon N. Stephenson, Arctic Research Support & Logistics Program Director, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-8029, fax: (703) 292-9082, email: sstephen@nsf.gov

- Charles E. Myers, Head, Interagency Arctic staff, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-8029, fax: (703) 292-9082, email: cmyers@nsf.gov

- Renee D. Crain, Science Assistant, Office of the Director, Office of Polar Programs, 755 S, telephone: (703) 292-8029, fax: (703) 292-9081, email: rcrain@nsf.gov

For questions related to the use of FastLane, contact:

- Linda Izzard, Program Coordination Specialist, Office of the Director, Office of Polar Programs, 740 S, telephone: (703) 292-7430, fax: (703) 292-9082, email: lizzard@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

Crosscutting programs at NSF include interdisciplinary programs, programs that are supported by multiple Directorates at NSF, and programs jointly supported by NSF and other Federal agencies. Selected major programs are listed on the Crosscutting programs website at http://www.nsf.gov/home/crssprgm/. Within the crosscutting Environmental Research and Education program are several emphasis areas compatible with arctic research, including Biocomplexity in the Environment, Global Change Research and Environmental Education. More information about these emphasis areas at NSF can be found on the ERE web site at http://www.nsf.gov/geo/ere/ereweb/index.cfm.

OPP also works closely with other programs in the Geosciences Directorate (http://www.geo.nsf.gov/start.htm), including Ocean Sciences, Atmospheric Sciences and Earth System History and has co-funded education projects with the Elementary, Secondary and Informal Education (ESIE) program in the Education and Human Resources Directorate (http://

www.ehr.nsf.gov/).

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090 or (800) 281-8749
- **To Order Publications or Forms:**

  Send an e-mail to: pubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

OMB control number: 3145-0058.