International Polar Year, 2007

Program Solicitation

NSF 07-536

Replaces Document(s):
NSF 06-534

National Science Foundation

Office of Polar Programs

Directorate for Biological Sciences

Directorate for Education & Human Resources

Directorate for Social Behavioral & Economic Sciences

Office of International Science and Engineering

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

March 16, 2007

September 14, 2007

Second deadline is an additional deadline only for the "Humans in Polar Regions" subtopic of Human and Biotic Systems in Polar Regions

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the NSF FastLane system. In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

Participating Directorates in FY 07:

This solicitation builds on the NSF investments and activities that resulted from the FY 06 IPY solicitation, which were supported by EHR, OPP, and OISE. "International Polar Year, 2007" is the result of an agency-wide planning activity.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

International Polar Year, 2007

Synopsis of Program:

The "International Polar Year 2007-2008" (IPY) will extend from March 2007 through March 2009. IPY is envisioned as an intense scientific campaign to explore new frontiers in polar science, improve our understanding of the critical role of the polar regions in global processes, and educate the public about the polar regions. Projects are expected to be interdisciplinary in scope; involve a pulse of activity during the IPY period; leave a legacy of infrastructure and data; expand international cooperation; engage the public in polar discovery; and help attract the next generation of scientists and engineers. To accomplish these goals, this special solicitation for IPY proposals will support specific research and education activities within the following emphasis areas:

Understanding Environmental Change in Polar Regions:

This area will support research that advances the understanding of the physical, geological, chemical, human, and biological drivers of environmental change at the poles, their relationship to the climate system, their impact on ecosystems, and their linkages to global processes.

Human and Biotic Systems in Polar Regions:

This area will provide opportunities for scientists to address fundamental questions about social, behavioral, and/or natural systems that will increase our understanding of how humans and other organisms function in the extreme environments of the polar regions.

Education and Outreach:

This area will support standalone education proposals that specifically invigorate science, technology, engineering, and mathematics (STEM) education in the context of the IPY, including: formal science education projects at the K-12, undergraduate, or graduate level; informal science education projects for the broader public; and coordination and communication for IPY education projects.

Proposed research activities must be integrally related to one or more of these emphasis areas and adhere to the guidance of the National Research Council's report “A Vision for the International Polar Year 2007-2008” (2005), including where appropriate, specific significant linkages to international activities. These emphasis areas are intended to advance the frontiers of knowledge and build on the momentum achieved by NSF IPY investments and activities that are currently underway in response to an NSF IPY solicitation published in early 2006.

As was required for the 2006 IPY Solicitation, *all proposals must address the project’s relevance to the IPY in a separate statement in the Project Summary, and as an integral part of the Project Description*. Proposals that fail to address IPY relevance in both sections of the proposal will be returned without review. See Section VI. “Proposal Review Information: Additional Review Criteria” for guidance.

Proposals for IPY projects that are not related to the topics described in this solicitation should be submitted to other announcements of opportunity at NSF. (See Section IX, "Other Programs of Interest."). These other announcements are also listed on an IPY web page maintained by NSF's Office of Polar Programs (http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp). These IPY proposals should meet the goals and priorities of the relevant program.

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

- 47.074 --- Biological Sciences
- 47.075 --- Social, Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources
- 47.078 --- Office of Polar Programs
- 47.079 --- Office of International Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 60 to 70

Anticipated Funding Amount: $41,700,000 Depending on suitability of proposals and availability of funds, each participating directorate will provide support for research and education activities under the IPY Solicitation in FY 07 and FY 08 (combined) as follows: BIO: $4,000,000; EHR: $4,000,000; OISE: $700,000; OPP: $29,000,000; and SBE: $4,000,000.

Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/)

B. Budgetary Information

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

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  March 16, 2007

  September 14, 2007

  Second deadline is an additional deadline only for the "Humans in Polar Regions" subtopic of Human and Biotic Systems in Polar Regions

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

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 International Polar Year (IPY) will extend from March 2007 through March 2009. This period commemorates the fiftieth anniversary of the 1957 International Geophysical Year (IGY) and has been designated the fourth IPY by the National Academy of Sciences (NAS), the International Council for Science (ICSU), the World Meteorological Organization (WMO), the Antarctic Treaty System and its adhering nations, the Arctic Council, and many other international organizations. The U. S. National Committee for IPY, formed under the auspices of the NAS, has published a vision document available at http://www.us-ipy.org/. The ICSU-WMO Joint Committee published an additional planning framework and is facilitating international cooperation through an International Programme Office in Cambridge, England. Further information on international efforts and the history of the IPY is available at http://www.ipy.org

The President’s Office of Science and Technology Policy designated the National Science Foundation as the lead federal agency in organizing U.S.-IPY activities. This solicitation continues NSF's investments in IPY by focusing on three emphasis areas for research and education spanning the geophysical, biological and human sciences. For more details about IPY activities in other federal agencies, see the agency web sites, solicitations, and remarks in the National Research Council's

report *International Polar Year 2007-2008: Report of the Implementation Workshop* (2005) and its IPY web site (www.us-ipy.org). Additional information is also available on the U.S. government IPY site (www.us-ipy.gov), maintained by NSF.

II. PROGRAM DESCRIPTION

The International Polar Year is intended to be a milestone event in exploring new frontiers in polar research and improving our understanding of the critical role of polar regions in global processes. The following are desirable characteristics of IPY projects. Those that

- advance polar science by launching new initiatives;
- represent a pulse of activity that can be implemented within the IPY timeframe or that extends the legacy of IPY;
- encompass scientific investigations that are interdisciplinary in scope;
- link arctic and antarctic research;
- include comprehensive data management plans;
- leave a legacy of data and/or infrastructure for polar observations, research, and education;
- develop and expand international partnerships and cooperation, and bring new investigators to polar research;
- engage the public in polar discovery; and
- attract and develop the next generation of scientists and engineers.

This solicitation will consider IPY research proposals in three emphasis areas:

- **Understanding Environmental Change in Polar Regions**
- **Human and Biotic Systems in Polar Regions**
- **Education and Outreach**

These emphasis areas advance the frontiers of knowledge and build on the momentum achieved by NSF IPY investments and activities that are currently underway in response to an NSF IPY solicitation published in early 2006, which focused on: Study of Environmental ARctic CHange (SEARCH), Life in the Cold and Dark, Polar Ice Sheet Dynamics, and Education and Outreach (see website http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp for a list of NSF IPY awards).

The specific topics of research that will be supported under each emphasis area for the current solicitation are described below. Proposals submitted under this solicitation may be co-reviewed among NSF programs or with other Federal Agencies.

Proposals for IPY projects that are not related to the topics described in this solicitation should be submitted to other announcements of opportunity at NSF. (See Section IX, "Other Programs of Interest."). These other announcements are also listed on an IPY web page maintained by NSF's Office of Polar Programs (http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp).

As an important contribution to the IPY legacy, data management is expected to be an integral part of all research proposals, although standalone data management proposals will also be considered. Similarly, education may be integral to proposals as they address broader impacts, but as described under the Education and Outreach emphasis area, standalone education proposals that meet IPY criteria are also appropriate.

Priority will be given to proposals that take interdisciplinary approaches and forge new and innovative partnerships among disciplines, as well as those that build collaborations with researchers and educators who have not previously been involved in polar research. Such proposals will leave a legacy by promoting and stimulating new collaborations that may continue beyond IPY, and will further our understanding of fundamental questions in polar science, including interactions of human communities with the environment.

Scientists from numerous countries are engaged in IPY research. International efforts during the IPY present opportunities for collaboration with foreign scientists in the development of integrated projects that could lead to important advances in scientific understanding of polar regions, and in our ability to conduct research in these extreme environments. Collaboration and participation of U.S. organizations in foreign-led efforts within the emphasis areas are strongly encouraged, as is participation of non-U.S. scientists in proposals supported under this IPY solicitation. Awards made through this program will support U.S. institutions. Collaborators from institutions outside the U.S. must seek funding from their respective funding organizations. See the section below on International Participation

(1) Understanding Environmental Change in Polar Regions

The International Polar Year provides an opportunity to focus worldwide attention on the challenges of understanding the

system-scale environmental changes now observed in the polar regions. This emphasis area will support research that advances the understanding of the drivers of environmental change in the Arctic and Antarctic, including physical, geological, chemical, human, and biological processes and their interactions with ecosystems and the climate system. Proposals about environmental change research that do not address one or more of the specific topics listed below should be submitted to other announcements of opportunity at NSF (See Section IX, "Other Programs of Interest").

Observations of the polar regions are critical for identifying and characterizing processes related to environmental change. For example, Long Term Ecological Research (LTER) sites (http://www.lternet.edu/) have been established in the Arctic and the Antarctic to acquire long-term data sets, as well as to promote synthesis activities and comparative research across sites and ecosystems, and among national and international research programs. In the Arctic, the research community has identified establishment of an Arctic Observing Network (AON) as one key to advancing SEARCH (http://www.arcus.org/SEARCH/index.php) under the IPY. Proposals that make use of polar observing systems (e.g., LTER sites and AON) to further the understanding of environmental variability and climate change in polar regions are encouraged. Proposals that contribute to the design of an Arctic Observing Network are also encouraged.

The extreme environments of the polar regions present significant challenges for implementing technologies that will enable or advance scientific inquiry. Addressing these challenges is likely to involve applications development, as well as engineering systems, software systems, and cyberinfrastructure research. Proposals are encouraged that advance modern technologies (including network development, communications, data management and data systems) to enhance measurements and exploitation of the data collected from polar observing networks, such as, but not limited to, polar LTER sites and AON.

In particular, proposals should address one or more of the following topics:

- Documenting the state of the present climate system, and the nature and extent of climate changes occurring in the polar regions by developing or enhancing key observation networks, and enhancing the function of existing networks (e.g., by developing observing network nodes, data discovery capacity, etc.).
- Understanding the forcing mechanisms, thresholds, and feedbacks that control the climate system, including non-linear responses to physical drivers resulting in abrupt climate change; the interactions among the atmosphere, oceans, ice sheets, permafrost, and lithosphere that affect climate change; and the feedbacks that may dampen or accelerate climate change.
- Investigating the paleontological and archaeological records during glacial/interglacial cycles to determine how past and present trajectories of change in climate can be used to predict the trajectory of future changes.
- Understanding environmental interactions between the polar regions and the lower latitudes, such as identifying key climate teleconnections to lower latitudes (e.g., patterns of deep water circulation) and identifying low latitude drivers of polar conditions.
- Understanding the relationships between climate change and the structure and function of organisms; the organization of biological communities, ecosystems, and human social systems in polar regions; the mechanisms that control these relationships; and the main interactions among these domains.
- Understanding the relationships among increased climate variability and biodiversity and ecosystem function across multiple spatial scales; and the relationship among climate change and alteration of life histories and population dynamics of key polar species, including changes in range or distribution of migratory species and the ecology of infectious diseases.
- Understanding the relationship among environmental change and ecosystem services and the consequent socio-economic consequences in polar regions (e.g., understanding the responses of human communities to, and interactions with, climate change).

(2) Human and Biotic Systems in Polar Regions

The extreme physical environments of the polar regions have presented biologists and social scientists with unique study systems for many decades. These research efforts have resulted in insights that are broadly applicable to human and biological systems elsewhere on the globe. However, there are significant gaps in our knowledge that could be overcome using an increased understanding of human social interactions and/or recent advances in life sciences technology. This solicitation presents an opportunity for scientists to address fundamental questions about human and biotic systems that will increase our understanding of how humans and other organisms function in these extreme environments. Proposals that link human and biotic systems are appropriate and invited, although those addressing either of these research areas (within the context of each of the subtopics listed below) are also appropriate. This thematic area represents an extension of support for projects about “Life in the Cold and Dark,” a thematic emphasis in the NSF FY 2006 IPY Program. Proposals explicitly focused on understanding the effects of environmental change on human and biotic systems should be submitted to the “Understanding Environmental Change in Polar Regions” emphasis area described above.

Humans in Polar Regions

Humans have been an integral part of the arctic polar environment for the last 10,000 or more years. Indigenous peoples as

well as recent migrants into the region have influenced and been influenced by the natural environment. Humans now have begun to dwell, for at least limited periods, in the Antarctic, and here too the environmental extremes influence human individual and social behavior. This emphasis area encourages the submission of proposals that advance the understanding of our species' place in the complex system of polar phenomena. In particular, proposals that address the following are encouraged:

- Adaptations of humans and polar communities to life in the polar environment, which for much of the year is both cold and dark, and how these adaptations developed over time; the effect of settlement patterns in polar regions on education and the development of human capital; the factors contributing to vulnerability, resilience, and sustainability of human cultures in the Arctic.
- Historical or extant forces driving social and economic organization in polar regions; the impact of migrations and culture contact on social institutions, demographics, or biological or linguistic variability.
- Responses of resource utilization, world economy and global politics to impacts of polar climate change; the nature and extent of social transformations induced by large-scale resource utilization, industrialization and development in the arctic regions; the influence of these transformations on the relationship between demographic, economic and social trends, and ultimately how they impact the environment.
- Dynamics found in highly isolated groups in polar settings; effects of harsh conditions of cold and dark on basic perceptual processes, as well as complex processes of emotion and cognition; the factors contributing to vulnerability and resilience of individuals under these harsh conditions.

Proposals that involve polar residents as instrumental partners in research and which have clear plans for communicating results to diverse audiences are particularly encouraged.

Environmental Genomics of Polar Organisms

Application of genomic approaches provide researchers with new opportunities to understand how organisms interact with (adapt to and modify) their biotic and abiotic environment. The unique environments and organisms of the polar regions provide natural laboratories where fundamental questions about evolution and adaptation can be addressed. The topics under this emphasis area are relatively broad in scope, but proposals submitted to this area must use genomic tools to reveal the basis for physiological adaptations, patterns in species diversity, and controls on ecosystem function. Genomic approaches to these questions may range in scope from the molecular to the population-level, but studies should further the development of fundamental knowledge about organism-environment interactions in the polar regions, and strengthen our capacity to apply these methods. The NAS publication *Frontiers in Polar Biology in the Genomics Era* (http://books.nap.edu/catalog/10623.html) includes background information on the ecological relevance and research benefits of genomic approaches to polar biology.

Examples of appropriate research topics include, but are not limited to:

- Application of genomic methods to further our understanding of the evolution of genes associated with control of circadian rhythms and photoperiodic timers in species inhabiting polar regions, where extremes of day length provide unique study systems.
- Metagenomic studies of polar microbial communities that link genomic sequence data with information about the organisms and environment from which the DNA was isolated.
- Elucidating potentially unique genome structures or patterns of gene regulatory element function in polar marine species that occupy relatively low- and relatively constant-temperature niches; comparing genome structure and function between polar species and species that occupy relatively constant high-temperature niches at low latitudes.
- Identifying seasonal patterns of changes in gene expression or levels of protein (proteomics), and mechanistically linking such patterns to seasonal changes in performance and life cycles; understanding how these patterns in polar species inform us more generally about genome-wide patterns and their mechanistic linkages in all organisms.

(3) Education and Outreach

In addition to the educational activities normally integrated into research proposals, this solicitation will consider standalone education proposals that specifically invigorate science, technology, engineering, and mathematics (STEM) education for U. S. audiences in the context of the IPY. The education topics for this solicitation are: formal science education projects at the K-12, undergraduate, or graduate level; informal science education projects for the broader public; and coordination and communication for IPY education projects. Innovative projects that bridge formal and informal education will also be accepted.

Educating people about the polar regions and their importance to the global system will be a significant legacy of International Polar Year. Standalone science education proposals that focus on the goals of the IPY to increase public knowledge of and interest in the polar regions are encouraged. Projects should leverage the inherent appeal of the polar regions to teach about the active conduct of scientific research and the relevance of polar regions to the earth system. Proposals are encouraged to relate to one or more of the scientific emphasis areas but they may relate to other areas of

polar research. Proposers should be aware of the IPY education projects funded in FY'06 and should not duplicate these efforts. A list of these projects and their abstracts can be found at the IPY web page (http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp). Where appropriate, proposals are expected to involve international collaborations that strengthen the proposed project activity (see section below on International Collaborations).

Successful education proposals should

- enhance and create innovative science education resources that impact a broad audience;
- engage and educate diverse and underrepresented communities;
- use recent advances in research on STEM education;
- encourage interdisciplinary teaching and learning;
- attract and develop the next generation of polar researchers;
- reflect the international aspect of IPY and, where appropriate, build international partnerships and collaborations; and
- include a plan for evaluating the impact of the project on the target audience.

This solicitation will consider IPY education proposals in three focus areas.

Polar Formal Science Education:

Formal education projects for K-12 teachers and students and for undergraduate or graduate students are expected to develop innovative programs that invigorate education in polar science in the context of the IPY. Projects are encouraged to take advantage of learning gained from best practices in other countries that have been successful with education in polar science and build mutually beneficial and synergistic international collaborations.

Formal science education projects should focus on the education and professional development of one of three primary audiences: K-12 teachers of STEM (including pre-service teachers), undergraduate students, or graduate students. Because of the limited time-frame for IPY, proposals should concentrate the major thrust of their activities for the benefit of one of these audiences. Formal education projects for K-12 teachers and students and for undergraduate or graduate students are expected to develop innovative programs that invigorate education in polar science in the context of the IPY. Projects are encouraged to take advantage of learning gained from best practices in other countries that have been successful with education in polar science and build mutually beneficial and synergistic international collaborations. It is expected that the undergraduate and graduate students concentrate their academic studies and/or research in STEM disciplines relevant to the polar research.

- Teacher Professional Enhancement:

  NSF will fund projects to adapt and enhance instructional materials to meet the needs of K-12 teachers and/or students interested in teaching and learning about IPY. Projects that highlight the importance of polar science to society are encouraged. NSF is seeking proposals that create new materials and/or take advantage of existing resources. Although many such resources exist, it is not easy for teachers to readily identify and evaluate the quality of these resources, to determine their suitability for a particular classroom, or to determine their alignment with state science education standards. Successful proposals should create a product that will allow teachers to identify educational resources, quickly determine the learning objectives of the resource, provide access to student assessment tools, provide a summary evaluation of the pedagogical quality of the resource, allow teachers to match the resource's learning objectives with science education standards, and provide for teacher support. Dissemination should be on a national or international scale. Projects that target a local population of teachers, rather than a large regional or national audience, will not be considered for funding. Priority will be given to projects that will disseminate materials within the IPY timeframe.

  NSF will also consider proposals for summer professional development workshops for K-12 teachers that enable teachers to incorporate current polar science research activities into their STEM courses. Workshops should have a minimum duration of 14 days, be structured in a manner informed by current research on teacher professional development, and have an appropriate balance of science content and pedagogy.

- Undergraduate Education:

  Proposals under this topic should focus on the education or training of undergraduate students or the development of undergraduate level materials. Projects should be based on high-quality science and be guided by current best practices in education. These proposals will likely require expertise from professionals in education as well as scientific researchers. Priority will be given to new courses or course materials focusing on IPY that have a broad impact on undergraduate polar STEM education. Field courses

and other training experiences that develop the next generation of polar scientists will also be considered. NSF wishes to build on experiences gained through innovative projects in undergraduate education supported by existing programs such as:

"Course, Curriculum and Laboratory Improvement (CCLI)" (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06536)

"Research Experiences for Undergraduates (REU)" (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5517&from=fund).

- Graduate Education:

Proposals under this topic should focus on transformative education and training of graduate students to allow them to cross traditional boundaries in research. Proposals should include the development of skills normally not offered by graduate programs. Proposals should not be requests for field research assistants but should contribute to innovative practices for graduate education and build on experiences gained through projects supported by existing programs such as:

"Graduate Teaching Fellows in K-12 Education (GK-12)"

(http://www/msf/gov/funding/pgm_summ.jsp?pims_id=5472&org=EHR&from=home)

"Integrative Graduate Education and Research Traineeships (IGERT)"

(http://www/msf/gov/funding/pgm_summ.jsp?pims_id=12759&org=EHR&from=home)

Examples of possible activities include, but are not limited to, connecting graduate research with education activities in K-12 schools; exploring the frontiers of interdisciplinary work; using real data or modeling processes, or establishing international partnerships with researchers across the globe that are involved in polar research.

Polar Informal Science Education (ISE)

IPY presents an opportunity to engage the public in science conducted in the polar regions through informal science education such as television programs, large format films, museum exhibits, zoos, aquariums, planetariums, advanced uses of on-line technology and other media as well as youth and community programs. ISE IPY proposals must demonstrate relevance to IPY goals, be designed for national distribution, and should contribute to building the legacy of the IPY. International collaboration is encouraged where feasible.

Successful projects must address the characteristic ISE criteria of "innovation" "collaboration," and "audience impact," and where possible, "strategic impact," as described in the "Informal Science Education" solicitation: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06520 .

Coordination and Communication

The polar research and education communities recognize a need for coordination and information dissemination about IPY education activities to a broad audience. A single award in this category is anticipated and may be funded as a Cooperative Agreement. During IPY, there will be a broad array of opportunities for people to engage in learning about the polar regions through education grants, research grants, and public affairs and outreach efforts by NSF and other federal agencies, as well as by the international community. IPY education opportunities will target various audiences about different aspects of the polar regions, dispersed across the two-year IPY timeline. NSF is soliciting proposals to compile information about educational opportunities, materials, and projects and to distribute this information effectively to formal and informal audiences. Proposals should include dedicated staff time to assemble project information and organize it into an IPY education web portal that may be linked to/from existing IPY web sites. Proposals should include a timeline highlighting events throughout IPY and use a variety of formats such as email newsletters, public service announcements, podcasts, presence at relevant conferences, and other mechanisms to bring IPY opportunities to the attention of K-12, university, under-served audiences, and the general public. Proposals should clearly articulate an approach for performing IPY education coordination and communication, including both polar regions and involving both scientists and educators, to actively reach the U.S. audience. Proposals should include plans for archiving IPY 2007 education products as a legacy of IPY for future reference.

The following workshop reports provide background information and concepts relevant to education for IPY:

Arctic Science Education: Recommendations from the Working Group on Arctic Science Education to the National Science Foundation, 2002 (http://www.arcus.org/Education/Education_Report_02.html)

Building Partnerships in Polar Research and Education, 1998 (http://www.arcus.org/Education/Education_Report.html)

Bridging the Poles: Education Linked with Research, 2004 (http://www.ldeo.columbia.edu/res/pi/polar_workshop/)

Poles Together: Coordinating IPY Outreach and Education, 2005 (http://cires.colorado.edu/education/k12/)

DATA MANAGEMENT AND ACCESSIBILITY

Ensuring IPY's legacy requires a strategy for managing the data that will be generated by projects funded through this solicitation, and data management is expected to be an integral part of all proposals (see Section V.A). However, the program will also consider standalone proposals for data storage, access, and visualization. Proposals may relate to a single IPY project, theme, region, or combination of these. More information on data management aspects of IPY activities can be found in the NAS vision document (http://www.us-ipy.org/) and through the IPY International Programme Office web site (http://www.ipy.org).

NSF policy (see Grant Proposal Guide - GPG, Section VI-I) 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 the research project. This policy is outlined in Guidelines and Award Conditions for Scientific Data on the OPP web site (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=opp991).

INTERNATIONAL COLLABORATION

Proposals that include strong international collaborations will be given a higher priority for funding. As science and engineering discoveries increasingly result from international collaboration, U.S. researchers and educators must be globally engaged and able to operate effectively in teams of partners from different nations and cultural backgrounds. International partnerships are, and will continue to be, indispensable in addressing many critical science and engineering problems. In the context of IPY, these partnerships can also invigorate STEM education for U.S. audiences. Active participation of U.S. researchers and educators in IPY projects is highly encouraged, as is the involvement of U.S. researchers and educators in IPY-related research/education in international settings. Successful international projects include those with substantive intellectual contributions from foreign collaborators who bring unique capabilities to the IPY activity.

Awards made through this program will support the U.S.-based participants. Collaborators in institutions outside the U.S. must seek funding from their respective funding organizations.

Proposals must explicitly address how the proposed activity will have greater impact because of its international connections. International activities will be evaluated on the value that they add to the domestic research proposed and to the overall goals of IPY. Researchers and educators who develop international collaborations should describe the relative roles and contributions of U.S. and foreign participants in their project descriptions. Budgets should include all relevant costs associated with the U.S. part of the collaboration, including travel costs associated with work at the foreign collaborator's institution, and costs for students and/or teachers to travel overseas for short or extended visits in foreign laboratories or schools.

Proposals that involve international collaborations must also include the following documentation in the Supplementary Documents section of the proposal: (1) letters from the international collaborators documenting their agreement to collaborate on the proposed projects and their roles in the proposed work; (2) foreign collaborators' biographical sketches (CVs); and (3) contact information for the governmental organizations from which corresponding support is anticipated.

FIELDWORK AND INFRASTUCTURE

Fieldwork in the Arctic and the Antarctic during IPY will be supported through the Arctic Research Support and Logistics program (http://www.nsf.gov/od/opp/arctic/res_log_sup.jsp) and the U.S. Antarctic Program (http://www.nsf.gov/od/opp/prss/), respectively. Proposers should include a justification for necessary fieldwork as part of the project description.

Please see the Antarctic Research Opportunities program solicitation, NSF 06-549 (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5519&org=OPP) for details about facilities and logistics in Antarctica and the U.S. Antarctic Program portal (http://www.usap.gov) for related information. Please see the Arctic Research Opportunities program solicitation, NSF 06-603 (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5521&org=OPP), and the RSL web site (http://www.nsf.gov/od/opp/arctic/res_log_sup.jsp) for information about conducting research in the Arctic. Proposal preparation instructions in these solicitations provide the full details for obtaining field support in the polar regions.

The Office of Polar Programs anticipates that new logistical capabilities will be developed in response to this solicitation. Researchers should clearly identify their needs, which may include aircraft or other vehicles, wireless and satellite communications networks, and other resources that will develop science support capabilities of the U.S. Antarctic Program. Researchers should also identify any requirements for fieldwork during non-traditional times of the year.

Proposals involving fieldwork will be evaluated for operational feasibility, which may include resource availability, environmental protection, and waste management provisions, safety and health measures, and safeguards of radioactive materials.

Considerations for Proposals with Arctic Fieldwork

Because 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 (http://www.nsf.gov/od/opp/arctic/conduct.jsp) was developed by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC) and approved by IARPC in 1990. All arctic research grantees are expected to abide by these principles. Researchers may also find helpful information in the *Guidelines for Improved Cooperation between Arctic Researchers and Northern Communities* (http://www.arcus.org/guidelines).

Considerations for Proposals with Fieldwork in Antarctica or the Southern Ocean

All proposers planning fieldwork in Antarctica or the Southern Ocean must comply with Sections II and V of the Antarctic Research Solicitation, NSF 06-549 (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5519&org=OPP), which contains detailed information on the facilities and policies of the U.S. Antarctic Program that are not included in this solicitation. Special attention must be paid to the sections on the Antarctic Conservation Act, Environmental Protection and Waste Management, Specimens for Research, and any permits required to comply with these policies. Additional information on the Antarctic Conservation Act (ACA) is available on the NSF web site at http://www.nsf.gov/od/opp/antarct/aca/aca.jsp . This page also contains links to the ACA permit form (http://www.nsf.gov/od/opp/antarct/aca/nsf01151/aca4_permit.pdf) and a list of protected antarctic sites (http://www.cep.aq/apa/index.html) maintained by the Committee on Environmental Protection, Antarctic Treaty.

In addition, all proposals involving fieldwork in Antarctica or the Southern Ocean must be accompanied by an Operational Requirements Worksheet, which can be created at the Polar Ice (http://polarice.usap.gov/index.htm) web site as described in Section V.A. of the Antarctic Research Solicitation (NSF 06-549) under the heading "Antarctic or Southern Ocean Proposals Involving Fieldwork."

III. AWARD INFORMATION

Depending on suitability of proposals and availability of funds, each participating directorate will provide support for research and education activities under the IPY Solicitation in FY 07 and FY 08 (combined) as follows: BIO: $4,000,000; EHR: $4,000,000; OISE: $700,000; OPP: $29,000,000; and SBE: $ 4,000,000. Anticipated funding for the specific emphasis areas of the IPY Solicitation, for FY 07 and FY 08 combined, are approximately: Understanding Environmental Change in Polar Regions: $20,230,000; Human and Biotic Systems in the Polar Regions: $12,230,000; Education and Outreach: $9,230,000.

IV. ELIGIBILITY INFORMATION

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program 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/publications/pub_summ.jsp?ods_key=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. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

The following instructions supplement the Grant Proposal Guide (GPG) and NSF Grants.gov Application Guide guidelines.

Cover Sheet

Proposers must include this program solicitation number in the program announcement/solicitation block on the FastLane Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing. Note to Grants.gov users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page.

Proposers should also select the IPY topic that is most relevant to their proposed research or education activity, so that proposals can be directed to the most appropriate program officer. *Note: More than one topic can be selected, but a single topic must be designated as primary.* Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration.

For research proposals, select Office of Polar Programs as the Directorate, and then complete the following steps.

Choose from the following for the Understanding Change in Polar Regions emphasis area:

- Polar Observing Systems
- Phys, Chem, Geol, and/or Paleo Aspects
- Human and/or Biological Aspects
- Data and Data Systems

Choose from the following for the Human and Biotic Systems emphasis areas:

- Humans in the Polar Regions
- Environmental Genomics of Polar Organisms

For education and outreach IPY proposals, select Education and Human Resources as the Directorate, and then complete the following steps.

Choose from the following:

- K-12 Education
- Undergraduate Education
- Graduate Education
- Informal Science Education

Proposals addressing education coordination and communication should select "Informal Science Education."

Title

Proposal titles must include the prefix "**IPY**:" as an identifier. For collaborative proposals submitted as separate submissions from multiple organizations (defined in the NSF Grant Proposal Guide, Section II. D.3.b), the prefix IPY: should come after the identifier Collaborative Research.

Page limit

The normal 15-page limit for the Project Description specified in the GPG and the NSF Grants.gov Application Guide will be strictly enforced. However, collaborative proposals with three or more organizations may add one page to the Project Description for each organization beyond the first two in order to accommodate a description of prior work supported by NSF. Please note that the GPG limits reporting on prior support to a single award most closely related to the proposal.

Relevance to IPY

All proposals must explicitly address the projects relevance to the IPY. This relevance must be included as a separate statement in the Project Summary and developed as an integral part of the Project Description. Proposals that fail to address IPY relevance in both sections of the proposal will be returned without review. Proposers should consult the Additional Review Criteria in Section VI.A: Proposal Review Information for guidance regarding IPY relevance for research proposals. That section also describes the additional review criteria for education proposals, which should be addressed in the Project Description of proposals for education projects.

Data Management

To ensure the legacy of IPY, all research proposals must include a description of their plans for data management in the Project Description. Proposers must also adhere to the general data policy (see Section VII. B., Special Award Conditions) and should include the following required elements, as appropriate, in the Supplementary Documents Section.

Requirements for the data management plan:

- Statement regarding where data will be archived. At a minimum, the proposal should include a letter of support from the specified data center.
- Identification of the data management point of contact and the person who is responsible for submitting the data, metadata, and other documentation.
- Clear indication of which data are community data. Community data must be made available through an openly accessible data management system as soon as data are collected and verified.

Within the first three months of the award, investigators will provide a metadata inventory description (a high-level summary of the data to be collected) to the relevant archive. If a community-wide data coordination service is established, the metadata must be shared with this service. Every project must submit complete documentation and quality-controlled data to the appropriate archive in accordance with the OPP data policy (see Section VII.B.).

Arctic Proposals Involving Fieldwork

Detailed proposal preparation instructions involving arctic fieldwork are available in the solicitation Arctic Research Opportunities; Section V. A. (NSF 06-603, http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5521&org=OPP). Additional information is available in the Program Description for the Arctic Research Support and Logistics (RSL) program (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=13437&org=OPP). The RSL program was created, in part, to enhance access, safety and interactions with local arctic communities. More information about the RSL program is available on the program web site (http://www.nsf.gov/od/opp/arctic/res_log_sup.jsp).

The anticipated fieldwork should be described in sufficient detail for proper review of the proposal and to initiate logistics planning for successful proposals. A description of fieldwork is appropriate in a section of the proposal describing the overall project schedule. Figures showing the fieldwork area are encouraged. The Arctic Research Support and Logistics contractor, VECO Polar Resources (VPR) (http://www.vecopolar.com/), can assist with logistics scoping during the proposal-writing phase for work in all locations. VPR can help direct investigators to appropriate organizations for additional information. If a third-party logistics contractor is identified, their costs should not be itemized or included in the project budget spreadsheet. Instead, the scope and kind of support should be described clearly in the budget justification to allow the logistics provider and reviewers to assess the scope and feasibility and to initiate planning. Please see the Arctic Research Opportunities solicitation (NSF 06-603) for more detailed information about logistics support for arctic fieldwork.

Principal Investigators in the Arctic 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.jsp.

Antarctic or Southern Ocean Proposals NOT Involving Fieldwork

Proposers must complete the Worksheet for Proposals with No Fieldwork in Antarctica (http://www.nsf.gov/od/opp/antarct/nofldwrk.doc) and upload it as a Single Copy Document through FastLane or Grants.gov. Proposals lacking this worksheet are subject to return without review.

Antarctic or Southern Ocean Proposals Involving Fieldwork

Proposed fieldwork must be described in the proposal at a level of detail sufficient for merit review. The costs for field support in the Antarctic should not be itemized or included in the project budget spreadsheet because these costs will be identified through a separate operational review process. To determine field support needs, costs, and feasibility, proposers must submit a Polar Ice Operational Requirements Worksheet (ORW) found at (http://www.usap.gov/scienceSupport/polarice/). This worksheet captures details about the field support requirements that may not be germane to merit review but are critical to feasibility analysis. Completing the Polar Ice ORW requires a substantial amount of time and *must be done before the proposal is submitted*. It is strongly recommended that proposers start this process at least two weeks before final proposal submission. Proposals lacking an ORW may be subject to return without review.

To complete an ORW:

FastLane proposals:

- Prepare, but do not yet submit, the proposal in FastLane.

- Log on to Polar Ice, and apply for a new account. You will be issued a password within one business day.
- Fill out the Operational Requirements Worksheets (ORW). Please note that if your proposal is recommended for an award, your ORW will be used to define your field program.
- Use Polar Ice to produce a PDF version of the completed ORW.
- Upload the ORW as a Single Copy Document through FastLane, and submit the proposal to NSF. Please note that reviewers will not have access to the ORW file, so fieldwork information required for merit review must be included in the proposal s Project Description.
- Log back into Polar Ice and follow the instructions for providing the NSF proposal number.

Grants.gov proposals:

- Prepare, but do not yet submit, the proposal in Grants.gov.
- Log on to Polar Ice, and apply for a new account. You will be issued a password within one business day.
- Fill out the Operational Requirements Worksheets (ORW). Please note that if your proposal is recommended for an award, your ORW will be used to define your field program.
- Use Polar Ice to produce a PDF version of the completed ORW.
- Attach the ORW as a Single Copy Document to the "National Science Foundation Grant Application Cover Page" at item 6, "Additional Single-Copy Documents" and submit the proposal. Please note that reviewers will not have access to the ORW file, so fieldwork information required for merit review must be included in the proposal s Project Description.
- The proposer will receive a confirmation message from NSF within 60 hours of submission of the proposal via Grants.gov. When you have received your NSF proposal number, log back into Polar Ice and follow the instructions for providing the NSF proposal number.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

  March 16, 2007

  September 14, 2007

  Second deadline is an additional deadline only for the "Humans in Polar Regions" subtopic of Human and Biotic Systems in Polar Regions

D. FastLane / Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

  Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are available at: https://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 solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

  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. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- **For Proposals Submitted Via Grants.gov:**

  Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information

about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: http://www.grants.gov/CustomerSupport. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. 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 the reviewer is qualified to make judgements.

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.

Additional Review Criteria:

Proposals will also be evaluated using additional review criteria that consider relevance to the goals of the International Polar Year 2007-2008 (IPY) (see guidance below). Proposers are encouraged to review the U.S. National Committee and ICSU-WMO planning documents available at http://www.us-ipy.org/ and http://www.ipy.org.

Relevance to the goals of the International Polar Year (IPY)

Research proposals will be evaluated to assess the degree to which the proposed activity will

- address science questions consistent with the emphasis areas described in this solicitation. Proposals that do not address at least one of the emphasis areas will be returned without review.
- contribute to international collaborations or partnerships and engages new investigators in polar research, where appropriate.
- address science and/or education in one or both polar regions, linking arctic and antarctic efforts where appropriate.
- provide open and timely access to data and products that will contribute to the legacy of IPY.
- provide meaningful education and training for beginning scientists, teachers, students, or the broader public within the context of the solicitation's emphasis areas.
- address outreach activities that engage the public in polar discovery and communicate research to school children and the general public, as well as policy makers and arctic communities.
- maximize effective use of existing logistical assets or develop new capabilities that are feasible within the IPY timeframe.
- involve communities near field sites and engage arctic residents in meaningful ways (arctic studies only).

Proposals focusing on IPY Education must provide clear and appropriate measures of project success. Proposals will also be evaluated according to the following characteristics.

1. Polar Formal Science Education

Teacher Professional Enhancement projects should

- provide meaningful professional development experiences in polar science (e.g., training, hands-on laboratory research experience, etc.);
- broadly disseminate teacher experiences to students and other professionals; and
- contribute to the polar learning community of teachers, scientists, and other education specialists that will sustain polar education in K-12 settings.

Undergraduate and Graduate Formal Education projects should include

- innovative project deliverables that demonstrate meaningful education and training in the polar sciences;
- goals and measurable outcomes that are defined and appropriate;
- broad dissemination of programmatic innovation to students and other professionals;
- development of a sustainable learning community; and
- an appropriate evaluation plan.

2. Polar Informal Science Education projects should include

- innovative deliverables that enhance science learning;
- project designs, including project personnel and partnerships appropriate to addressing IPY goals; and
- identification of target audiences, demonstrating knowledge of the audiences, their needs and interests.

3. Coordination and Communication projects should include

- identification of appropriate partners and approach for coordinating education projects and communications about those projects; and

- identification of target audiences and modes of communication.

Operational feasibility for proposals involving fieldwork

Proposals involving fieldwork will also be evaluated for operational feasibility, which includes resource availability, environmental protection and waste management provisions, safety and health measures, and safeguards of radioactive materials. Proposers must recognize that proposals may be declined for operational reasons. For proposals involving fieldwork in the Antarctic, this operational evaluation is based largely on the Operational Requirements Worksheets that the proposer must complete as instructed in Section V (Proposal Preparation and Submission Instructions) of the Antarctic Research solicitation (NSF 06-549).

Safety and health requirements vary for antarctic and arctic fieldwork. All antarctic field participants must meet specified U.S. Antarctic Program health and dental requirements. See Section V.B., (Budget preparation) of the Antarctic Research solicitation (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06549). Candidates for wintering at the year-round stations are screened for psychological fitness.

For arctic field participants, physicals are required for deployment to Summit Field Camp in Greenland and other remote areas in Greenland.

Additional information on the Broader Impacts review criterion:

The polar regions present exceptional opportunities to address NSF's “Broader Impacts” review criterion. The Foundation's Advisory Committee for Polar Research has produced a document (http://www.nsf.gov/od/opp/opp_advisory/oaccrit2.jsp) that may aid in proposal preparation. Other Foundation programs that may assist in achieving broader impact are the Antarctic Artists and Writers Program (http://www.nsf.gov/od/opp/aawr.jsp; NSF solicitation for the Antarctic Artists and Writers program, NSF 06-554, (http://www.dev.nsf.gov/funding/pgm_summ.jsp?pims_id=12783&org=OPP), which deploys humanities scholars, artists, and writers to the Antarctic; and the annual program for media representatives (http://www.nsf.gov/news/news_summ.jsp?cntn_id=100288).

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review 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.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. 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.

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 Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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 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.B. 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 (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 agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF. 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 and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

Special Award Conditions: Arctic Research Principles of Conduct:

Principal Investigators in the Arctic are expected to follow the “Principles for the Conduct of Research in the Arctic,” listed at http://www.nsf.gov/od/opp/arctic/conduct.jsp.

Data:

National Science Foundation policy requires submission of data, derived data products, samples, physical collections, and other supported materials to national data centers and other specified repositories. Investigators are expected to share these resources with other researchers at no more than incremental cost and within a reasonable time. Investigators should use national and international standards to the greatest extent possible for collection, processing, and communication of NSF sponsored data sets. *Data sets from activities that contribute to AON are expected to be publicly available immediately upon collection.*

Data policy:

Antarctic and arctic proposals must follow appropriate data submission procedures. For details on the procedures and policy, please see Guidelines and Award Conditions for Scientific Data on the OPP web site (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=opp991).

Publications:

The NSF-funded *Antarctic Bibliography* is the world's most complete bibliography of antarctic scientific literature. For every publication that is developed under an antarctic award, please send one copy, labeled with the award number, to the Bibliography. This will assure the publication’s citation in this valuable reference tool. Doing so will waive the requirement stated in Article 20, Grant General Conditions, to provide electronic or paper copies to NSF.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. 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. Such reports provide information on activities and findings, project participants (individual and organizational) 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. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Dona Boggs, Program Director, Integrative Organismal Biology/BIO, telephone: (703) 292-8413, email: dboggs@nsf.gov
- Matthew Kane, Program Director, Molecular & Cellular Biosciences /BIO, telephone: (703) 292-7186, email: mkane@nsf.gov
- David Campbell, Program Director, Elementary, Secondary, & Informal Education /EHR, telephone: (703) 292-5093, email: dcampbel@nsf.gov
- Alphonse Desena, Program Director, Elementary, Secondary, & Informal Education /EHR, telephone: (703) 292-5106, email: adesena@nsf.gov
- Valentine Kass, Program Director, Elementary, Secondary, & Informal Education /EHR, telephone: (703) 292-5095, email: vkass@nsf.gov
- Sonia Ortega, Program Director, Graduate Education /EHR, telephone: (703) 292-8697, email: sortega@nsf.gov
- Keith Sverdrup, Program Director, Undergraduate Education /EHR, telephone: (703) 292-4644, email: ksverdru@nsf.gov
- Sandra Welch, Program Director, Elementary, Secondary, & Informal Education /EHR, telephone: (703) 292-5094, email: swelch@nsf.gov
- Garie Fordyce, Program Manager, OISE, telephone: (703) 292-4603, email: gfordyce@nsf.gov
- Cassandra Dudka, Program Manager, Europe and Eurasia Program /OISE, telephone: (703) 292-7250, email: cdudka@nsf.gov
- Marie Bundy, IPY Program Officer, Antarctic Sciences/OPP, telephone: (703) 292-8033, email: mbundy@nsf.gov
- Renee Crain, Arctic Research & Education Specialist, Arctic Sciences/OPP, telephone: (703) 292-4482, email: rcrain@nsf.gov
- Kaye Husbands, Science Advisor for Science of Science Policy, Social, Behavioral & Economic Sciences /SBE, telephone: (703) 292-7267, email: khusband@nsf.gov
- Mark Weiss, Senior Advisor, Social, Behavioral & Economic Sciences /SBE, telephone: (703) 292-8700, email: mweiss@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service)is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at http://www.nsf.gov/mynsf/.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

Related Programs:

Cooperating NSF Programs:

Proposals for research activities that are not listed under the three Emphasis Areas of this IPY Solicitation should be directed to cooperating NSF programs that will accept IPY proposals. Detailed information on these cooperating NSF programs is listed at http://www.nsf.gov/od/opp/ipy/ipyinfo.jsp . This list will be updated regularly and should be consulted when considering proposal submissions. Cooperating NSF programs presently include: BIO, GEO, OISE, OPP, and SBE. Proposals submitted to a cooperating NSF program must meet the goals and review criteria of that program. IPY proposals are expected to help implement the vision developed by and articulated in the NAS/National Research Council (NRC) document, *A Vision for the International Polar Year 2007-2008* (http://www.us-ipy.org/). In particular, proposals for IPY activities should be focused on the polar regions, and where possible and appropriate, should develop and expand international partnerships and cooperation. Inclusion of researchers and educators who have not previously been involved in polar research is strongly encouraged.

As with proposals submitted to the cross-cutting NSF Solicitation "International Polar Year, 2007," desirable characteristics and goals of IPY projects include those that

- advance polar science by launching new initiatives;
- represent a pulse of activity that can be implemented within the IPY timeframe or that will extend the legacy of IPY;
- encompass scientific investigations that are interdisciplinary in scope;
- link Arctic and Antarctic research;
- include comprehensive data management plans;
- leave a legacy of data and/or infrastructure for polar observation, research, and education;
- develop and expand international partnerships and cooperation;
- engage the public in polar discovery; and
- attract and develop the next generation of scientists and engineers.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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
- **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; and 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 proposer 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 or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; 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," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records, " 69 Federal Register 26410 (May 12, 2004). 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 Office of Management and Budget (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 the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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