Arctic Research Opportunities
Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; Arctic Observing Network; Polar Cyberinfrastructure; Arctic Research Coordination and Policy Support

PROGRAM SOLICITATION
NSF 21-526

REPLACES DOCUMENT(S):
NSF 16-595

National Science Foundation

Directorate for Geosciences
    Office of Polar Programs

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

    Proposals Accepted Anytime

IMPORTANT INFORMATION AND REVISION NOTES

Important Information

Innovating and migrating proposal preparation and submission capabilities from FastLane to Research.gov is part of the ongoing NSF information technology modernization efforts, as described in Important Notice No. 147. In support of these efforts, research proposals submitted in response to this program solicitation must be prepared and submitted via Research.gov or via Grants.gov, and may not be prepared or submitted via FastLane.

Revision Notes

For inquiries related to Arctic Research Coordination and Policy Support, please email ArcticCoordPolicy@nsf.gov.

- It is clarified that the Arctic Sciences Section accepts proposals in the areas of Polar Cyberinfrastructure and Arctic Research Coordination and Policy Support.
- The Arctic System Science (ARCSS) and Arctic Natural Science (ANS) programs no longer limit submissions per PI.
- Program descriptions have been updated.
- Descriptions for Research Networking Activities and Large Project Support (formerly known as Research Project Overview) proposals have been clarified.
- Doctoral Dissertation Research Improvement Grants are no longer described in this solicitation; please refer to NSF 20-597 where Arctic related submissions will be considered.

Any proposal submitted in response to this solicitation should be submitted in accordance with the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

    Arctic Research Opportunities
    Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; Arctic Observing Network; Polar Cyberinfrastructure; Arctic Research Coordination and Policy Support

Synopsis of Program:

    The National Science Foundation (NSF) invites investigators at U.S. organizations to submit proposals to the Arctic Sciences Section, Office of Polar Programs (OPP), to conduct research about the Arctic region.

    The goal of this solicitation is to attract research proposals that advance a fundamental, process, and/or systems-level understanding of the Arctic's rapidly changing natural environment, social and cultural systems, and, where appropriate, to improve our capacity to project future change. The Arctic Sciences Section supports research focused on the Arctic region and its connectivity with lower latitudes. The scientific

scope is aligned with, but not limited to, research priorities outlined in the Interagency Arctic Research Policy Committee (IARPC) five-year plan.

The Arctic Sciences Section coordinates with programs across NSF and with other federal and international partners to co-review and co-fund Arctic-related proposals as appropriate. The Arctic Sciences Section also maintains Arctic logistical infrastructure and field support capabilities that are available to enable research.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Rainer Amon, Program Director, Arctic Natural Sciences, telephone: (703) 292-7979, email: ramon@nsf.gov

- Gregory J. Anderson, Program Director, Arctic System Sciences, W7134, telephone: (703) 292-4693, email: greander@nsf.gov

- Kelly Brunt, Program Director, Arctic System Sciences, telephone: (703) 292-8457, email: kbrunt@nsf.gov

- Renee D. Crain, Arctic Research Support and Logistics Manager, W7154, telephone: (703) 292-4482, email: rcrain@nsf.gov

- Roberto Delgado, Program Director, Arctic Observing Network, W7246, telephone: (703) 292-2397, email: robdelga@nsf.gov

- Colene M. Haffke, Program Director, Arctic Natural Sciences, W7155, telephone: (703) 292-8030, email: cohaffke@nsf.gov

- Erica Hill, Program Director, Arctic Social Sciences, W7176, telephone: (703) 292-4521, email: erhill@nsf.gov

- Olivia Lee, Program Director, Arctic Observing Network, telephone: (703) 292-2611, email: olee@nsf.gov

- Allen Pope, Program Director, Polar Cyberinfrastructure, W7100, telephone: (703) 292-2858, email: apope@nsf.gov

- Frank R. Rack, Arctic Research Support and Logistics Manager, W7189, telephone: (703) 292-2684, email: frack@nsf.gov

- Elizabeth L. Rom, OPP Education Liaison, W8164, telephone: (703) 292-7709, email: elrom@nsf.gov

- Kate Ruck, Arctic Research Support and Logistics Manager, W7249, telephone: (703) 292-8051, email: kruck@nsf.gov

- Marc Stieglitz, Program Director, Arctic Natural Sciences, W7244, telephone: (703) 292-4354, email: mstiegli@nsf.gov

- Colleen Strawhacker, Program Director, Arctic System Sciences and Arctic Research Coordination and Policy Support, W7178, telephone: (703) 292-7432, email: colstraw@nsf.gov

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

- 47.050 --- Geosciences

Award Information

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

Estimated Number of Awards: 75

per year, pending availability of funds.

Anticipated Funding Amount: $40,000,000

per year approximately, pending availability of funds.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
- Foreign organizations: For cooperative projects involving U.S. and foreign organizations, support will only be provided for the U.S. portion.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

- Alaska Native serving and Tribal organizations.

Who May Serve as PI:

> There are no restrictions or limits.

Limit on Number of Proposals per Organization:

> There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

> There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposal Submission:** Not required

- **Full Proposals:**

  - Full Proposals submitted via Research.gov: *NSF Proposal and Award Policies and Procedures Guide* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.
  - 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: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:**

  Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:**

  Not Applicable

- **Other Budgetary Limitations:**

  Not Applicable

C. Due Dates

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

  Proposals Accepted Anytime

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria. Additional merit review criteria 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:

Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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I. INTRODUCTION

The Arctic Sciences Section (ARC) in the Office of Polar Programs (OPP) funds scientific research about the Arctic region and provides operational support for Arctic research activities. Science programs provide support for disciplinary, multidisciplinary, and convergence investigations directed at understanding the Arctic region and its connectivity with lower latitudes.

A geographic definition of the Arctic region is provided by the United States Arctic Research and Policy Act (ARPA) of 1984 Section 112. Because this solicitation includes research on phenomena that link the Arctic to lower latitudes, the ARPA definition should not be viewed as strictly constraining the location of the work proposed. Proposals conducting research outside the Arctic geographic region should contain a clear statement of how the proposed research will increase our knowledge of the Arctic.

II. PROGRAM DESCRIPTION

The Arctic Sciences Section solicits proposals for research to enhance our understanding of the Arctic, from advancing fundamental disciplinary understanding of important Arctic processes to complex interdisciplinary studies of couplings among social, biological, physical, and geochemical components of the Arctic system to the changing connections between the Arctic and lower latitudes. Of special interest is research focused on understanding processes relevant to social and environmental change. All proposals should discuss explicitly how their results would contribute to increasing our understanding of the Arctic region or its interaction with global systems. Proposals should be submitted to one of the following programs but may be co-reviewed as appropriate:

Arctic Social Sciences

The Arctic Social Sciences Program (ASSP) supports research on Arctic social and cultural systems, present and past, and research relevant to understanding these systems. ASSP welcomes research proposals in all social science disciplines that are funded by the NSF Directorate of Social, Behavioral and Economic Sciences. Topics of particular interest are outlined in the final report for the *Arctic Horizons* process. These community recommended research priorities include:

- Past and present drivers of change in the Arctic, including resource, cultural, climate, and economic changes
- Convergent research on socioecological systems
- Demographics of past and present migration
- Community and social health
- Food, water, and energy security
- Youth and gender studies
- Sustainability and sustainable development
- Globalization
- Urban and rural systems
- Innovations in data curation, management, sharing, discoverability, and access, including those contributing to synthesis science

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). The program has a special interest in a wide range of Indigenous scholarship, including Indigenous conceived and led research projects; community participatory-based research models and knowledge coproduction; and more.

Arctic Natural Sciences

The Arctic Natural Sciences (ANS) program supports novel and creative research that is focused on disciplinary and/or interdisciplinary investigations to advance understanding of Arctic processes, including how those processes are shifting in a rapidly changing Arctic. The program encourages proposals that test hypotheses leading to new understanding of the Arctic, including those that synthesize and analyze existing data. Areas of interest include Arctic marine and terrestrial ecosystems, terrestrial hydrology, atmospheric and oceanic dynamics and climatology, and glaciological processes. Proposals may be co-reviewed with other programs at NSF, as appropriate. Where ANS participates in cross-Agency competitions, such as the Paleo Perspectives on Climate Change program, proposals should generally be submitted directly to these competitions rather than to ANS. If there is doubt as to the appropriate destination for a proposal, prospective PIs are encouraged to contact the ANS program officers prior to submission.

Arctic System Science

The Arctic System Science (ARCSS) program supports projects that study systems of the Arctic operating at multiple temporal and spatial scales, systems that

can inform our understanding of Arctic processes, and the relationship of Arctic systems to other global and regional systems. For ARCSS, the "Arctic system" is defined very broadly to encourage creative proposals. PIs should ask themselves if their work addresses interactions among several components of the Arctic system, explores emergent behavior in linked subsystems, or otherwise provides essential knowledge, and they should apply that knowledge to system-level understanding.

ARCSS projects are often but not always interdisciplinary and can focus on the relationships among physical, chemical, biological, geological, ecological, social, cultural, and/or economic processes. ARCSS welcomes proposals focusing on the cycles of carbon, water, and energy in the functioning of Arctic systems, as well as the relationship of these cycles to human and social processes occurring in the Arctic. ARCSS also accepts proposals that contribute to better understanding of the interactions and feedbacks between humans and the environment. Theoretical and methodological approaches can include (but are not limited to) political ecology, historical ecology, human ecodynamics, food security, resilience theory, Indigenous and local knowledge, socioecological systems, coupled natural human systems, risk and vulnerability studies, ecosystem services, and sustainability studies. ARCSS also encourages projects aimed at creating new knowledge through synthesis of published science, reports and previously collected data to better understand the Arctic system at multiple scales.

If there is doubt as to the appropriate home for a proposal, prospective PIs are encouraged to contact the ARCSS program officer(s) prior to proposal submission

Arctic Observing Network

The Arctic Observing Network (AON) program supports proposals to make field observations to detect and understand Arctic change occurring on time scales longer than the duration of a typical NSF research grant. These projects should address major drivers and/or impacts of change and generate data that are intended for wider use by the scientific research community in understanding the changing Arctic. Proposals to develop new sensors/sensing platforms and/or to design/optimize observing strategies will also be considered. To promote broader use, AON data must promptly be made public (see Office of Polar Programs Data Management policy, NSF 16-055 for specific requirements). Data analysis may be included as part of the proposed work. Proposals may be single investigator or collaborative and include up to 5 years of observations. Continuation of observations beyond 5 years requires a successful new proposal that must demonstrate use of the previously collected data by the scientific research community.

Polar Cyberinfrastructure

The Polar Cyberinfrastructure program considers proposals that promote effective collaboration between Polar and cyberinfrastructure researchers. The Arctic Sciences Section will support proposals that provide significant benefit to the Arctic research community including (i) cost-effective transfer of data from remote field locations; (ii) long-term sustainable curatorship, standardization, management and discovery of data and metadata; (iii) visualization, manipulation, and analysis, particularly for understanding complexity; (iv) access and interoperability across scientific disciplines; (v) promotion of effective use of High Performance Computing (HPC) for direct and sustainable advances in current Arctic research; and (vi) e-learning and educational tools based on cyberinfrastructure components. Proposals that establish or enhance Virtual Organizational resources for Arctic research, and its broader impacts, are also encouraged. The Program works collaboratively with NSF's Office of Advanced Cyberinfrastructure and NSF's EarthCube program for reviewing and funding purposes.

Arctic Research Coordination and Policy Support

The Arctic Research Coordination and Policy Support (ARCPS) Program supports short- and long-term efforts to enhance communication, coordination, and collaboration across the research enterprise, which includes:

- communication, coordination, and collaboration within the Arctic research community.
- communication, coordination, and collaboration between the Arctic research community and interested stakeholders, such as northern residents, policy makers, the general public, and industry.

Efforts to coordinate within the Arctic research community tend to be ones that cut across the Arctic Section disciplinary portfolio, focusing on:

- the NSF-funded community
- US federal interagency efforts where NSF plays a leadership role
- partnerships between the US research community and their international counterparts

Successful ARCPS proposals are expected to promote new, diverse, and integrative research communities that are capable of effectively conducting and communicating research on local, regional, and global science and policy topics to enhance our understanding of the Arctic. Projects are expected to build capacity and develop approaches to synthesize results that inform policy development and/or management decisions. These efforts, in turn, will support national goals for Arctic research, including enhancing the wellbeing of Arctic residents; advancing stewardship of the Arctic environment; strengthening national and regional security; improving our understanding of the Arctic as a component of the Earth system (2019-2020 Report on the Goals and Objectives for Arctic Research, Arctic Research Commission) .

Another key goal is to support communication, coordination, and collaboration among direct stakeholders of Arctic research, including the Arctic research community and the public, including fostering partnerships with northern communities, especially Indigenous communities. These efforts may involve (but are not limited to):

- planning efforts designed to develop research questions and projects in partnership with stakeholder groups, allowing for robust co-production of knowledge with local and Indigenous peoples and organizations
- exploration of new collaborations with potentially interested stakeholders
- consulting activities to ensure research is not disruptive to northern residents and their livelihoods, including subsistence activities

Activities supported by ARCPS have included, but are not limited to, the Polar Research Board of the National Academies of Science, the Arctic Research Consortium of the U.S. (ARCUS), the Polar Geospatial Center (PGC), the Study of Environmental Arctic Change (SEARCH), and U.S. participation in coordinating bodies, such as the International Arctic Science Committee (IASC). Investigators must contact cognizant Program Officers to discuss the suitability of proposals prior to submission to ARCPS.

Types of Proposals Accepted

The Arctic Sciences Section supports research proposals and other activities that can be submitted to the Programs listed above. The following list of proposal types comprise the majority of the portfolio for the Arctic Sciences Section:

- **General Arctic Science proposals** – The Arctic Sciences Section encourages the submission of general research proposals, either single investigator or collaborative, for research that involves field observations, process studies, modeling, synthesis, and other efforts to further our understanding of the

Arctic. We anticipate that most proposals submitted in response to this solicitation will fall in this category.

- **Research Networking Activities** (RNAs) – RNA awards support collaboration by groups of investigators to aggregate research results across disciplinary, organizational, or international boundaries. Such proposals may support activities such as synthesis of research results, inter-comparison of existing data or models, developing networks of connections among existing research projects, exploration of new theory and efforts to establish best practices for data collection, observations, models, or data management.

  RNAs support efforts that are more complicated and larger in scope than are appropriate for a Research Coordination Network (RCN); for example, RNA activities might include modeling and large-scale data analysis that are beyond the budgetary scope of RCNs. RNAs are encouraged to engage, as appropriate, with international partners that have funding from their own sources and with activities, centers and networks supported by other federal agencies, state, local, or tribal governments or the private sector.

  Proposals should identify an initial network of likely participants, but there should be mechanisms identified to maintain openness and promote participation in the proposed network by interested parties outside of the initial group. The inclusion of new researchers, post-docs, graduate students, and undergraduates is strongly encouraged. Proposals should present a clear management plan that includes a description of the roles and responsibilities of the PIs and a steering committee. Mechanisms for assessing progress and the effectiveness of the networking activities should be part of the management plan. RNA projects may be up to 5 years in duration. Proposers are strongly encouraged to discuss plans with the cognizant program officer prior to submission.

- **Conferences** – Conference proposals support effort to bring together scientists for focused interactions to analyze or synthesize past or ongoing research or to discuss future research priorities or strategies. These are typically one-time events with budgets under $50,000 but may be larger if needed. Consultation with a cognizant program officer from the relevant program prior to submission is required. Conference proposals must be prepared and submitted in accordance with the guidance in Chapter II.E.9 the PAPPG. The "Conference" type of proposal should be selected.

- **Large Project Support (LPS) –** ARC supports the development of large, complex projects that may require significant planning and coordination among large groups of investigators and/or the development of agreements between interagency or international partners. NSF recognizes that such projects often succeed through sustained efforts of a community coalescing behind a core leadership group that may require support through development, design, and eventual implementation. The Large Project Support (LPS) mechanism is intended to provide support for such projects. Generally, projects proposed through the LPS mechanism would involve three stages: (a) conceptual development, (b) project planning, and (c) project implementation, as described below:

  - *Conceptual Development:* ARC will support conceptual development, often through a community workshop or workshops. First, the interested group should send to a cognizant ARC program officer a brief document summarizing the approach to conceptual development. ARC program officers will contact the interested group to discuss the idea and provide guidance for the next steps. Workshop proposals should follow the guidance for Conference Proposals in Chapter II.E.9 the PAPPG, including the need for workshops to be broadly advertised, inclusive, include meaningful participation from young investigators and local communities, address dependent care options as appropriate, and develop and require attendees to adhere to a code of conduct. The "Conference" type of proposal should be selected.

  - *Project Planning:* If the project requires further detailed planning before research projects can be proposed, ARC may support a planning grant. The grant may support workshops, the development of white papers, and other activities to:

    - Foster the development of a science plan describing the science goals and an implementation plan outlining a project management structure, a project schedule, and necessary resources;

    - Provide time to develop, align, or schedule resources;

    - Enable the provision of planning information need to coordinate actions by national and/or international funding entities; and

    - Support an individual or group to lead the Project Planning phase.

      NSF will review the science and implementation plan documents and decide whether to encourage proposal submissions for the Implementation Stage.

  - *Implementation Stage:* The *Implementation Stage* of a large project is typically best supported by a coordinated set of proposals. This would usually comprise a *coordinating proposal* plus a number of *contributing research proposals*. The coordinating proposal would include (a) science goals and objectives, (b) a detailed concept of operations plan (logistics, project coordination, etc.), and (c) support for a project coordination office; this proposal would provide support for the project lead and their team. Each of the research proposals would describe the plan to implement one or more major components of the overall project, including logistics and other support needed to carry out that component.

ARC would review these proposals in a single panel and may conduct site visits if appropriate. ARC may work with the project leadership to coordinate with interagency and/or international partners as needed. The decision on whether to advance the entire project would be made following review of the coordinated set of proposals and would depend on ARC's assessment of the potential to meet the overall goals of the project.

ADDITIONAL OPPORTUNITIES

Other NSF Funding Opportunities

Consult the NSF online program guide to browse for funding opportunities (https://www.nsf.gov/funding/browse_all_funding.jsp).

Education and Outreach Activities: Investigators who wish to propose projects that are primarily education and outreach efforts are encouraged to contact the Polar Education Liaison, and to submit proposals via other solicitations in the Directorate of Geosciences and Directorate of Education and Human Resources as detailed in the Dear Colleague Letter: Support for Engaging Students and the Public in Polar Research (NSF 19-086).

The Arctic Sciences Section encourages investigators from Alaska Tribal Colleges and Universities Program-eligible (TCUP-eligible) institutions to submit proposals or collaborative proposals from consortia of TCUP-eligible institutions and/or partnering universities with educational or research ties to Alaska TCUP-eligible institutions' faculty or students. Such collaborations may include, for example, attracting, retraining, and supporting TCU students in independent research endeavors and non-TCU institutions providing research training to enable the successful transition of TCU students to major research universities. The Section also encourages submissions from or in collaboration with investigators at other Minority-Serving Institutions, including Historically Black Colleges and

Universities (HBCUs) and Hispanic-Serving Institutions (HSIs), and urges prospective PIs to contact a Program Officer to discuss the opportunities within the Section and at NSF.

III. AWARD INFORMATION

Pending availability of funds, $40,000,000 may be available for proposals to this solicitation. This does not include logistics support that may be provided through the Arctic Research Support and Logistics program. NSF estimates 75 awards per year as standard or continuing grants, or cooperative agreements. The number of awards and average award size and duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

> Proposals may only be submitted by the following:

> - Institutions of Higher Education (IHEs) - Two- and four-year IHEs (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Special Instructions for International Branch Campuses of US IHEs: If the proposal includes funding to be provided to an international branch campus of a US institution of higher education (including through use of subawards and consultant arrangements), the proposer must explain the benefit(s) to the project of performance at the international branch campus, and justify why the project activities cannot be performed at the US campus.
> - Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
> - For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.
> - Foreign organizations: For cooperative projects involving U.S. and foreign organizations, support will only be provided for the U.S. portion.
> - Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.
>
> - Alaska Native serving and Tribal organizations.

Who May Serve as PI:

> There are no restrictions or limits.

Limit on Number of Proposals per Organization:

> There are no restrictions or limits.

Limit on Number of Proposals per PI or co-PI:

> There are no restrictions or limits.

Additional Eligibility Info:

> Only U.S. organizations are eligible to submit proposals under this solicitation.

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 Research.gov or Grants.gov.

- Full Proposals submitted via Research.gov: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *NSF Proposal and Award Policies and Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg. Paper copies of the PAPPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov. The Prepare New Proposal setup will prompt you for the program solicitation number.
- 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: (https://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). 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) 292-8134 or by e-mail

from nsfpubs@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 Research.gov. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

Proposals may be returned without review for failing to comply with the PAPPG or NSF Grants.gov Application Guide, this solicitation, or the instructions that supplement the PAPPG and NSF Grants.gov Application Guide.

Project Description

Maximum Length for Project Description

For initial stage Large Project Support (LPS) proposals only, the Project Description is limited to 20 pages in length.

The Project Description for all other proposals submitted pursuant to this solicitation is limited to 15 pages in length.

Additional required information in the section - "Results from Prior NSF Support"

Under the section of Results from Prior NSF Support, PIs must indicate where metadata and data from the award discussed are archived.

Proposals involving investigators employed by other Federal agencies or FFRDCs

As stated in PAPPG Chapter I.E.7, NSF does not normally support research or education activities by investigators employed by Federal agencies or FFRDCs. Other Federal agencies and FFRDCs may submit proposals directly to NSF only when the proposed project meets one of the special exceptions described in that section of the PAPPG. Proposers who think their project may meet at least one of those exceptions must contact a cognizant NSF Program Officer in writing before preparing a proposal for submission, must receive written concurrence from the cognizant NSF Program Officer, and must include the request and concurrence as a Single Copy Document in the proposal submission.

Revising Previously Declined Proposals

A declined proposal may be resubmitted, but only after it has undergone substantial revision. Revised proposals must include a brief description of how the resubmitted proposal has been revised in response to reviewer and panel comments as part of the body of the Project Description section of the proposal. Please note that a revised proposal may be returned without review if the cognizant NSF Program Officer determines the revised submission has not clearly taken into account the major comments or concerns resulting from the prior NSF review.

Principles for the Conduct of Research in the Arctic

Principal Investigators are expected to incorporate the *Principles for Conducting Research in the Arctic* into the design, planning, execution, and completion of their research. The 2018 Principles, revised from the 1990 version by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC), reflect the values of the IARPC member agencies. Investigators may find these resources useful: Conducting Research with Northern Communities site by the Arctic Research Consortium of the U.S. and Fostering a Respectful Work Environment by the University-National Oceanographic Laboratory System (UNOLS) .

Proposals Involving Human Subjects

The NSF PAPPG provides procedural information for projects with human subjects in the section Proposals Involving Human Subjects. Investigators must ensure that human subjects are protected from research risks in conformance with the relevant federal policy known as the Common Rule (*Federal Policy for the Protection of Human Subjects*, 45 CFR 690). Additional information is available at https://www.nsf.gov/bfa/dias/policy/human.jsp

Proposals Involving Arctic Field Work or Ship Time

The Arctic Research Support and Logistics (RSL) program provides support for the fieldwork of projects awarded by the Arctic Sciences Section and may support other projects on a reimbursable basis. The RSL program supports a prime logistics contract, the Arctic Research Support and Logistics Services contract, currently operated by Battelle Arctic. The RSL program also funds ship time, ice core drilling support, infrastructure support for monitoring networks, and related support for field projects. The RSL program can fund many of these third-party research support and logistics service providers directly or funds can be requested through the proposal budget. Investigators may decide how best to arrange for the logistics costs and may reach out to the RSL program managers or the cognizant science program officer to discuss these arrangements.

Proposals involving fieldwork in the Arctic must 1) describe the field activities in the body of the proposal, including a schedule of proposed work, and 2) describe the costs of the fieldwork either in the grant budget or in Supplementary Documents. The total cost of a project including fieldwork is considered at the time of review. Any science support provided by third-party organizations must be described in a 1-2 page Supplementary Document that outlines the scope of support and a cost estimate. Please allow service providers 4-6 weeks to prepare Supplementary Documents to include in proposals and initiate the request far in advance of proposal submission. For any instrument or infrastructure deployed to the field, investigators should include the scope and cost for the demobilization or other disposal of the property.

Proposals requesting support for fieldwork should expect to go to the field no sooner than 12 months after proposal submission, or 18 months for proposals including ship time requests, to allow time to plan, budget, and complete environmental compliance documentation. Per the NSF PAPPG, awardees are responsible for acquiring and complying with all permits necessary for their work and are responsible for all activities conducted under the award. NSF is not responsible for costs associated with medical evacuations or other interruptions to scheduled fieldwork and reserves the right seek reimbursement for costs incurred for search, rescue, or medical evacuation. Proposers should ensure all members of the field team are covered by institutional medical evacuation insurance or request funds to purchase medical evacuation insurance, which is an allowable grant cost. All Investigators should have a risk management plan for their fieldwork including a plan for emergencies. The ARSLS contractor can help Investigators develop these plans and offers training relevant to fieldwork.

NSF's prime contractor for Arctic field research support is currently Battelle Arctic. For assistance from Battelle Arctic in planning field support, email arctic.planning@battelle.org. The Battelle Arctic website (https://battellearcticgateway.org/for-researchers) provides more information on services available for

researchers. Frequently used field support and service organizations are listed below. Investigators should reach out to these providers directly when preparing their proposals and request a scope and cost document for the Supplementary Documents if the support has an incremental cost.

- UNAVCO for geodesy
- Incorporated Research Institutions for Seismology (IRIS) for geophysical studies
- Ice Drilling Program (IDP) for ice core drilling and drill development
- Ice Core Facility (ICF) for ice core archival and sample requests
- Polar Geospatial Center (PGC) for satellite imagery – researchers working on glaciers or the Greenland Ice Sheet are encouraged to notify PGC early in the planning process of potential imagery needs and request imagery from PGC as soon as an award is received.
- Toolik Field Station (TFS) for access to this field station

Proposals requesting ship time on U.S. Coast Guard (USCG; http://icefloe.net) or University-National Oceanographic Laboratory System (UNOLS; https://www.unols.org) vessels should complete a UNOLS Ship Time Request (https://strs.unols.org) and include it as Supplementary Documentation. Refer to guidance on requesting ship time here: https://www.nsf.gov/news/news_summ.jsp?cntn_id=191729&org=OCE. Please contact the ship operator for more information during proposal development. Other international and regional class vessels are available and can be arranged by Battelle. If requesting ship time on foreign research vessels, please contact Frank Rack at frack@nsf.gov to coordinate with NSF; proposals involving foreign research vessels should have Supplementary Documentation describing the scope and cost and outline the partnership arrangement with points of contact.

For work in Greenland, follow the process laid out by the Government of Greenland (http://naalakkersuisut.gl/en/About-government-of-greenland/Travel-activities-in-remote-parts-of-Greenland). In response to the requirement that researchers in remote parts of Greenland carry DKK 1,000,000 in Search and Rescue (SAR) insurance payable to the Danish State (http://naalakkersuisut.gl/en/About-government-of-greenland/Travel-activities-in-remote-parts-of-Greenland/Procedure-and-forms), NSF made an agreement with the Government of Greenland for Search and Rescue costs as a self-insured government agency. NSF provides the names of each traveler under the auspices of NSF to the Government of Greenland. NSF would coordinate SAR activities with the Government of Greenland and reserves the right to seek reimbursement for costs incurred. For work based out of Thule Air Base, please coordinate with Battelle Arctic and please reach out to Jennifer Mercer at jmercer@nsf.gov to coordinate with NSF.

Coordination and Collaborations with Arctic Communities

Given the deep knowledge held by local and Indigenous residents in the Arctic, NSF encourages scientists and Arctic residents to collaborate on Arctic research projects. NSF recognizes that these collaborations will take a variety of forms based on the nature of the scientific projects, needs of community members and organizations, and the intensity of planned collaboration. The following outlines and defines some (but not all) forms of engagement:

Research Sites Near Arctic Residents. Proposers preparing projects working near, or impacting, Arctic communities are strongly encouraged to discuss the proposed work with those communities while developing the project concept. In accordance with the Interagency Arctic Research Policy Committee (IARPC) *Principles for Conducting Research in the Arctic*, researchers should coordinate their field activities with nearby communities and are expected to share results with the community following each field season and/or at the end of the project. Investigators should include travel funds for this in their proposal budget. Some projects may require consultation with Tribal or subsistence co-management organizations. Time for consultation should be included in the project schedule and travel and salary funds for these consultations should be included in the proposal budget. The Arctic Research Support and Logistics (RSL) program may also support requests to visit communities and support communication with local communities. Please contact the RSL Program Officers for information about these opportunities.

Community engagement and outreach are important components of both integrative research and research capacity-building. Here, community engagement refers to substantive interaction with community partner organizations and anchor institutions such as governments, federal and state agencies, schools, libraries, health and social service providers, Tribal and Indigenous-serving organizations, non-profits, cultural organizations, and businesses. In accordance with the IARPC *Principles for Conducting Research in the Arctic*, investigators and community partners are encouraged to work closely to develop and evaluate creative approaches to achieving meaningful engagement for mutual benefit. Co-production of knowledge does not fall under this category for the purposes of this solicitation.

Co-production of Knowledge. Knowledge co-production with Arctic Indigenous communities is encouraged only when appropriate and must be strongly justified and supported in the proposal text and project budget. NSF identifies co-production of knowledge as the integration of different knowledge systems and methodologies to systematically understand the phenomena, systems, and processes being studied in a research project. In the Arctic, this often takes the form of Indigenous Knowledge holders and scientists working closely together to address shared research questions, pursue shared methodologies, and agree upon appropriate outreach and data sharing activities. In Greenland, it may also mean working closely with the local Greenlandic science research community. A co-produced approach includes research in which local and Indigenous peoples and organizations fully engage in the complete research process from the development of research questions, to the collection, use and stewardship of data, and interpretation and application of results. Given the diversity of peoples, worldviews, ideas, approaches, and methodologies in the Arctic, the co-production of knowledge in Arctic projects will take various forms. If intending to pursue knowledge co-production, community engagement must begin well in advance of proposal submission, and PIs are recommended to put into practice the *Principles for Conducting Research in the Arctic*.

Proposals that include research in communities must attach a letter or email that confirms community collaboration, or at a minimum community awareness, from the relevant community organizations (e.g., Alaska Native corporations or non-profits, tribal councils, municipal governments, and/or school authorities, or Greenlandic research institutes) as a Supplementary Document. Investigators should request sufficient funding to support the time and travel of Arctic community members and treat their collaborators as members of their research team, including acknowledging collaborators in publications and including them as co-authors and in research presentations, as appropriate.

Environmental Policy Considerations of Fieldwork

Federal agencies must comply with the National Environmental Policy Act (NEPA) and other applicable laws and policies such as the Endangered Species Act, the Marine Mammal Protection Act, and the National Historic Preservation Act. Projects will be assessed for environmental impacts prior to award and additional consultations or mitigation efforts may be required. PIs should expect to be involved in the assessment and environmental compliance process for their projects. Investigators may need to travel to communities or meetings as part of the environmental compliance for projects and should request these funds in their award. The RSL program may also provide travel funds if needed to ensure that appropriate consultation takes place. Researchers proposing work that may affect cultural or historic properties, or whose work involves tribal lands, must cooperate with NSF in complying with the consultation requirements of section 106 of the National Historic Preservation Act and the Native American Graves Protection and Repatriation Act (NAGPRA). For additional information on cultural or historic preservation issues, see the Advisory Council on Historic Preservation's web site at http://www.achp.gov/work106.html; for information concerning NAGPRA see http://www.nps.gov/nagpra/. Contact the Environmental Officer of the Office of Polar Programs, Dr. Polly Penhale (ppenhale@nsf.gov) for guidance on environmental consultations, permitting, and NSF's obligations under existing environmental laws.

Identify this Solicitation Number on the Proposal Cover Sheet.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

    Proposals Accepted Anytime

Arctic Natural Sciences; Arctic Social Sciences; Arctic System Science; Arctic Observing Network; Arctic Cyberinfrastructure; Arctic Research and Policy Support.

D. Research.gov/Grants.gov Requirements

For Proposals Submitted Via Research.gov:

To prepare and submit a proposal via Research.gov, see detailed technical instructions available at: https://www.research.gov/research-portal/appmanager/base/desktop?_nfpb=true&_pageLabel=research_node_display&_nodePath=/researchGov/Service/Desktop/ProposalPreparationandSubmission.html. For Research.gov user support, call the Research.gov Help Desk at 1-800-673-6188 or e-mail rgov@nsf.gov. The Research.gov Help Desk answers general technical questions related to the use of the Research.gov 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.

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. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: https://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical 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.

Proposers that submitted via Research.gov may use Research.gov to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF 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 either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with 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 of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://www.nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Building the Future: Investing in Discovery and Innovation - NSF Strategic Plan for Fiscal Years (FY) 2018 – 2022*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (PAPPG Chapter II.C.2.d(i). contains additional information for use by proposers in development of the Project Description section of the proposal). Reviewers are strongly encouraged to review the criteria, including PAPPG Chapter II.C.2.d(i), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
   a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
   b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and other underrepresented groups in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

- Proposals will be evaluated for their potential to advance understanding of the Arctic region or its impact on global systems
- Proposals to the AON program must demonstrate that the data collected will be of value to the scientific community.
- ARCSS proposals must identify explicitly how the results of the research will contribute to improvements in system-level understanding.

- Proposals conducting research outside the Arctic geographic region must contain a clear statement of how the proposed research will increase our knowledge of the Arctic.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review, or Site Visit Review.

Ad hoc, panel, and site visit.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will generally be completed and submitted by each reviewer and/or panel. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

In order to coordinate funding actions among various agencies considering similar proposals, NSF may, at the point of decision, share information about the existence and general content of proposals with Federal agencies with which it has a Memorandum of Understanding (MOU). If another Federal agency is willing to consider co-funding proposals, NSF may also share proposals and review content with and/or may invite Federal employees of that agency to attend review panels as observers for the purpose of determining whether the agency may provide funding.

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 strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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. After an administrative review has occurred, Grants and Agreements Officers perform 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, 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.

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 notice, 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 notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. 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 https://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-8134 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

Special Award Conditions:

Principles for the Conduct of Research in the Arctic

Principal Investigators are expected to follow the Principles for Conducting Research in the Arctic, prepared by the Social Science Task Force of the U.S. Interagency Arctic Research Policy Committee (IARPC), approved by IARPC in 1990, and revised in 2018. Investigators may find useful the Guidelines for Improved Cooperation between Arctic Researchers and Northern Communities.

Data Management Policy

Proposals submitted under this solicitation are required to include a Data Management Plan compliant with the Office of Polar Programs Data Management Policy (NSF 16-055). This policy establishes requirements for the archiving of metadata and data in long-lived and publicly accessible, unrestricted archives. Questions concerning this policy should be directed to the cognizant Program Officer in the Arctic Sciences Section.

Policies Related to Arctic Fieldwork

Participants in NSF-sponsored Arctic fieldwork are required to comply with the following NSF policies: Code of Conduct, Field Safety Risk Management, Physical Qualifications for Arctic Fieldwork, and IT Security Rules of Behavior. Failure to comply can result in removal from the field or from NSF facilities, retraction of funding, debarment, and referral to law enforcement as appropriate. These policies are available on the Arctic Research Support and Logistics program website (https://www.nsf.gov/geo/opp/arctic/res_log_sup.jsp) and the NSF prime Arctic logistics contractor website (https://battellearcticgateway.org/for-researchers).

Acknowledgement of Support

Grantees will be required to include appropriate acknowledgment of NSF support under the Arctic Sciences Section in any publication (including World Wide Web pages) of any material based on or developed under the project, in the following terms:

"This material is based upon work supported by the National Science Foundation Arctic Sciences Section under Grant No. (Grantee enters NSF grant number.)"

Grantees also will be required to orally acknowledge NSF support using the language specified above during all news media interviews, including popular media such as radio, television, and news magazines.

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 no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=pappg.

PIs are required to include in the final project report permanent digital identifiers, such as digital object identifiers (DOIs) and/or other URL links, to all metadata and archived data products resulting from the award. Those links must be provided in the "products" section of the final report.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Rainer Amon, Program Director, Arctic Natural Sciences, telephone: (703) 292-7979, email: ramon@nsf.gov

- Gregory J. Anderson, Program Director, Arctic System Sciences, W7134, telephone: (703) 292-4693, email: greander@nsf.gov

- Kelly Brunt, Program Director, Arctic System Sciences, telephone: (703) 292-8457, email: kbrunt@nsf.gov

- Renee D. Crain, Arctic Research Support and Logistics Manager, W7154, telephone: (703) 292-4482, email: rcrain@nsf.gov

- Roberto Delgado, Program Director, Arctic Observing Network, W7246, telephone: (703) 292-2397, email: robdelga@nsf.gov

- Colene M. Haffke, Program Director, Arctic Natural Sciences, W7155, telephone: (703) 292-8030, email: cohaffke@nsf.gov

- Erica Hill, Program Director, Arctic Social Sciences, W7176, telephone: (703) 292-4521, email: erhill@nsf.gov

- Olivia Lee, Program Director, Arctic Observing Network, telephone: (703) 292-2611, email: olee@nsf.gov

- Allen Pope, Program Director, Polar Cyberinfrastructure, W7100, telephone: (703) 292-2858, email: apope@nsf.gov

- Frank R. Rack, Arctic Research Support and Logistics Manager, W7189, telephone: (703) 292-2684, email: frack@nsf.gov

- Elizabeth L. Rom, OPP Education Liaison, W8164, telephone: (703) 292-7709, email: elrom@nsf.gov

- Kate Ruck, Arctic Research Support and Logistics Manager, W7249, telephone: (703) 292-8051, email: kruck@nsf.gov

- Marc Stieglitz, Program Director, Arctic Natural Sciences, W7244, telephone: (703) 292-4354, email: mstiegli@nsf.gov

- Colleen Strawhacker, Program Director, Arctic System Sciences and Arctic Research Coordination and Policy Support, W7178, telephone: (703) 292-7432, email: colstraw@nsf.gov

For questions related to the use of FastLane or Research.gov, contact:

- FastLane and Research.gov Help Desk: 1-800-673-6188
- FastLane Help Desk e-mail: fastlane@nsf.gov.
- Research.gov Help Desk e-mail: rgov@nsf.gov

- Linda Izzard, Program Coordination Specialist, W7236A, telephone: (703) 292-7430, fax: (703) 292-9082, email: lizzard@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, "NSF Update" 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 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. "NSF Update" also is available on NSF's website.

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

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 55,000 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 Arctic 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 (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 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 https://www.nsf.gov
>
> - **Location:**   2415 Eisenhower Avenue, Alexandria, VA 22314
>
> - **For General Information**   (703) 292-5111
>   (NSF Information Center)**:**
>
> - **TDD (for the hearing-impaired):**   (703) 292-5090
>
> - **To Order Publications or Forms:**

Send an e-mail to:	nsfpubs@nsf.gov
or telephone:	(703) 292-8143
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