

GeoPRISMS Program

PROGRAM SOLICITATION

NSF 16-560

REPLACES DOCUMENT(S):

NSF 15-564



National Science Foundation

Directorate for Geosciences
Division of Ocean Sciences
Division of Earth Sciences

Full Proposal Target Date(s):

July 26, 2016

IMPORTANT INFORMATION AND REVISION NOTES

This revision updates the "Continued Community Input and Phased Funding Model" section, simplifies the submission of letters for Postdoctoral Fellow proposals, and adds a requirement to contact a Program Officer prior to submitting a RAPID proposal.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 16-1), which is effective for proposals submitted, or due, on or after January 25, 2016.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

GeoPRISMS Program

Synopsis of Program:

GeoPRISMS (Geodynamic Processes at Rifting and Subducting Margins) Program investigates the coupled geodynamics, earth surface processes, and climate interactions that build and modify continental margins over a wide range of timescales. These interactions cross the shoreline and have applications to margin evolution and dynamics, construction of stratigraphic architecture, accumulation of economic resources, and associated geologic hazards and environmental management. The GeoPRISMS Program includes two broadly integrated science initiatives (*Subduction Cycles and Deformation* and *Rift Initiation and Evolution*), linked by five overarching scientific topics and themes, where transformative advances are likely to occur in the decade 2011-2020, and where a focused scientific program could be most effective. These overarching science topics include 1) Origin and evolution of continental crust; 2) Fluids, magmas and their interactions; 3) Climate-surface-tectonics feedbacks; 4) Geochemical cycles; and 5) Plate boundary deformation and geodynamics. Each of the initiatives has identified primary sites for focused investigations, as well as thematic studies that will complement primary site studies.

Further information and a science plan for the program detailing each initiative and the associated thematic studies, as well as the overarching themes, can be found on the GeoPRISMS website at <http://www.geoprisms.org/>.

The expected level of funding will be approximately \$4 million per year for the foreseeable future.

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.

- Maurice Tivey, Program Director, OCE: Marine Geology & Geophysics, telephone: (703) 292-7710, email: mtivey@nsf.gov
- Jennifer Wade, Program Director, EAR: Petrology & Geochemistry, telephone: (703) 292-4739, email: jwade@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

Estimated Number of Awards: 10

Anticipated Funding Amount: \$4,000,000

pending the availability of funds

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- 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.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

Who May Serve as PI:

Only PIs employed by the types of institutions described above may apply.

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 FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: 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/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 Target Date(s):**

July 26, 2016

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:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

GeoPRISMS is a community-driven Program that is designed to enhance understanding of the complex processes governing global continental margin evolution. Mechanical, chemical, biological and fluid processes act in concert to drive the initiation, evolution and eventual destruction of continental margins, as well as the accumulation of resources in these regions. GeoPRISMS expands the dimensions of the preceding MARGINS program in several fundamental ways: (1) integration of scientific emphases to define two main initiatives (*SCD* and *R/E*), (2) explicit inclusion of surface processes and their feedbacks in the evolution of continental margins, (3) consideration of ancient and exhumed margins to understand parts of the system that are not accessible at active margins, (4) implementation of science objectives through a combination of focus-sites (now termed primary sites) and thematic based investigations, (5) further integration through overarching scientific themes that cross-cut tectonic categories, (6) increased attention to US margins and facilities such as EarthScope and the Cascadia Initiative, (7) expanded emphasis on issues with direct societal impact, and (8) a vertically-integrated education and outreach program supporting development from K-12 to early career scientists. GeoPRISMS emphasizes multidisciplinary research and studies that cross the shoreline, recognizing that the shoreline is where much of continental evolution takes place, and is also where the dynamics of the solid Earth have the largest impact on human populations.

The GeoPRISMS Program is jointly supported by the Divisions of Earth and Ocean Sciences of the Directorate for Geosciences.

II. PROGRAM DESCRIPTION

The National Science Foundation (NSF) invites proposals directed towards the program elements listed below in the special-focus section. NSF funding will be provided by the Divisions of Earth and Ocean Sciences.

Proposals submitted to the GeoPRISMS Program should include a statement in the Project Description addressing the relevance of the proposed study to the overall goals of the program and the connections of the research to initiative primary sites and/or thematic studies. Proposals will be reviewed in accordance with established NSF procedures and the criteria described in the GPG (<http://www.nsf.gov/pubsys/ods/getpub.cfm?gpg>) and the additional solicitation specific review criteria. Competition for GeoPRISMS funding will take place once a year and proposals will be evaluated by a joint Earth and Ocean Sciences panel. The proposal deadline for each year is for funding in the following fiscal year. Proposals can be submitted to either of the two programs named below, depending on their degree of relevance to marine or onshore work. Questions regarding proposal preparation and deadlines should be directed to the program officers listed in this solicitation for the following programs. Proposals for some of the overarching science topics can also be submitted, with prior program-officer concurrence, to Core programs and other special programs in these two Divisions.

Scientific Objectives of the GeoPRISMS Program

The GeoPRISMS science objectives were established by the broader geosciences community through a series of community workshops with the aim that GeoPRISMS carry out interdisciplinary investigations of the coupled geodynamics, earth surface processes and climate interactions that build and modify continental margins over a wide range of time scales. These interactions cross the shoreline and have applications to margin evolution and dynamics, construction of stratigraphic architecture, accumulation of economic resources, and associated geologic hazards and environmental management. GeoPRISMS investigations should be aimed towards a comprehensive understanding of the observable system properties, and can include theoretical, numerical and experimental studies, as well as field investigations. GeoPRISMS objectives must be achievable with existing technological capabilities or reasonable increments beyond present capabilities, but should be open to a range of integrative and interdisciplinary community experiments. Finally, broader impacts such as societal relevance, contribution within the discipline, and education and outreach are important elements of the GeoPRISMS Program.

The GeoPRISMS Initiatives

Subduction Cycles and Deformation (SCD)

The *SCD* initiative takes a holistic approach to the deformation processes and material cycles governed by subduction. It integrates and expands the former SEIZE and SubFac initiatives of the MARGINS Program, building on a growing recognition that the two systems are tightly linked and responding to many of the same forcing functions, although manifest in different ways. The *SCD* Initiative focuses on the coupled processes responsible for both long-term margin evolution and material transfer and short-term plate boundary deformation and volcanism. For example, *SCD* studies can examine the properties, mechanisms, and manifestations of strain build-up and release along the plate boundary, the transport and release of volatiles such as H₂O and CO₂ through the thrust zone and sub-arc mantle, and the ways in which these processes affect the long-term growth and evolution of continents. In so doing, *SCD* will provide fundamental scientific understanding of the processes that generate some of the largest natural hazards on the planet, including great earthquakes, tsunamis, and explosive volcanic eruptions.

The primary sites identified by the GeoPRISMS research community for this initiative include: the Aleutians, Cascadia and New Zealand margins.

Details of the *SCD* initiative, including objectives of primary sites and associated thematic studies can be found on the GeoPRISMS web site at <http://www.geoprisms.org/>.

Rift Initiation and Evolution (RIE)

The *RIE* initiative provides a new and broad perspective on the processes by which continents break apart. It expands the former RCL (Rupturing Continental Lithosphere) initiative of the MARGINS Program to include all stages of continental breakup, with increased emphasis on the interaction between surface processes, sedimentation, and continental evolution. It includes early-stage rifts, but also the study of passive margins, which archive the entire history of rift zone construction and evolution. This approach provides direct relevance to understanding both mineral and hydrocarbon resources. The *RIE* initiative seeks to determine the parameters and physical properties that control the processes of continental evolution, with particular emphasis on the initiation of continental rift zones, feedbacks between tectonics, magmatism and surficial processes, and the resulting stratigraphic and tectonic architecture of rifted margins.

The primary sites identified by the GeoPRISMS research community for this initiative are the Eastern North American Margin (ENAM) and East African Rift System (EARS).

Details of the *RIE* initiative, including the objectives of primary sites and associated thematic studies can be found on the GeoPRISMS web site at <http://www.geoprisms.org/>.

Overarching Themes

In addition to the two initiatives listed above, a suite of five overarching themes has been identified by the science community that will serve as the basis for integrative studies and provide a framework for cross-initiative programs: (1) Origin and Evolution of Continental Crust; (2) Fluids, Magmas and Their Interactions; (3) Climate-Surface-Tectonic Feedbacks; (4) Geochemical Cycles; and (5) Plate Boundary Deformation and Geodynamics. Details of the overarching scientific topics and themes can be seen in the science plans posted on the GeoPRISMS web site at <http://www.geoprisms.org/>.

Continued Community Input and Phased Funding Model

The geosciences community has made substantial effort to produce both a Science Plan and an Implementation Plan for the two initiatives of the GeoPRISMS Program. The former represents a broad outline of science priorities and future directions. The latter includes more detail on studies, including possible community experiments at each of the primary sites for the two initiatives (i.e., the operations plans). In order to target the limited available resources in a practical and cost-effective manner, NSF has implemented a phased funding model to address the extensive science objectives and numerous primary research sites identified by the community during their planning activities. With this phased implementation model, NSF prioritized some of the primary sites for certain types of proposals each year. This model allowed proponents to self-organize, plan, and coordinate their research. This also has allowed GeoPRISMS program directors to better leverage the limited available funds each year. The community continues to provide recommendations to the Foundation through community workshops, the GeoPRISMS Steering and Oversight Committee (GSOC), and most recently, a mid-life (5-year) review which resulted in a report and several recommendations. Based on this input, program funding priorities and focus is expected to continue to evolve.

The phased funding model adopted for GeoPRISMS has defined windows of opportunity during which proposals of certain types will be accepted for given primary sites. Large and costly field experiments can only be supported in one site at a time, for up to two sequential years. Smaller studies (such as preparatory work, data analysis and synthesis, or thematic studies), requiring a lower percentage of the overall annual budget, are considered for all sites each year. The windows of opportunity for large-scale data acquisition projects have been thus defined, by site:

Completed [will continue to be accepted in Core Programs]: Cascadia, ENAM, EARS

Remaining: New Zealand, Alaska/Aleutians (as outlined below)

It is important to note that the above 'window' dates serve only as guidelines, and that NSF is open to accepting proposals that fall outside of these guidelines when justified by unique and time-limited opportunities. In such cases, PIs must contact the program officers ahead of submission. Proposals addressing thematic/other topics will continue to be considered throughout the duration of the program.

Shallow Water Opportunities and Work in Alaska/Aleutians

The Transportable Array (TA) component of the SAGE Facility is currently being deployed in Alaska and northwestern Canada.

When fully deployed at the end of summer 2017, the TA will provide data from approximately 260 seismic stations, complementing GPS stations operated as part of the Plate Boundary Observatory component of the GAGE Facility. The TA stations are anticipated to collect data through 2018. GeoPRISMS projects that make use of the data produced by the unique instrumental infrastructure of the Alaska TA to address questions laid out in the GeoPRISMS Science & Implementation Plans are encouraged. Proposals that make use of the Transportable Array should explain how those data will be used in coordination with any new data to be obtained as part of the proposal, and why the acquisition is time-sensitive.

OCE and EAR recently released a Dear Colleague Letter (NSF-16-061) that encourages cross-coastal field projects in the Alaskan arc to take advantage of the Alaska TA deployment. The DCL also emphasizes that the shallow water OBS (ocean bottom seismometer) instruments of the former Amphibious Array are now part of the OBSIP (Ocean Bottom Seismometer Instrument Pool). Researchers requiring OBS's should request instruments through the normal OBSIP proposal process. Please see NSF-16-061 for more details and guidance regarding that opportunity.

Postdoctoral Fellowship Program

GeoPRISMS Postdoctoral Fellowship program is aimed at providing opportunities for early-career scientists to solidify research skills, build a track record, establish peer relationships, and acquire professional self-confidence. NSF's GeoPRISMS Program provides support for postdoctoral researchers to conduct up to two years of multi-disciplinary research at higher education institutions in the United States. The intention is to encourage individuals, typically within five years after award of their Ph.D., to diversify their expertise relative to that used in their thesis research.

The GeoPRISMS Postdoctoral Fellowship is designed so that recipients can choose the research environment most beneficial for their scientific development and that of the GeoPRISMS Program. To this end, applicants are encouraged to establish a relationship with a proposed advisor (mentor) well in advance of proposal submission.

Although awards must be held at U.S. institutions, there is no citizenship requirement and nationals of countries involved in the NSF-GeoPRISMS Program are encouraged to apply. It is expected that candidates will write their own materials for submission, except where otherwise required. There is no fixed dollar amount for a postdoctoral proposal; rather, the budget should be for the candidate's direct work only and should be appropriate to the postdoctoral research project, including salary commensurate with the experience of the candidate, institutional standards and local cost of living.

NSF enables career-life balance through a variety of mechanisms. Support to address dependent care issues may be available for awardees. For more information, please see <http://www.nsf.gov/career-life-balance/>.

GeoPRISMS Postdoctoral Fellowship proposals are subject to the same submission and review criteria as other proposals for GeoPRISMS funding. Submissions should state that the proposal is for a GeoPRISMS Postdoctoral Fellowship and must be submitted by the institution to which an award would be made. In addition to the standard NSF proposal requirements, applicants should also include, in a Supplementary Document: a short abstract of your dissertation research and planned publications (not to exceed one single-spaced page); any fellowships, scholarships, teaching, and other positions relevant to your field held since entering college/university; any academic honors you have received relevant to your major field of study; your native language and fluency in other languages; and a statement of your long-term career goals and (particularly for international fellowship candidates) the ways the GeoPRISMS Fellowship will lead to development of long-term collaborative activities in GeoPRISMS science.

The proposal should also be supported by four (4) letters of reference which must be uploaded by the applicant directly as Supplementary Documents. It is anticipated that one of your referees will be your Ph.D. thesis adviser, and another the sponsoring/collaborating scientist at the proposed host institution. The latter reference should state that your proposed mentor and institution are willing to host you and can accept the GeoPRISMS Fellowship award. Other referees should be faculty members or researchers with current knowledge of your academic and/or professional experience.

Conferences, Theoretical Institute and Rapid Response Proposals

The GeoPRISMS Program will also continue to support science synthesis and planning conferences and Theoretical and Experimental Institutes, to facilitate integration within and between the initiatives. In addition, proposals that require rapid response to events that create opportunities (RAPID - see PAPPG for a description and guidance) for the study of extant processes at GeoPRISMS primary sites and are compatible with GeoPRISMS science plans will also be accepted. PIs must contact a program director prior to submission of a RAPID proposal.

III. AWARD INFORMATION

Under this solicitation, the program expects to make approximately 10 standard or continuing awards for up to five years. NSF anticipates having approximately \$4 million in fiscal year 2016, and annually thereafter, pending the availability of funds.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- 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.
- Other Federal Agencies and Federally Funded Research and Development Centers (FFRDCs): Contact the appropriate program before preparing a proposal for submission.

Who May Serve as PI:

Only PIs employed by the types of institutions described above may apply.

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:

Proposals for postdoctoral fellowships must be submitted by a US academic institution. For all other proposals, the categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program 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 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 nsfpubs@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/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) 292-7827 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 the NSF FastLane system. Chapter II, Section D.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the [GPG](#) 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 GPG instructions.

In addition to the standard NSF guidelines, proposals submitted to the GeoPRISMS Program should also include, in the Project Description, a statement addressing the relevance of the proposed study to the overall goals of the GeoPRISMS Program and their relationship to initiative objectives, primary sites, or thematic studies, as well as identified special-focus experiments. Proposals submitted for support from the Ocean Drilling Program should contain a section that addresses the potential of the proposed research to enhance the effectiveness or planning of proposed drilling activities.

Data Management Requirements: Proposals must include a section outlining how the project will comply with the GeoPRISMS data management policy (see GeoPRISMS web page for copy of the policy at <http://www.geoprisms.org/>).

See Section II, Program Description, for additional proposal preparation information.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- **Full Proposal Target Date(s):**

July 26, 2016

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions 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.

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: <http://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 FastLane are strongly encouraged to use FastLane 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 the [GPG](#) as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://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 [Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018](#). 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. (GPG 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 GPG 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 underrepresented minorities 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 submitted to the GeoPRISMS program will also be evaluated for relevance of the proposed study to the overall goals of the GeoPRISMS initiatives and their relationship to identified special-focus experiments.

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 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.

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 http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 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 Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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 Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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:

- Maurice Tivey, Program Director, OCE: Marine Geology & Geophysics, telephone: (703) 292-7710, email: mtivey@nsf.gov

- Jennifer Wade, Program Director, EAR: Petrology & Geochemistry, telephone: (703) 292-4739, email: jwade@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, "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 <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

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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 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: nsfpubs@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:

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Arlington, VA 22230

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