EarthScope

PROGRAM SOLICITATION
NSF 17-511

REPLACES DOCUMENT(S):
NSF 15-578

National Science Foundation

Directorate for Geosciences
Division of Earth Sciences

Full Proposal Target Date(s):

February 10, 2017

February 10, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

This is a revised solicitation that replaces NSF 15-578. The primary revisions in this solicitation are: (1) The emphasis of EarthScope synthesis and integration as the primary focus of the program; and (2) All PIs planning to collect any new field data, observations, or samples must contact the EarthScope Program Officers as early as possible in the proposal planning process.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 17-1), which is effective for proposals submitted, or due, on or after January 30, 2017. Please be advised that proposers who opt to submit prior to January 30, 2017, must also follow the guidelines contained in NSF 17-1.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

EarthScope

Synopsis of Program:

EarthScope is an Earth science program to explore the 4-dimensional structure of the North American continent. The EarthScope Program provides a framework for broad, integrated studies across the Earth sciences, including research on fault properties and the earthquake process, strain transfer, magmatic and hydrous fluids in the crust and mantle, plate boundary processes, large-scale continental deformation, continental structure and evolution, and composition and structure of the deep Earth. In addition, EarthScope offers a centralized forum for Earth science education at all levels and an excellent opportunity to develop cyberinfrastructure to integrate, distribute, and analyze diverse data sets.

This Solicitation primarily encourages submission of proposals that integrate and synthesize major outcomes of EarthScope research and education and outreach efforts with the goal of elucidating and documenting the advances the EarthScope program has made since its inception.

This Program also accepts single investigator or collaborative proposals to conduct scientific research and/or education and outreach activities within North America that

1. Make use of capabilities provided through, and/or data and/or models derived from, GAGE (Geodesy Advancing Geosciences and EarthScope), SAGE (Seismological Facilities for the Advancement of Geosciences and EarthScope), and/or SAFOD (San Andreas Fault Observatory at Depth);
2. Further the scientific and educational goals of EarthScope, as described in the 2010 EarthScope Science Plan and/or EarthScope Education and Outreach Implementation Plan; and
3. Do not make use of or require access to the SAFOD Main Hole or SAFOD Pilot Hole.

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.

- Margaret Benoit, telephone: (703) 292-7233, email: mbenoit@nsf.gov

Gregory J. Anderson, 785 N, telephone: (703) 292-4693, email: greander@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: 15 to 25

Anticipated Funding Amount: $6,000,000 for FY 2017, pending 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.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

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: 2

An individual may appear as Principal Investigator (PI), Co-PI, Senior Personnel (or any similar designation), or elsewhere in the proposal budget in no more than two proposals submitted in response to this solicitation. Proposers are responsible for ensuring that no individual is listed as PI, Co-PI, or Senior Personnel or appears elsewhere in the budget in more than two proposals. In cases where any individual appears in the budget for three or more proposals, all proposals involving that person may be returned without review.

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: https://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: 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 Target Date(s)**:

  February 10, 2017

February 10, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

Additional award conditions apply. Please see the full text of this solicitation for further information.

Reporting Requirements:

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

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I. INTRODUCTION

The EarthScope Program is part of the Division of Earth Sciences (EAR). EAR provides funding for the conduct of research in most areas of the solid Earth and surface-terrestrial sciences. EAR focuses on improving our understanding of the Earth's structure, composition, evolution, and the interaction with the Earth's biosphere, atmosphere, and hydrosphere. In addition, EAR provides support for instrumental and observational infrastructure, cyberinfrastructure, and innovative educational and outreach activities. Projects may employ any combination of field, laboratory, and computational studies with observational, theoretical, or experimental approaches. Support is available for research and research infrastructure through grants and cooperative agreements awarded in response to investigator-initiated proposals. EAR will consider co-funding of projects with other agencies and supports international work and collaborations.

II. PROGRAM DESCRIPTION

EarthScope addresses fundamental questions about the evolution of continents and the processes responsible for earthquakes and volcanic eruptions using North America as a natural laboratory. Through the synthesis and integration of scientific information derived from geology, geochemistry, geophysics, and geodesy, the EarthScope program is yielding a comprehensive time-dependent picture of the continent far beyond that which any single discipline or technology can achieve. EarthScope provides a framework for broad, integrated studies across the Earth sciences, including research on active deformation of the North American continent; continental evolution through geologic time; deep Earth structure and dynamics; earthquakes, faults, and the rheology of the

lithosphere; magma, water, and volatiles in the crust and mantle; topography and tectonics; aspects of studies of the hydrosphere, cryosphere, and atmosphere that EarthScope can illuminate; and associated educational topics. Further details about the broad array of scientific targets within North America of interest to the EarthScope program are articulated in the 2010 EarthScope Science Plan http://www.earthscope.org/assets/uploads/pages/es_sci_plan_hi.pdf.

The Division of Earth Sciences intends to sunset the EarthScope program at the end of fiscal year 2018 and transition support for similar projects to other programs. **As part of the sunsetting process, the EarthScope program is placing primary emphasis on integration and synthesis of major outcomes of EarthScope research and education and outreach efforts.** The program strongly encourages a broad array of integration and synthesis proposals with the goal of elucidating and documenting the advances that the EarthScope program has made since its inception.

Examples of possible types of proposals could include, but are not limited to:

- Proposals for projects that develop publications or other media aimed at the general public, educators, and other stakeholders that articulate and exhibit major outcomes from EarthScope research;
- Proposals for projects that integrate multiple data sets and analyses from one or more regions of the continent with the goal of providing a comprehensive perspective on a scientific target outlined in the EarthScope Science Plan, including making new insights on Earth processes and identifying current knowledge gaps;
- Proposals for projects that synthesize major outcomes from EarthScope research, such as conferences, the development of formal or informal educational modules, or other activities that demonstrate the progress that EarthScope has made in advancing knowledge; and/or
- Proposals for projects that develop community model products that could be used to advance further research.

EarthScope synthesis proposals should include a clear plan for documenting and disseminating the outcomes of the synthesis.

The program will also accept proposals to conduct scientific research and/or education and outreach activities within North America that

1. Make use of capabilities provided through, and/or data and/or models derived from, GAGE, SAGE, and/or SAFOD;
2. Further the scientific and educational goals of EarthScope; and
3. Do not make use of or require access to the SAFOD Main Hole or SAFOD Pilot Hole.

Such data and/or models include raw and processed data, as well as data products and modeled data (e.g., surface velocity field derived from Plate Boundary Observatory data; tomographic models derived from USArray data).

Where appropriate, proposals may be considered for joint support with other programs in EAR or with other divisions at the National Science Foundation. In some cases, proposals may be transferred to other programs within EAR or to other divisions within the National Science Foundation when it is deemed appropriate by Program Officers from the respective programs or divisions. Principal Investigators (PIs) are encouraged to contact the cognizant program officers before submitting proposals that may cross programmatic boundaries before submission.

Examples of projects supported by the program can be found at http://www.earthscope.org (Funded Proposals under Quick Links) and using the NSF Award Search (Program Information) engine by entering Element Codes 007F, 017F, and 1741.

EarthScope Education and Outreach (E&O)

The EarthScope program invites proposals to address program-wide education and outreach objectives. EarthScope E&O projects should strive to integrate research components of EarthScope with activities that are broadly defined to include formal instruction at all levels and informal education for the community-at-large. Supplemental proposal preparation instructions for education and outreach proposals are given in Section V.

Professional Development of Graduate Students and Postdoctoral Researchers

Activities supported by EarthScope provide an ideal environment for mentoring and training young scientists, including introducing them to new methodologies for analyzing data and utilizing new technologies. If funds to support training of graduate students and postdoctoral researchers are requested as part of a proposal, the EarthScope program strongly encourages PIs to develop Broader Impact plans that support professional development activities that enable graduate students and postdoctoral researchers to broaden career options, particularly for careers outside of academe. Examples of possible career development activities for which PIs may request support include, but are not limited to: Enrollment in workshops and short courses, career counseling, participation in internships, and development of partnerships with other organizations for leveraging resources that assist young scientists in developing new career pathways.

III. AWARD INFORMATION

Under this Solicitation, proposals may be submitted for up to three years. The program expects to make approximately 15 to 25 standard or continuing grants or cooperative agreements with durations of one to three years depending on the quality of submissions and the availability of funds. Approximately $6,000,000 is expected to be available in FY 2017 to support proposals received under this solicitation, subject to 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.
- For-profit organizations: U.S. commercial organizations, especially small businesses with strong capabilities in scientific or engineering research or education.

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: 2

An individual may appear as Principal Investigator (PI), Co-PI, Senior Personnel (or any similar designation), or elsewhere in the proposal budget in no more than two proposals submitted in response to this solicitation. Proposers are responsible for ensuring that no individual is listed as PI, Co-PI, or Senior Personnel or appears elsewhere in the budget in more than two proposals. In cases where any individual appears in the budget for three or more proposals, all proposals involving that person may be returned without review.

Additional Eligibility Info:

Colleges and universities designated as Undergraduate or Predominately Undergraduate Institutions should consult the guidelines described in Research in Undergraduate Institutions.

Proposals may involve scientists at one organization or collaborative efforts of associated researchers from different organizations working on coordinated projects.

Proposals that have been declined are not eligible for resubmission for one year from the original date of submission and must be substantially revised to be considered. Any such resubmission must include a Supplementary Document of no more than one (1) page in length that explicitly describes what changes have been made to the proposal in response to previous NSF review comments and concerns. A proposal that has not been substantially revised, or that lacks this Supplemental Document, may be returned without review as per the PAPPG.

Proposals to conduct scientific research and/or education and outreach activities within North America that make use of capabilities provided through, and/or data and/or models derived from, GAGE, SAGE, and/or SAFOD to further the scientific and educational goals of EarthScope, as described in the 2010 EarthScope Science Plan and/or EarthScope Education and Outreach Implementation Plan, are eligible for submission 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 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: https://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: (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) 292-7827 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.

The following information provides instructions that supplement the PAPPG and the NSF Grants.gov Application Guide.

Principal investigators are strongly encouraged to contact the EarthScope Program Directors prior to submitting any proposal to the

program. Principal investigators planning projects that involve either of the following must contact the EarthScope Program Directors as early as possible during the proposal development process or the proposal may be returned without review:

- Collection of any new field data, observations, or samples;
- An **annual** budget exceeding $300,000.

All EarthScope science proposals must explicitly identify which of the EarthScope science targets, as outlined in the 2010 EarthScope Science Plan, the project is intended to address.

All proposals requesting funds for professional development activities must include a simple strategy for assessing the outcomes and effectiveness of the activities.

Supplementary Documents

All proposals that include funding to support undergraduate or graduate students must include a description of the mentoring activities that will be provided for all such individuals, regardless of location, to be uploaded as a Supplementary Document of no more than one (1) page in length. This part of the proposal will be evaluated under the Foundation's Broader Impacts Merit Review criterion. Proposals requesting support for undergraduate or graduate students that lack this Supplementary Document **may be returned without review**.

PIs for proposals that require support from the GAGE and/or SAGE Facilities must obtain formal letters of support commitment from UNAVCO and/or IRIS (Incorporated Research Institutions for Seismology) and include those letters as a Supplementary Document. Proposals requiring facility support but lacking such letters **may be returned without review**.

All resubmitted proposals must contain a Supplementary Document of no more than one (1) page explicitly describing what changes have been made to the proposal in response to previous NSF review comments and concerns. A resubmitted proposal that has not been substantially revised, or that lacks this Supplemental Document, **may be returned without review**.

Requirements for EarthScope Education and Outreach Proposals

All EarthScope Education and Outreach proposals must include the following within the 15 page Project Description:

- A description of the activities to be undertaken related to EarthScope research and to exploring and experimenting with ways to integrate education and research.
- A plan for assessing and evaluating the effectiveness of the E&O activities.
- A plan to disseminate those activities that are found to be effective.

Investigators are encouraged to view the EarthScope Education and Outreach Implementation Plan (http://www.earthscope.org/assets/uploads/pages/ES_EnO_Impl_Plan_2_07.pdf) and tie their proposed activities to specific goals outlined in that plan.

A description of previous educational efforts of the investigators must be included in a Supplementary Document not to exceed one (1) page in length. This might include how the investigator has: 1) influenced his or her research discipline; 2) incorporated or integrated contemporary research questions, processes, and results into educational experiences; 3) contributed to the literature of teaching and learning; 4) mentored others to conduct research and to educate students; or 5) demonstrated leadership among colleagues in promoting the above.

EarthScope Education and Outreach proposals lacking these elements **may be returned without review**.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

  February 10, 2017

  February 10, Annually Thereafter

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: 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 *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.

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 https://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 https://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

Special Award Conditions:

EAR and EarthScope Data Policies: Principal investigators are required to adhere to the EAR Data Policy (https://www.nsf.gov/geo/ear/EAR_data_policy_204.pdf) and the EarthScope Data Policy (http://www.earthscope.org/assets/uploads/pages/esdatapolicy.pdf). Final reports for all awards must include a statement describing how the data policy requirements have been met.

Publications: Principal investigators are required to provide to the EarthScope National Office full bibliographic details for any publication resulting from funding under this solicitation.

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 https://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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All proposals that include funds intended for the professional development of graduate students and postdoctoral researchers must report on progress and outcomes of these activities in Annual and Final Reports.

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:

- Margaret Benoit, telephone: (703) 292-7233, email: mbenoit@nsf.gov
- Gregory J. Anderson, 785 N, telephone: (703) 292-4693, email: greander@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.

Related Programs:

The EarthScope program is closely related to the other programs in the Deep Earth Processes Section, including Integrated Earth Systems, Earth Sciences Instrumentation and Facilities, Geophysics, Petrology and Geochemistry, and Tectonics. Other closely related programs include EAR Education and Human Resources, Faculty Early Career Development (CAREER) Program, Geomorphology and Land Use Dynamics, GeoPRISMS, Hydrologic Sciences, and Marine Geology and Geophysics.

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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 https://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:**

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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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