

EarthScope

Program Solicitation

NSF 06-562

Replaces Document NSF 04-589



National Science Foundation
Directorate for Geosciences
Division of Earth Sciences

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

July 16, 2006

July 16, annually

REVISIONS AND UPDATES

In furtherance of the President's Management Agenda, in Fiscal Year 2006, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

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

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

- A. Collaborative Proposals. All collaborative proposals must be submitted via the NSF FastLane system. This includes collaborative proposals submitted:
- by one organization (and which includes one or more subawards); or
 - as separate submissions from multiple organizations.

Proposers are advised that collaborative proposals submitted in response to this Program Solicitation via Grants.gov will be requested to be withdrawn and proposers will need to resubmit these proposals via the NSF FastLane system. (Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.)

- B. All Other Types of Proposals That Contain Subawards. All other types of proposals that contain one or more subawards also must be submitted via the NSF Fastlane system. (Chapter II, Section C.2.g.(vi)(e) of the Grant Proposal Guide provides additional information on subawards.)

The following items are major revisions and updates of the previous version of this program solicitation:

This solicitation has been revised to be consistent with the other Division of Earth Sciences (EAR) programs. In particular:

- the title has been shortened for clarity and consistency

- EAR data policy wording has been included
- Grants.gov information has been included

Other text edits have been made throughout the document to reflect changing program needs and personnel.

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.

The nucleus of the Program is the EarthScope Facility, consisting of the Plate Boundary Observatory (PBO), the San Andreas Fault Observatory at Depth (SAFOD), and the USArray. The EarthScope Facility is a multi-purpose array of instruments and observatories that will greatly expand the observational capabilities of the Earth Sciences and permit us to advance our understanding of the structure, evolution and dynamics of the North American continent. The Facility is designed to continually incorporate technological advances in geophysics, seismology, geodesy, information technology, drilling technology, and downhole instrumentation.

This Solicitation calls for single or collaborative proposals to conduct scientific research associated with the EarthScope Facility and support activities that further the scientific and educational goals of EarthScope.

Cognizant Program Officer(s):

- Kaye Shedlock, Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-4693, fax: (703) 292-9025, email: kshedloc@nsf.gov
- Lina Patino, Assistant Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-5047, fax: (703) 292-9025, email: lpatino@nsf.gov

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

- 47.050 --- Geosciences

Eligibility Information

- **Organization Limit:** None Specified.
- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 15 to 25
- **Anticipated Funding Amount:** \$6,000,000 for FY2007, pending availability of funds

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide and NSF Grants.gov Application Guide guidelines.
 - Full proposals submitted via FastLane:
 - Grant Proposal Guide (GPG) Guidelines apply
 - Full proposals submitted via Grants.gov:
 - NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>) To obtain copies of the Application Guide and Application Forms Package: click on the Apply tab on the Grants.gov website, 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.

B. Budgetary Information

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

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. submitter's local time):
 - July 16, 2006
 - July 16, annually

Proposal Review Information

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

Award Administration Information

- **Award Conditions:** Additional award conditions apply. Please see the full text of this solicitation for further information.
- **Reporting Requirements:** 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, contracts, 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

The rich fabric of tectonic provinces in North America provides a solid scientific framework for a major program to investigate the relationships among processes and structures over a wide range of scales within the crust, lithosphere, and mantle, with the goal of understanding the tectonic and geologic processes that have constructed the continents. The North American Continent is also ideally located with respect to global seismicity to provide unprecedented views of the deep mantle. EarthScope addresses fundamental questions about the evolution of continents and the processes responsible for earthquakes and volcanic eruptions. Through the integration of scientific information derived from geology, geochemistry, geophysics, and geodesy, the EarthScope program will yield a comprehensive time-dependent picture of the continent far beyond that which any single discipline or technology can achieve. EarthScope includes new observational technologies that will be linked through high performance computing and telecommunication networks. These observational facilities provide a framework for broad, integrated studies across the Earth sciences, including research on fault properties and the earthquake process, crustal strain transfer, magmatic and hydrous fluids in the crust and upper mantle, plate boundary processes, large-scale continental deformation, continental structure and evolution, deep-Earth structure, and associated educational aspects.

The integrated observing systems that will comprise the EarthScope Facility include: USArray that maps in 3-D the earth's interior by means of seismic and magnetotelluric systems; Plate Boundary Observatory (PBO) that monitors the distortion of the earth's surface by means of geodetic systems; and the San Andreas Fault Observatory at Depth (SAFOD) that defines the conditions and physics of an active plate boundary fault at depth. These systems capitalize on recent developments in sensor technology and communications to provide Earth scientists with synoptic and high-resolution data derived from a variety of geophysical sensors. The intent is that all data from the EarthScope Facility will be openly available in near-real-time to maximize participation from the scientific community and to provide on-going educational outreach to students and the public.

The EarthScope Program is committed to supporting the most meritorious research in any relevant area, including interdisciplinary and multidisciplinary research, as well as research involving international collaboration. The Program is

especially interested in proposals in emerging fields. 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 are encouraged to contact the cognizant program officers regarding proposals that may cross disciplinary boundaries before submission.

Examples of projects supported by the program can be found using the [NSF Award Search \(Program Information\)](#) engine by entering Element Code 1741.

Scientific Targets

EarthScope encompasses a broad array of scientific targets within the context of the North American continent. Examples include, but are not limited to:

- **Fault properties and the earthquake process:** How does strain accumulate and release at plate boundaries and within the North American plate? How do earthquakes start, rupture, and stop? What is the absolute strength of faults and the surrounding lithosphere? What structural and geologic factors give rise to intraplate regions of seismicity? How can we accurately predict earthquake induced ground motions over a wide frequency range?
- **Crustal strain transfer:** How does crust and mantle rheology vary with rock type and with depth? How does lithospheric rheology change in the vicinity of a fault zone? What is the distribution of stress in the lithosphere? What types of transient movements occur in the lithosphere? What is the role of non-tectonic processes in creating lithospheric stress? How do faults interact with one another?
- **Magmatic and hydrous fluids in the crust and upper mantle:** What effect does tectonic deformation have on fluid flow in the crust? What is the role of hotspots in evolution of the continents? How does tectonic rate (convergence, extension, mantle upwelling) affect magma production? Where does melting in the lithosphere occur and what controls magma migration, accumulation, and residence time? What is the relation between magma movement, surface deformation, and volcanic eruption? Over what temporal and spatial scales do earthquake deformation and volcanic eruptions couple? What controls eruption style? What are the predictive signs of imminent volcanic eruption? What are the structural, rheological, and chemical controls on fluid flow in the crust?
- **Plate boundary processes:** What is the geometry of the plate boundary megathrust and how does it relate to spatial and temporal variations in convergence, strain rate, seismicity, and volcanism along the convergent margin? What is the deeper slab and upper mantle structure and how does it relate to intermediate-depth subduction zone seismicity? What is the role of extension, orogenic collapse, and rifting in constructing the continents? How is strain partitioned within plate boundaries? What controls the lithospheric architecture in plate boundaries? What controls the locus of volcanism? How do plate boundary processes contribute to growth of the continent through time?
- **Large-scale continental deformation:** What are the fundamental controls on deformation of the continent? What is the strength profile(s) of the lithosphere? What defines tectonic regimes within the continent? How does convective and advective flow effect plate motions and transfer stresses to the lithosphere? What role do fluids play in lithospheric deformation? How is deformation distributed throughout the continent? How has topography evolved through time?
- **Continental structure and evolution:** What is a continent? How is the lithosphere formed? By what mechanisms are continents dispersed and reassembled? How are the crust and lithospheric mantle related? How are continental structure and deformation related? How does magmatism modify, enlarge, and deform continental lithosphere?
- **Deep-Earth structure:** How and where are forces generated in the upper mantle and transferred to the crust? How is evolution of the continents linked to processes in the upper mantle? What is the level of heterogeneity in the mid-mantle? What is the nature and heterogeneity of the lower mantle and core-mantle boundary?

Development of Information Technology Resources and Related Activities

The infrastructure provided by the EarthScope Facility (USArray, PBO and SAFOD) presents a multidisciplinary field laboratory that can stimulate new mechanisms for collaboration, data integration, and data management of a diverse suite of geologic, geochemical, and geophysical data sets. Proposals are invited for supporting or complementary infrastructure, such as: aerial image acquisition or archive, physical archives for EarthScope materials, upgrade of geochemical facilities, other infrastructure needs. Proposals are encouraged that show evidence of collaborative arrangements between academic and/or industry groups. Activities related to support of EarthScope community coordination, planning, workshops, and development of community resources and products are also welcomed.

EarthScope is committed to providing an integrated database and archive access capability applying the tools from modern data management and information technologies. Proposals are invited that will extend the power and capabilities of this database through information technology advances, and that will provide standardized data, visualization and analysis tools, and data integration products to the scientific and education communities. This includes facilitating the adoption of standards for data exchange for geologic data and the transcription of existing data into these standards. Pilot projects or prototype development for producing and distributing EarthScope products such as tomographic velocity inversions, GPS velocity vectors, surface wave dispersion, etc. are also encouraged.

Proposals to this competition should include aspects of the following elements:

- Internet-accessible and dynamically updated databases to facilitate the exchange of information among persons and groups likely to be interested in these findings;
- Participation in or establishment of an Internet-accessible knowledge network to disseminate the information resulting from this activity; and
- A clear commitment to make data products and tools openly accessible through EarthScope and other cooperating data and products facilities.

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. Partnerships or collaborations are strongly encouraged among the members of the EarthScope or other educational communities. Proposals may include demonstration products or pilot projects that may be scalable to support larger EarthScope E&O activities in future years. For example, these may include community data products that are accessible to students and non-specialists, and teaching modules that will allow EarthScope resources to be incorporated into an inquiry-based learning experience consistent with national educational standards. Supplemental proposal preparation instructions and review criteria for education and outreach proposals are given in Sections V and VI.

Earth Science (EarthScope)/Earthquake Engineering (NEES) Research Opportunities

The George E. Brown Jr. Network for Earthquake Engineering Simulation (NEES) is a national, shared use experimental resource for advancing understanding and improving the design and performance of the Nation's constructed civil and mechanical infrastructure when subjected to earthquake excitation and tsunamis. NEES is a shared national research and education network of 15 experimental facilities and centralized data and model repositories, linked by high-speed Internet2 connections. These resources enable collaboration and advanced research based on experimentation and computational simulations of earthquakes and how buildings, infrastructure, coastal regions, and geologic materials perform during seismic events. NEES will enable engineers and researchers to develop more cost-effective ways to mitigate damage from natural and man-made disasters through the use of improved materials, designs, monitoring tools and construction techniques. The NEES and EarthScope facilities provide complementary capabilities to extend the continuum and interface of knowledge and technology in Earth Sciences and earthquake engineering. Co-funding opportunities will be considered between EAR, through this solicitation, and by the Directorate for Engineering, Division of Civil and Mechanical Systems, for projects that propose research requiring coordinated use of both NEES and EarthScope facilities. Proposals should address both the requirements of this solicitation and the George E. Brown Jr. Network for Earthquake Engineering Simulation Research (NEESR) solicitation (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf06504). Proposals will be co-reviewed by ad hoc mail reviews and/or panels formed to review proposals under both solicitations.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program solicitation. 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. A proposal that has not been substantially revised will be returned without review as per the [Grant Proposal Guide](#).

IV. AWARD INFORMATION

Under this Solicitation, proposals may be submitted for up to five years. The program expects to make approximately 15 to 25 standard or continuing grants or cooperative agreements with durations of 1 to 5 years depending on the quality of

submissions and the availability of funds. Approximately \$6,000,000 is expected to be available in FY2007 to support proposals received under this Solicitation.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

In furtherance of the President's Management Agenda, in Fiscal Year 2006, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

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

- Proposals submitted via the FastLane system:

Proposals submitted in response to this Program Solicitation via FastLane should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

- Proposals submitted via Grants.gov:

Proposals submitted in response to this Program Solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (<http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, i.e, the Program Solicitation Number, and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

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

- A. Collaborative Proposals. All collaborative proposals must be submitted via the NSF FastLane system. This includes collaborative proposals submitted:
 - by one organization (and which includes one or more subawards); or
 - as separate submissions from multiple organizations.

Proposers are advised that collaborative proposals submitted in response to this Program Solicitation via Grants.gov will be requested to be withdrawn and proposers will need to resubmit these proposals via the NSF FastLane system. (Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.)

- B. All Other Types of Proposals That Contain Subawards. All other types of proposals that contain one or more subawards also must be submitted via the NSF Fastlane system. (Chapter II, Section C.2.g.

(vi)(e) of the Grant Proposal Guide provides additional information on subawards.)

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

Proposals that require facility (PBO, SAFOD, and/or USArray) and/or other agency support outside that requested in the submitting organization(s) proposal budget(s), or that require permits, etc., should include support commitment letters and/or permits as appendices. **Note:** This is not a cost-sharing requirement.

For EarthScope Education and Outreach (E&O) proposals, the following items should be included in the 15-page Project Description and will be considered in the review:

- A description of previous educational efforts of the investigators. 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.
- 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.

B. Budgetary Information

Cost Sharing:

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

C. Due Dates

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

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

July 16, 2006

July 16, annually

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

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

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

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

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

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

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

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

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

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

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

What is the intellectual merit of the proposed activity?

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

What are the broader impacts of the proposed activity?

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

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

Integration of Research and Education

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

Integrating Diversity into NSF Programs, Projects, and Activities

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

Additional Review Criteria:

Proposals that create synergy among the various EarthScope components and activities are encouraged. Proposals will be judged additionally on their relevance to defining community products, developing community tools, and other similar activities.

For EarthScope Education and Outreach (E&O) proposals, the following items should be included in the 15-page Project Description and will be considered in the review:

- A description of previous educational efforts of the investigators. 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.
- 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.

B. Review Protocol and Associated Customer Service Standard

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

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

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

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

Consistent with the requirements of OMB Circular A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, and the Federal Geographic Data Committee, all NSF awards that result in relevant geospatial data must be submitted to Geospatial One-Stop in accordance with the guidelines provided at: www.geodata.gov.

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

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

Special Award Conditions:

EAR Data Policy: Principal investigators are required to adhere to the EAR Data Policy available on the NSF website. Final reports for all awards should include a statement describing how the data policy requirements have been met.

C. Reporting Requirements

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

EAR Data Policy: Principal investigators are required to adhere to the EAR Data Policy available on the NSF website. Final reports for all awards should include a statement describing how the data policy requirements have been met.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final

technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

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

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

Kaye Shedlock, Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-4693, fax: (703) 292-9025, email: kshedloc@nsf.gov

Lina Patino, Assistant Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-5047, fax: (703) 292-9025, email: lpatino@nsf.gov

For questions related to the use of FastLane, contact:

Lerome D. Jackson, Program Technology Specialist, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8551, fax: (703) 292-9025, email: ljackson@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

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

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

Related Programs:

Collaboration in Mathematical Geosciences ([NSF 05-535](#))

Continental Dynamics ([NSF 04-512](#))

Earth Sciences: Instrumentation and Facilities ([NSF 05-587](#))

Geophysics ([NSF 06-546](#))

George E. Brown, Jr. Network for Earthquake Engineering Simulation Research ([NSF 06-504](#))

Geoscience Education ([NSF 05-609](#))

Faculty Early Career Development (CAREER) Program ([NSF 05-579](#))

Petrology and Geochemistry ([NSF 06-543](#))

Tectonics ([NSF 06-544](#))

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

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

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

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
 - Send an e-mail to: pubs@nsf.gov
 - or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the

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

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

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