

Earth Sciences Research at the National Science Foundation (EAR)

Program Solicitation

NSF 04-613

Replaces Document NSF 03-590



National Science Foundation

Directorate for Geosciences

Division of Earth Sciences

Preliminary Proposal Due Date(s) (optional):

April 1, annually

Continental Dynamics

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

November 15, annually

Continental Dynamics

December 1, annually

Geophysics; Hydrologic Sciences; Petrology and Geochemistry; Tectonics

January 16, annually

Geobiology and Environmental Geochemistry; Geomorphology and Land Use Dynamics; Instrumentation and Facilities; Sedimentary Geology and Paleobiology

June 1, annually

Geophysics; Hydrologic Sciences; Petrology and Geochemistry; Tectonics

July 16, annually

EarthScope; Geobiology and Environmental Geochemistry; Geomorphology and Land Use Dynamics; Instrumentation and Facilities; Sedimentary Geology and Paleobiology

August 17, annually

REU-Site proposals accepted only by Education and Human Resources Program once per year on the annual NSF-wide deadline

Full Proposal Deadline(s):

No fixed deadline

Education and Human Resources Program: Proposals other than REU sites are accepted at any time.

REVISIONS AND UPDATES

The Division of Earth Sciences has been realigned in two Sections: Surface Earth Processes Section and Deep Earth Processes Section.

The Geology and Paleontology Program has been reorganized into three disciplinary Programs: Geobiology and Environmental Geochemistry; Geomorphology and Land Use Dynamics; and Sedimentary Geology and Paleobiology (see Section II for new program descriptions).

The upper limit for equipment requests on research proposals has been changed (see Sec V.B *Other Budgetary Limitations* for details).

Cost sharing requirements have been clarified.

The preliminary proposal deadline date for Continental Dynamics has been changed to April 1 annually.

The full proposal deadline date for Education and Human Resources has been updated to reflect the new NSF-wide REU-Site proposal deadline of August 17 annually.

The complete list of cognizant program officers is included.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Earth Sciences Research at the National Science Foundation (EAR)

Synopsis of Program:

The Division of Earth Sciences (EAR) supports research and education related to the Earth's terrestrial regions, interior, and freshwater systems. 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 from U.S. universities and other eligible institutions. Human resource development and education are expected to be an integral part of most research proposals, but are also eligible for direct support. Multidisciplinary work is strongly encouraged. Projects involving disciplines outside the earth sciences will be recommended for joint support with other programs within the Foundation. EAR will consider co-funding of projects with other agencies and supports international work and collaborations.

This program solicitation is a compilation of information about EAR's various programs. Prospective

proposers should contact the cognizant program officer for more information. Some of these programs also have separate program announcements or solicitations that prospective proposers should read for specific requirements.

Cognizant Program Officer(s):

- Herman B. Zimmerman, Division Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8550, fax: (703) 292-9025, email: hzimmerm@nsf.gov
- Walter S. Snyder, Section Head, Surface Earth Processes, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8553, fax: (703) 292-9025, email: wsnyder@nsf.gov
- James H. Whitcomb, Section Head, Deep Earth Processes, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8553, fax: (703) 292-9025, email: jwhitcom@nsf.gov
- Enriqueta C. Barrera, Program Director, Geobiology and Environmental Geochemistry, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8551, fax: (703) 292-9025, email: ebarrera@nsf.gov
- Rachael Craig, Program Director, Bigeosciences, Integrated Carbon Cycle Research, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8233, fax: (703) 292-9025, email: rcraig@nsf.gov
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- David M. Fountain, Program Director, Tectonics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8552, fax: (703) 292-9025, email: dfountain@nsf.gov
- Stephen Harlan, Program Director, Tectonics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8552, fax: (703) 292-9025, email: sharlan@nsf.gov
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- Leonard E. Johnson, Program Director, Continental Dynamics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8559, fax: (703) 292-9025, email: lejohnso@nsf.gov
- Russell C. Kelz, Associate Program Director, Instrumentation and Facilities, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8558, fax: (703) 292-9025, email: rkelz@nsf.gov
- David Lambert, Program Director, Instrumentation and Facilities, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8558, email: dlambert@nsf.gov
- H. Richard Lane, Program Director, Sedimentary Geology and Paleobiology, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8551, email: hlane@nsf.gov
- Robin Reichlin, Program Director, Geophysics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8556, fax: (703) 292-9025, email: rreichli@nsf.gov
- Kaye Shedlock, Program Director, EarthScope, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8556, fax: (703) 292-9025, email: kshedloc@nsf.gov
- Thomas Torgersen, Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8549, fax: (703) 292-9025, email: ttorgers@nsf.gov

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

- 47.050 --- Geosciences

Eligibility Information

- **Organization Limit:**

Proposals will generally be accepted from colleges, universities, and other institutions in the United States with formal research programs in the areas supported by EAR.

- **PI Eligibility Limit:**

Proposals may involve individual scientists or collaborative efforts of associated researchers working on coordinated projects.

- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 500 to 600
- **Anticipated Funding Amount:** \$150 Million, pending availability of funds

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is Specialized. Please see the full text of this solicitation for further information.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Preliminary Proposals (optional) :**
 - April 1, annually
Continental Dynamics
- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
 - November 15, annually
Continental Dynamics
 - December 1, annually
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Instrumentation and Facilities; Sedimentary Geology and Paleobiology
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EarthScope; Geobiology and Environmental Geochemistry; Geomorphology and Land Use
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the annual NSF-wide deadline
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 - No fixed deadline
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time.

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full text of this solicitation for further information.

TABLE OF CONTENTS

Summary of Program Requirements

- I. **Introduction**
- II. **Program Description**
- III. **Eligibility Information**
- IV. **Award Information**
- V. **Proposal Preparation and Submission Instructions**
 - A. Proposal Preparation Instructions
 - B. Budgetary Information
 - C. Due Dates
 - D. FastLane Requirements
- VI. **Proposal Review Information**
 - A. NSF Proposal Review Process
 - B. Review Protocol and Associated Customer Service Standard
- VII. **Award Administration Information**
 - A. Notification of the Award
 - B. Award Conditions
 - C. Reporting Requirements
- VIII. **Contacts for Additional Information**
- IX. **Other Programs of Interest**

I. INTRODUCTION

The Division of Earth Sciences (EAR) supports research and education focused on understanding Earth dynamics. Deciphering the complex record of the planet's past or investigating the forces actively changing it today, EAR's research portfolio centers on the Earth's interior and terrestrial surface, including freshwater systems and interactions with the biosphere and atmosphere. Support is available for field, laboratory, and theoretical studies in any discipline of earth science including geology, geobiology, geophysics, geochemistry, geodesy, geolimnology, geomorphology, economic geology, environmental science, hydrology, paleontology, petrology, sedimentology, seismology, stratigraphy, structural geology, tectonics, and volcanology. Given the complexity of Earth systems, multidisciplinary research is strongly encouraged and supported. Recent examples include:

- Cooperative Studies of the Earth's Deep Interior (CSEDI) involving geochemistry, mineralogy, and geophysics and using the nation's advanced X-ray synchrotron facilities;
- Continental scientific drilling in California, Hawaii, and Japan to understand the mechanisms of earthquakes and

- volcanic eruptions;
- Studies of the nation's watersheds to understand the processes that occur at the intersection of the hydrosphere, geosphere, and biosphere;
- Geoinformatics initiatives involving earth scientists and information technology specialists to synthesize data between disciplines and promote modeling of earth systems;
- Multidisciplinary studies of the evolution of the North American continent and the processes responsible for earthquakes and volcanic eruptions using the EarthScope Facility.

Societally relevant applications of EAR's research are wide-ranging, and help improve our understanding of natural and anthropogenic hazards; global climate change; and water, mineral, and energy resources. Consequently, many activities occur in partnership with other federal and state agencies. EAR also encourages the integration of research, education and public awareness through the support of outreach projects, digital libraries and other human resources activities.

II. PROGRAM DESCRIPTION

The Division of Earth Sciences is aligned into two Sections. The **Surface Earth Processes Section (SEP)** consists of the programs: Education and Human Resources (EH), Geobiology and Environmental Geochemistry (GEG), Geomorphology and Land Use Dynamics (GLD), Hydrologic Sciences (HS), and Sedimentary Geology and Paleobiology (SGP). The SEP Section will support research on processes occurring at or near the Earth's surface, studies of the stratigraphic record and paleobiology, and crosscutting studies on education and human interactions with the geosphere. The **Deep Earth Processes Section (DEP)** consists of the programs: Continental Dynamics (CD), EarthScope: Science, Education, and Related Activities (ES), Geophysics (PH), Instrumentation and Facilities (IF), Petrology and Geochemistry (CH), and Tectonics (TE). The DEP Section will support research on the Earth's crust, mantle, and core, crosscutting programs for the support of earth science instrumentation and facilities, and the EarthScope facility and associated science and education activities.

For convenience in evaluation, proposals are assigned to one of the programs listed below. The program titles illustrate the general subject matter covered, but should not be considered restrictive. EAR is committed to supporting the most meritorious research in any relevant area, including interdisciplinary or multidisciplinary research, and are especially interested in proposals in emerging areas of science that may not fit easily into one of these categories. Where appropriate, proposals may be considered for joint support with other Divisions at the National Science Foundation.

Assignment to a program is normally made by EAR staff on the basis of proposal content, program officer workload, or other considerations. Where the Principal Investigator requests assignment to a specific program, those requests will be honored insofar as possible. In some cases proposals may be transferred to other Divisions within the Foundation. In such cases, Principal Investigators will be notified by the Division assigned to handle their proposals.

Surface Earth Processes Section

Education and Human Resources

The Education and Human Resources Program (EH) facilitates highly innovative educational activities in the earth sciences, including efforts to increase the diversity of participants and involve leading researchers in education. Activities at all levels are supported, including: 1) graduate and postdoctoral education outside the framework of normal NSF research grants; 2) undergraduate education, including the NSF-wide Research Experiences for Undergraduates Program; 3) elementary and secondary education; and 4) education outside of the classroom. EH also manages support of the Digital Library for Earth System Education (DLESE) on behalf of the Directorate for Geosciences.

Geobiology and Environmental Geochemistry

The Geobiology and Environmental Geochemistry Program (GEG) supports studies focused on: (1) interactions between

biological and geological processes; (2) furthering understanding of the geochemical processes that shape the biosphere; (3) the role of biological agents in geophysical and geochemical processes; (4) processes, rates, and mechanisms of inorganic and organic geochemical phenomena, at, or in proximity to, the Earth's surface, including the soil sciences; (5) development of tools, methods, and models for low temperature geochemistry and geobiological research, and (6) understanding geochemical phenomena at the broad spectrum of environmental interfaces ranging from planetary and regional to mineral-surface and supramolecular scales. GEG facilitates cross-disciplinary efforts to harness new bioanalytical tools - such as those emerging from molecular biology - in the study of the terrestrial environment at a broad range of temporal and spatial scales.

Geomorphology and Land Use Dynamics

Geomorphology and Land Use Dynamics (GLD) will support studies of: (1) the dynamic processes that produce landforms and the relationship to atmospheric and hydrologic agents and their underlying structures; (2) the history of geologic changes recorded in surface features; (3) airborne and space borne imaging of the landscape; (4) the study of sustainable landscapes and anthropogenically or naturally modified landscapes, and (5) changes in land uses and land covers that are critical to ecosystem functioning, services, and human welfare. GLD includes computer analysis of remote sensing (airborne, satellite) data using pattern recognition tools. This is a fast-growing area of research because of its applications to ecological, hydrological and social systems (including national security applications).

Hydrologic Sciences

Hydrologic Sciences (HS) focuses on processes that comprise the hydrologic cycle including evapotranspiration, precipitation, infiltration, overland and streamflow, subsurface percolation and the transport of solutes, nutrients, and particles by these fluxes. This program encourages studies probing the spatial and temporal heterogeneity of water and chemical fluxes and storages from local to global scales – including water masses, residence times, interfacial fluxes, pathways among system compartments, and research in geolimnology and microbial alteration. HS also supports research in aqueous geochemistry directly connected to those hydrologic processes and the physical, chemical, and biological processes taking place in the evolution of water bodies or driven by water movements at scales ranging from slow percolation through aquifer pores to rapid atmospheric processes interconnected at the global scale. Since the study of hydrologic processes requires expertise from many basic sciences and mathematics, HS encourages interdisciplinary proposals and joint review with related programs.

Sedimentary Geology and Paleobiology

Sedimentary Geology and Paleobiology (SGP) will support studies of: (1) life and ecology in past geologic time based on fossil plants, animals, and microbes; (2) stratified rocks and interpretation of the historical information they contain; (3) the science of dating and measuring the time sequence of events of the Earth's past; and (4) the production, transport and deposition of physical and chemical sediments. SGP especially encourages integrative studies at the national and international levels that seek to link subdisciplines, such as paleoclimatology, paleobiogeography, and paleoenvironmental and paleoecologic reconstructions.

Deep Earth Processes Section

Continental Dynamics (see Program Solicitation [NSF 04-512](#))

The Continental Dynamics Program (CD) considers proposals for multidisciplinary research that focus on an improved understanding of the processes governing the origin, structure, composition, and dynamical evolution of the continents and continental building blocks. The program is particularly oriented toward projects whose scope and complexity require a cooperative or multi-institutional approach and multi-year planning and execution. The intent of the program is to fund relatively large projects that do not fit easily within other EAR programs and that have broad support of major sections of the earth science community.

EarthScope: Science, Education, and Related Activities (see Program Solicitation [NSF 04-589](#))

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 EarthScope observational facility provides 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 mantle, plate boundary processes, large-scale continental deformation, continental structure and evolution, and composition and structure of the deep earth. In addition, EarthScope offers centralized forums for earth science education at all levels and cyberinfrastructure development to integrate, distribute, and analyze diverse data sets. The EarthScope program supports scientific research associated with EarthScope as well as activities that further the scientific and educational goals of EarthScope.

Geophysics

The Geophysics Program (PH) supports basic research in the physics of the solid earth to explore its composition, structure, and processes. Laboratory, field, theoretical, and computational studies are supported. Topics include seismicity, seismic wave propagation, and the nature and occurrence of earthquakes; the earth's magnetic, gravity, and electrical fields; the earth's thermal structure; and geodynamics. Supported research also includes geophysical studies of active deformation, including GPS-based geodesy, and studies of the properties and behavior of earth materials in support of geophysical observation and theory.

Instrumentation and Facilities (new Program Solicitation under revision will replace [NSF 04-507](#))

The Instrumentation and Facilities Program (IF) considers proposals for: (1) the acquisition of new research equipment or the modernization of existing equipment, (2) the development of new instrumentation or techniques that extend current research capabilities in the earth sciences, (3) the support of shared facilities that make complex and expensive instrument systems available on a national or regional basis, and (4) the support of research technicians.

Petrology and Geochemistry

The Petrology and Geochemistry Program (CH) supports basic research on the composition and structure of Earth materials to explore the nature, origin, and evolution of the earth's crust, mantle, and core. Proposals in this program generally address the petrology and geochemistry of igneous and metamorphic rocks, mineral physics, and volcanology. Topics include major and trace element geochemistry; stable and radiogenic isotope geochemistry and geochronology; experimental mineralogy, geochemistry, and petrology, thermodynamic modeling, chemical aspects of mineral physics; mineralogy and crystallography; ore deposit petrogenesis; physical and chemical volcanology; and analytical method development. Proposals to study extraterrestrial materials will be considered if applicable to understanding Earth formation and evolution.

Tectonics

The Tectonics Program (TE) supports a broad range of field, laboratory, computational, and theoretical investigations aimed at understanding the evolution and deformation of continental lithosphere and how deformational processes have modified the lithosphere through geologic time. Because understanding such large-scale phenomena commonly requires a variety of expertise and methods, TE supports integrated research involving the disciplines of structural geology, petrology, geochronology, sedimentology, stratigraphy, geomorphology, rock mechanics, paleomagnetism, geodesy, and other geophysical techniques. Proposals to elucidate the processes that act on the lithosphere at various time-scales, either at depth or the surface, are encouraged.

Special Emphasis Areas

In addition to the Division's research programs, EAR participates in research areas selected for special emphasis. These are usually related to national research initiatives, such as the U.S. Global Change Research Program. They may also be selected by EAR on the basis of scientific opportunities identified by NSF Advisory Committees, the National Academy of

Science, or community workshops. Areas of special emphasis are typically described in separate program announcements, and may involve special application and evaluation criteria. Some specific opportunities and other Foundation-wide research programs and initiatives are listed under Section IX.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation. Proposals will generally be accepted from colleges, universities, and other institutions in the United States with formal research programs in the areas supported by EAR. Colleges and universities designated as Undergraduate or Predominately Undergraduate Institutions should consult the guidelines described in [Research in Undergraduate Institutions](#).

Proposals may involve individual scientists or collaborative efforts of associated researchers working on coordinated projects.

Proposals that have been declined are not eligible for resubmission for one year and must be substantially revised to be considered.

IV. AWARD INFORMATION

An estimated 500-600 awards will be made with an anticipated funding level of \$150,000,000. Individual program budgets, number of awards, and average award size/duration are subject to the availability of funds. Anticipated award dates vary with individual programs.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: <http://www.nsf.gov/cgi-bin/getpub?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.

Data Policy: Principal investigators are required to adhere to the [EAR Data Policy](#) available on the NSF website. Proposals should include a statement describing how the data policy requirements will be met.

Proposers are reminded to identify the program announcement/solicitation number (04-613) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing in the amount of 30% of all permanent equipment costs in excess of \$50,000 is required for proposals submitted to the Instrumentation and Facilities Program. Please see the latest Instrumentation and Facilities Program Solicitation for

details. No cost sharing is required for equipment requested within research proposal budgets (see *Other Budgetary Limitations* section below).

The proposed cost sharing must be shown on Line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal. Only items which would be allowable under the applicable cost principles, if charged to the project, may be included as the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in-kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost-sharing toward projects of another Federal agency may not be counted towards meeting the specific cost-sharing requirements of the NSF award. All cost-sharing amounts are subject to audit. Failure to provide the level of cost-sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

Other Budgetary Limitations:

Equipment needs that can be demonstrably linked to the conduct of a specific research project being proposed to EAR may be included within the budget of the related research proposal. In general, equipment requests on proposals submitted to EAR research programs should not exceed a total of \$50,000. Equipment requests in excess of \$50,000 usually require a separate proposal directly to the Instrumentation and Facilities Program. However, equipment requests of less than \$50,000 that are unassociated with specific research proposals may be submitted to the Instrumentation and Facilities Program.

C. Due Dates

Proposals submitted in response to this announcement/solicitation will be accepted at any time.

Preliminary Proposals (*optional*):

April 1, annually
Continental Dynamics

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

November 15, annually
Continental Dynamics

December 1, annually
Geophysics; Hydrologic Sciences; Petrology and Geochemistry; Tectonics

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August 17, annually
REU-Site proposals accepted only by Education and Human Resources Program once per year on the annual NSF-wide deadline

Full Proposal Deadline(s) :

No fixed deadline

Education and Human Resources Program: Proposals other than REU sites are accepted at any time.

The deadlines for proposal submission vary by program and are listed above. Proposals must be submitted within an acceptance window from two weeks before each deadline to the deadline date (by 5 p.m. proposer's local time on the deadline date). All proposals must be submitted through FastLane. Proposals submitted either before or after the acceptance window will be returned without review.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed 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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/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>

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.

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 and/or panel review.

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

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.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual award.

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 also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). 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.

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

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?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>.

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.

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:

- Herman B. Zimmerman, Division Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8550, fax: (703) 292-9025, email: hzimmerm@nsf.gov
- Walter S. Snyder, Section Head, Surface Earth Processes, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8553, fax: (703) 292-9025, email: wsnyder@nsf.gov
- James H. Whitcomb, Section Head, Deep Earth Processes, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8553, fax: (703) 292-9025, email: jwhitcom@nsf.gov
- Enriqueta C. Barrera, Program Director, Geobiology and Environmental Geochemistry, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8551, fax: (703) 292-9025, email: ebarrera@nsf.gov
- Rachael Craig, Program Director, Bigeosciences, Integrated Carbon Cycle Research, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8233, fax: (703) 292-9025, email: rcraig@nsf.gov
- Sonia Esperanca, Program Director, Petrology and Geochemistry, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8554, email: sesperan@nsf.gov
- David M. Fountain, Program Director, Tectonics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8552, fax: (703) 292-9025, email: dfountain@nsf.gov
- Stephen Harlan, Program Director, Tectonics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8552, fax: (703) 292-9025, email: sharlan@nsf.gov
- L. Douglas James, Program Director, Hydrologic Sciences, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8549, email: ldjames@nsf.gov
- Leonard E. Johnson, Program Director, Continental Dynamics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8559, fax: (703) 292-9025, email: lejohnso@nsf.gov
- Russell C. Kelz, Associate Program Director, Instrumentation and Facilities, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8558, fax: (703) 292-9025, email: rkelz@nsf.gov
- David Lambert, Program Director, Instrumentation and Facilities, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8558, email: dlambert@nsf.gov
- H. Richard Lane, Program Director, Sedimentary Geology and Paleobiology, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8551, email: hlane@nsf.gov
- Robin Reichlin, Program Director, Geophysics, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8556, fax: (703) 292-9025, email: rreichli@nsf.gov
- Kaye Shedlock, Program Director, EarthScope, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8556, fax: (703) 292-9025, email: kshedloc@nsf.gov
- Thomas Torgersen, Program Director, Directorate for Geosciences, Division of Earth Sciences, 785 S, telephone: (703) 292-8549, fax: (703) 292-9025, email: ttorgers@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
- Brian E. Dawson, Information Technology Specialist, Directorate for Geosciences, 705 N, telephone: (703) 292-4727, fax: (703) 292-9042, email: bdawson@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 [Custom News Service](#) (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

Related Programs:

- Collaboration in Mathematical Geosciences ([NSF 04-508](#))
- Earth System History ([NSF 04-597](#))
- EarthScope: Science, Education and Related Activities for the USArray, San Andreas Fault Observatory at Depth (SAFOD), and Plate Boundary Observatory (PBO) ([NSF 04-589](#))
- Earth Sciences: Instrumentation and Facilities ([NSF 04-507](#))
- Faculty Early Career Development (CAREER) Program ([NSF 02-111](#))
- Geoscience Education ([NSF 04-598](#))
- Developing Global Scientists and Engineers ([NSF 04-36](#))
- International Planning Visits and Workshops ([NSF 04-35](#))
- Opportunities for Enhancing Diversity in the Geosciences (OEDG) ([NSF 04-590](#))
- Research Experiences for Undergraduates ([NSF 04-584](#))
- Research in Undergraduate Institutions ([NSF 00-144](#))
- Science and Technology Centers: Integrative Partnerships ([NSF 03-550](#))
- MARGINS ([NSF 02-110](#))
- Cooperative Studies Of The Earth's Deep Interior ([NSF 04-593](#))

- Deep Underground Science and Engineering Program Planning and Technical Requirements ([NSF 04-595](#))
- Water Cycle Research ([NSF 04-577](#))
- Research in Biogeosciences ([NSF 04-535](#))
- Assembling the Tree of Life ([NSF 04-526](#))
- U.S. Science Support Program Associated with the Integrated Ocean Drilling Program ([NSF 03-586](#))
- Global Learning and Observations to Benefit the Environment ([NSF 02-013](#))
- Marine Geology and Geophysics
- Integrated Carbon Cycle Research Program ([NSF 03-582](#))

Other Divisions/Offices:

Division of Ocean Sciences (OCE):

- Marine Geology and Geophysics Program
- Chemical Oceanography Program
- Ocean Drilling Program

Office of Polar Programs (OPP):

- Antarctic Geology and Geophysics Program
- Antarctic Glaciology Program
- Arctic Natural Sciences Program

Division of Civil and Mechanical Structures (CMS)

- Geomechanics and Geotechnical Systems
- Geoenvironmental Engineering and GeoHazards Mitigation
- Network Earthquake Engineering Simulation Program

Office of International Science and Engineering (OISE)

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

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financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) 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

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