

# Sedimentary Geology and Paleobiology

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## PROGRAM SOLICITATION

NSF 12-608

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### REPLACES DOCUMENT(S):

NSF 09-560

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**National Science Foundation**

Directorate for Geosciences  
Division of Earth Sciences

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

January 17, 2013

Third Thursday in January, Annually Thereafter

Spring Deadline (Track 1). In 2015 and 2017, deadline for Track 2 as well.

February 22, 2013

2013 Track 2 Proposal Deadline

July 18, 2013

Third Thursday in July, Annually Thereafter

Fall Deadline (Track 1 only)

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## IMPORTANT INFORMATION AND REVISION NOTES

### New Earth-Life Transitions (ELT) Track added to Program

For the years 2013-2017, the Sedimentary Geology and Paleobiology Program will be sponsoring a two track opportunity that will consist of the normal SGP competition (Track 1) and bi-annually, a new track termed Earth-Life Transitions (ELT) (Track 2). This second track is in direct response to the challenges posed by the community through various workshops and National Academy reports. This new track will be competed in 2013, 2015 and 2017 and will make awards up to \$1,500,000, which is larger than normal programmatic funding levels. In addition to allowing larger funding levels than the normal program competition, Track 2 projects will be required to be interdisciplinary in nature, have a modeling component and focus on specific intellectual questions involving Earth-Life Transitions through time.

A delayed initial proposal deadline of February 22, 2013 for this new Track 2 will afford the community additional time to respond to this new funding opportunity. The deadline will coincide with the normal programmatic deadline in years thereafter.

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## SUMMARY OF PROGRAM REQUIREMENTS

### General Information

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#### Program Title:

Sedimentary Geology and Paleobiology

#### Synopsis of Program:

The Sedimentary Geology and Paleobiology Program (SGP) supports research in a wide variety of areas in sedimentary geology and paleobiology in order to comprehend the full range of physical, biological, and chemical processes of Earth's dynamic system. The program supports the study of deep-time records of these processes archived in the Earth's sedimentary carapace (crust) at all spatial and temporal scales. These records are fingerprints of the processes that produced them and continue to shape the Earth.

For the years 2013-2017, the Sedimentary Geology and Paleobiology Program will be sponsoring a two track opportunity that will consist of the normal SGP competition (Track 1) and bi-annually, a new track termed Earth-Life Transitions (ELT) (Track 2).

**Track 1: General Program:** Sedimentary Geology and Paleobiology supports general studies of: (1) the changing aspects of life, ecology, environments, and biogeography in past geologic time based on fossil plants, animals, and microbes; (2) all aspects of the Earth's sedimentary carapace - insights into geological processes recorded in its records and rich organic and inorganic resources locked in rock sequences; (3) the science of dating and

measuring the sequence of events and rates of geological processes as manifested in Earth's past sedimentary and biological (fossil) record; (4) the geologic record of the production, transportation, and deposition of physical and chemical sediments; and (5) understanding Earth's deep-time (pre-Holocene) climate systems.

**Track 2: Earth-Life Transitions:** In fiscal years 2013-2017, the Sedimentary Geology and Paleobiology program is sponsoring a bi-annual second track opportunity termed Earth-Life Transitions (ELT) within the normal programmatic spring competition. The goals of the ELT track are: 1) to address critical questions about Earth-Life interactions in deep-time through the synergistic activities of multi-disciplinary science and 2) to enable team-based interdisciplinary projects involving stratigraphy, sedimentology, paleontology, proxy development, calibration and application studies, geochronology, and climate modeling at appropriately resolved scales of time and space, to understand major linked events of environmental, climate and biotic change at a mechanistic level.

**Cognizant Program Officer(s):**

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

- Harold R. Lane, Program Director, 675 S, telephone: (703) 292-4730, fax: (703)292-9025, email: [hlane@nsf.gov](mailto:hlane@nsf.gov)
- Lisa Park Boush, Program Director, National Science Foundation, 675 S, telephone: (703) 292-4724, fax: (703) 292-9025, email: [lboush@nsf.gov](mailto:lboush@nsf.gov)

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

- 47.050 --- Geosciences

## Award Information

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**Anticipated Type of Award:** Standard Grant or Continuing Grant

**Estimated Number of Awards:**

40 to 50

Track 1: General Program: 30 to 40

Track 2: Earth-Life Transitions (ELT): 4 (\$1,000,000-1,500,000); 6 (<\$500,000)

**Anticipated Funding Amount:**

\$6,000,000 to \$8,100,000

Track 1: \$6,000,000 annually

Track 2 (ELT): \$4,000,000 bi-annually (Spring)

Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and the quality of the proposals.

## Eligibility Information

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**Organization Limit:**

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

**PI Limit:**

None Specified

**Limit on Number of Proposals per Organization:**

None Specified

**Limit on Number of Proposals per PI:**

Track 1: No limit

Track 2 (ELT): An individual may serve as PI or co-PI on only one proposal submitted to a single deadline in response to this solicitation.

## Proposal Preparation and Submission Instructions

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**A. Proposal Preparation Instructions**

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is

## B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **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

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

January 17, 2013

Third Thursday in January, Annually Thereafter

Spring Deadline (Track 1). In 2015 and 2017, deadline for Track 2 as well.

February 22, 2013

2013 Track 2 Proposal Deadline

July 18, 2013

Third Thursday in July, Annually Thereafter

Fall Deadline (Track 1 only)

## Proposal Review Information Criteria

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

## Award Administration Information

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**Award Conditions:** Standard NSF award conditions apply.

**Reporting Requirements:** Standard NSF reporting requirements apply.

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## I. INTRODUCTION

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The Sedimentary Geology and Paleobiology Program is part of the Division of Earth Sciences (EAR). EAR provides funding for the conduct of research concerning the solid Earth and its surface environment. EAR supports investigations of the Earth's structure, composition, evolution, and the interaction of the lithosphere 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 from U.S. universities and other eligible organizations. EAR will consider co-funding of projects with other agencies and supports international work and collaborations.

## II. PROGRAM DESCRIPTION

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### General Description:

The Sedimentary Geology and Paleobiology Program (SGP) supports research in a wide variety of areas in sedimentary geology and paleobiology in order to comprehend the full range of physical, biological, and chemical processes of Earth's dynamic system. The program supports the study of deep-time records of these processes archived in the Earth's sedimentary carapace (crust) at all spatial and temporal scales. These records are fingerprints of the processes that produced them and continue to shape the Earth.

The SGP 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.

### Earth-Life Transitions Emphasis:

Earth's deep-time record provides numerous analogs to the emerging climate state of dramatically warmer global average temperatures and highly elevated greenhouse gas contents in the atmosphere. Life itself has undergone transformations that may have responded to or influenced these climatic changes. Only the deep-time geological and paleontological record can provide examples of change that equal or exceed the scale of contemporary human-induced impacts on land, biota, oceans, and climate. Understanding past biosphere-geosphere behavior is a powerful approach to anticipating how linked physical, chemical, and biological processes that characterize Earth's surface may be impacted by and respond to human activity. Earth's biogeochemical, paleontological and geological history archived in the deep-time rock record thus provides a major research opportunity to investigate the future of our planet.

Comprehending the full range of physical, biological and chemical processes of Earth's dynamic system using the deep-time records was identified in the recently published GEOVision report (2009) and by numerous recent National Academy reports, "New Research Opportunities in the Earth Sciences" (NROES, 2012), "Understanding Earth's Deep Past," (2011); "Understanding Climate's Influence on Human Evolution," (2010) and culminating in the recent summary brochure entitled "Transitions-The Changing Earth-Life System-Critical Information for Society from the Deep Past." Earth-Life Transitions (ELT) is a direct response to the challenges posed by the community through these workshops and reports.

Understanding the full range of Earth-life processes through all of Earth history, including deep time, is vital for addressing urgent societal issues, and these processes must be addressed in a systematic and interdisciplinary fashion. The major challenges that face our understanding of Earth-Life processes through time include: 1) what is the full range of potential climate system states and biotic transitions experienced on Earth, 2) what are the thresholds, feedbacks, and tipping points in the climate-life system, and how do they vary through time, 3) what are the ranges of ecosystem response, modes of vulnerability, and resilience to change in different Earth-system states and 4) how have climate, the oceans, the Earth's sedimentary crust, carbon sinks and soils, and life itself evolved together, and what does this tell us about the future trajectory of the integrated Earth-life system.

The focus of ELT will be to explore the coupling between Earth's climate system, depositional systems, and its biota over a range of temporal and spatial scales, particularly at critical transitions in Earth's history. ELT projects must ultimately advance our understanding of first-order questions related to the coupling of Earth's climate, depositional, and biotic systems. The goals of the Earth-Life Transitions program are 1) to address critical questions about Earth-Life interactions in deep-time through the synergistic activities of multi-disciplinary science and 2) to enable team-based interdisciplinary projects involving stratigraphy, sedimentology, paleontology, proxy development, calibration and application studies, geochronology, and climate modeling at appropriately resolved scales of time and space, to understand the major linked events of environmental, climate and biotic change at a mechanistic level. Concerted application of the interdisciplinary capabilities to the deep-time record will provide breakthrough understanding of this profound and nonlinear bio-geosystem.

### Track 1 and Track 2 Proposals

The Sedimentary Geology and Paleobiology Program will be sponsoring a two track opportunity for the bi-annual years starting 2013-2017. These two tracks will consist of the regular SGP competition (Track 1) and a new interdisciplinary track focusing on Earth system dynamics that links climate change and the biogeosciences, termed Earth-Life Transitions in deep-time (ELT) (Track 2).

**Track 1: General Program:** This track will support studies of: (1) the changing aspects of life, ecology, environments, and biogeography in past geologic time based on fossil plants, animals, and microbes; (2) all aspects of the Earth's sedimentary crust - insights into geological processes recorded in its records and rich organic and inorganic resources locked in rock sequences; (3) the science of dating and measuring the sequence of events and rates of geological processes as manifested in Earth's past sedimentary and biological (fossil) record; (4) the geologic record of the production, transportation, and deposition of physical and chemical sediments; and (5) understanding Earth's deep-time (pre-Holocene) climate systems.

This track is open to all proposals that support these areas of inquiry and is not changed from the scope of the prior program. Examples of projects supported by the program can be found using the NSF Award Search (Program Information) engine by entering Element Code 7459.

**Track 2: Earth-Life Transitions:** The Earth-Life Transitions (ELT) track competitions will be held bi-annually, in fiscal years 2013-2017 (2013, 2015, 2017) during the spring competition. Projects are required to involve collaborations among investigators from different Geoscience disciplinary specialties and include a modeling component. Inclusion of collaboration with other science fields is also welcome and encouraged. ELT also strongly encourages the involvement of early-career investigators.

ELT awards will be made for projects that bring together interdisciplinary teams of researchers to address a specific earth-life transitions research problem. Activities should address the research challenges identified in the program solicitation. In addition to research awards, activities, such as initial data collection, creation of coordinated working groups and workshops to organize groups around a central ELT theme will be considered for support.

All SGP projects will be expected to meet NSF's broader impacts review criteria by fostering integration of research and education, broadening participation of underrepresented groups, enhancing infrastructure for research and education and/or disseminating scientific results to the broader scientific community and to the general public. The activities of all SGP projects (Track 1 and Track 2) should attempt to attract students and involve early career researchers as best possible. Successful projects from both tracks will include creative, integrative and effective broader impact activities developed within the context of the mission, goals, and resources of the organizations involved. Partnerships with institutions serving students under-represented in the Geosciences are especially encouraged. The broader impacts activities must be an integral part of the proposed research and this should be reflected in the expertise of collaborators, the proposal budget and budget justification.

### III. AWARD INFORMATION

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**Anticipated Type of Award:** Continuing Grant or Standard Grant

**Anticipated Funding Amount:**

Track 1: \$6,000,000 annually

Track 2 (ELT): \$4,000,000 bi-annually (Spring)

**Estimated number of Awards:**

Track 1: The estimated number of awards for this track is estimated to be between 30 to 40 annually.

Track 2: NSF anticipates funding a total of 4 ELT awards at approximately \$1,000,000-\$1,500,000. In addition, approximately 6 awards no larger than \$500,000 are anticipated.

Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and the quality of the proposals.

### IV. ELIGIBILITY INFORMATION

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**Organization Limit:**

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

**PI Limit:**

None Specified

**Limit on Number of Proposals per Organization:**

None Specified

**Limit on Number of Proposals per PI:**

Track 1: No limit

Track 2 (ELT): An individual may serve as PI or co-PI on only one proposal submitted to a single deadline in response to this solicitation.

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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**Full Proposal Preparation Instructions:** Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov). Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and

Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: ([http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov).

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

**Collaborative Proposals.** All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

**The following information supplements the Grant Proposal Guide and the NSF Grants.gov Application Guide:**

**Track 1: General Program Proposals:** Track 1 proposals are submitted following the same rules that have obtained in the past and no special title requirements.

**Track 2: Earth-Life Transitions Proposals:** Track 2 proposals follow the rules for Track 1 except that Track 2 must have, at the beginning of the title on the cover page and in all places where the title is placed, the following in bold: **ELT:**, or **ELT Collaborative Research:**, whichever is appropriate.

**EAR 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. Data Management Plans should follow the template provided on the SGP website. Forms can also be requested by the cognizant program officers.

**Projects involving work in foreign countries:** For studies in countries other than the United States, the project description should discuss, where appropriate, collaborations with scientists and students from the host country, and how these individuals will be involved in the project. Collaborations should be well justified, in that they represent true intellectual collaboration and utilize the expertise and specialized skills, facilities, and/or resources of the foreign collaborator. Letters of collaboration must be included in the Special Information and Supplementary Documents section of the proposal. These letters should include a discussion of the role of the collaborator in the project and the resources the collaborating foreign institution/organization will provide to the project. Principal investigators are encouraged to provide U.S. students and junior researchers with international research experiences. An important provision of [Grant Proposal Guide](#) (Sec II.C.2.j) states "some governments require nonresidents to obtain official approval to carry out investigations within their borders and coastal waters under their jurisdiction. PIs are responsible for obtaining the required authorizations and for advising NSF that they have been obtained or requested." Failure to obtain the appropriate permits for all aspects of the research effort may jeopardize not only the proposed research, but also the well-being of the personnel. Where relevant, arrangements to allocate samples and data between host country organization(s) or institution(s) and U.S. organization(s) or institution(s) should be discussed in the proposal. Investigators are encouraged to include any such permits (including legally required collecting, import, and export permits for samples, instrumentation, and data), authorizations, and agreements, in the Special Information and Supplementary Documents section of the proposal.

## B. Budgetary Information

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**Cost Sharing:** Inclusion of voluntary committed cost sharing is prohibited

**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. Investigators planning on submitting an EAR research proposal with a significant equipment budget are encouraged to discuss these plans with the relevant research program officer prior to submission.

## C. Due Dates

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

January 17, 2013

Third Thursday in January, Annually Thereafter

Spring Deadline (Track 1). In 2015 and 2017, deadline for Track 2 as well.

February 22, 2013

2013 Track 2 Proposal Deadline

July 18, 2013

Third Thursday in July, Annually Thereafter

Fall Deadline (Track 1 only)

## D. FastLane/Grants.gov Requirements

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- **For Proposals Submitted Via FastLane:**

Detailed technical instructions regarding the technical aspects of 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](mailto:fastlane@nsf.gov). The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

**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. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

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

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: [http://www07.grants.gov/applicants/app\\_help\\_reso.jsp](http://www07.grants.gov/applicants/app_help_reso.jsp). 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](mailto: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. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal.

### A. NSF Merit Review Criteria

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All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. 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 the reviewer 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, original, or potentially transformative 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?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

NSF staff also 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 and Selection Process

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

Although both Track 1 and Track 2 proposals will be reviewed within one sitting panel, the tracks will be reviewed separately.

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.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's 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 Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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

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### A. Notification of the Award

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

### B. Award Conditions

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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 (GC-1); \* or Research Terms and Conditions \* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/awards/managing/award\\_conditions.jsp?org=NSF](http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov).

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=aag](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

### C. Reporting Requirements

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For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. 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. Such reports provide information on activities and findings, project participants (individual and organizational), 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. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF



awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=aag](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

## VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Harold R. Lane, Program Director, 675 S, telephone: (703) 292-4730, fax: (703)292-9025, email: [hlane@nsf.gov](mailto:hlane@nsf.gov)
- Lisa Park Boush, Program Director, National Science Foundation, 675 S, telephone: (703) 292-4724, fax: (703) 292-9025, email: [lboush@nsf.gov](mailto:lboush@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: [support@grants.gov](mailto:support@grants.gov).

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: [support@grants.gov](mailto:support@grants.gov).

## IX. OTHER INFORMATION

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The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

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The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of

awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center): (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**
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- **To Locate NSF Employees:** (703) 292-5111

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, [NSF-50](#), "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and [NSF-51](#), "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton  
Reports Clearance Officer  
Division of Administrative Services  
National Science Foundation  
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