

# Atmospheric and Geospace Sciences Postdoctoral Research Fellowships (AGS-PRF)

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## PROGRAM SOLICITATION

NSF 11-521

### REPLACES DOCUMENT(S): NSF 06-584



National Science Foundation

Directorate for Geosciences

Division of Atmospheric and Geospace Sciences

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

April 11, 2011

February 02, 2012

February 02, 2013

## IMPORTANT INFORMATION AND REVISION NOTES

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A revised version of the **NSF Proposal & Award Policies & Procedures Guide** (PAPPG), [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in [NSF 13-1](#) apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in [NSF 13-1](#).

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, [National Science Foundation's Merit Review Criteria: Review and Revisions](#). While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the [Grant Proposal Guide](#) and the [Award & Administration Guide](#).

*Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the [Grant Proposal Guide](#).*

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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Program Title:

Atmospheric and Geospace Sciences Postdoctoral Research Fellowships (AGS-PRF)

Synopsis of Program:

The Division of Atmospheric and Geospace Sciences (AGS) awards Postdoctoral Research Fellowships (PRF) to highly qualified investigators within 3 years of obtaining their PhD to carry out an independent research program. The research plan of each Fellowship must address scientific questions within the scope of AGS disciplines. The program supports researchers for a period of up to 2 years with Fellowships that can be taken to the institution or national facility of their choice. The program is intended to recognize beginning investigators of significant potential, and provide them with experience in research that will broaden perspectives, facilitate interdisciplinary interactions and help establish them in leadership positions within the Atmospheric and Geospace Sciences community. Because the Fellowships are offered only to postdoctoral scientists early in their careers, doctoral advisors are encouraged to discuss the availability of AGS Postdoctoral Research Fellowships with their graduate students early in their doctoral programs. Fellowships are awards to individuals, not institutions, and are administered by the Fellows.

An important aspect of the Fellowship is that Fellows are organized into a cohort and are expected to attend a workshop at the end of the first year to discuss their research and to explore connections across various science disciplines.

Fellows may also be provided with the opportunity to serve as NSF proposal reviewers or panelists.

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.*

- Sierra Warren, Program Specialist, telephone: 703-292-8520, email: [swarren@nsf.gov](mailto:swarren@nsf.gov)

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

- 47.050 --- Geosciences

## Award Information

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Anticipated Type of Award: Fellowship

Estimated Number of Awards: 10 Ten Fellowships each year contingent upon availability of funds.

Anticipated Funding Amount: \$1,720,000 \$86,000 per year per Fellowship during fiscal years 2011, 2012, and 2013.

## Eligibility Information

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Organization Limit:

Proposals may only be submitted by the following:

- AGS Postdoctoral Research Fellowships are awards to individuals; proposals are submitted directly by the fellowship candidate to NSF. Each candidate must identify one or more sponsoring scientist(s) and host institution(s) in the proposal. Activities supported by the AGS Fellowship program may be conducted at any appropriate U.S. or foreign host institution. Appropriate institutions include colleges and universities, private nonprofit institutes and museums, government installations and laboratories.

PI Limit:

Applicants must:

- Be U.S. citizens (or nationals) or legally admitted permanent residents of the United States (i.e., have a "green card") at the time of application;
- Either currently be a graduate student, or have held a PhD degree in a scientific or engineering field for no more than 3 years prior to the award start date;
- Present research and education plans that fall within the purview of the Division of Atmospheric and Geospace Sciences at NSF (<http://www.nsf.gov/div/index.jsp?div=ags>);
- Not have submitted concurrently the same project to another NSF program.

It is anticipated that the research will be conducted at an institution other than the proposer's PhD-granting institution. However, if proposers choose to remain at their current institution, they should include an explanation on how this choice benefits their research and career development.

If an applicant fails to meet any eligibility criterion, their application will be returned without review.

Applicants uncertain about the eligibility requirements are strongly encouraged to contact the cognizant program officer.

Awardees must begin the fellowship within 12 months of notification of an award.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI or Co-PI: 1

Only one proposal per PI is allowed.

## 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 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))

### B. Budgetary Information

- Cost Sharing Requirements: Inclusion of voluntary committed cost sharing is prohibited.
- Indirect Cost (F&A) Limitations: Not applicable.

- Other Budgetary Limitations: Not Applicable

#### C. Due Dates

- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):  
 April 11, 2011  
 February 02, 2012  
 February 02, 2013

## Proposal Review Information Criteria

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

## Award Administration Information

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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 Division of Atmospheric and Geospace Sciences (AGS) offers 2-year Postdoctoral Research Fellowships (PRF) to provide opportunities for scientists early in their careers to obtain training beyond their graduate education. The AGS-PRF is intended to recognize beginning investigators of significant potential and provide them with research experiences that will broaden perspectives, facilitate interdisciplinary interactions and establish them in positions of leadership within the scientific community.

During the tenure of the Fellowships, participants must conduct research on topics supported by AGS. Projects may employ any combination of field, laboratory, and computational studies with observational, theoretical, or experimental approaches.

Fellows must affiliate with appropriate research institutions and are expected to devote themselves full time to the Fellowship activities during its term.

An important aspect of the Fellowship is that all Fellows are organized into a cohort and are expected to attend a workshop at the end of the first year to discuss their research and to explore connections across disciplines.

Fellows may also be provided with the opportunity to serve as NSF proposal reviewers or panelists.

## II. PROGRAM DESCRIPTION

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### A. Appropriateness for AGS priorities

Any research plan whose focus falls within the scope of any of the AGS disciplines is eligible for support. AGS supports research to add new understanding of the behavior of Earth's atmosphere and its interactions with the Sun. Included are:

- Studies of the physics, chemistry, and dynamics of Earth's upper and lower atmosphere and its space environment.
- Research on climate processes and variations.
- Studies to understand the natural global cycles of gases and particles in Earth's atmosphere.

NSF also provides support for participation by the United States scientific community in international scientific research endeavors, such as the World Climate Research Program.

Applicants are strongly encouraged to contact the cognizant program officer to discuss the appropriateness of their research for funding.

### B. Location of Work

Research and education activities supported by the AGS Fellowship Program may be conducted at any appropriate U.S. or foreign host institution. Appropriate institutions include colleges and universities, private nonprofit institutes and museums, government installations and laboratories. The justification of the choice of institutions must be made clearly and compellingly in the proposal. The applicant may propose to take the Fellowship to more than one host institution. Normally changes of institution would be sequential, moving from one institution to another during the duration of the Fellowship, but holding the Fellowship at two institutions simultaneously, for example at a national center and a nearby university, is also possible. For the latter case, a single institution must be designated by the applicant to receive the institutional allowance.

Because the objectives of the Fellowships include broadening the perspectives and experiences of the Fellows and promoting interdisciplinary research careers, careful consideration should be given to the selection of the sponsoring scientist(s) and host institution(s).

### C. The Sponsoring Scientist(s)

The Fellow must affiliate with a host institution(s) at all times during the entire tenure of the Fellowship and select a sponsoring scientist(s) who will provide mentoring and guidance with the research and education activities. In addition, the sponsoring scientist must design a mentoring plan for the Fellow.

The applicant is responsible for making prior arrangements with the host institution and sponsoring scientist(s). If more than one sponsor is proposed, one must be named lead sponsor and the roles of the other sponsors must be clearly stated in the project description. An important basis for judging the suitability of the host institution is the degree to which the institution letter describes and offers a research, education, and mentoring plan that could not be provided without Fellowship support.

(See Section V.A. Proposal Preparation Instructions for additional information about the institution letter.)

## III. AWARD INFORMATION

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### A. Duration and Tenure:

Support may be requested for periods of up to 24 continuous months. Awardees must begin the Fellowship within 12 months of notification of an award and tenure begins on the first of the month. Interruptions in tenure or extensions without additional cost to NSF are permitted only for extenuating circumstances, including parental leave for the birth or adoption of children.

In this case, either parent may request parental leave and up to two months of the Fellow's stipend may be used for paid parental leave if the following conditions are met: 1) A request, by the Fellow, for paid parental leave must be approved by the cognizant Program Director; 2) The two months of paid parental leave cannot be used to increase the level of Fellow salary support beyond twenty-four months; 3) A no-cost extension may be requested to extend the Fellowship award in order to complete the goals of the Fellowship plans but no supplemental funds will be provided for this purpose.

Fellowships are not renewable.

Those applicants selected to receive Fellowships will be contacted by NSF and asked to provide additional information, such as completing acceptance forms and starting certificates, before starting their Fellowships. Successful applicants who have not completed the PhD at the time of application must provide certification of the receipt of the PhD before receiving their Fellowship award. Normally Fellowships will be held at institutions specified in the proposal, but under certain circumstances and with suitable justification, Fellows may transfer during the tenure of the Fellowship to a new institution upon approval by NSF.

### B. Stipend and Allowances:

The total fellowship amount is \$86,000 per year consisting of three components:

- 1) A stipend of \$58,000 per year paid monthly at the rate of \$4,833 directly to the Fellow as an electronic funds transfer into a personal account at a financial institution;
- 2) An allowance of \$19,000 per year is paid as a lump sum to the Fellow at the beginning of the first and second years of the Fellowship to support Fellowship activities such as materials and supplies, use or purchase of equipment, computing resources, publication charges, subscription fees, and travel. This allowance includes funds to attend one AGS-PRF Workshop during the award period
- 3) An annual benefit allowance of \$9,000 in support of fringe benefits, including health insurance provided through either a group plan offered by the host organization or an individual plan secured by the Fellow, dental and/or vision insurance, disability insurance, retirement, dependent care, and moving expenses.

No additional appointment or Fellowship may be held during the period of the Fellowship. No other remuneration from any source may be accepted during the period of the Fellowship without permission of the Program Officer.

## IV. ELIGIBILITY INFORMATION

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### Organization Limit:

Proposals may only be submitted by the following:

- AGS Postdoctoral Research Fellowships are awards to individuals; proposals are submitted directly by the fellowship candidate to NSF. Each candidate must identify one or more sponsoring scientist(s) and host institution(s) in the proposal. Activities supported by the AGS Fellowship program may be conducted at any appropriate U.S. or foreign host institution. Appropriate institutions include colleges and universities, private nonprofit institutes and museums, government installations and laboratories.

### PI Limit:

Applicants must:

- Be U.S. citizens (or nationals) or legally admitted permanent residents of the United States (i.e., have a "green card") at the time of application;
- Either currently be a graduate student, or have held a PhD degree in a scientific or engineering field for no more than 3 years prior to the award start date;
- Present research and education plans that fall within the purview of the Division of Atmospheric and Geospace Sciences at NSF (<http://www.nsf.gov/div/index.jsp?div=ags>);
- Not have submitted concurrently the same project to another NSF program.

It is anticipated that the research will be conducted at an institution other than the proposer's PhD-granting institution. However, if proposers choose to remain at their current institution, they should include an explanation on how this choice benefits their research and career development.

If an applicant fails to meet any eligibility criterion, their application will be returned without review.

Applicants uncertain about the eligibility requirements are strongly encouraged to contact the cognizant program officer.

Awardees must begin the fellowship within 12 months of notification of an award.

### Limit on Number of Proposals per Organization:

None Specified

### Limit on Number of Proposals per PI or Co-PI: 1

Only one proposal per PI is allowed.

## 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).

Before starting proposal preparation, the applicant must be registered as an individual awardee. To register as a new individual in FastLane go to: <https://www.fastlane.nsf.gov/cgi-bin/N1CheckROB>. To register as a new individual in Grants.gov go to: [http://www.grants.gov/applicants/individual\\_registration.jsp](http://www.grants.gov/applicants/individual_registration.jsp). Fellowship proposals must be submitted by the Fellowship applicant, not by the applicant's current or proposed institutional Sponsored Projects Office (SPO). The applicant serves as his/her own SPO and Authorized Organizational Representative (AOR) for the purposes of any research administration functions in FastLane or Grants.gov.

A full proposal consists of many parts and requires input from the Fellowship applicant, the proposed sponsoring scientist(s), and the proposed host institution(s). Applicants are advised to begin the proposal well in advance of the submission deadline and to submit as early as possible. The submission of incomplete or late proposals is not permitted. Partially completed proposals may be saved in FastLane or Grants.gov for future completion and submission.

Proposals must include all of the following items. In cases where requirements given in this document differ from those given in the Grant Proposal Guide or NSF Grants.gov Application Guide, this solicitation takes precedence.

Detailed instructions for submitting a proposal to the NSF AGS Postdoctoral Research Fellowships are available from the [FastLane homepage](#) by clicking on the link for [Postdoctoral Fellowships and Other Programs](#).

- NSF Cover Page. Select the AGS-PRF program solicitation number shown at the beginning of this solicitation from the drop-down menu. Select at least one specific disciplinary program from the drop-down list in FastLane as the unit of consideration. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. The project title must begin with AGS-PRF and follow with an informational title. No co-PIs are permitted.
- Information about Principal Investigators (Applicant).
- Table of Contents. This form will be automatically generated by FastLane or Grants.gov.
- Project Summary: Limited to one page, the summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. The summary must separately address both NSF merit review criteria, intellectual merit and broader impacts; see the Grant Proposal Guide for instructions. If the overview or either merit review criteria is not included in the summary, the proposal will not be accepted or will be returned without review. The summary must also identify the proposed sponsoring scientist(s) and the proposed host institution(s).
- Project Description, not to exceed ten (10) single-spaced pages (including figures, pictures, and tables), which must include the following information: (1) a detailed plan for research activities; (2) a detailed justification for the choice of the host institution(s) and sponsoring scientist(s), identifying collaborating scientist(s), relating the proposed work to current research and educational efforts at the host institution(s), and describing available facilities and resources; (3) a description of the applicant's long-term career goals and the role of this postdoctoral experience in achieving them. Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. You can decide where to include this section within the project description.
- References Cited. See the Grant Proposal Guide or NSF Grants.gov Application Guide for format.
- Biographical Sketch, not to exceed two (2) pages. See the Grant Proposal Guide or NSF Grants.gov Application Guide for format. The Biographical Sketch must clearly include all information necessary to certify the applicant's eligibility, as well as all components described in the Grant Proposal Guide.
- NSF Budget Page. The stipend, activities allowance and benefit allowance should be entered in Participant Support Costs (Section F on the FastLane budget and Field E on the Grants.gov budget). Enter the \$58,000 stipend in F.1 (FastLane) or E.2 (Grants.gov) and the \$19,000 activities allowance plus the \$9,000 benefit allowance (sum total of \$28,000) in F.4 (FastLane) or E.5 (Grants.gov). A budget justification of no more than two pages should document and justify the estimated costs as organized in the budget components described above.
- Current and Pending Support. Include current and planned applications to other Fellowship programs.
- Facilities and Equipment: Please note that this section is a required part of the proposal. The applicant should enter "See the Project Description" in the Facilities, Equipment, and Other Resources section of the proposal.
- Data Management Plan: *All* proposals *must* include a supplementary document of no more than two pages labeled "Data Management Plan". Describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans.
- The letter of commitment, as described below, is considered to be Supplementary Documentation and is the only item other than the required Data Management Plan permitted as supplementary documentation or appendices. Since this program relies on reviewed proposals rather than applications, no letters of recommendation are allowed. This letter of commitment from the institution should not be written as a letter of recommendation.
  1. The letter of commitment from the prospective host institution should be signed by both the department chair (or equivalent) and the proposed sponsoring scientist (scientific mentor);
  2. The letter should certify that the applicant's proposal has been read and approved by the proposed scientific mentor;
  3. The letter should certify that adequate facilities and support will be provided for the Fellow;
  4. The letter should include a mentoring plan that discusses the role the proposed scientific mentor will play in the professional development of the fellow, and of the opportunities for training and research at the host institution that will be of particular benefit to the Fellow.
  5. Should the applicant propose to hold the Fellowship at more than one institution through the 2-year tenure, letters of commitment must be provided for all institutions involved.

Some proposals may require other documentation before the final decision can be made, e.g., government permits and letters of collaboration. Their existence should be noted in the project description but they should not be included in the application. NSF may request them later.

## B. Budgetary Information

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Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Indirect Cost (F&A) Limitations: Not applicable.

## C. Due Dates

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- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
  - April 11, 2011
  - February 02, 2012
  - February 02, 2013

## 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 for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: [http://nsf.gov/bfa/dias/policy/merit\\_review/](http://nsf.gov/bfa/dias/policy/merit_review/).

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years \(FY\) 2011-2016](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission is to foster integration of research and education through the programs, projects and activities it supports at academic and research institutions. These institutions 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

### A. Merit Review Principles and Criteria

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The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

#### 1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind

the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

## 2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter II.C.2.d.i.](#) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including [GPG Chapter II.C.2.d.i.](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
  - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
  - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

### Additional Solicitation Specific Review Criteria

Applicants will be evaluated based on their ability, accomplishments, and potential for continued professional growth as evidenced by the submitted CV and the work outlined in the body of the proposal. The research and training plan is evaluated based on its scientific merit, its feasibility, its significance in generating new knowledge, and its impact on the career development of the applicant. Other important evaluative factors are the suitability and availability of the sponsoring scientist(s) and the host institution(s), including colleagues and facilities, and the sponsoring scientist(s) mentoring plan.

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 judgements.

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:



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 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.

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 *applicant* by a Grants Officer in the Division of Grants and Agreements. Applicants 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 applicant. (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 prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

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

- Sierra Warren, Program Specialist, telephone: 703-292-8520, email: [swarren@nsf.gov](mailto:swarren@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).

## 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, "My NSF" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "My NSF" also is available on NSF's website at <http://www.nsf.gov/mynsf/>.

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.

*Facilitation Awards for Scientists and Engineers with Disabilities* provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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

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

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding

grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

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

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

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0023. Public reporting burden for this collection of information is estimated to average 12 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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

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