

NSF Science, Engineering and Education for Sustainability Fellows (SEES Fellows)

PROGRAM SOLICITATION

NSF 13-595

REPLACES DOCUMENT(S):

NSF 12-601



National Science Foundation

Directorate for Biological Sciences

Directorate for Computer & Information Science & Engineering

Directorate for Geosciences

Directorate for Education & Human Resources

Directorate for Mathematical & Physical Sciences

Directorate for Social, Behavioral & Economic Sciences

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

November 26, 2013

IMPORTANT INFORMATION AND REVISION NOTES

Proposals with a primary focus on topics covered by the Directorate for Engineering ([ENG](#)) are considered "out of scope" for this revised solicitation; however, proposals may include such topics as a secondary (or tertiary) focus.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Science, Engineering and Education for Sustainability Fellows
NSF SEES Fellows

Synopsis of Program:

Through the SEES Fellows Program, NSF seeks to advance science, engineering, and education to inform the societal actions needed for environmental and economic sustainability and human well-being while creating the necessary workforce to address these challenges. The Program's emphasis is to facilitate investigations that cross traditional disciplinary boundaries and address issues of sustainability through a systems approach, building bridges between academic inquiry, economic growth, and societal needs. The Fellow's proposed investigation must be interdisciplinary and allow him/her to obtain research experiences beyond his/her current core disciplinary expertise. Fellows are required to develop a research partnership(s) that will advance and broaden the impact/scope of the proposed research, and present a plan for their own professional development in the area of sustainability science and engineering. Proposals with a primary focus on topics covered by the Directorate for Engineering ([ENG](#)) are considered "out of scope" for this revised solicitation; however, proposals may include such topics as a secondary (or tertiary) focus.

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.

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

- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 15 to 20

Anticipated Funding Amount: \$5,500,000 in FY 14, pending availability of funds and receipt of sufficient quality proposals.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Proposals may also be submitted by individuals who are unaffiliated or who are affiliated with for-profit organizations, state or local governments or Federal agencies. When applying as independent/unaffiliated individuals, Fellow applicants must register with FastLane prior to submitting their proposals and, if recommended for an award, must affiliate with a U.S. university, college, or non-profit, non-academic organization, which will administer the award.

Who May Serve as PI:

The Principal Investigator (PI) on the NSF SEES Fellows proposal must be the prospective Fellow. No co-PIs are allowed.

To be eligible to submit a proposal to the NSF SEES Fellows program, an individual must, as of the proposal deadline date, meet all of the following criteria:

- Be a U.S. citizen, national, or permanent resident;
- Have earned the doctoral degree, or expect to have earned the doctoral degree, by the start date of the award;
- Not have worked for more than 36 full-time equivalent months in one or more positions that require the doctoral degree. If more than 36 months have elapsed between conferral of the doctoral degree and the SEES Fellows proposal deadline date, PIs must include specific language in their Biographical Sketch affirming that they meet this eligibility requirement;
- Not be employed in a tenure-track (or tenure-track-equivalent) position at an academic institution or at a non-profit, non-degree-granting organization such as a museum, observatory, or research lab.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required
- **Preliminary Proposal Submission:** Not required
- **Full Proposals:**
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: 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).

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):

November 26, 2013

Proposal Review Information Criteria

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

Award Administration Information

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

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

A sustainable world is one in which human needs are met equitably without harm to the environment, and without sacrificing the ability of future generations to meet their needs. Meeting this formidable challenge requires a substantial increase in our understanding of the integrated system of society, the natural world, and the alterations humans bring to Earth. NSF's Science, Engineering, and Education for Sustainability (SEES) activities aim to address this need through support for interdisciplinary research and education.

Fundamental to all sustainability research is the simultaneous consideration of social, economic, and environmental systems and the long-term viability of those systems. Concepts that underlie the science of sustainability include complex adaptive systems theory, emergent behavior, multi-scale processes, as well as the vulnerability, adaptive capacity, and resilience of coupled human-environment systems. An important research goal is to understand how patterns and processes at the local and regional scales are shaped by and feed into processes and patterns that manifest at the global scale over the long term. These topics guide research to explore alternate ways of managing the environment, migrating from finite resources to renewable or inexhaustible resources, and applying technology to improve human well-being. Conceptual frameworks for sustainability, including general theories and models, are critically needed for such informed decision-making.

SEES activities span the entire range of scientific domains at NSF and aim to: 1) support interdisciplinary research and education that can facilitate the move towards global sustainability; 2) build linkages among existing projects and partners and add new participants in the sustainability research enterprise; and 3) develop a workforce trained in the interdisciplinary scholarship needed to understand and address the complex issues of sustainability. The SEES Fellows program addresses all three of these SEES aims. Proposals with a primary focus on topics covered by the Directorate for Engineering ([ENG](#)) are considered "out of scope" for this revised solicitation; however, proposals may include such topics as a secondary (or tertiary) focus.

II. PROGRAM DESCRIPTION

There is a critical need to develop the workforce in the area of sustainability science and engineering. Through SEES Fellows, NSF seeks to advance science, engineering, and education to inform the societal actions needed for environmental and economic sustainability and sustainable human well-being while creating the necessary workforce to address these challenges. The program's emphasis is to facilitate investigations that cross traditional disciplinary boundaries and address issues of sustainability through a systems approach, building bridges between academic inquiry, economic growth, and societal needs. The Fellow's proposed investigation must be interdisciplinary and allow him/her to obtain research experience beyond his/her current core disciplinary

expertise.

A goal of the SEES Fellows Program is to support research that would not fit neatly into a single NSF disciplinary research program.

Fellows are required to develop a partnership(s) that will advance and broaden the impact/scope of the proposed research. Partners may include, but are not limited to, a NSF Research Coordination Network (RCN), center or facility; industry; National Laboratory; state, regional, or local resource management agency; Non-Government Organization (NGO); foreign institution; or international organization.

Fellows are required to have two mentors, one for the proposed research at the host institution (the institution that will administer the award) and the other for the partnership. The host mentor and partner mentor must be from different institutions, and must provide different disciplinary expertise.

Fellows must also present a plan for their own professional development in the area of sustainability science and engineering. Activities may include, but are not limited to, obtaining training in a new discipline, gaining expertise on new methods/tools, serving in a leadership role in a professional society or industry group, mentoring students, undertaking efforts to broaden participation of under-represented groups in sustainability science, developing an education activity, developing a professional network or working on a project that focuses on public engagement.

Fellows may include a plan for leading and teaching a course at the undergraduate or graduate level that ideally relates directly to their proposed sustainability science or engineering research, partnerships, or professional development activities. If proposed, the institution where the teaching would take place must cover the Fellow's salary plus fringe benefit costs for time committed to the course. The teaching is limited to no more than one course per term, and no more than three courses throughout the period of the SEES Fellows award. This restriction is meant to provide the Fellow adequate time to engage in research collaborations and other professional development, and the teaching experience would be in addition to other professional development activities described in the proposal.

The challenge of sustainability is of global concern, and international partnerships are encouraged. As with all partnerships, these should represent true intellectual collaborations that are mutually beneficial, and leverage the expertise, specialized skills, facilities, and/or resources of all partners. While the formal host institution for the SEES Fellow must be in the United States (for award administration requirements), Fellows may spend extended periods at other locations, including international sites, as called for by the research, partnerships, and professional development plans. Fellows are responsible for obtaining any required visas for foreign travel, research permits, and import/export documents. Please review NSF's web page "Information for U.S. Travelers" at <http://www.nsf.gov/od/ose/for-travelers-main.jsp>.

Fellows must propose a well-integrated, synergistic research plan with their chosen host institution, an effective research partnership(s), and a meaningful professional-development plan. Overall, the proposal should reflect the Fellow's own research interests and professional goals presented in relationship to overall impact on science, engineering and education for sustainability. Because there may be different expectations within different disciplinary fields and/or different partnering organizations, a wide range of research and professional activities may be appropriate for the NSF SEES Fellows program. More information about NSF's SEES investment area can be found on the SEES webpage at: <http://www.nsf.gov/sees/>.

NSF enables career-life balance through a variety of mechanisms. Support to address dependent care issues may be available for awardees. For more information, please see <http://www.nsf.gov/career-life-balance/>.

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 15 to 20

Anticipated Funding Amount: \$5,500,000 in FY 14, pending availability of funds and receipt of sufficient quality proposals.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in, the US acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.
- Non-profit, non-academic organizations: Independent museums, observatories, research labs, professional societies and similar organizations in the U.S. associated with educational or research activities.
- Proposals may also be submitted by individuals who are unaffiliated or who are affiliated with for-profit organizations, state or local governments or Federal agencies. When applying as independent/unaffiliated individuals, Fellow applicants must register with FastLane prior to submitting their proposals and, if recommended for an award, must affiliate with a U.S. university, college, or non-profit, non-academic organization, which will administer the award.

Who May Serve as PI:

The Principal Investigator (PI) on the NSF SEES Fellows proposal must be the prospective Fellow. No co-PIs are allowed.

To be eligible to submit a proposal to the NSF SEES Fellows program, an individual must, as of the proposal deadline date, meet all of the following criteria:

- Be a U.S. citizen, national, or permanent resident;
- Have earned the doctoral degree, or expect to have earned the doctoral degree, by the start date of the award;
- Not have worked for more than 36 full-time equivalent months in one or more positions that require the doctoral degree. If more than 36 months have elapsed between conferral of the doctoral degree and the SEES Fellows proposal deadline date, PIs must include specific language in their Biographical Sketch affirming that they meet this eligibility requirement;
- Not be employed in a tenure-track (or tenure-track-equivalent) position at an academic institution or at a non-profit, non-degree-granting organization such as a museum, observatory, or research lab.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: 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. 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). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

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

Important Proposal Preparation Information: FastLane will check for required sections of the full proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

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. Unless otherwise specified in this solicitation, you can decide where to include this section within the Project Description.

Requirements listed in the NSF Grant Proposal Guide or NSF Grants.gov Application Guide must be strictly adhered to. **SEES Fellows proposals must also adhere to the following additional guidelines:**

1. Cover Sheet. The title of the proposed project must start with "SEES Fellows:" followed by a short, descriptive title of the research. If the project will involve international partners, check the "International Cooperative Activities Country Name" box and identify the country/countries involved.
2. Project Summary. The Project 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 overview for SEES Fellowship proposals must: 1) identify the host and partner mentors and their organizations, 2) explicitly address the relevance of the proposed research to sustainability as well as to the goal of the SEES Fellows Program to support interdisciplinary research, and 3) highlight the Fellow's proposed professional development activities.
3. Project Description. As noted in the Program Description section above, a competitive SEES Fellows proposal will include well developed plans for research, partnerships, and the Fellow's own professional development. The Project Description must address all three aspects. The Project Description must also explicitly address the relevance of the proposed research to sustainability and the goal of the SEES Fellows Program to support interdisciplinary research.
4. Biographical Sketch. The Biographical Sketch must include identification of U.S. citizenship or permanent resident status, and the month and year when your doctoral degree was (or is expected to be) received. If more than 36 months have elapsed between the

date that the doctoral degree was conferred and the application deadline for the SEES Fellows solicitation, the Biographical Sketch must include the following statement: "**I affirm that I have not worked for more than 36 full-time equivalent months in positions for which the doctoral degree was a requirement.**" Do not include personal information such as birth date or place of birth. **Only** the Fellow's Biographical Sketch should be uploaded in this section. Biographical Sketches for the host mentor and partner mentor must be included in the Supplementary Documentation section, together with their letters of collaboration.

5. Budget Pages. The proposed SEES Fellow is listed as PI. For allowable budget items, see the Other Budgetary Limitations section below.

6. Current and Pending Support. Under pending support, include this proposal, as well as pending and planned applications to other fellowship or research programs.

Supplementary Documentation

7. Postdoctoral Researcher Mentoring Plan. Because the potential SEES Fellow is the PI on the proposal, this does not apply, and nothing should be uploaded to this module.

8. Letter of Collaboration from Host Mentor. (Maximum 2 pages for letter; 2 pages for NSF format biographical sketch) The host mentor must confirm support of the Fellow's plan for research at their institution as well as agreement with the proposed partnership(s). The host mentor must include a description of the mentoring activities that will be provided for the Fellow, such as career counseling, training in preparing grant applications, guidance on ways to improve teaching skills, and training in research ethics. The host mentor's 2-page Biographical Sketch (conforming to NSF Grant Proposal Guide or NSF Grants.gov Application Guide requirements) must be appended to their letter of collaboration.

9. Letter of Collaboration from Partner Mentor. (Maximum 2 pages for letter; 2 pages for NSF format biographical sketch) The partner mentor must outline the nature of the collaboration and explain how the partnership(s) will advance and broaden the impact/scope of the proposed research. The letter must also include a description of the mentoring activities that will be provided for the Fellow. The partner mentor's 2-page Biographical Sketch (conforming to NSF Grant Proposal Guide or NSF Grants.gov Application Guide requirements) must be appended to their letter of collaboration.

10. Additional Letters of Collaboration. Letters of collaboration (up to one page each) are allowed to document agreement with other collaborators discussed in the proposal. These letters should focus on how the collaboration will advance and broaden the impact/scope of the proposed research.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Other Budgetary Limitations:

- Salary plus fringe benefits for the Fellow may be up to a maximum of \$264,000, based on 36 months full-time equivalent effort. Amounts for the Fellow's salary plus fringe benefits may be less than the stated maximum, based on institutional policies and pay scales.
- Up to a maximum of \$60,000 (for 36 months full-time equivalent effort) may be requested for expenses directly related to the proposed research, partnerships and professional development, including but not limited to salary and fringe benefits for student research assistants, equipment, domestic and foreign travel, materials and supplies, computing resources, access to data, and publication charges. Included in this amount, the Fellow must budget for trips to NSF for PI meetings in the second and third year of their award.
- Fellows proposing international partnerships may request up to an additional \$30,000 (for 36 months full-time equivalent effort) for international travel, subsistence, and other expenses required for the research, partnerships and professional development activities. These costs should be clearly explained in the budget justification, including number of trips and duration of stays. Please refer to the GPG (http://www.nsf.gov/pubs/policydocs/pappguide/nsf13001/gpg_2.jsp#IIC2gvc) for guidelines on international travel.
- No other direct cost budget items are allowed.
- For Fellows proposing projects requiring less than 36 months full-time equivalent effort, salary plus fringe benefits, together with other expenses, must be prorated accordingly.
- To allow for limited teaching time or other activities not paid for by the award, the proposed duration of the SEES Fellows project can be for a maximum of 48 months, with up to 36 months of NSF funding for the Fellow's salary and other expenses.
- Funding for SEES Fellows is provided as an NSF standard grant, and awards are subject to the standard indirect cost policies and rates for the awardee (host) institution.

C. Due Dates

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

November 26, 2013

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

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

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage:

<http://www.grants.gov/web/grants/applicants.html>. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

A comprehensive description of the Foundation's merit review process is available on the NSF website at: 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 [Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

SEES:

- Will the proposed activities advance the foundations of sustainability science and engineering by including a strong conceptual framework?
- Will the proposed activities integrate across NSF-supported disciplines and will the applicant expand beyond his or her current core disciplinary expertise?

Hosts and Partnerships:

- Are the proposed host mentor and partner mentor effective and committed to enable the Fellow to be successful? Do the host and partner's organizations have the infrastructure to enable the Fellow to be successful?
- Will the proposed partnerships advance and broaden the impact/scope of the proposed research activities?
- Are the partnerships based on mutual benefits and will they leverage the expertise, specialized skills, facilities, and/or resources of all partners?

Professional Development:

- Will the proposed professional development activities enhance the Fellow's career growth while complementing the proposed interdisciplinary research and partnerships?

B. Review and Selection Process

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

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and

Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award notice, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at 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.

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.

Special Award Conditions:

NSF SEES-Fellow applicants will be notified if they will be offered an award. The applicant must accept the award (via email to the cognizant Program Officer) or withdraw their application within 30 days of notification. The exact start date of the award will be determined by NSF after discussion between the cognizant Program Officer and the PI.

Unaffiliated applicants must affiliate with a host organization in order to receive the award. A Fellow's Award will not be finalized until a host organization provides to NSF a revised cover sheet and budget for the proposed activity signed by an authorized organizational representative. Guidance regarding this process will be provided by the NSF Program Officer.

Awards are made to the organization on behalf of the Fellow. If the Fellow chooses to affiliate with another organization during the grant and receives approval from the NSF Program Officer, the current awardee organization must allow the award to be transferred.

Fellows who are granted family or medical leave by the grantee institution may request supplemental support. Please see <http://www.nsf.gov/career-life-balance/> for additional information on NSF's career-life balance initiative, and contact your Program Director.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer 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.

VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

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

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

or telephone: (703) 292-7827

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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

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