Improving Undergraduate STEM Education: Education and Human Resources (IUSE: EHR)

PROGRAM SOLICITATION
NSF 15-585

REPLACES DOCUMENT(S):
NSF 14-588

National Science Foundation

Directorate for Education & Human Resources
Division of Undergraduate Education

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

November 03, 2015

Exploration and Design Tier for Engaged Student Learning & Institution and Community Transformation

January 13, 2016

Development and Implementation Tiers for Engaged Student Learning & Institution and Community Transformation

November 02, 2016

Exploration and Design Tier for Engaged Student Learning & Institution and Community Transformation

January 11, 2017

Development and Implementation Tiers for Engaged Student Learning & Institution and Community Transformation

IMPORTANT INFORMATION AND REVISION NOTES

The award limit and duration for the Exploration and Design (formerly Exploration) tiers for both the Engaged Student Learning and Institutional and Community Transformation tracks have been increased. These projects may request up to $300,000 over a period of up to 3 years.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 17-1), which is effective for proposals submitted, or due, on or after January 30, 2017.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Improving Undergraduate STEM Education: Education and Human Resources (IUSE: EHR)

Synopsis of Program:

A well-prepared, innovative science, technology, engineering and mathematics (STEM) workforce is crucial to the Nation's health and economy. Indeed, recent policy actions and reports have drawn attention to the opportunities and challenges inherent in increasing the number of highly qualified STEM graduates, including STEM teachers. Priorities include educating students to be leaders and innovators in emerging and rapidly changing STEM fields as well as educating a scientifically literate populace. Both of these priorities depend on the nature and quality of the undergraduate education experience. In addressing these STEM challenges and priorities, the National Science Foundation invests in evidence-based and evidence-generating approaches to understanding STEM learning; to designing, testing, and studying instruction and curricular change; to wide dissemination and implementation of best practices; and to broadening participation of individuals and institutions in STEM fields. The goals of these investments include: increasing the number and diversity of STEM students, preparing students well to participate in science for tomorrow, and improving students' STEM learning outcomes.

The Improving Undergraduate STEM Education (IUSE: EHR) program invites proposals that address immediate challenges and opportunities that are facing undergraduate STEM education, as well as those that anticipate new structures (e.g. organizational changes, new methods for certification or credentialing, course re-conception, cyberlearning, etc.) and new functions of the undergraduate learning and teaching enterprise. The IUSE: EHR program recognizes and respects the variety of discipline-specific challenges and opportunities facing STEM faculty as they strive to incorporate results from educational research into classroom practice and work with education

research colleagues and social science learning scholars to advance our understanding of effective teaching and learning.

Toward these ends the program features two tracks: (1) **Engaged Student Learning** and (2) **Institutional and Community Transformation**. Two tiers of projects exist within each track: (i) *Exploration and Design* and (ii) *Development and Implementation*.

Note: Because it addresses undergraduate STEM education, the IUSE: EHR funding opportunity is offered in alignment with the NSF-wide undergraduate STEM education initiative, Improving Undergraduate STEM Education (NSF-IUSE). More information about NSF-IUSE can be found in the Introduction of this solicitation.

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.

- Myles G. Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Teri Jo Murphy, telephone: (703) 292-2109, email: tmurphy@nsf.gov
- Ellen Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Abiodun Ilumoka, telephone: (703) 292-2703, email: ailumoka@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 140

Anticipated Funding Amount: $110,000,000

The program estimates that approximately $110,000,000 will be available for new and continuing awards per fiscal year. See section III below for further information about the anticipated number of awards in the program's two tracks and the average size and duration of awards. The estimated program budget, number of awards, and average award size/duration are subject to the availability of funds.

Eligibility Information

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

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* (PAPPG) guidelines apply. The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.
  - 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:**

  Not Applicable

C. Due Dates

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

  November 03, 2015

  Exploration and Design Tier for Engaged Student Learning & Institution and Community Transformation

  January 13, 2016

  Development and Implementation Tiers for Engaged Student Learning & Institution and Community Transformation

  November 02, 2016

  Exploration and Design Tier for Engaged Student Learning & Institution and Community Transformation

  January 11, 2017

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Proposal Review Information Criteria

Merit Review Criteria:

National Science Board approved criteria apply.

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

NSF-IUSE

The National Science Foundation (NSF) Improving Undergraduate STEM Education (NSF-IUSE) initiative is a comprehensive, Foundation-wide effort to accelerate improvements in the quality and effectiveness of the education of undergraduates in all of the STEM fields. The importance of the undergraduate experience for preparing both a diverse STEM workforce ready and equipped for innovation, and a STEM-literate public ready to support and benefit from the progress of science, is described in a number of key reports and documents.[1],[2],[3],[4],[5],[6],[7],[11] NSF, with its mission to advance science, engineering, and education, plans to invest over $120M in FY 2016 through coordinated investments across directorates within a coherent framework for improving undergraduate STEM learning. The NSF-IUSE framework promotes new and exciting approaches to using research on STEM learning and education to address STEM education challenges across and within institutions (Institutional Transformation), as well as within and across specific disciplines (Community Transformation). The framework draws upon a knowledge base accumulated from decades of research, development, and proven practices across the nation in STEM undergraduate education. NSF expects that investments within the IUSE portfolio will integrate theories and findings from education research with attention to the needs and directions of frontier science and engineering research. New knowledge about learning and implementation will be developed across all IUSE investments.

In FY 2016, NSF-IUSE serves as the framework for all investments in research and development that are critical for **curricular** improvement in undergraduate STEM education, within formal and informal learning environments. FY 2016 NSF-IUSE programs call for proposals to:

- use and build evidence about improved STEM instructional practices;
- design and study innovative learning opportunities, including cyberlearning;
- create, implement, and test program, curricular, course, and technology-driven models;
- develop, implement, and test creative approaches for adoption of education research into disciplinary teachings;
- develop and validate assessments/metrics for undergraduate STEM learning and instructional practice; and
- conduct fundamental research on issues of undergraduate STEM teaching and learning.

The NSF-IUSE approach recognizes the dynamic and continually evolving landscape of individual STEM disciplines, the emerging interdisciplinary needs for undergraduate STEM learning, evolving challenges in the higher education domain, changing technologies, and the STEM needs of academia, government, and the private sector. The interplay between STEM education research and STEM education practice is featured; coupling education research and education practice fosters a “cycle of innovation” that iterates between new questions emerging from innovative practice to be solved by new research and new solutions derived from research to be implemented through modified practice [8]. Within and beyond specific STEM disciplines, new discoveries, new technologies, emergence of new sub-fields, and assimilation of interdisciplinary lines of inquiry create the context for needed change. Research and education synergies exist within undergraduate research experiences, research centers, and observing facilities, as well as classrooms. Ongoing changes in subject matter content, workforce needs, and theories of educational practice constitute the engine that drives new STEM education inquiry, development, testing, and implementation. Successful implementation along all stages of this cycle requires collaborations among STEM disciplinary experts, learning scientists, and STEM education practitioners.

NSF-IUSE programs have the following goals:

- **Improve STEM Learning & Learning Environments:** Improve the knowledge base for defining, identifying, and innovating effective undergraduate STEM education teaching and learning for all NSF-supported disciplines, and foster widespread use of evidence-based resources and pedagogies in undergraduate STEM education.
- **Broaden Participation & Institutional Capacity for STEM Learning:** Increase the number and diversity of undergraduate students recruited and retained in STEM education and career pathways through improving the evidence base for successful strategies to broaden participation and implementation of the results of this research.
- **Build the Professional STEM Workforce for Tomorrow:** Improve the preparation of undergraduate students so they can succeed as productive members of the future STEM workforce, regardless of career path, and be engaged as members of a STEM-literate society.

Investments will include design and implementation of new effective practices as well as foundational and exploratory research, design and development research, and impact research.

The publication, Common Guidelines for Education Research and Development, offers guidance on building the evidence base in STEM learning. Research and development efforts that increase understanding of effective undergraduate STEM teaching and learning provide the foundation for building the STEM workforce of tomorrow and improving scientific literacy.

IUSE: EHR

National objectives of particular interest include broadening the implementation of effective instructional practices and innovations at two and four year institutions, creating seamless transitions between them, and supporting the retention of STEM students by addressing the high failure rates in introductory courses, especially mathematics. Indeed, as mathematics becomes an increasingly indispensable component of scientific investigation across all disciplines, there is a need to promote student learning and use of mathematical and computational skills in all STEM curricula. There also is a critical need to develop and implement effective techniques for teaching these skills and to position these efforts within the context of changing workforce needs, for example the education of future data scientists [9]. An additional major challenge continues to be increasing the persistence of STEM students from all demographic groups in the first two years of college.

Other goals include developing increased use of inquiry-based laboratories and research-based courses and further work on the design, development, and widespread implementation of effective STEM learning and teaching knowledge and practices, as well as foundational research on STEM teaching and STEM learning [10]. The program supports research, development, and implementation efforts that bring recent advances in STEM disciplinary and interdisciplinary knowledge into undergraduate education, as well as research that lays the groundwork for institutional improvement and change and similar changes across and within specific disciplines. In addition, IUSE: EHR encourages projects that develop faculty expertise, prepare K-12 teachers, and provide all undergraduate students with STEM competencies and a basic understanding of STEM concepts and principles. Proposals with a disciplinary or multi-disciplinary focus, including proposals for geosciences and polar sciences, are encouraged.

[1] National Research Council (2010) *Rising Above the Gathering Storm, Revisited: Rapidly Approaching Category 5*. Washington, DC: National Academies Press, https://www.nap.edu/catalog.php?record_id=12999

[2] National Research Council (2011) *Expanding Underrepresented Minority Participation: America’s Science and Technology Talent at the Crossroads*. Washington, DC: National Academies Press, www.nap.edu/catalog.php?record_id=12984

[3] President’s Council of Advisors on Science and Technology (2012) *Engage to Excel*: *Producing One Million Additional College Graduates with Degrees in Science, Technology, Engineering, and Mathematics,*

http:www.whitehouse.gov/sites/default/files/microsites/ostp/pcast-engage-to-excel-final_feb.pdf

[4] National Research Council (2012) *Discipline-based Education Research: Understanding and Improving Learning in Undergraduate Science and Engineering*. Washington, DC: National Academies Press, https://www.nap.edu/catalog.php?record_id=13362

[5] National Science and Technology Council, Committee on STEM Education (2013) *Federal Science, Technology, Engineering, and Mathematics (STEM) Education 5-Year Strategic Plan*.
http://www.whitehouse.gov/sites/default/files/microsites/ostp/stem_stratplan_2013.pdf

[6] Kober, N. (2015) Reaching Students: What Research Says About Effective Instruction in Undergraduate Science and Engineering. Board on Science Education, Division of Behavioral and Social Sciences and Education, Washington, D.C.: The National Academies Press, http://www.nap.edu/catalog.php?record_id=18687

[7] The Coalition for Reform of Undergraduate STEM Education, (2014) Catherine L. Fry (Editor), Achieving Systematic Change: A Source Book for Advancing and Funding Undergraduate STEM Education. Washington, D. C.: The Association of American Colleges and Universities. http://www.aacu.org/pkal/sourcebook

[8] Booth, W.C., G.C. Colomb and J.M. Williams (2008) *The Craft of Research*, 3rd edition, Chicago: University of Chicago Press and American Society for Engineering Education (2009) Creating a Culture for Scholarly and Systematic Innovation in Engineering Education. Washington, DC: ASEE

[9] National Research Council, *The Mathematical Sciences in 2025*, Washington, DC: The National Academies Press, 2013.

[10] For an analysis of effective practices and a research agenda for continuing to build the knowledge base of how to improve undergraduate STEM education, see NRC (2012) *op. cit.*

[11] National Research Council (2010). Preparing Teachers: Building Evidence for Sound Policy. Committee on the Study of Teacher Preparation Programs in the United States, Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press, http://www.nap.edu/catalog/12882/preparing-teachers-building-evidence-for-sound-policy

II. PROGRAM DESCRIPTION

A. Overview

The IUSE: EHR program envisions all undergraduate students fully engaged in their STEM learning, within institutions of higher education deeply committed to the broad use of practices of teaching and learning that are rooted in a solid research base of demonstrated effectiveness. Towards this vision, the program recognizes the key role faculty play both as creators of innovative learning materials and teaching approaches, and implementers of promising practices. To achieve this vision, two goals guide the IUSE: EHR program: 1) to promote the development, use, and testing of instructional practices and curricular innovations that engage and improve student learning and retention in STEM, and 2) to promote community and institutional transformation that will increase opportunities for the application of highly effective STEM teaching methods.

The National Science Foundation is committed to agency-wide investments to increase the numbers, to broaden the diversity, and to improve the preparation of STEM professionals through undergraduate education. Projects supported by IUSE: EHR can serve to build evidence, adding to the literature on what works and the conditions under which success is achieved. Equally important, projects can serve to generate new knowledge about how to continue to transform undergraduate STEM teaching and learning. Moreover, projects can lead to new understanding of how to apply and encourage the application by others of such improved practices at an institution-wide scale, and how to sustain such applications across and within discipline specific communities. Indeed, transferability and propagation are critical aspects for IUSE: EHR-supported efforts and should be addressed throughout a project's lifetime by ensuring attention to designing for use in a large variety of institutions. Principal Investigators are encouraged to consider the value of the project from the perspective of the end users as well as the relationships, partners, and structures which would eventually be needed to sustain the improvement on a wide scale.

IUSE: EHR supports a broad range of projects, including: research and development of innovative learning resources; design research to understand the impact of such resources; strategies to implement effective instruction in a department or multiple departments, within or across institutions; faculty development projects; design and testing of instruments for measuring student outcomes; and proposals for untested and unconventional activities that could have a high impact on learning and contribute to transforming undergraduate STEM education. Proposals are particularly encouraged that address immediate challenges and opportunities facing undergraduate STEM education, as well as those that anticipate new structures (e.g. organizational changes, new methods for certification or credentialing, course re-conception, Cyberlearning, etc.) and new functions of the undergraduate learning and teaching enterprise.

Included among such projects are conferences that explore revolutionary ideas to improve undergraduate STEM education, proposals to increase the diversity of the institutions and faculty participating in the IUSE: EHR enterprise, and efforts involving collaborations of education researchers and discipline scientists, to ensure that undergraduate STEM education benefits from both cutting-edge STEM and educational research and the development of a healthy community of STEM education researchers and practitioners. Indeed, through all of its projects, the IUSE: EHR program recognizes and respects the variety of discipline-specific challenges and opportunities facing STEM faculty as they strive to incorporate results from educational research into classroom practice and work with education research colleagues and social science learning scholars to advance knowledge and adoption of evidence-based teaching and learning practices. Results and findings of IUSE: EHR projects, in turn, contribute to NSF's and EHR's larger themes that focus attention on STEM workforce development, STEM literacy across the population, and increasing participation and persistence in STEM, especially by members of underrepresented groups.

Toward these ends the program features two tracks: (1) **Engaged Student Learning** and (2) **Institutional and Community Transformation**. Two tiers of projects exist within each track: (i) *Exploration and Design* and (ii) *Development and Implementation*.

B. Program Tracks

Engaged Student Learning

This track focuses on design, development, and research studies that involve the creation, exploration, or implementation of tools, resources, and models that show particular promise to increase engagement of undergraduate students in their STEM learning and lead to measurable and lasting learning gains. Projects are encouraged to form collaborations among STEM disciplinary researchers,

education researchers, and cognitive scientists so that their projects can best leverage what is known about how people learn and/or contribute to the growth of that body of knowledge. The undergraduate audience for IUSE projects includes students at two- and four-year schools, both declared and undeclared STEM majors, students whose courses of study require solid skills and knowledge of STEM principles, and students seeking to fulfill a general education requirement in STEM.

Recognizing disciplinary differences and priorities, NSF's investment in research and development in undergraduate STEM education encompasses a range of approaches. These approaches include: assessment/metrics of learning and practice; education research; faculty learning through professional development; learning environments; and the use and impact of co-curricular activities that increase student motivation and persistence, both in their STEM learning and undergraduate disciplinary research. Both individually and integrated in a range of combinations, these approaches can lead to outcomes including: developing the STEM and STEM-related workforce; advancing science; broadening participation in STEM; educating a STEM-literate populace; improving K-12 STEM education through undergraduate pre-service STEM teacher preparation courses and curricula; encouraging life-long learning; and building capacity in higher education.

Institutional and Community Transformation

This track supports projects that use innovative approaches to increase substantially the widespread use of highly effective, evidence-based STEM teaching and learning, curricular, and co-curricular practices in institutions of higher education or across/within disciplinary communities. These projects may be proposed by an institution or set of institutions; alternatively, the community proposals may be submitted through professional communities, including discipline-based professional societies and networks or organizations that represent institutions of higher education. Projects are expected to be both knowledge-based and knowledge-generating. Competitive proposals pertaining to institutional and community transformation will include a description of the theory of change that is guiding the work proposed and will test hypotheses about transforming undergraduate teaching and learning in STEM by examining the impact of deliberate processes of change. Useful theories of change typically include a description of the problem or a plan to develop information about the problem to be addressed; the goals to be achieved by the proposed project; the processes, interventions, or strategies that will enable the proposing institution or community to meet these goals; a rationale for why these processes are likely to enable the achievement of the stated goals; and indication of how the proposer will assess whether the goals have been met. It is expected that, in presenting a theory of change, proposals will be informed by research literature and theoretical perspectives concerning change that are relevant to the goals and context presented in the proposal.

While proposed projects will vary in approach and theories of change, promising proposals will also recognize that STEM higher education is a complex system, and that achieving change goals involves analyzing and addressing the relevance and impact of critical organizational factors (e.g., faculty reward systems, opportunities for professional growth, and institutional policies and processes) that could impede or facilitate progress toward the stated goals. For example, support from key administrative leaders, ranging from presidents and provost, to deans and department chairs, is often a particularly important factor in affecting the development, impact, and sustainability of change efforts at the institutional level.

Applicants may apply for IUSE: EHR grants to begin institutional or community transformation planning efforts, to support implementation efforts for effective teaching and learning practices, or to conduct research on how to increase the importance placed on evidence-based practices within institutional processes (such as in strategic planning or faculty reward systems). Projects may focus on whole institutions or on large departments or colleges within an institution, or on networks or groups of institutions. For example, projects may seek to transform high-enrollment, lower-division courses, or may implement efforts in multiple courses within a department or a college or in a particular disciplinary area. Projects may use technology and distance education methods (or hybrid designs) when supported by evidence of potential effectiveness. Faculty learning through professional development or leadership development for pedagogical and curricular innovation could also be important considerations for this track. Community Transformation projects should be similarly organized as appropriate for the discipline(s) involved.

A competitive proposal will include an evaluation plan that provides formative feedback to guide the development of the project and summative assessment of the effectiveness of the project in achieving its goals as well as expected and unexpected outcomes. The development of instruments and metrics to assess institutional or community shifts toward evidence-based practices is encouraged.

Conferences

Proposals for conferences addressing critical challenges in undergraduate STEM education may be submitted at any time following consultation with a program officer. We also encourage proposals that will increase the diversity of the institutions and faculty participating in the IUSE: EHR enterprise and those involving collaborations of education researchers and discipline scientists to ensure that undergraduate STEM education reflects cutting-edge STEM and educational research.

C. Project Approaches

The research and development of innovative tools, resources, and models for undergraduate STEM education that IUSE: EHR supports are expected to be both knowledge-based and knowledge-generating. They may be smaller *Exploration and Design* or larger *Development and Implementation* projects.

Exploration and Design projects are small-scale efforts that fall within either the **Engaged Student Learning** or **Institutional and Community Transformation** tracks. These projects may seek to establish the basis for Development and Implementation of new interventions or strategies, develop strategies for the adoption, adaptation, and implementation of effective practices, or adapt and implement strategies shown to be effective at other institutions. They may also pose new interventions or strategies, and explore challenges to their adoption, with the goal of informing policy, practice, and future design or development of components in the STEM higher education enterprise. *Exploration and Design* projects should describe the proposers current teaching approaches within the context of what is known about effective educational practices and how the implementation and evaluation of those practices has informed the proposed project. In the **Engaged Student Learning** track, proposals should clearly describe the steps they will take to design, develop, and implement promising teaching approaches, tools, resources, or models. In the **Institutional and Community Transformation** track, *Exploration and Design* projects should include a description of the participant team, the target audience, the institution(s) or community to be transformed and the actions to be taken to move toward broader implementation. Results of *Exploration and Design* projects are expected to be significant enough to contribute to the body of knowledge about STEM teaching and learning and/or effective means to broader implementation. These projects may request up to $300,000 over a period of up to 3 years.

Development and Implementation projects are larger-scale efforts that also may fall within either the **Engaged Student Learning** or **Institutional and Community Transformation** tracks. These projects may focus on new or promising interventions or strategies to achieve well-specified STEM learning objectives, including making refinements on the basis of small-scale testing.

Within the **Engaged Student Learning** track there are two levels of *Development and Implementation* projects: Level I and Level II.

- *Development and Implementation Level I* projects have a budget limit of $600,000 and a maximum duration of 3 years. Typically such projects will focus on achieving propagation beyond a single institution or work to promote change across multiple STEM disciplines within an institution. Level I projects should carry the development to a state in which the evaluation

of the project produces evidence to determine whether or not the project's efforts are effective.
- *Development and Implementation Level II* projects have a budget between $601,000 and $2,000,000 and a maximum duration of 5 years and are intended to support large-scale efforts. This level also supports long-term research on efforts to effect change, in order to learn what has been achieved.

Within the **Institutional and Community Transformation** track there is only one level of *Development and Implementation* project. Such a project has a budget up to $3,000,000 and a maximum duration of 5 years and is expected to support ambitious efforts to achieve the widespread deployment of effective instructional, curricular, and co-curricular practices in support of student engagement, learning, and retention.

Within the **Engaged Student Learning** or **Institutional and Community Transformation** tracks, we welcome studies that explore how effective teaching strategies and curricula enhance learning and attitudes, how widespread practices have diffused through the community, and how faculty and programs implement changes in their curriculum. Research results should provide a foundation for creating learning materials, teaching strategies, faculty development approaches, and evaluation methodologies that have the potential for a direct impact on STEM educational practices.

Proposers should indicate clearly which IUSE: EHR track they are addressing: **Engaged Student Learning** or **Institutional and Community Transformation**; and which type of project approach (tier) they are pursuing: *Exploration and Design* or *Development and Implementation* (level, as appropriate).

	Exploration and Design	*Development and Implementation*
Engaged Student Learning	Up to $300K, for 3 years	Level 1: up to $600K, for 3 years Level 2: $601K - $2M, for 5 years
Institutional and Community Transformation	Up to $300K, for 3 years	Up to $3M, for 5 years

III. AWARD INFORMATION

NSF anticipates that approximately $110 million will be available for new and continuing awards in this program per fiscal year. Grants may be awarded in a variety of sizes and durations, as summarized below. The estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and the quality of proposals received.

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 140

Engaged Student Learning: *Exploration* and Design - approximately 75 awards

Engaged Student Learning: *Development and Implementation, Level I* - approximately 20 awards

Engaged Student Learning: *Development and Implementation, Level II* - approximately 15 awards

Institutional and Community Transformation: *Exploration and Design* - approximately 20 awards

Institutional and Community Transformation: *Development and Implementation* - approximately 10 awards

Estimated amounts are per award

Engaged Student Learning: *Exploration and Design* - up to $300,000

Engaged Student Learning: *Development and Implementation, Level I* - up to $600,000

Engaged Student Learning: *Development and Implementation, Level II* - from $601,000 up to $2,000,000

Institutional and Community Transformation: *Exploration and Design* - up to $300,000

Institutional and Community Transformation: *Development and Implementation* - up to $3,000,000

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), Chapter I.E.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

There are no restrictions or limits.

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

There are no restrictions or limits.

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 Proposal & Award Policies & Procedures Guide* (PAPPG). The complete text of the PAPPG is available electronically on the NSF website at: https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp. Paper copies of the PAPPG 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. PAPPG Chapter II.D.3 provides additional information on collaborative proposals.

See PAPPG Chapter II.C.2 for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the PAPPG instructions.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

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

  November 03, 2015

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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 PAPPG Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://www.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. (PAPPG 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 PAPPG 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.

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 generally be completed and submitted by each reviewer and/or panel. 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 *Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.

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 no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 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 Proposal & Award Policies & Procedures Guide* (PAPPG) Chapter VII, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=papp.

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:

- Myles G. Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Teri Jo Murphy, telephone: (703) 292-2109, email: tmurphy@nsf.gov
- Ellen Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov
- Abiodun Ilumoka, telephone: (703) 292-2703, email: ailumoka@nsf.gov

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.

For specific disciplinary questions proposers are encouraged to contact a Program Officer in their discipline.

Biological Sciences

- Kathleen Bergin, telephone: (703) 292-5171, email: kbergin@nsf.gov
- Ellen Carpenter, telephone: (703) 292-5104, email: elcarpen@nsf.gov

- Celeste Carter, telephone: (703) 292-4651, email: vccarter@nsf.gov
- Chuck Sullivan, telephone: TBD, email: TBD
- Lidia Yoshida, telephone: (703) 292-4644, email: lyoshida@nsf.gov

BIO: Division of Biological Infrastructure

- TBD

Chemistry

- Tom Higgins, telephone: (703) 292-8831, email: thhiggin@nsf.gov
- Tom Kim, telephone: (703) 292-7855, email: tkim@nsf.gov
- Dawn Rickey, telephone: (703) 292-4674, email: drickey@nsf.gov

Computer Science

- Stephanie August, (703) 292-5128, email: saugust@nsf.gov

Engineering

- Karen Crosby, telephone: (703) 292-4629, email: kcrosby@nsf.gov
- Abby Ilumoka, telephone: (703) 292-2703, email: ailumoka@nsf.gov
- Olga Pierrakos, telephone: (703) 292-7936, email: olpierra@nsf.gov

ENG: Division of Engineering Education & Centers (EEC)

- Elliot Douglas, telephone: (703) 292-7051, email: edouglas@nsf.gov

Geological Sciences

- Keith Sverdrup, telephone: (703) 292-4653, email: ksverdru@nsf.gov

GEO: Division of Ocean Sciences (OCE)

- Elizabeth L. Rom, telephone: (703) 292-7709, email: elrom@nsf.gov

Interdisciplinary

- Myles Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Corby Hovis, telephone: (703) 292-4625, email: chovis@nsf.gov
- Teri Jo Murphy, telephone: (703) 292-2109, email: tmurphy@nsf.gov
- Lidia Yoshida, telephone: (703) 292-4644, email: lyoshida@nsf.gov

Mathematics

- Ron Buckmire, telephone: (703) 292-4630, email: rbuckmir@nsf.gov
- John Haddock, telephone: (703) 292-4643, email: jhaddock@nsf.gov
- Teri Jo Murphy, telephone: (703) 292-2109, email: tmurphy@nsf.gov
- Sandra Richardson, telephone: (703) 292-4657, email: srichard@nsf.gov

Physics / Astronomy

- Corby Hovis, telephone: (703) 292-4625, email chovis@nsf.gov
- Kevin Lee, telephone: (703) 292-4639, email: kelee@nsf.gov

Research/Evaluation/Assessment

- Myles Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Connie Della-Piana, telephone: (703) 292-5309, email: cdellapi@nsf.gov
- Dawn Rickey, telephone: (703) 292-4674, email: drickey@nsf.gov

Social Sciences and Behavioral Sciences

- Myles Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov
- Connie Della-Piana, telephone: (703) 292-5309, email: cdellapi@nsf.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.

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 (FASED) provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See the *NSF Proposal & Award Policies & Procedures Guide* Chapter II.E.6 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
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

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