Innovative Technology Experiences for Students and Teachers (ITEST)

PROGRAM SOLICITATION
NSF 15-599

REPLACES DOCUMENT(S):
NSF 14-512

National Science Foundation

Directorate for Education & Human Resources
   Research on Learning in Formal and Informal Settings

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

November 13, 2015

August 10, 2016

Second Wednesday in August, Annually Thereafter

    Annually until Revised

IMPORTANT INFORMATION AND REVISION NOTES

Revisions to this solicitation:

- Clarification of expectations for research plans
- Clarification of expectations for project evaluation
- Addition of Solicitation Specific Review Criteria related to broadening participation goals
- Addition of a funding track for an ITEST Resource Center which is a one time call for the date of November 13, 2015.

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 16-1), which is effective for proposals submitted, or due, on or after January 25, 2016.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

    Innovative Technology Experiences for Students and Teachers (ITEST)

Synopsis of Program:

ITEST is a program that promotes PreK-12 student interests and capacities to participate in the science, technology, engineering, and mathematics (STEM) and information and communications technology (ICT) workforce of the future. To achieve this objective, ITEST supports the development, implementation, and selective spread of innovative strategies for engaging students in experiences that: (1) increase student awareness of STEM and ICT careers; (2) motivate students to pursue the education necessary to participate in those careers; and/or (3) provide students with technology-rich experiences that develop their knowledge of related content and skills (including critical thinking skills) needed for entering the STEM workforce. ITEST projects may adopt an interdisciplinary focus on multiple STEM domains, focus on a single domain, or focus on one or more sub-disciplines within a domain. ITEST projects must involve students, and may also include teachers. The ITEST program is especially interested in broadening participation of students from traditionally underrepresented groups in STEM fields and related education and workforce domains. Projects that actively engage business and industry partners to better ensure that PreK-12 experiences foster the knowledge and skill-sets needed for emerging STEM-related occupations are strongly encouraged. ITEST supports two project types: *Strategies* projects and *SPrEaD* (Successful Project Expansion and Dissemination) projects. *Strategies* projects support the design, implementation, and testing of innovative educational experiences that support the objectives of the ITEST program. *SPrEaD* projects support the wider and broader testing and dissemination of promising strategies to generate evidence and greater understanding of contextual factors that operate to enhance, moderate, or constrain anticipated project impacts. All ITEST projects may include activities designed to inform judgments regarding the feasibility of implementing strategies in typical learning environments associated with formal classrooms, out-of-school settings, or combinations of such environments. The ITEST program also invites proposals for an ITEST Resource Center to provide technical assistance to projects and provide assistance with the outreach activities of the ITEST program.

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.

- Address questions to, telephone: (703) 292-8628, email: DRLITEST@nsf.gov

- Julia V. Clark, telephone: (703) 292-5119, email: jclark@nsf.gov

- Catherine Eberbach, telephone: (703) 292-4960, email: ceberbac@nsf.gov

- Michael Ford, telephone: (703) 292-5153, email: miford@nsf.gov

- David L. Haury, telephone: (703) 292-5102, email: dhaury@nsf.gov

- Margret Hjalmarson, telephone: (703) 292-4313, email: mhjalmar@nsf.gov

- Julie I. Johnson, telephone: (703) 292-8624, email: jjohnson@nsf.gov

- Rebecca Kruse, telephone: (703) 292-4211, email: rkruse@nsf.gov

- Julio E. Lopez-Ferrao, telephone: (703) 292-5183, email: jlopezfe@nsf.gov

- Celestine H. Pea, telephone: (703) 292-5186, email: cpea@nsf.gov

- Joseph Reed, telephone: (703) 292-5187, email: jreed@nsf.gov

- Robert Russell, telephone: (703) 292-2995, email: rlrussel@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: 20 to 30

Approximately 15-20 *Strategies* awards with durations up to three years and total budgets up to $1,200,000 each will be made, depending on availability of funds; and approximately 5-10 *SPrEaD* awards with durations of three to five years and total budgets up to $2,000,000 each will be made. One Resource Center with a budget of up to $3,500,000 will be supported for a duration of 3 years.

Anticipated Funding Amount: $35,000,000

NSF anticipates having approximately $35,000,000 available for the FY16 competition and approximately $35,000,000 each year thereafter.

Eligibility Information

Who May Submit Proposals:

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

> An individual may serve as the Principal Investigator (PI) for no more than one ITEST proposal during any given funding period under this solicitation. In the event that a person submits more that one proposal as PI, only the proposal received first will be considered.

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. submitter's local time):

  November 13, 2015

  August 10, 2016

  Second Wednesday in August, Annually Thereafter

  Annually until Revised

Proposal Review Information Criteria

Merit Review Criteria:

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

Award Administration Information

Award Conditions:

Standard NSF award conditions apply.

Reporting Requirements:

Standard NSF reporting requirements apply.

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I. INTRODUCTION

The Innovative Technology Experiences for Students and Teachers (ITEST) program supports projects that will advance understanding of how to foster increased levels of interest and readiness among students for occupations in science, technology, engineering, and mathematics (STEM), and related fields such as information and communications technologies (ICT). Through funds provided by revenue from the federal H1-B visa program, the ITEST program seeks to enrich the formal and informal learning experiences of PreK-12 students by supporting projects that: a) increase awareness among students of STEM-related occupations; b) motivate students to pursue appropriate education pathways for STEM-related occupations; and/or c) provide students with technology-rich experiences that develop disciplinary-based knowledge and practices, or promote critical thinking, reasoning skills, or communication skills needed for entering STEM workforce sectors. The ITEST program also seeks to improve the knowledge base and leadership skills within the professional communities of researchers, scientists, and educators who support STEM learning and education pathways to STEM-related occupations.

The National Science Foundation (NSF) is charged with promoting the vitality of the nation's science and engineering research and education enterprises. The ITEST program contributes to that mission by supporting projects having the potential to prepare increasingly diverse populations of students for rapidly changing occupations in STEM-related fields. In an effort to identify the most promising strategies to meet this challenge, the ITEST program supports a broad array of projects that explore innovative new approaches to achieving STEM workforce priorities, but yet are similar in two fundamental ways: a) They show promise of engaging participants in rich experiences with STEM-related technologies or practices; and b) They show promise of advancing knowledge on how best to prepare students for STEM-related occupations. The research and development goals of the ITEST program are consistent with the commitment of the Directorate for Education & Human Resources (EHR) to building and expanding research foundations in STEM learning and learning environments, workforce development, and broadening participation in STEM. ITEST projects may be embedded within the formal learning environments of schools, within informal learning environments after school or away from schools, or in blended programs that link formal and informal learning environments. Whatever learning environment is examined, the ITEST program is particularly interested in broadening the participation of students within populations currently underrepresented in STEM-related fields, including women, ethnic minorities, English language learners, veterans, students with disabilities, and socioeconomically disadvantaged students.

A note about STEM-related fields and STEM-related occupations. STEM is an acronym for Science, Technology, Engineering, and Mathematics, and the term "STEM-related fields" is used in this solicitation as shorthand for referring to all four of these disciplines, their many sub-disciplines, and related fields such as information and communication technologies. The ITEST program invites proposals that focus on any one of these disciplines or related fields, or a combination of these disciplines and fields. There is no implied expectation that any one proposal must address all these disciplines and fields, or their integration. While proposals that have an interdisciplinary focus on two or more of these disciplines or related fields are welcome, so are proposals that focus on a single discipline, sub-discipline, or related field.

It is often assumed that preparation for STEM-related occupations implies preparation for advanced academic degrees in STEM-related fields. However, the areas of greatest STEM workforce need currently and in the foreseeable future are for technicians and other mid-level STEM workers in science-and-technology-driven industries. Many of these positions require technical training or proficiency with STEM-related skills and reasoning, but not advanced academic preparation in STEM-related fields. The ITEST program supports projects that focus on STEM-related fields at all levels of professional engagement along the full spectrum of STEM-related occupations, from technicians and mid-level STEM specialists to scientists, technologists, engineers, or mathematicians. Attracting and preparing students for the STEM workforce is to be interpreted broadly as preparing students for STEM-related careers at all levels, from technicians to researchers needing advanced academic degrees in STEM-related fields.

II. PROGRAM DESCRIPTION

The ITEST program seeks to promote PreK-12 students' interests and capacities to participate in the STEM and ICT workforce of the future. To achieve this objective, ITEST supports the development, implementation, and selective spread of innovative strategies for engaging students in experiences that make them aware of STEM and ICT careers, and motivate them to pursue the education necessary to participate in those careers. Individual ITEST projects contribute to this endeavor through applied research that builds on fundamental knowledge, either by testing innovative new learning strategies that are informed by strong theoretical frameworks, or by further development and testing of practices based on empirical evidence showing impact. The ITEST program supports these efforts through two types of research and development projects:

> **Strategies** projects that address the initial design, development, and implementation of innovative technology-related interventions.

> **SPrEaD** (Successful Project Expansion and Dissemination) projects that support the further examination and broader implementation of interventions that have demonstrated evidence of impact.

Successful ITEST projects will engage students in exploratory research or design and development research studies that advance: (a) knowledge of promising interventions and the conditions and contexts that influence their success in promoting STEM-related career awareness among PreK-12 students, and (b) student interests in pursuing education pathways to STEM-related occupations, and progress along those pathways. The ITEST program is particularly interested in projects that examine the effectiveness of engaging adult volunteers with relevant disciplinary expertise from academia or industry to mentor or engage students in school, after school, or out-of-school settings. Also encouraged are proposals that engage students in the uses of cutting-edge technological tools, in computing or the computer sciences, or in work or problem based experiences involving the innovative uses of emerging technologies. Studies of interventions that engage elementary school students in such experiences having relevance to STEM-related occupations are of particular interest to the ITEST program. Projects may also involve partnerships with higher education or business and industry to enhance the development of authentic experiences that serve to build student interest in STEM-related fields and occupations.

The ITEST program is committed to infusing STEM-related career awareness within its projects, whether in school or out of school. The ITEST program is also intent on going beyond impacts on student achievement to measuring the success of interventions on such variables as awareness, interests, motivation, and similar factors as they relate to education pathways to STEM-related occupations. Given these priorities, ITEST projects are expected to be grounded in professional literatures relating to career and technical education and technological literacy, in addition to the literature focusing on STEM education research and curriculum standards. Likewise, it is expected that ITEST project teams will reflect the diversity in expertise needed to successfully manage the proposed projects. The ITEST program is particularly interested in projects that bring researchers in STEM education together with

researchers in the STEM disciplines, career development, psychology, sociology, anthropology, or any other scientific specialty related to the focus of the proposed project.

ITEST proposals may focus on any STEM-related field (such as biology, chemistry, physics, environmental sciences, engineering fields, computer science, marine science, or mathematics) provided the project addresses specific needs of students in grades PreK-12 and their teachers. ITEST proposals often emphasize linkages between and within STEM and STEM-related domains because the STEM workforce of the future will likely require more integrated knowledge and experiences (for instance, fields such as nanotechnology, biotechnology, energy use and generation, green technologies, and additive manufacturing). While ITEST projects must address at least one STEM-related content domain, they may also provide opportunities for students to learn and practice inter-personal and intra-personal skills needed in the STEM workplace (such as conflict management, self-regulation, persistence, leadership, knowledge of workplace ethics, negotiation, or self-direction). Projects designed to improve student critical thinking skills and the possibility of transferring these skills across domains and into career settings are especially encouraged.

In addition to having a clearly specified STEM-related content or technology focus, ITEST projects must involve students and contribute to systematic understanding of student outcomes related to STEM workforce awareness, interests, skills, knowledge or readiness. ITEST projects may also focus on: a) conceptual, epistemic, or social learning outcomes, b) the development of technological or computational practices, or c) learning environment conditions that enhance learner motivations, mindsets, identity, and interest in STEM-related learning and occupations. Within these focal contexts, ITEST projects may also examine the roles and impacts of teachers, mentors, and other education professionals working with students. Individual projects may engage students at a single grade level, or at multiple elementary, middle, or secondary school grade levels. Direct involvement with business and industry (such as private-public partnerships) is strongly encouraged.

All ITEST projects are expected to: a) be informed by relevant research (such as that on innovative pedagogical approaches, career education, in-school and out-of-school learning environments); and b) contribute to the research knowledge base on strategies for improving awareness of, interests in, and readiness for STEM-related occupations or education pathways to those occupations. ITEST projects are expected to generate data and provide evidence that furthers and deepens understandings of factors, designs and practices that encourage and motivate students to pursue and persist in education programs or pathways that prepare them for STEM-related occupations.

Collectively, ITEST projects contribute to producing knowledge about: a) strategies and models that enhance student interest in and capabilities to successfully pursue STEM-related programs of study and occupations; and b) factors and designs that enable successful interventions to spread beyond the context of pilot studies. In an effort to facilitate building that knowledge base, the ITEST program has identified seven broad areas for researchers to consider. These are guiding questions that research can help answer:

1. What coherent sets of experiences effectively and efficiently support student competency (e.g. knowledge, skills), motivation and persistence for productive participation in the STEM-related workforce of today or in the future?
2. What instructional and curricular models can effectively engage teachers to utilize and integrate technologies so as to enhance student understanding of STEM-related occupations?
3. What roles might business and industry workforce members play in motivating students to become aware of, interested in, and prepared for careers in the STEM-related workforce?
4. What roles might business and industry play in preparing teachers to support student awareness of the workplace?
5. What strategies might parents, mentors and caregivers adopt in the digital and computer age that develop student understandings of and appreciation for the scientific, technical, mathematical, and engineering basis of technological developments?
6. What strategies effectively engage principals, guidance counselors, and other school system administrative leaders to promote student and teacher adoption and effective use of technologies that support STEM-related learning and career awareness?
7. Given the shifting demographics reflected in our current classrooms and in our country, what are effective and productive ways to ensure broadening participation by engaging diverse underrepresented populations in STEM programs and careers?

Each ITEST project must be aligned in some way with one or more of these questions. In the *Project Summary* and *Project Description* of each proposal there must be an explicit and specific indication of how the proposed project addresses one or more of these guiding questions. There is no expectation that any one project will provide a definitive answer to any of the questions, but the proposal must indicate how the project will contribute to an answer for some aspect of one or more of these questions. To that end, each ITEST project is expected to have an explicit research plan that has the following essential components at a minimum:

- One or more explicit research questions that are aligned with and grounded in the research literature of one or more of the broad questions presented above.
- For S*trategies* projects, a research design as would be appropriate for Early-Stage, Exploratory, or Design and Development Studies as described in the *Common Guidelines for Education Research and Development*, available online at: http://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf?WT.mc_id=USNSF_ 124.
- For *SPrEaD* projects, a research design as would be appropriate for further design and development or studies of impact as described in the *Common Guidelines for Education Research and Development*.
- Identification and description of the data to be collected, measurement instruments or procedures to be used in collecting data, and evidence of the reliability and validity of instruments.
- Identification of the analytic or other procedures proposed for data analyses.
- Inclusion of someone with education research expertise on the PI team or an advisory group who can provide guidance in research design or methodologies, instrument implementation or development, data analysis, or qualitative research procedures as appropriate.

Strategies Proposals

The goal of ITEST *Strategies* projects is to design, implement, and study innovative interventions that support PreK-12 student engagement in relevant performance-based learning experiences that: (a) incorporate the skills, knowledge, and practices represented in the STEM-related occupations, and (b) generate awareness, interest and motivation to pursue STEM-related occupation trajectories. *Strategies* projects may also devise ways to provide teachers with the appropriate resources to ensure students consider and are prepared for entering the STEM-related workforce. *Strategies* projects are expected to contribute to STEM education knowledge about the design and implementation of effective interventions as well as about future research activities.

In an effort to identify and develop the nation's STEM-related human resources, the ITEST program encourages projects or activities that cultivate innovative and creative thinking among participants. This may involve the use of various technologies and resources to increase exposure to open-ended, real-world problem solving, hands-on training, and interactions with practicing scientists, engineers and other experts from industry. Fostering of entrepreneurial skills (such as identifying or creating a need, communicating ideas, predictive analysis, persistence, and resilience) and explicit learning of STEM workforce tools and skills may also be included in the overall project format along with opportunities for students and teachers to design, make, and test their ideas.

Partnerships with PreK-12 schools, two- and four-year colleges, universities, informal science education institutions, government laboratories, or community-based organizations are encouraged along with business and industry partners that support, inform and cultivate student career awareness and interests. These partnerships can provide opportunities for career exploration and mentoring, interactions with technology and STEM professionals, and workplace applications of technology skills. Projects that expand and extend our notions of learning environments and where learning STEM-related skills are taking place are also encouraged.

Proposals are expected to draw on existing theory and evidence to design and iteratively develop interventions or strategies, including testing of individual components to provide feedback in the development process. *Strategies* projects can include pilot tests of fully developed interventions to determine whether they achieve intended outcomes under varying contexts and conditions. Results should reveal understandings about how and which aspects of the project are effective in motivating and engaging students in STEM learning, career awareness, or persistence in STEM-related endeavors.

Strategies projects can be up to three years in duration with maximum award sizes at $1,200,000. The size and duration of the request should be appropriate to the scope of the project.

Successful Project Expansion and Dissemination (*SPrEaD*) Proposals

The goal of ITEST *SPrEaD* projects is to support the further development of successful innovative interventions across a wider range of contexts and settings. To this end, ITEST accepts proposals for developed interventions having evidence of strong theoretical and empirical support that can be expanded in order to determine whether they achieve intended outcomes under varying contexts and conditions. Where appropriate, *SPrEaD* projects document factors that may enhance, moderate, or constrain the effects of strategies designed to promote student knowledge of, or dispositions toward, STEM-related education programs and occupations. Programmatically, ITEST accumulates information from *SPrEaD* projects to inform the larger ITEST community's efforts to build and inform future implementation research and impact studies.

SPrEaD proposals must:

- Identify the strategy, model or intervention to be studied, and describe the contexts and conditions for broadening and scaling (e.g., composition, size and demographics of targeted populations, dynamics of contexts, etc.).
- Present prior evidence on the feasibility of impact for implementing the strategy in selected settings by intended users.
- Explain how the new implementation builds on, extends, or differs from previous implementations.
- Identify anticipated contributions to knowledge about effective STEM-related programs from the new implementation.
- Present a study design capable of generating robust evidence of the strategy's promise for generating the intended outcomes, including: data sources; data quality or collection protocols; valid and reliable instruments/measures and where applicable, sample designs and power analyses and analysis plans.
- Include plans to document the fidelity of implementation (including the extent to which the implementation may vary from original feasibility studies).
- Involve at least one partner not previously involved in the intervention being further developed. Partners might include schools, providers of extended day or after school programs, informal science institutions, out-of-classroom STEM-related engagement programs, businesses, industry, commercial organizations, or community organizations.

SPrEaD projects can range in duration from three to five years with a maximum award size of $2,000,000. The size and duration of the request should be appropriate to the scope of the project.

ITEST Resource Center Proposal

The ITEST program intends to fund one Resource Center to provide technical support for all ITEST projects, to facilitate national dissemination of project outcomes, to further develop the ITEST research and development community, and to advance the mission of broadening participation in STEM careers and career education pathways.

- **Lead institution:** It is anticipated that the lead institution for the ITEST Resource Center will be a service-oriented educational organization or institution with demonstrated capacity to plan, develop, and manage a national center that provides technical support for a diverse portfolio of ITEST projects nationwide. It should have demonstrated expertise in targeting STEM and ICT-related disciplines, formal and informal STEM educators, and STEM teacher professional development. It is also expected that the lead institution and any identified partners will have demonstrated expertise in addressing issues related to capacity building, broadening participation, and career development.
- **Technical Support:** The ITEST Resource Center is expected to monitor ITEST projects during the various stages of project implementation and provide technical research assistance appropriate to *Strategies* or *SPrEaD* projects. Support may include, but is not limited to, facilitating the emergence and development of communities of practice, identifying promising practices and resources (both print and electronic) that may be of help to projects in meeting their goals, or providing prospective Principal Investigators with access to information about ITEST program projects, outcomes, and resources.
- **Dissemination:** The ITEST Resource Center is expected to facilitate broad dissemination of project outcomes, findings, and evidence of promising practices to the various discourse communities associated with formal and informal education for students in the various STEM and related ICT fields. In addition to providing comprehensive reports of ITEST program activities and outcomes to NSF, the Center is expected to implement a dissemination plan that will inform formal and informal STEM education professionals, industry and policy stakeholders, and STEM education research communities of ITEST program resources, outcomes, and projects.
- **Community Building:** The ITEST Resource Center is expected to facilitate discussions and linkages across the network of ITEST projects through PI convenings and other appropriate means to promote the ongoing development of the ITEST research and development community. The Center is also expected to collaborate with other resource centers supported by EHR for the purpose of: a) broadening awareness of the diverse funding programs in STEM education and their resources, and b) promoting synergistic efforts among resource centers to advance the knowledge base and broader participation in STEM education.
- **Broadening Participation:** The ITEST Resource Center is expected to facilitate broadening participation in STEM careers and career education pathways through expansion of the ITEST portfolio by targeting outreach activities to geographic regions, community types (rural, suburban, or urban), and institutions (such as community colleges, school districts, informal learning centers, and minority serving institutions) that are less well represented in the ITEST portfolio.

The ITEST Resource Center project will be supported for 3 years with total funding not to exceed $3,500,000. The size of the request should be appropriate to the scope of work proposed.

Expectations for all funded ITEST projects

The ITEST Resource Center provides technical assistance to ITEST grantees and collects project data to contribute to the existing and expanding repository of data on ITEST projects. All projects are expected to comply with the Resource Center's monitoring requests to gather data, build models and disseminate findings.

All projects will be encouraged to use common instruments and to consider sharing data from these instruments (with IRB approval) to support improved coordination and understanding of program impacts.

III. AWARD INFORMATION

Approximately 15-20 *Strategies* awards with durations up to three years and total budgets up to $1,200,000 each will be made; and approximately 5-10 *SPrEaD* awards with durations of three to five years and total budgets up to $2,000,000 each will be made. One Resource Center with a budget of up to $3,500,000 will be supported for a duration of 3 years.

NSF anticipates having approximately $35,000,000 available for the FY16 competition and approximately $35,000,000 each year thereafter.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

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

> An individual may serve as the Principal Investigator (PI) for no more than one ITEST proposal during any given funding period under this solicitation. In the event that a person submits more that one proposal as PI, only the proposal received first will be considered.

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.5 of the Grant Proposal Guide provides additional information on collaborative proposals.

See Chapter II.C.2 of the GPG 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 GPG instructions.

The following information supplements the standard GPG or NSF Grants.gov Application Guide proposal preparation guidelines:

Cover Sheet: The Cover Sheet must contain all requested information. Complete this form with the appropriate information and make sure to check the human subjects box when appropriate. If project funds are requested from another Federal agency or

another NSF program, it must be indicated on the cover sheet. If such funds are requested subsequent to proposal submission, a letter should be sent to the attention of the ITEST program, identifying the proposal by its NSF number. In the title section on the cover sheet, begin the title with the type of ITEST proposal being submitted (i.e., *Strategies*, *SPrEaD* or *Resource Center* proposal), followed by a colon and the title of the proposed project.

To avoid delays in processing, it is strongly recommended that PIs begin the process of obtaining appropriate Institutional Review Board (IRB) approvals or exemptions as needed for projects involving human subjects. No awards will be made without such approvals or exemptions.

Project Summary: A one-page Project Summary must be provided, suitable for public release, which presents a self-contained description of the activity that would result if the proposed project were to be funded. The Project Summary consists of three parts: an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity. The first sentence of the overview must clearly indicate the type of ITEST project being submitted (*Strategies, SPrEaD,* or *Resource Center*) and the key ITEST question(s) being addressed. For *Strategies* projects the overview must describe the STEM or STEM-related content emphases, the strategy to be designed, implemented, and evaluated, and the audiences to be targeted, including the age ranges or grade bands of student participants. For *SPrEaD* projects the overview must describe the evidence collected from previous efforts with an innovation that justifies an expansion of the effort. Project Summaries are used by NSF Program Officers to make decisions about the Merit Review process, so they should clearly describe the nature of the project. Proposals that do not contain an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review.

Project Description (maximum of 15 pages, including results from prior NSF support): To be competitive, a proposal must respond fully to the ITEST program description in this solicitation. Reviewers will judge the merit of each proposal based on the content of the Project Description.

The narrative section of a competitive ITEST *Strategies* or *SPrEaD* project should include the following:

Project overview and succinct rationale

Project goals and objectives

Summary of effectiveness and impact of prior support (see below for more details)

Explanation of principles and the theoretical framework that guided the project design, informed by the relevant literature of the STEM education discourse communities.

Detailed work plan with a timeline

Qualifications of key personnel who will be coordinating the project

Anticipated results

Research plan (See below for more details)

Independent project evaluation process (See below for more details)

Dissemination plan (See below for more details)

Include a description of the responsibilities, qualifications, and level of effort of the key personnel involved in the project, including the roles of consultants and advisors at each stage of the project.

The narrative section of a competitive proposal for the ITEST Resource Center should address all of the expectations described for an ITEST Resource Center Proposal in *Section II: Program Description*.

Results from Prior NSF Support: If the prospective PI or Co-PIs received support for related NSF activities within the past five years, a description of the project(s) and outcomes must be provided in sufficient detail to enable reviewers to assess the value of results achieved. Past projects should be identified by providing the NSF award number, funding amount, years of support, title, and summary of results. The intellectual merit and broader impacts of the prior project(s) must be noted, and research and evaluation data should be clearly described.

Project Evaluation Through Independent Review: All ITEST projects must include provisions for ongoing, independent, and critical reviews of their designs and activities, including their theoretical frameworks, data collection plans, analysis plans, and reporting plans. A proposal must describe appropriate, project-specific independent review and feedback processes to provide both formative and summative evaluations of project implementation activities and outcomes. The feedback processes should enable the project team to answer two overarching questions relating to the goals and objectives of both the research and development aspects of the project: Is the project making sufficient progress toward meeting the goals and objectives? What are the impacts of the project with respect to its intended outcomes? The project evaluation processes may be conducted by an external review panel or advisory board, or by a third-party evaluator, or both. The external critical review or evaluation processes should be sufficiently independent and rigorous to influence the modification of project activities as necessary to improve the quality of the implementation and findings. Successful proposals will: a) describe the areas of expertise of the independent (external) reviewer(s); b) explain how that expertise relates to the goals and objectives of the proposal; and c) specify how the PI will report and use results of the project's external, critical review process.

Dissemination: A proposal must include a creative communication strategy for reaching broad audiences with the findings of the project, including, where appropriate, scholars, practitioners, policymakers and public audiences. While the potential results of the proposed research are expected to be of sufficient significance to merit peer-reviewed and broader publication, approaches that reach broader audiences are strongly encouraged. Proposals should identify the key elements of a communication plan, e.g., target audiences and identification of the channels/media/technologies appropriate for reaching specific audiences.

Other sections (in addition to the 15 page narrative):

References Cited: Any literature cited should be specifically related to the proposed project, and the Project Description should make clear how each reference has played a role in the motivation for, or design of, the project.

Biographical Sketches: Biographical information (no more than two pages each) must be provided for each senior person listed on the budget forms, and other personnel with key qualifications important to the project. Biographical sketches should adhere to the format outlined in the GPG II.f.i (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).

Special Information/Supplementary Documentation: The only items permitted in the Supplementary information section are letters of

collaboration from project partners, the postdoctoral researcher mentoring plan (if applicable) and the data management plan. Letters of support from persons merely endorsing but not making substantial commitment to the project are not allowed.

Appendix: Not permitted. The 15 pages Project Description should contain all of the information needed to describe the project. Proposals submitted with an Appendix will be returned without review.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Additional limitations to consider include the following:

Major research equipment purchases are not supported. The ITEST program limits the purchase of equipment to software, probes, and specialized equipment needed to implement a given project. General purpose equipment such as computers, printers, projectors, notepads, and cellphones are not supported.

C. Due Dates

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

    November 13, 2015

    August 10, 2016

    Second Wednesday in August, Annually Thereafter

    Annually until Revised

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://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. (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

In addition to considering the two general Merit Review Criteria, reviewers will also be asked to consider the following three questions relating to broadening participation when reviewing Strategies and SPrEaD proposals:

1. Does the proposal include explicit strategies for recruiting and selecting participants from identified groups currently underrepresented in STEM professions, careers, or education pathways?
2. Does the proposal identify the specific needs of the underrepresented groups to be served, and does it include specific plans or strategies for addressing or accommodating the particular needs of participants of the identified underrepresented groups?
3. Do the planned activities of the proposed project include explicit attention to strategies appropriate to participants' experiences for promoting awareness, interest, or readiness for STEM careers or STEM education pathways?

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 *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

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 *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:

- Address questions to, telephone: (703) 292-8628, email: DRLITEST@nsf.gov

- Julia V. Clark, telephone: (703) 292-5119, email: jclark@nsf.gov

- Catherine Eberbach, telephone: (703) 292-4960, email: ceberbac@nsf.gov

- Michael Ford, telephone: (703) 292-5153, email: miford@nsf.gov

- David L. Haury, telephone: (703) 292-5102, email: dhaury@nsf.gov

- Margret Hjalmarson, telephone: (703) 292-4313, email: mhjalmar@nsf.gov

- Julie I. Johnson, telephone: (703) 292-8624, email: jjohnson@nsf.gov

- Rebecca Kruse, telephone: (703) 292-4211, email: rkruse@nsf.gov

- Julio E. Lopez-Ferrao, telephone: (703) 292-5183, email: jlopezfe@nsf.gov

- Celestine H. Pea, telephone: (703) 292-5186, email: cpea@nsf.gov

- Joseph Reed, telephone: (703) 292-5187, email: jreed@nsf.gov

- Robert Russell, telephone: (703) 292-2995, email: rlrussel@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.

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.

> This solicitation has been revised to incorporate a newly issued publication jointly developed by the National Science Foundation and the Institute of Education Sciences in the U.S. Department of Education entitled, *Common Guidelines for Education Research and Development*. The *Guidelines* describe six types of research studies that can generate evidence about how to increase student learning. Research types include those that generate the most fundamental understandings related to education and learning; examinations of associations between variables; iterative design and testing of strategies or interventions; and assessments of the impact of a fully-developed intervention on an education outcome. For each research type, there is a description of the purpose and the expected empirical and/or theoretical justifications, types of project outcomes, and quality of evidence.

> The *Guidelines* publication can be found on the NSF website with the number NSF 13-126:
> http://www.nsf.gov/pubs/2013/nsf13126/nsf13126.pdf?WT.mc_id=USNSF_124

> A set of FAQs regarding the *Guidelines* are available with the number NSF 13-127:
> http://www.nsf.gov/pubs/2013/nsf13127/nsf13127.pdf

> Grant proposal writers and PIs are encouraged to familiarize themselves with both documents and use the information therein to help in the preparation of proposals to NSF.

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

- **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

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The National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia 22230, USA
Tel: (703) 292-5111, FIRS: (800) 877-8339 | TDD: (800) 281-8749

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