

# Innovative Technology Experiences for Students and Teachers (ITEST)

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## PROGRAM SOLICITATION

NSF 14-512

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### REPLACES DOCUMENT(S):

NSF 12-597

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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. proposer's local time):

February 11, 2014

November 06, 2014

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## IMPORTANT INFORMATION AND REVISION NOTES

### Revision Summary

This solicitation has been revised to incorporate into the Other Information section 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](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.

### Revisions to this Solicitation:

1. Describes how the ITEST program complements the new EHR Core Research (ECR) Program.
2. Replaces the Scale-up strand with a Successful Project Expansion and Dissemination (*SPrEaD*) strand to better address and understand the contextual and broadening participation factors that influence learning and learning environments.
3. Establishes a stronger focus on research and development by assimilating components of the former Research strand into the *Strategies* and *SPrEaD* strands. The expectation is for all proposals to include a research component.
4. Eliminates the request for proposals for a new Resource Center.
5. Revises the description of what is required for evaluation of proposals.
6. Eliminates the requirement for Letters of Intent.

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## SUMMARY OF PROGRAM REQUIREMENTS

### General Information

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#### Program Title:

Innovative Technology Experiences for Students and Teachers (ITEST)

#### Synopsis of Program:

The ITEST program through research and model-building activities seeks to build understandings of best practice factors, contexts and processes contributing to K-12 students' motivation and participation in the science,

technology, engineering, and mathematics (STEM) core domains along with other STEM cognate domains (e.g., information and communications technology (ICT), computing, computer sciences, data analytics, among others) that inform education programs and workforce domains. The ITEST program funds foundational and applied research projects addressing the development, implementation, and dissemination of innovative strategies, tools, and models for engaging students to be aware of STEM and cognate careers, and to pursue formal school-based and informal out-of-school educational experiences to prepare for such careers. ITEST supports projects that: (1) increase students' awareness of STEM and cognate careers; (2) motivate students to pursue the appropriate education pathways for STEM and cognate careers; and/or (3) provide students with technology-rich experiences that develop disciplinary-based knowledge and practices, and non-cognitive skills (e.g., critical thinking and communication skills) needed for entering STEM workforce sectors. ITEST projects may adopt an interdisciplinary focus on one or more STEM domains or focus on sub discipline(s) within a domain. ITEST projects must involve students, and may also include teachers. ITEST is especially interested in broadening participation of student groups from traditionally underrepresented in STEM and cognate intensive education and workforce domains. Strongly encouraged are projects that actively engage business and industry to better ensure K-12 experiences are likely to foster the skill-sets of emerging STEM and cognate careers. ITEST supports two project types: **Strategies** and **SPREaD** (*Successful Project Expansion and Dissemination*) projects. Strategies projects address the creation and implementation of innovative technology-related interventions that support ITEST's objectives. SPREaD projects support the wider and broader dissemination and examination of innovative interventions to generate evidence and understanding regarding contextual factors that operate to enhance, moderate, or constrain the desired results. All ITEST projects include activities designed to inform judgments regarding the feasibility of implementing strategies in typical delivery settings such as classrooms and out-of-school settings.

#### 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](mailto:DRLITEST@nsf.gov)
- Julia V. Clark, telephone: (703) 292-5119, email: [jclark@nsf.gov](mailto:jclark@nsf.gov)
- Edith Gummer, telephone: (703) 292-5110, email: [egummer@nsf.gov](mailto:egummer@nsf.gov)
- David L. Haury, telephone: (703) 292-8614, email: [dhaury@nsf.gov](mailto:dhaury@nsf.gov)
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- Celestine H. Pea, telephone: (703) 292-5186, email: [cpea@nsf.gov](mailto:cpea@nsf.gov)
- Robert Russell, telephone: (703) 292-2995, email: [rrussel@nsf.gov](mailto:rrussel@nsf.gov)
- Elizabeth VanderPutten, telephone: (703) 292-5147, email: [evanderp@nsf.gov](mailto:evanderp@nsf.gov)

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

- 47.076 --- Education and Human Resources

## Award Information

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

**Estimated Number of Awards:** 20 to 30 each year depending on the availability of funds. 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.

**Anticipated Funding Amount:** \$50,000,000

Pending availability of funds, NSF anticipates having approximately \$50,000,000 available for the two fiscal year period FY 2014-2015 for support of the ITEST portfolio. Approximately \$25,000,000 will be available for the FY 2014 competition and approximately \$25,000,000 will be available for the FY 2015 competition.

## Eligibility Information

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#### 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 proposal under this solicitation.

## Proposal Preparation and Submission Instructions

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## 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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)).

## B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

## C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
  - February 11, 2014
  - November 06, 2014

## Proposal Review Information Criteria

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

## Award Administration Information

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

**Reporting Requirements:** Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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## I. INTRODUCTION

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## About the National Science Foundation and the Directorate for Education and Human Resources

The National Science Foundation (NSF) is charged with promoting the vitality of the nation's science and engineering research and education enterprises.

The Directorate for Education and Human Resources (EHR) makes investments that support a healthy and vital national science, technology, engineering, and mathematics (STEM) education enterprise. The directorate works toward that vision through its mission, which is to support the preparation of a diverse, globally competent STEM workforce and a STEM-literate citizenry through investment in innovative research and development on STEM education and learning.

Opportunities to learn STEM effectively - for people of all ages, from all corners of the Nation, and in many venues (e.g., classrooms and living rooms; science centers and virtual centers) - are the foundation for a scientifically literate society and strong scientific workforce. These in turn are the basis for keeping our Nation globally competitive, prosperous and secure. EHR provides the focus for NSF's investments to advance STEM learning, scientific literacy, and a globally competitive science and engineering workforce.

The EHR investments are concentrated into three categories that form a strategic framework for the directorate's mission. Within each of these categories, EHR will continue to build and emphasize its research and development activities.

- Learning and learning environments: Investments in this category seek to develop understanding of the cognitive, affective, and non-cognitive foundations of STEM learning; to study emerging contexts and tools for learning STEM concepts and skills; and to build environments that promote new, high-impact learning opportunities for tomorrow's scientists and engineers, as well as citizens and students living in an increasingly technology-oriented society.
- Broadening participation in STEM: Programs in this category capitalize on the Nation's diversity in order to increase the scientific workforce by engaging and building capacity in all people in STEM learning and professional training, particularly those from groups that have been traditionally underrepresented in STEM fields.
- STEM workforce: Workforce investments are intended to improve the education and preparation of a STEM workforce that will be ready to capitalize on unprecedented advances in technology and science, and to address global, social, and economic challenges yet to be imagined.

This framework positions the Directorate to respond more readily to emerging opportunities created by new technologies, improvements in the STEM education evidence base, administration priorities, and other national or societal needs. Different programs within EHR emphasize different categories of the research and development activities ([http://www.nsf.gov/about/budget/fy2014/pdf/25\\_fy2014.pdf](http://www.nsf.gov/about/budget/fy2014/pdf/25_fy2014.pdf)).

To achieve these goals, the Directorate sponsors programs in the Division of Research on Learning in Formal and Informal Settings (DRL), Division of Undergraduate Education (DUE), Division of Graduate Education (DGE), and Human Resource Development (HRD). The ITEST program is managed in DRL.

## About the Division of Research on Learning in Formal and Informal Settings

The Division of Research on Learning in Formal and Informal Settings (DRL) supports the research on and development of: innovative resources, models, and tools for K-12 STEM education and teacher learning; partnerships of K-12 school districts and institutions of higher education; fundamental research on STEM learning; experiences that enable lifelong STEM learning pathways inside and outside of school; national STEM education priorities; and evaluation studies and activities. While DRL-funded research is likely to be situated in institutional and social settings and may involve development of learning resources, tools, and model learning environments, the principal goal is to understand and support STEM learning in all its forms, by the full range of learners, in a full range of settings. This includes development of innovative and effective approaches and instruments for promoting and assessing learning. A particular focus is on understanding how to improve STEM learning and education opportunities for all learners, including those from groups traditionally underrepresented in STEM - especially women, minorities, persons with disabilities, English-language learners, and veterans. DRL encourages the submission of EAGER, RAPID, INSPIRE, and CAREER proposals in its programs.

DRL funds projects through the following programs:

- Advancing Informal STEM Learning (AISL)
- Discovery Research K-12 (DRK-12)
- Innovative Technology Experiences for Students and Teachers (ITEST)
- Math and Science Partnership (MSP) [In 2014 to be STEM-C - Science, Technology, Engineering, Mathematics and Computing Partnerships.
- Promoting Research and Innovation in Methodologies for Evaluation (PRIME)
- Research on Education and Learning (REAL)

Each program can be accessed from the [DRL Web Page](#).

## II. PROGRAM DESCRIPTION

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The Innovative Technology Experiences for Students and Teachers (ITEST) program supports projects that build understandings of best practice factors, contexts and processes contributing to students' motivation, participation, enhanced interest in and capabilities to successfully pursue STEM and/or STEM cognate (e.g., information and communications technology (ICT), computing, computer sciences, data analytics, among others) domain intensive education programs and careers. ITEST seeks to ensure a high-quality STEM workforce that can meet U.S. technology needs by supporting projects that: (1) increase students' awareness of STEM and cognate careers; (2) motivate students to pursue appropriate education pathways for STEM and cognate careers; and/or (3) provide students with technology-rich experiences that develop disciplinary-based knowledge and practices, and non-cognitive skills (e.g., critical thinking and communication skills) needed for entering STEM workforce sectors. ITEST is funded by H-1B visa revenues in direct response to current concerns about effectively responding to extant and emerging areas requiring specialists at all levels and in all fields of science, technology, engineering, and mathematics (STEM), including cognate domains.

ITEST supports two types of foundational and applied research projects :

**Strategies** projects that address the creation and implementation of innovative technology-related interventions.

**SPReAD** (Successful Project Expansion and Dissemination) projects that support the wider and broader dissemination and examination of innovative interventions.

ITEST supports projects that enhance students' interest in and capabilities to successfully pursue STEM and STEM cognate careers. A number of DRL programs also address students' STEM learning in K-12 formal and informal settings but with difference emphases. The programs include: the Discovery Research K-12 (DR K-12) program, the Advancing Informal STEM Learning (AISL) program, and the EHR Core Research (ECR) program. The DR-K12 focuses on researching the development and implementation of innovative resources, models, and tools for K-12 students and teachers, primarily in formal elementary, middle, and high school settings. The AISL focus is on understanding design and engagement in out-of-school STEM learning and learning environments across all ages in the life span; including cross venue youth programs in grades K-12. The ECR emphases are on foundational research to advance our understandings of and methodologies for studying STEM learning, STEM learning environments, broadening participation in STEM, and/or STEM workforce development.

The research and development goals of the ITEST program are consistent with EHR's commitment to building and expanding research foundations in STEM learning and learning environments, workforce development and broadening participation in STEM. ITEST projects explore and test strategies and tools for fostering K-12 students' motivations, interests and capacities in STEM learning. ITEST is especially interested in broadening participation of student groups from traditionally underrepresented in STEM and cognate intensive education and workforce domains. Underrepresented groups may include, but are not limited to, women, underrepresented minorities (African-Americans, Hispanics, Native Americans, Alaska Natives, Native Hawaiian, and other Pacific Islanders) and persons with disabilities. ITEST projects may provide students with authentic, contextual experiences from in- and/or out-of-school educational settings/programs. Projects may also involve partnerships with higher education, and business and industry to enhance the development of authentic experiences that serve to build student interest in STEM.

Successful ITEST projects will engage in foundational or model-based design applied research that seeks to understand conditions and contexts that improve K-12 students' STEM learning pathways and STEM-focused career preparations and mentorships. 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 and engage students in school, after school or out-of-school. Typically, proposals with a primary focus on *workforce development for youth and on school to work transitions* should be submitted to ITEST. Also encouraged are proposals that engage students in the use of cutting-edge technological tools, in computer sciences, or in providing students with work/problem based opportunities for innovative use of technology.

ITEST is committed to support research projects that accumulate knowledge across projects to inform further strategy development, impact assessment, and implementation studies. All ITEST projects are expected to produce empirical findings and/or research tools that contribute to knowledge about which models and interventions with K-12 students and teachers are most likely to increase capacity in the STEM and STEM cognate intensive workforce of the future. Effective strategies must be developed and studied for engaging American youth of the 21st century in STEM and STEM cognate learning in a manner that leads them to pursue career trajectories that focus on technology-intensive STEM fields. Research in this area has the potential to transform policy and education in STEM. To that end, the ITEST program is seeking projects that bring together researchers in STEM education (qualitative and/or quantitative), career development, psychology, sociology, anthropology, STEM disciplines, and other critical areas that heavily invest in STEM and STEM cognate careers. ITEST will support systematic, rigorous studies to enlarge and make more substantive the knowledge base upon which efforts to improve and expand the STEM and STEM cognate intensive workforce can build.

The objectives and emphases of the ITEST program are aligned with numerous reports and recommendations for STEM workforce development and college and career readiness, including reports by the President's Council of Advisors on Science and Technology (*Prepare and inspire: K-12 Education in science, technology, engineering and math (STEM) for America's future*); the National Science Board (*Preparing the Next Generation of STEM Innovators: Identifying and Developing Our Nation's Human Capital*); the National Research Council *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21<sup>st</sup> Century*, (*K-12 Framework for Science Education, America's Lab Report, Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroad; Engaging Schools: Fostering High School Students' Motivation to Learn*; and); the U.S. Department of Education (*Transforming American Education: Learning, Powered by Technology and Investing in America's Future: A Blueprint for Transforming Career and Technical Education*); and NSF Task Force on Cyberlearning (*Fostering Learning in the Networked World: The Cyberlearning Opportunity and Challenge*).

The ITEST program defines "STEM and STEM cognate workforce of the future" to broadly include professionals at all engagement levels, including technicians, technologists, scientists, engineers, computer scientists and mathematicians. ITEST proposals may focus on any STEM and/or STEM cognate intensive domains (e.g., biology, chemistry, physics, engineering, computer science, geometry, statistics, and algebra) provided the project addresses specific needs of students in grades K-12 (and their teachers). ITEST proposals often bridge between and within STEM and STEM cognate domains because the STEM workforce of the future is likely to require integrated knowledge and experiences (e.g., in fields such as nanotechnology, biotechnology, energy use and generation, and additive manufacturing). ITEST accepts proposals with an interdisciplinary focus that includes two or more STEM and STEM cognate areas; proposals that focus on a single domain or a sub-discipline within a domain are also welcome. Finally, while ITEST projects must address at least one STEM content domain, they may also provide opportunities for students to learn and practice inter- and intra-personal skills needed in the workplace (e.g. conflict management, self-regulation, persistence, leadership, knowledge of workplace ethics, negotiation, or self-direction). Projects designed to improve students' 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 content or technological focus, ITEST projects **must** involve students and contribute to systematic understanding of students' learning and development. ITEST projects may have a focus on 1) conceptual, epistemic, and/or social learning outcomes, 2) the development of technological and/or computational practices, or 3) learning environment conditions that enhance learners' motivation, mindset, identity and interest in STEM learning and careers. Within these focal contexts, ITEST projects may also examine the roles and impact of teachers, mentors, and other education professionals working with students. ITEST only supports K-12 projects targeting kindergarten through high school aged children; individual projects may engage students at a single grade or at multiple elementary, middle, and/or secondary school grade levels. Direct involvement with business and industry (e.g., through private-public partnerships) is strongly encouraged.

All ITEST projects are informed by relevant research (e.g., innovative pedagogical approaches, career education, in- and out-of-school learning environments) and are expected to contribute to the knowledge base of student STEM college and career readiness and preparation. ITEST projects are expected to generate data and provide evidence that furthers and deepens our understandings of factors, designs and practices that encourage and motivate students to pursue and persist in STEM or STEM cognate educational programs and careers.

Programmatically, ITEST supports efforts to learn how successful projects identify, develop, and test strategies to achieve well-specified learning goals for building a strong, competent STEM workforce. Collectively, ITEST projects contribute to producing knowledge about: (1) strategies and models that enhance students' interest in and capabilities to successfully pursue STEM and/or STEM cognate programs of study and careers; and (2) factors and designs that enable successful interventions to spread beyond the context of pilot studies. All ITEST projects include activities designed to inform judgments regarding the feasibility of implementing strategies in typical delivery settings such as classrooms and out-of-school settings.

Proposals to the ITEST program may request support for projects that:

1. Develop, implement, and study a curricular or instructional strategy or model to understand how to improve student interest in and/or preparation for STEM and/or STEM cognate careers based on a well-specified theory of action appropriate to a well-defined end-user;
2. Test existing measures or create valid and reliable new performance -based measures to evaluate the implementation and impact of an intervention strategy on how to prepare students for the existing or future STEM workforce. The focus may be on student assessments or assessing growth in teachers' knowledge of STEM and/or STEM cognate career opportunities.
3. Conduct design-based pilot studies of fully or partially developed interventions to examine the attainment of intended outcomes such as knowledge about approaches, models, and interventions involving children, mentors and teachers that are most likely to increase the nation's capacity and innovation in the STEM and/ STEM cognate workforce of the future.

### Strategies Proposals

The goal of ITEST *Strategies* projects is to design, implement, research and evaluate interventions that support K-12 students' engagement in performance-based relevant experiences that 1) incorporate the skills, knowledge, and practices represented in the STEM and/or STEM cognate workforce and 2) motivate and build interest to pursue STEM and/or STEM cognate career trajectories. *Strategies* projects may devise ways to provide teachers with the appropriate resources to ensure students consider and are prepared for entering the STEM and/or STEM cognate workforce. *Strategies* projects are expected to contribute to STEM researchers' and educators' knowledge about the design and implementation of effective interventions as well as about future research activities.

In an effort to identify and grow our nation's STEM and STEM cognate human capital, ITEST encourages projects to consider incorporating 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. Principles of entrepreneurship (e.g. identifying and/or creating a need, communicating ideas, predictive analysis, etc.) 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.

*Strategies* proposals must clearly address one or more of the following questions:

- What coherent sets of experiences effectively and efficiently support student competency (e.g. knowledge, skills), motivation and persistence for productive participation in the STEM and STEM cognate workforce of today or in the future?
- What instructional and curricular models can effectively engage teachers to utilize and integrate technologies so as to enhance student understanding of STEM and STEM cognate careers?
- What roles might business and industry workforce member's play in motivating students to become aware of, interested in and prepared for careers in the STEM and STEM cognate workforce?
- What roles might business and industry play in preparing teachers to support student awareness of the workplace?
- What strategies might parents, mentors and caregivers adopt in the modern digital and computer age that develop student understandings of and appreciation for the scientific, technical, mathematical, and engineering basis of technological developments?
- What strategies effectively engage principals, guidance counselors, and other school system administrative leaders to promote students' and teachers' adoption and effective use of technologies that support STEM and STEM cognate learning and career awareness?
- 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?

Partnerships with K-12 schools, two- and four-year colleges, universities, informal science education institutions, government laboratories, and /or community-based organizations are encouraged along with business and industry partners that support and inform and cultivate students' 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 and STEM cognate 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 individual components to provide feedback in the development process. *Strategies* projects should include pilot tests of fully developed interventions to determine whether they achieve intended outcomes under varying contexts and conditions. Proposals should describe the questions, instruments, methods, and analyses selected and describe how the project will collect and interpret evidence that the goals of the strategy have been implemented and achieved. Results should reveal understandings about how and which aspects of the project are effective in motivating and engaging students in STEM learning, career awareness, and persistence in STEM. Results may also inform future work so as to build and refine models and foundational theories of STEM learning and engagement or may guide promising interventions or strategies for more advanced testing.

*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 pilot studies that provide evidence of successful innovative interventions across a wider range of contexts and settings. To this end, ITEST accepts proposals for fully developed interventions that can expand existing designs and projects 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 enhance student knowledge of, or disposition toward, STEM and STEM cognate programs and careers. Programmatically, ITEST accumulates information from *SPrEaD* projects to inform the larger ITEST community's efforts to build and inform future implementation research and efficacy studies.

Proposals to *SPrEaD* 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 population(s), 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 implementation(s).
- Identify anticipated contributions to knowledge building about effective STEM and STEM cognate programs from the new implementation.
- Present a study design capable of generating robust evidence of the strategy's promise for generating the intended outcomes to include: data sources; data quality and/or collection protocols; valid and reliable instruments/measures and where applicable, sample designs and power analyses and analysis plans.
- Include plans to document the integrity of implementation (including the extent to which the implementation may vary from original feasibility studies).

- Involve a partnership from a different type of institution. Partners might include schools, providers of extended day and/or after school programs, informal science institutions, out-of-classroom STEM/ STEM cognate engagement programs, businesses, industry, commercial organizations, community organizations, etc.

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.

### Expectations for All ITEST projects

The ITEST Learning Resource Center has been renamed the STEM Learning and Research (STELAR) Center. The STELAR 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.

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National Research Council (2006). *ICT fluency and high schools: A workshop summary*. Planning Committee on ICT Fluency and High School Graduation Outcomes. Board on Science Education, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

National Research Council (2008). *Research on Future Skill Demands*. Washington, DC: National Academy Press.

National Research Council (2009). *Learning Science in Informal Environments: People, Places, and Pursuits*. Washington, DC: National Academy Press.

National Research Council (2011). *Successful K-12 STEM Education: Identifying Effective Approaches in Science, Technology, Engineering, and Mathematics*. Washington, DC: National Academy Press.

National Research Council (2011). *Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads*. Washington, DC: The National Academies Press.

National Research Council (2012). *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21<sup>st</sup> Century*. Washington, D.C. The National Academies Press.

U.S. Department of Education, Office of Educational Technology (March, 2010). *Transforming American Education: Learning Powered by Technology*.

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## 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.

Pending availability of funds, NSF anticipates having approximately \$50,000,000 available for the two fiscal year period FY 2014-2015 for support of the ITEST portfolio. Approximately \$25,000,000 will be available for the FY 2014 competition and approximately \$25,000,000 will be available for the FY 2015 competition.

## IV. ELIGIBILITY INFORMATION

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### 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 proposal under this solicitation.

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov). Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: ([http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=grantsgovguide](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov).

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

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

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

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

*Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. Unless otherwise specified in this solicitation, you can decide where to include this section within the Project Description.*

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 each title with the type of ITEST proposal being submitted (i.e., *Strategies* or *SPrEaD* proposal).

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 should be prepared, suitable for public release, which presents a self-contained description of the activity that would result if the proposal were funded. The Project Summary consists of an overview, a statement on the **intellectual merit** of the proposed activity, and a statement on the **broader impacts** of the proposed activity. The overview must describe the ITEST program component to which the proposal is submitted (*Strategies or SPREaD*). *Strategies* projects must describe the STEM or STEM cognate content emphases, the strategy to be designed, implemented, and evaluated, and the audiences to be involved. *SPREaD* projects must discuss the evidence collected from previous efforts with an innovation that justifies an expansion of the effort. 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): The Project Description contains most of the information that determines whether a grant will be awarded. Competitive proposals 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
- project goals and objectives
- summary of effectiveness and impact of prior support (see below for more detail)
- explanation of principles that guided the project design, informed by the literature
- detailed work plan with a timeline
- qualifications of key personnel who will be coordinating the project
- anticipated results
- research plan (if appropriate)
- external review or evaluation process (see below for more detail)
- dissemination plan (see below for more detail)

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

**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 NSF award number, funding amount, years of support, title, and summary of results. Research and evaluation data should be clearly described. Details regarding evaluation data from past projects may be included in the Supplementary Documentation (no more than two pages).

**Evaluation or External Review:** All DRL projects are subject to a series of external, critical reviews of their designs and activities (including their theoretical frameworks, any data collection plans, analysis plans, and reporting plans). A proposal must describe appropriate project-specific external review and feedback processes. These might include an external review panel or advisory board proposed by the project or a third-party evaluator. The external critical review or evaluation should be sufficiently independent and rigorous to influence the project's activities and improve the quality of its findings. Successful proposals will (1) describe the expertise of the external reviewer(s); (2) explain how that expertise relates to the goals and objectives of the proposal; and (3) 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 a broad audience for 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, including consultants, and advisors. 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](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 commitment from project partners, evaluation results from prior NSF support as appropriate (maximum of 2 pages), the postdoctoral researcher mentoring plan (if applicable) and the data management plan. Letters of support that are not letters of commitment are not allowed.

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

## B. Budgetary Information

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**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 cell phones are not supported.

## C. Due Dates

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

## D. FastLane/Grants.gov Requirements

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

### 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](mailto:support@grants.gov). The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

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

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [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

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

#### 1. Merit Review Principles

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

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

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

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

## 2. Merit Review Criteria

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

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

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

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

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

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

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

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

## B. Review and Selection Process

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Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

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

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

After programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications. After an administrative review has occurred, Grants and Agreements Officers perform the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants

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

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

## VII. AWARD ADMINISTRATION INFORMATION

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### A. Notification of the Award

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

### B. Award Conditions

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An NSF award consists of: (1) the award 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](http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [nsfpubs@nsf.gov](mailto:nsfpubs@nsf.gov).

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

### C. Reporting Requirements

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

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

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

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

The ITEST Learning Resource Center has been renamed the STEM Learning and Research (STELAR) Center. The STELAR 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.

## VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Address questions to, telephone: (703) 292-8628, email: [DRLITEST@nsf.gov](mailto:DRLITEST@nsf.gov)
- Julia V. Clark, telephone: (703) 292-5119, email: [jclark@nsf.gov](mailto:jclark@nsf.gov)

- Edith Gummer, telephone: (703) 292-5110, email: [egummer@nsf.gov](mailto:egummer@nsf.gov)
- David L. Haury, telephone: (703) 292-8614, email: [dhaury@nsf.gov](mailto:dhaury@nsf.gov)
- Christopher Hoadley, telephone: (703) 292-7906, email: [choadley@nsf.gov](mailto:choadley@nsf.gov)
- Julie I. Johnson, telephone: (703) 292-8624, email: [jjohnson@nsf.gov](mailto:jjohnson@nsf.gov)
- Julio E. Lopez-Ferrao, telephone: (703) 292-5183, email: [jlopezfe@nsf.gov](mailto:jlopezfe@nsf.gov)
- Celestine H. Pea, telephone: (703) 292-5186, email: [cpea@nsf.gov](mailto:cpea@nsf.gov)
- Robert Russell, telephone: (703) 292-2995, email: [rrussel@nsf.gov](mailto:rrussel@nsf.gov)
- Elizabeth VanderPutten, telephone: (703) 292-5147, email: [evanderp@nsf.gov](mailto:evanderp@nsf.gov)

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

## IX. OTHER INFORMATION

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The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF [Grants Conferences](#). Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at [https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic\\_id=USNSF\\_179](https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179).

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new 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](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

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

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

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

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

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS)

capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

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

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

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

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

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. 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:

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