

# Research and Evaluation on Education in Science and Engineering (REESE)

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## Program Solicitation

NSF 07-595

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*Replaces Document(s):*

NSF 06-609

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**National Science Foundation**

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

**Letter of Intent Due Date(s) (optional)** (due by 5 p.m. proposer's local time):

November 05, 2007

optional

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

January 08, 2008

Full Proposals

## REVISION NOTES

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In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via [Grants.gov](http://Grants.gov) or via the [NSF FastLane](#) system. 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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

A realignment in NSF's Directorate for Education and Human Resources (EHR) has merged the Division of Research, Evaluation, and Communication (REC) and the Division of Elementary, Secondary, and Informal Education (ESIE) into a new division, the Division of Research on Learning in Formal and Informal Settings (DRL). This revision reflects efforts to increase coordination and coherence across the DRL programs. The main discussion of the REESE program has now been subdivided into *Frontier* and *Contextual* strands to bring increased clarity to the types of research encouraged by REESE. *Frontier* projects focus on areas of relatively higher risk and where NSF expects solutions in the longer-term. Eligible topics are those limited to the discussion in Section II. A. The *Contextual* projects are expected to have nearer-term implications for policy and practice. This strand is not specifically limited to specified topic areas, although the solicitation anticipates most of the important areas relevant to Science, Technology, Engineering, and Mathematics (STEM) learning and education (see Section II. B).

The proposal types allowable under this solicitation have been updated to enable more flexible mechanisms for conducting research relevant to this program (see Section II. D.) The proposal types now include the following:

- *Knowledge Diffusion proposals* are small projects for the synthesis of existing knowledge on a topic of critical importance to STEM learning and education or for the diffusion of research based knowledge. Formerly known as "synthesis" proposals, this proposal type has been expanded to include more forms of knowledge diffusion. The maximum award size for knowledge diffusion projects is \$250,000 for duration of up to two years.
- While *Empirical Research proposals* remain unchanged, REESE has now added *Large Empirical Research proposals* for complex projects focused on important issues in STEM learning. The projects could involve teams of multi-disciplinary experts working on conceptually related projects, or they might be longitudinal or randomized control studies of large samples of participants. The maximum award for Large Empirical Research projects is \$2,000,000 with a duration of up to five years.
- *REESE Diffusion and Evaluation proposals* are new to REESE and should provide technical assistance for projects on research methods and analysis procedures, synthesize findings across the REESE portfolio of projects, perform special evaluative studies, and disseminate findings. Maximum award size for diffusion and evaluation projects is \$5,000,000 for duration up to five years. REESE will fund up to one award of this type.

The deadline for the submission of proposals has been moved earlier in the year.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Research and Evaluation on Education in Science and Engineering (REESE)

#### Synopsis of Program:

The Division of Research on Learning in Formal and Informal Settings (DRL) in the Directorate for Education and Human Resources (EHR) of the National Science Foundation (NSF) supports basic and applied research and evaluation that enhances science, technology, engineering and mathematics (STEM) learning and teaching. The Research and Evaluation on Education in Science and Engineering (REESE) program aims at advancing research at the frontiers of STEM learning, education, and evaluation, and at providing the foundation knowledge necessary to improve STEM teaching and learning at all educational levels and in all settings. This solicitation calls for four types of proposals-Knowledge Diffusion, Empirical Research, Large Empirical Research, and Diffusion and Evaluation.

The goals of the REESE program are: (1) to advance discovery and innovation at the frontiers of STEM learning, education, and evaluation; (2) to stimulate the field to produce high quality and robust research results through the advancement of theory, method, and human resources; and (3) to help coordinate advances in education, learning research, and evaluation efforts. REESE advances its mission by developing an interdisciplinary research portfolio focusing on core scientific questions of learning in real and emerging educational contexts, from childhood through adulthood, and from before school through to graduate school and beyond into the workforce. In addition, research questions related to education and evaluation are central to the REESE activity.

#### Cognizant Program Officer(s):

- Address questions to:, telephone: (703)292-8650, email: [DRLREESE@nsf.gov](mailto:DRLREESE@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 or Cooperative Agreement

**Estimated Number of Awards:** 25 to 35 It is anticipated that about 10-15 Knowledge Diffusion awards, 10-15 Empirical awards, 4 Large Empirical awards, and 1 Diffusion and Evaluation award will be made.

**Anticipated Funding Amount:** \$30,000,000 pending availability of funds. The maximum award for Knowledge Diffusion projects is \$250,000 with duration of up to two years. The maximum award for Empirical Research projects is \$1,000,000 with duration of up to three years. The maximum award for Large Empirical Research projects is \$2,000,000 with duration of up to five years. The maximum award size for the Diffusion and Evaluation project is \$5,000,000 for duration of up to five years.

## Eligibility Information

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### Organization Limit:

None Specified

### PI Limit:

None Specified

### Limit on Number of Proposals per Organization:

None Specified

### Limit on Number of Proposals per PI:

None Specified

## Proposal Preparation and Submission Instructions

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### A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is optional. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>)

### B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required under this solicitation.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

## C. Due Dates

- **Letter of Intent Due Date(s) (optional)** (due by 5 p.m. proposer's local time):

November 05, 2007

optional

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

January 08, 2008

Full Proposals

## 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, technology, engineering and mathematics (STEM) research and education enterprises. As part of this mission, the Directorate for Education and Human Resources (EHR) has primary responsibility for providing national and research-based leadership in STEM education. EHR promotes four goals in fulfilling this responsibility:

1. Prepare the next generation of STEM professionals and attract and retain more Americans to STEM careers.
2. Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in STEM education and that integrates research and education.
3. Increase the technological, scientific and quantitative literacy of all Americans so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.
4. Broaden participation (individuals, geographic regions, types of institutions, STEM disciplines) and close achievement gaps in all STEM fields.

To reach these goals, the Directorate sponsors programs in the Divisions of Research on Learning in Formal and Informal Settings (DRL), Undergraduate Education (DUE), Graduate Education (DGE), and Human Resource Development (HRD).

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

DRL invests in projects to enhance STEM learning for people of all ages. Its mission includes promoting innovative research, development, and evaluation of learning and teaching across all STEM disciplines by advancing cutting-edge knowledge and practices in both formal and informal learning settings. DRL also promotes the broadening and deepening of capacity and impact in the educational sciences by encouraging the participation of scientists, engineers, and educators from the range of disciplines represented at NSF. Therefore DRL's role in the larger context of Federal support for education research and evaluation is to be a catalyst for change-advancing theory, method, measurement, development, evaluation and application in STEM education. The Division seeks to advance both early, promising innovations, as well as larger-scale adoptions of proven educational innovations. In doing so, it challenges the field to create the ideas, resources, and human capacity to bring about the needed transformation of STEM education for the 21st century.

Because NSF is the premier Federal agency supporting basic research at the frontiers of discovery in the STEM fields, DRL takes as a central principle that new and emerging areas of STEM must figure prominently into efforts to improve STEM education at all levels and in all settings. Its programs should reflect this through the integration of cutting-edge STEM content and the engagement of STEM researchers in all DRL initiatives.

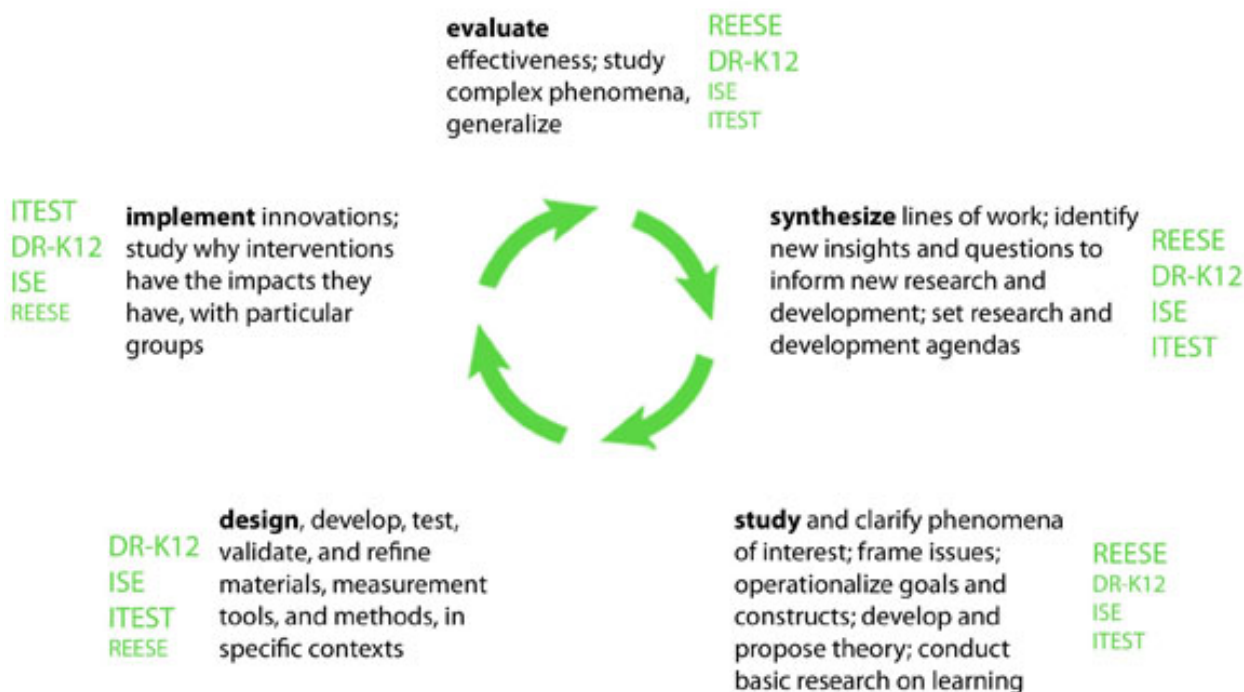
The Division's programs offer a set of complementary approaches for advancing research, development, and field-based improvement strategies.

- The Research and Evaluation on Education in Science and Engineering (REESE) program aims at advancing research at the frontiers of STEM learning, education, and evaluation, and at providing the foundation knowledge necessary to improve STEM teaching and learning at all educational levels and in all settings.
- The Discovery Research K-12 (DR K-12) program seeks to enable significant advances on K-12 student and teacher learning of the STEM disciplines, through research and development of innovative resources, models, and technologies for use by students, teachers, administrators and policy makers.
- The Informal Science Education (ISE) program builds on educational research and practice and seeks to increase interest in, engagement with, and understanding of STEM by individuals of all ages and backgrounds through self-directed STEM learning experiences.
- The Information Technology Experiences for Students and Teachers (ITEST) program seeks to engage students and teachers in the creative use of information technologies within the context of STEM learning experiences in school and other learning settings

Each of these programs is intended to improve the capacity of their respective fields to further STEM learning. They are central to NSF's strategic goals of *Learning* and *Discovery*, helping to cultivate a world-class, broadly inclusive STEM workforce, expanding the scientific literacy of all citizens, and promoting research that advances the frontiers of knowledge.

All research and development activities within DRL aim at generating knowledge, informing practitioners, and transforming practice in STEM education. DRL's programs are designed to complement each other within a cycle of innovation and

learning (see Figure 1) that forms the conceptual framework for its programs (adapted from RAND, 2003, American Statistical Association, 2007, NSF EHR, 2005). All DRL programs are concerned with all five components of the cycle, to different degrees. Programs whose primary emphases relate to particular components appear in larger type.



**Figure 1. DRL Cycle of Innovation and Learning**  
(Note: Programs whose primary emphases relate to particular components appear in larger type.)

Each part of the cycle, represented by the activities of DRL's programs, forms the vital and compelling foundation for advancement of the next. From challenging the STEM educational and research communities with innovative ideas, to conducting the pioneering and pragmatic research necessary to advance those goals, to developing world-class instructional materials and resources for teachers to advance their knowledge of STEM teaching and learning, to engaging all citizens and residents of the United States in learning and as future technologists, scientists and engineers, DRL is providing the ideas, resources, and human capacity to advance STEM learning and education in the 21<sup>st</sup> Century.

The major distinction between DR-K12 and REESE is that DR-K12 focuses specifically on issues of *K-12 learning* and projects will either involve a *substantial development component*, or will study the *implementation of particular resources, models and technologies for the purpose of informing future design and implementation* - the **design** and **implement** components of the cycle. REESE focuses primarily on *building theory and knowledge through research and evaluation*, across learning contexts and ages - the **study** and **evaluate** components in the cycle. The outcomes of DR-K12 projects will be resources, models, or technologies that are grounded in or informed by research or practice, as well as research findings about the implementation and impact of K-12 STEM education resources, models and technologies. The primary outcomes of REESE projects will be research findings, methods, and theoretical perspectives.

## References

American Statistical Association (2007). *Using statistics effectively in mathematics education research*. Retrieved July 9, 2007 from [http://www.amstat.org/research\\_grants/pdfs/SMERReport.pdf](http://www.amstat.org/research_grants/pdfs/SMERReport.pdf).

RAND Mathematics Study Panel (2003). *Mathematical proficiency for all students: Toward a strategic research and development program in mathematics education*. (MR-1643.0-OERI) Santa Monica, CA: RAND.

National Science Foundation (2005). *The mathematics education portfolio brief*, (NSF 05-03). Retrieved July 9, 2007 from <http://www.nsf.gov/pubs/2005/nsf0503/nsf0503.pdf>.

## II. PROGRAM DESCRIPTION

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The goals of the REESE program are: (1) to advance discovery and innovation at the frontiers of STEM learning, education, and evaluation; (2) to stimulate the field to produce high quality and robust research results through the advancement of theory, method, and human resources; and (3) to help coordinate advances in education, learning research, and evaluation efforts. REESE advances its mission by developing an interdisciplinary research portfolio focusing on core scientific questions of learning in real and emerging educational contexts, both formal and informal, from childhood through adulthood, and from before school through to graduate school and beyond into the workforce. In addition, research questions related to educational research methodology and evaluation are central to the REESE activity.

All REESE proposals must be responsive to one of two broad topical strands, *Frontier Research* or *Contextual Research*, as described below.

### A. Frontier Research

Research on the frontiers of knowledge often challenges existing assumptions about learning and teaching within or across STEM fields. It is the commitment of the REESE program to transform the STEM education and learning research and policy agenda through novel answers to foundational questions about what STEM concepts can be learned by whom, at what age, and how and where that can happen.

REESE seeks proposals that have the potential to transform existing fields of STEM learning and education through pioneering research that defies disciplinary boundaries in pursuit of the frontiers of knowledge in STEM learning. Through the Frontier projects, REESE challenges scholarly communities to put forward groundbreaking ideas, concepts, theories, modes of research and development, and the measurement and methodological technologies needed to understand and measure the impact of the proposed innovations. Frontier research is by its nature uncertain, so high-risk/high-gain proposals are welcome.

The REESE program expects that Frontier proposals will seek to contribute to far-reaching and longer-term developments in knowledge and theory. Thus, Frontier proposals should be potentially transformational in their implications in one or more of the following emerging topics of scholarly examination. Frontier proposals may be especially oriented toward the **study** and **design** components of the cycle in Figure 1. Please note: Frontier research proposals are limited to one or more of the following topics *only*.

#### 1. *Neural basis for learning mathematics*

Much scientific research is founded on mathematical reasoning. Recent developments in the technology for detecting, measuring, and imaging brain activity during cognitive task performance offer new opportunities for advancing understanding of mathematical cognition and for providing guidance to mathematics education. Over time, research on the learning of mathematics could begin to form the basis for more general reasoning in the sciences. The REESE program wishes to support behavioral, computational cognitive modeling or other studies that incorporate neural evidence to examine a range of issues in learning mathematics, including: (a) how mathematics learning is localized in the brain and how it overlaps with more general cognitive processing including the use of language; (b) how mathematics learning at a behavioral level is manifested in the brain during development and maturation; (c) in what ways the brain responds to targeted instructional interventions, particularly in the development of expertise, and whether the effectiveness of these interventions is tied to brain maturation; (d) what prior research (e.g., in psychophysics) could be combined with new work to understand the number sense/magnitude systems in the brain; (e) how studies on visuo-spatial and verbal learning can inform understanding of the learning of geometry or geometrical reasoning; (f) how the brain processes graphical and visual data during mathematical learning or reasoning; (g) how executive functioning, attentional processes, or memory limitations affect complex mathematics learning or reasoning; and (h) the role of affective processes, including the study of mathematics anxiety or the role of reward systems. REESE encourages proposals that specifically help establish the neural basis for learning core concepts in mathematics, and that develop tasks and experimental stimuli necessary to conduct such studies. Research teams with appropriate expertise, including mathematicians, should be assembled for these projects.

#### 2. *Cognitive processes underlying STEM learning and teaching*

The REESE program encourages proposals that push the boundaries of existing knowledge about the cognitive processes underlying the learning and teaching of complex STEM content at all age levels and in all learning contexts. The program seeks to foster

interdisciplinary collaboration between cognitive scientists and educational researchers, bringing their respective literatures into more systematic and productive contact. To that end, investigators must make a clear case for how the proposed research has the potential to lead to significant advancements in our understanding of STEM learning and teaching, even if such advancement is long-term and by no means assured. In particular, studies must identify the STEM content of focus and argue for its importance. Similarly, assumptions, whether implicit or explicit, about STEM learning must engage relevant theoretical developments and empirical findings, whether in the cognitive science or education research literatures.

This is a call for researchers to attempt to make substantial progress on fundamental intellectual and scientific questions about the nature of learning, teaching, and knowing that bear upon developing expertise in STEM fields. For example, investigators might take advantage of recent developments at the intersection of mathematics and cognitive science that seek to create probabilistic models of reasoning, memory, language, categorization, and learning in complex STEM domains. They might address such problems as whether and which aspects of knowledge of the natural world have early-arising conceptual biases that influence the course of learning throughout the lifespan, affecting which STEM concepts appear to be commonsense and which seem counterintuitive. By contrast, investigators might address claims about which aspects of understandings of the natural world are relative to a particular social or linguistic context and how they arise.

### 3. *Measurement, modeling, and methods*

The REESE program is committed to advancing the state of the art in STEM learning and education research and evaluation by supporting proposals to improve or develop new qualitative and quantitative methods, measures, tools and analytic techniques. Investigators studying problems in this area must make a clear case for how the proposed methods will be developed and applied within the context of education, learning, or evaluation research in one or more specific STEM content areas.

For instance, researchers and evaluators studying complex STEM education phenomena are in need of methods for reducing data while maintaining their validity and reproducibility, and without losing their inherent richness. Some methodologists are experimenting with hybrid forms of qualitative and quantitative techniques based in game and risk theory within more traditional experimental designs, for application to STEM education problems. Moreover, continued work is needed in methods of combining and aggregating different forms of evidence within a single design or across multiple studies through such methods as meta-analytic or synthetic techniques, mixed qualitative-quantitative techniques, and modeling data derived from qualitatively diverse perspectives in causal logic. New evaluation models to examine STEM program and project impact may be developed and validated.

REESE encourages the development of measures that can increase the validity and reliability of conclusions drawn from effects estimated through a range of scaling and other construct measurement techniques. Instruments that are designed to measure complex and meaningful constructs in STEM learning and education can be developed and tested in various field settings, within the contexts of research, implementation and program evaluation, and by a variety of users of different backgrounds. In the tradition of evaluation in particular, opportunities exist for a more synergistic union between measurement work deeply rooted in one or more STEM content areas (often absent from education evaluations) with methods designed to assess the impact of programmatic or policy implications at various organizational levels.

In addition, the STEM education research and evaluation communities remain in need of appropriate and robust ways to measure and model constructs at higher programmatic and organizational levels and within nested logic structures. Often these phenomena cannot be accurately depicted by simply aggregating individual level phenomena. Measurement and scaling techniques often make analytic assumptions about the parametric form of data and about nested phenomena themselves that fail to capture the complexity of many learning environments and that fail to meet classical statistical assumptions. Owing to this, research is encouraged that seeks ways that measurement and modeling techniques can become more intellectually responsive to education and learning theory and more robust to modeling assumptions, so that they can be applied to STEM learning and education questions.

Accurate attribution of causes to effects, especially in contexts where there are multiple



interventions operating at multiple organizational levels and enacted for various durations and to various degrees, is a continuing applied research and evaluation challenge. While STEM educational improvement programming has become more complex and multi-faceted over time, proper evaluation and research approaches and measurement and modeling techniques have failed to keep pace. In this regard, problems in the nesting of data or making estimates of intervention effects at various analytic levels may be also addressed and made robust to violations in assumptions. REESE encourages proposals that seek creative and robust solutions to these issues, for direct application in STEM education settings.

In the area of modeling and related developments for data mining, sharing, and manipulation, some fields of science and engineering are tapping creative solutions to representation. These solutions emerge from large-scale, distributed data and other authentic resources now becoming available due to advances in computing power, pattern recognition, graphical imaging and representation, and other web-based venues and technologies. Techniques such as these might be extended and adapted for use in modeling learning trajectories, making inferences about particular large-scale interventions, or in diffusion of innovations at various levels of social systems. REESE is interested in proposals to adapt and advance these techniques for application to STEM education.

Finally, proposals that seek to improve the means by which policymakers and the lay public can interpret and use research findings derived from relatively complex research and evaluation methods, while preserving their important nuances and caveats, are encouraged. Policymakers and decision makers need to be able to understand the findings of research in ways that communicate effectively but they also need to know when and where such findings apply. Better techniques are needed to assess the degree to which a finding holds across various settings, populations, and organizational contexts and the extent to which findings derived in one place may be transferable or portable to another. For any proposal addressing this area, the frontiers of STEM educational research and evaluation depend, in significant part, on the quality of tools available to researchers and evaluators and the availability of solutions to common challenges inherent in doing research and evaluation in real-world educational field settings.

#### 4. *Cyber-enabled learning and teaching*

NSF views the distributed knowledge communities enabled by cyberinfrastructure resources as providing a new basis for scientific research that is historically unprecedented. Networks of scientists are active in interdisciplinary research that reaches across temporal and geographic boundaries. Ongoing developments in cyberinfrastructure, including new tools and methods, hold potentially great promise for how, where, and for whom STEM research, STEM education, and STEM learning is organized and takes place. REESE welcomes research proposals that study how these networks of distributed knowledge communities may be exploited to advance the teaching and learning of STEM content at all age levels, in both formal and informal settings. Clear possibilities extend to the type of STEM content that can be taught, learned, and assessed, and the networked conditions under which these occur. REESE also encourages proposals that seek to understand the social, organizational, and technological effects (both positive and negative) that these developments have in teaching and learning STEM content. Investigators must make a clear case for how the proposed research represents the potential for a significant advance in STEM learning and teaching.

## **B. Contextual Research**

The Contextual Research strand encourages proposals that address central problems and topics in STEM education, teaching and learning, and evaluation, for all age groups and in all settings-problems that must be addressed in order for substantial progress to be made in educating the STEM workforce of tomorrow and ensuring the STEM literacy of all. Research in this area is often multidisciplinary, drawing on the expertise of STEM content experts, STEM education researchers, cognitive and social scientists, computer scientists, and potentially those from other areas of praxis and scholarship. It may also draw on international research trends and theoretical perspectives

In contrast to Frontier Research, which is limited to the specified topics above, the Contextual Research strand of REESE offers two broad areas-research on teaching and learning and research on policy and systems-as domains on which many of the problems central to advancing STEM learning and teaching are located. Investigators are welcome to draw on other key elements of current contexts for STEM education in arguing for the importance of other particular research topics. The REESE program expects that Contextual Research proposals will more typically address problems that are current and widely visible

within STEM teaching and learning, with nearer-term, more-direct implications for use in the context of policy and practice than is the case for Frontier research projects.

The research findings, prototypes, or other output of these contextual projects should be of use to communities of researchers, policy analysts, and developers who seek to develop curricula, improve teacher education programs, or provide guidance to policymakers or other stakeholders. Although a project may involve a specific curriculum, program, or policy as a test case, the intellectual merit and broader impact of the project should be carried by the potential progress it suggests for the deeper questions it engages. (For investigators interested in developing resources, models, or technologies, such as curricula, refer to the Discovery Research K-12 (DRK-12) program solicitation).

Examples of the type of work invited under this solicitation follow, although they do not constitute an exhaustive or mutually exclusive set of priorities.

1. *Studies of STEM teaching and learning in formal and informal settings.*

REESE invites proposals that advance understanding of the broad role that teachers and faculty, teaching and instruction, curriculum and learning environments, and assessment have for learning and education in STEM content areas. Topics such as recruitment, preparation, training, continuing development, and retention of STEM educators (e.g., K-12 teachers, graduate teaching assistants, higher education faculty, informal science educators) are central concerns of educational organizations of many types. For example, REESE encourages research on the content knowledge that STEM professionals need in order to teach particular topics and how that knowledge affects learning. It also encourages research on teacher or faculty understanding of learner knowledge in particular STEM domains, and on how learners' pre-existing conceptual understandings or misunderstandings affect their learning of more sophisticated STEM content.

REESE is strongly committed to supporting projects that lead to further understanding STEM learning, of a variety of aspects of STEM content, in all of its contexts. Projects are encouraged to examine the implications that learning of particular content, in particular social contexts (such as classrooms, cooperative learning arrangements, undergraduate courses, graduate programs or informal settings) has for individual learning and achievement. REESE encourages proposals on STEM learning in informal settings (e.g., museums, science centers, zoos and aquariums, and from media) due to the continued growth of these activities, their increased importance to people's out-of-school and lifelong learning experiences, and the blurring of the boundaries in society as to where, when, and how people learn. Perhaps particular STEM content is best learned in informal settings. REESE considers proposals on STEM learning in settings such as out-of-school programs, programs for at-risk students, alternative organizational designs for education and learning, home schooling, parent-child interactions, emergent social learning structures such as are available over the internet, and linkages between formal and informal settings.

REESE invites proposals for learning research that can help provide a foundation for methods for assessing learners' knowledge in STEM content domains. The learning of specific STEM content must be an integral aspect of these proposals and the particular content domain must be made explicit. Such research may address how to characterize student understanding, broadly defined, for multiple uses by teachers, administrators, parents, students, and policymakers.

Finally, REESE encourages proposals that unite research in teaching, learning, and assessment through the study of particular learning trajectories or progressions of STEM content across age bands or grade levels. These learning progressions research projects may seek to test conceptual models for what may be needed for the effective teaching, learning, and assessment of the novel, deep, or foundational content proposed. Such research studies aim to understand the dynamic interplay affecting the relationships among learner, teacher, and content in testing key conjectures and theoretical ideas about teaching, learning, and/or assessment.

2. *Policy, evaluation, and systems studies*

The REESE program is interested in research on the role of policy, evaluation, and organizational dynamics as they pertain to STEM learning and education. For example, policies and standards shaping large-scale testing programs at the state level affect the opportunities students have to learn STEM content, the selection of curriculum and instructional materials (and so what is taught at which grade level and how it is taught), and

rewards and incentive structures for organizational change. The data analytic capabilities of schools, administrators, and teachers may have implications for the implementation and use of such programs. Similarly, general education requirements at the postsecondary level and graduation requirements at the secondary level may have important benefits, opportunity costs, and individual and organizational responses.

Evaluation research can undertake evaluation of STEM education innovations and implementation. Such work should demonstrate how the evaluation design is rigorous and suitable to the questions being addressed. Proposers would need to argue how the project would advance knowledge in the evaluation research domain, and why the particular intervention is likely to lead to insights that can have impact nationally. Evaluation research also might look at the role that evaluation plays in improving education, or in shaping policy.

Systems studies can include such entities as K-12 school systems, informal educational organizations, and institutions of higher education (including graduate education) and requisite governance authorities. It also includes broader conceptions and organizational designs for learning such as those distributed in both virtual and real environments, those connected with larger national and international systems of innovation, or those linked across the various levels of the education system. In all cases, an argument for why the particular research questions are relevant for STEM learning must be provided. Systems studies may examine the mechanisms for the spread of research findings or other innovations. REESE welcomes research that deepens understanding of how systems-related resources can be engaged to advance the STEM learning of students who are members of underserved populations, perhaps identifying and modeling points within an organizational system that are particularly vulnerable or resilient to change.

REESE encourages research that seeks to understand the ways individuals, organizations, and whole systems respond to policy mandates and other interventions across various levels (i.e., international, national, state, district, school, or university and college) as they relate to STEM learning. Issues of adaptive and emergent organizational behavior are of interest in producing theoretical, descriptive, and potentially predictive models of change in STEM education and learning.

Policy and systems research problems are likely to require collaborative teams of researchers and practitioners, including social psychologists, sociologists, systems and institutional theorists, organizational sociologists, policy experts and economists, STEM education researchers, and STEM disciplinary experts.

### C. Information Applicable To All Proposals

**Research design and methodology:** In addition to encouraging proposals on a wide range of topics, the REESE program encourages research at various points in the cycle of innovation and learning, from early exploration, to early testing and refinement, to more definitive summative trials of innovations in actual practice (including the possibility of randomized control trials). Each supported project must meet the following basic requirements:

1. The proposed topics, questions, methodologies, and research settings must be consistent with the overall goals of the REESE program. Investigators should pose research problems of compelling national importance deeply rooted in one or more STEM fields. Research questions must be clear and specific and must be answerable through the means proposed.
2. The investigators must demonstrate how the proposed research program builds upon existing evidence obtained from relevant prior research. All proposals must draw on the existing educational and learning literatures *and* on the literature in one or more other domains such as the natural and biological sciences, engineering, psychology, cognitive science, cognitive neuroscience, organizational science, anthropology, economics, statistics, mathematics, sociology, and information science. A range of research designs appropriately matched to the nature of the research problem and questions are encouraged in REESE.
3. REESE expects investigators to propose rigorous and replicable research methods that are well-justified, are suited to the particular research questions being studied, and that have the likelihood of yielding significant knowledge in pursuit of core problems in STEM education and learning.
4. The investigators must explicitly describe the research design including the methods, sample selected for study, instruments, and all means of data collection. Information must also be provided on the reliability, validity, and appropriateness of proposed measures. If the reliability and validity of

the estimators are initially unknown, the applicant must include specific plans for establishing these measurement properties.

5. The investigators must provide a specific data analytic plan, including procedures to code and (if necessary) reduce qualitative data, details on how potential threats to internal and external validity will be addressed, and power analyses (when appropriate) demonstrating the adequacy of proposed cell sizes.

**Project personnel and management:** The research and management roles of each of the senior personnel on the project must be described in brief within the project description. Collaborative teams representing multiple disciplines will be typical in REESE projects. In addition, at least one of the senior personnel must be designated as the methodology and measurement leader of the project. In single investigator projects, this person will necessarily be the principal investigator. In multi-investigator projects, this person must be listed among senior personnel and may or may not be the principal or a co-investigator. All projects should address the role to be played by STEM disciplinary experts, as appropriate.

Where projects request time for students and other trainees, specific plans must be discussed for how any postdoctoral associates, graduate students, undergraduates, or others will benefit in their education and training in connection to the proposed research. Involvement of students is encouraged as a means of building capacity in STEM education.

REESE does not necessarily expect the same team of investigators to conduct research across all components of this cycle. However, investigators are expected to conduct research so that relevant models, frameworks, data and measures are well-documented, replicable, and usable by other research teams wishing to work on similar problems from other vantage points or by using other research designs. It is the intention of the REESE program to encourage investigative teams to work simultaneously, as part of a larger knowledge community, on a given problem of national importance. See the Large Empirical proposal discussion under Eligible Project Types for related information.

**Dissemination:** All REESE projects are expected to accumulate and communicate knowledge to the relevant research, policy, and practitioner communities. As part of DRL's strong and unwavering commitment to the broader impacts of funded research, successful REESE projects must publish in peer-reviewed professional or scholarly journals and must disseminate findings (positive or negative) through appropriate means to audiences relevant to the goals of the project. Projects are encouraged to seek out appropriate audiences across disciplinary boundaries. Projects will also be expected to share findings with the REESE Diffusion and Evaluation project.

**Project Evaluation:** All projects must have an evaluation plan that includes measures that the project team intends to use in assessing its success and meeting its milestones and objectives. It is critical that all studies have substantive external review that provides regular feedback on the project's research methods and progress, analysis procedures, interpretation of data into findings, and dissemination activities. Proposals must make a clear argument for what steps will be taken to ensure that the proposed evaluation is distant from the project and is objective.

#### D. Eligible proposal types

This solicitation calls for four types of proposals: knowledge diffusion, empirical, large empirical, and a national synthesis project. The content of all proposals, regardless of their type, must be responsive to one or more topics in the Frontier or Contextual strands described above. The proposal type and its research strand must be specified in the project summary, preferably in the first sentence.

##### 1. *Knowledge Diffusion proposals*

Knowledge diffusion projects are small grants for the synthesis of existing knowledge on a topic of critical importance to STEM learning, education, and/or evaluation, or for the diffusion of research-based knowledge. Synthesis proposals should identify areas where the knowledge base is sufficiently robust to support strong scientific claims, identify areas of importance to education research, evaluation or practice, and propose rigorous methods for synthesizing findings and drawing conclusions from a range of relevant literatures. Proposals should identify the criteria to be used for including or excluding studies. Investigators are permitted to propose workshops and other meetings in pursuit of the diffusion of research-based knowledge or to provide training on topics of advanced research or evaluation methods, analysis, modeling, or measurement. Maximum award size for knowledge diffusion proposals is \$250,000 for duration of up to two years.

## 2. *Empirical proposals*

Empirical proposals should identify areas that have the potential for advancing discovery and innovation in STEM learning. These projects are designed to support the collection of new empirical data and are expected to be based deeply in the STEM disciplines. Maximum award size for most empirical proposals is \$1,000,000 for duration of up to three years.

## 3. *Large Empirical proposals*

REESE will support a limited number of projects up to \$2,000,000 for up to five years. Proposals must carefully justify why a budget of this size would be required to carry out the research. The proposals will generally involve teams of multi-disciplinary experts working on conceptually related projects. For example, one team could seek to develop a new behavioral measure of learning in a content area of particular STEM importance, while a second team studied the neural underpinnings of learning in the area. A proposal may have one team generating a mature prototype, while another team might test the hypotheses about learning in a randomized control trial. Another example would be one team conducting largely theory-generating work from an ethnographic approach, while other teams conduct complementary quantitative studies. Such proposals must also include a Coordination Plan that provides (1) a description of how the separate activities are conceptually interlinked, (2) the rules for data sharing among the partners, (3) a description of how samples or data collection will be complementary or will use parallel data definitions, (4) a discussion of how data will be jointly modeled or analyzed or how findings will be aggregated across teams, (5) plans for joint publication and dissemination, and (6) a plan for ongoing dialogue, communication, and scholarly exchange. The Coordination Plan should be described in an appendix of not more than five pages. Nothing else may be included in the appendix.

Other types of proposals that might be appropriate for a large award would be a longitudinal study of a large sample of participants, or a randomized control trial of an intervention whose efficacy has been established in more limited conditions. These projects do not require a Coordination Plan.

## 4. *REESE Diffusion and Evaluation Project*

REESE will fund a diffusion and evaluation project as a cooperative agreement to support the goals of this program. The project will provide technical assistance for projects on research methods and analysis procedures, synthesize findings across the REESE portfolio of projects, perform special evaluative studies, and promote national awareness of research contributions from the REESE program. The project also will build the REESE community and connections to other relevant communities, through support of principal investigator meetings, more focused meetings around topics of interest and concern, and workshops on such topics as methods, data, and instrument sharing across projects. Successful proposers must have the capacity to manage a national level project, demonstrate deep and broad expertise in research on learning and education, and document their ability to provide methodological assistance, synthesize results, and disseminate program findings to multiple stakeholder audiences. Proposals for Diffusion and Evaluation are permitted to request up to \$5,000,000 for duration of up to five years.

- E. **Conferences and Workshops.** REESE may support a few well-focused conferences or workshops related to the goals of the program. Budgets are expected to be related to the duration of the event and the number of participants, but normally the total cost will not exceed \$100,000. Please see the [GPG Section II. D.](#) for additional information about conference and workshop proposals. Proposals may be submitted at any time, generally at least one year in advance of when the conference would be held. All conference proposals should provide for an evaluation of the impact of the conference done 18 months after the conference.

## III. AWARD INFORMATION

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Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. NSF expects to make standard or continuing grant awards and a cooperative agreement. The estimated number of awards will be 25 to 35. It is anticipated that about 10-15 Knowledge Diffusion awards, 10-15 Empirical awards, four Large Empirical awards, and one Diffusion and Evaluation award will be made. The anticipated funding amount is \$30,000,000. The maximum award for Knowledge Diffusion projects is \$250,000 with duration of up to two years. The maximum award

Empirical project is \$1,000,000 with duration of up to three years. The maximum award for Large Empirical research projects is \$2,000,000 with duration of up to five years. The maximum award size for the Diffusion and Evaluation project is \$5,000,000 for duration of up to five years.

#### IV. ELIGIBILITY INFORMATION

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The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the [Grant Proposal Guide](#), Chapter I, Section E.

**Organization Limit:**

None Specified

**PI Limit:**

None Specified

**Limit on Number of Proposals per Organization:**

None Specified

**Limit on Number of Proposals per PI:**

None Specified

#### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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##### A. Proposal Preparation Instructions

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**Letters of Intent(*optional*):**

Letters of Intent must be submitted via the NSF FastLane system, using the Letter of Intent module in FastLane, for all types of proposals.

**Letter of Intent Preparation Instructions:**

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is not required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

**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 [pubs@nsf.gov](mailto:pubs@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/bfa/dias/policy/docs/grantsgovguide.pdf>). 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 [pubs@nsf.gov](mailto:pubs@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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

**Refer to Section II, Program Description, for additional proposal preparation information and instructions.**

## B. Budgetary Information

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**Cost Sharing:** Cost sharing is not required under this solicitation.

**Budget Preparation Instructions:** A careful and realistic budget in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG), consistent with the proposed activities, and including a request for funds to cover the cost of attendance of the PI at each year's annual awardee meeting in Arlington, VA should be submitted with the proposal.

## C. Due Dates

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- **Letter of Intent Due Date(s) (optional)** (due by 5 p.m. proposer's local time):

November 05, 2007

optional

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

January 08, 2008

Full Proposals

## D. FastLane/Grants.gov Requirements

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- **For Proposals Submitted Via FastLane:**

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

**Submission of Electronically Signed Cover Sheets.** The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information

about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: [support@grants.gov](mailto:support@grants.gov). The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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 with the proposer.

### A. NSF Merit Review Criteria

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All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

#### **What is the intellectual merit of the proposed activity?**

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

#### **What are the broader impacts of the proposed activity?**

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: <http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf>.

NSF staff will give careful consideration to the following in making funding decisions:

#### **Integration of Research and Education**

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.



### ***Integrating Diversity into NSF Programs, Projects, and Activities***

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

## **B. Review and Selection Process**

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

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

## **VII. AWARD ADMINISTRATION INFORMATION**

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### **A. Notification of the Award**

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

\*These documents may be accessed electronically on NSF's Website at [http://www.nsf.gov/awards/managing/general\\_conditions.jsp?org=NSF](http://www.nsf.gov/awards/managing/general_conditions.jsp?org=NSF). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [pubs@nsf.gov](mailto:pubs@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 before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. 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 FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

### Additional Reporting Requirements

The REESE program is planning a program-wide monitoring process. Awardees may be expected to provide data for monitoring purposes.

## VIII. AGENCY CONTACTS

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General inquiries regarding this program should be made to:

- Address questions to:, telephone: (703)292-8650, email: [DRLREESE@nsf.gov](mailto:DRLREESE@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, MyNSF (formerly the Custom News Service) 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 Regional 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. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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

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 40,000 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 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: [pubs@nsf.gov](mailto:pubs@nsf.gov)  
  
or telephone: (703) 292-7827
  
- **To Locate NSF Employees:** (703) 292-5111

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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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  
Division of Administrative Services  
National Science Foundation  
Arlington, VA 22230

[Policies and Important Links](#) | [Privacy](#) | [FOIA](#) | [Help](#) | [Contact NSF](#) | [Contact Web Master](#) | [SiteMap](#)



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