Data-Intensive Research to Improve Teaching and Learning - An Ideas Lab to Foster Transformative Approaches to Teaching and Learning

PROGRAM SOLICITATION
NSF 13-565

National Science Foundation

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

Preliminary Proposal Due Date(s) ***(required)*** (due by 5 p.m. proposer's local time)***:***

August 19, 2013

Required for participation in the Ideas Lab workshop to be held October 7-11, 2013. Selected participants will be notified by September 6, 2013. Not required for full proposals that were not developed through the Ideas Lab.

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

December 09, 2013

All full proposals, whether or not developed through the Ideas Lab, must be received by the full proposal deadline. Proposers do not need to have participated in the Ideas Lab to submit a full proposal.

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 13-1, was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in NSF 13-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in NSF 13-1.

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, National Science Foundation's Merit Review Criteria: Review and Revisions. While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the *Grant Proposal Guide* and the *Award & Administration Guide*.

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the Grant Proposal Guide.

There are two paths towards final submission of proposals to this activity - through the Ideas Lab or through direct submission of a full proposal. Applicants who did not participate in the Ideas Lab or who did participate but were not invited to submit a full proposal may submit full proposals by the December 9, 2013 deadline. Participation in the Ideas Lab is not required to submit a full proposal.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Data-Intensive Research to Improve Teaching and Learning - An Ideas Lab to Foster Transformative Approaches to Teaching and Learning

Synopsis of Program:

The goal of this activity is to foster novel, transformative, multidisciplinary approaches that address the use of large data sets to create actionable knowledge for improving STEM teaching and learning environments (formal and informal) in the medium term, and to revolutionize learning in the longer term. These approaches will involve the work of learning scientists, STEM disciplinary experts, computer scientists, statisticians, database experts and educational researchers who design and study learning environments. Among the potential benefits of integrating approaches from these disciplines are improving student learning and engagement, optimizing personalized instruction, and supporting rapid decision making to help educators respond more effectively to the learning needs of individuals and groups of learners in multiple settings. These approaches may be risky but should have the potential to rapidly advance the field. The scope of this activity does not include infrastructure development

focused on data base design and development for education domains. The new approaches envisioned in this solicitation will require the generation and use of data that range from micro-level data on individual learners, to data from online learning sources (such as massively open online courses), to meso-level data from the classroom that provide information to students and teachers about how learning is progressing, to macro-level data such as school, district, state, and national data, including data from federal science and policy agencies. Participants in the Ideas Lab, selected through an open application process, will engage in an intensive five-day residential workshop, the development of multidisciplinary collaborative proposals through a real-time and iterative review process, and, for the participant teams invited to submit full proposals, the subsequent submission of full proposals.

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.

- Doris L. Carver, Program Director, EHR/DGE, telephone: (703) 292-5038, email: dcarver@nsf.gov
- Edith Gummer, Program Director, EHR/DUE, telephone: (703) 292-5110, email: egummer@nsf.gov
- Nandini Kannan, Program Director, MPS/DMS, telephone: (703) 292-8584, email: nkannan@nsf.gov
- Janet Kolodner, Program Director, CISE/IIS, telephone: (703) 292-8930, email: jkolodne@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 10 Up to 10 awards will be made in FY2014, pending availability of funds and the type, scale, and variety of project ideas developed at the Ideas Lab or submitted directly to NSF.

Anticipated Funding Amount: $5,000,000

Up to $3,000,000 will be available for FY2014 for successful proposals through the Ideas Lab, pending availability of funds and compelling proposals. Up to $2,000,000 in additional funds will be available in FY2014 for proposals in this competition not developed through the Ideas Lab, pending availability of funds.

Eligibility Information

Organization Limit:

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

PI Limit:

An individual may be included as a Co-PI or senior investigator on multiple full proposals.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

There are no limitations on the number of full proposals that can be submitted per PI.

However, preliminary proposals are required for individuals who wish to be participants in the Ideas Lab. Each potential participant for the Ideas Lab must submit a separate preliminary proposal (1 preliminary proposal per person). No Co-PIs are permitted.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.

- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

- **Preliminary Proposal Due Date(s)** ***(required)*** (due by 5 p.m. proposer's local time)*:*

  August 19, 2013

  Required for participation in the Ideas Lab workshop to be held October 7-11, 2013. Selected participants will be notified by September 6, 2013. Not required for full proposals that were not developed through the Ideas Lab.

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

  December 09, 2013

  All full proposals, whether or not developed through the Ideas Lab, must be received by the full proposal deadline. Proposers do not need to have participated in the Ideas Lab to submit a full proposal.

Proposal Review Information Criteria

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

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

TABLE OF CONTENTS

I. INTRODUCTION

Today's technological advances in data analysis techniques have enabled commercial entities, health care providers, social networking providers, and educators, among others, to apply the results of data analyses to better respond to their stakeholders. Rich and complex emerging sources of data and new advances in data analysis techniques inform an expanding landscape that can be valuable for developing, implementing, and evaluating new models of teaching and learning at the K-20 levels and beyond. New sources of data and new data analytic techniques allow an historic opportunity to maximize current efforts in formal and informal education institutions. These new data and techniques also allow us to re-envision formal and informal education for the future. Equally, the new data sources and techniques will allow vast numbers of learners not only to learn the science in today's curriculum, but also to explore frontier science activities. Already, we see citizen scientists of all ages engaging and contributing to the shared science mission of the nation.

The 2010 report "A Roadmap for Education Technology" (http://www.cra.org/ccc/docs/groe/GROE%20Roadmap%20for%20Education%20Technology%20Final%20Report.pdf.), prepared under the auspices of the Computing Community Consortium and funded by NSF, describes current educational challenges that include personalizing education, assessing student learning, and developing alternative teaching strategies. The report describes the need for better learning models that help understand when and how knowledge is gained and what pedagogical approaches work best at an individual level. The 2012 report "Enhancing Teaching and Learning Through Educational Data Mining and Learning Analytics: An Issue Brief" http://www.ed.gov/edblogs/technology/files/2012/03/edm-la-brief.pdf) by the U.S. Department of Education emphasizes the need for better models to predict student's learning behavior and for advances in student learning systems. The report advocates the promise of educational data mining, learning analytics, and visual data analytics for improving adaptive systems, while also describing significant barriers, such as interoperability and data alignment, to implementing data mining and learning analytics within K-20 settings.

The need for transformative advances in the teaching and student learning environments for formal and informal education now, and in the future, represents a significant challenge requiring novel ideas and innovative approaches. These new approaches will require the generation and use of data that range from micro-level data on individual learners, to data from online learning sources (such as massively open online courses), to meso-level data from the classroom that provide information to students and teachers about how learning is progressing, to macro-level data such as school, district, state, and national data, including data from federal science and policy agencies. The granularity of the data from each of these sources varies significantly. For example, some datasets contain detailed micro-level information on individual students while other sources provide aggregate macro-level data from state and federal agencies. Data from diverse sources such as data logs, blogs, intelligent tutoring systems, and click streams coming from on-line discussions and interactions with learning technologies provide a plethora of micro-level data that have potential to help advance our understanding of how students learn. In addition, over the past five years, significant investments have been made to develop state and district level student longitudinal data systems (SLDS) that capture large amounts of data ranging from scores on state assessments to the interventions experienced by students, their local benchmark or interim assessment scores, attendance records, discipline referrals and course taking. Integrating these multiple big databases could provide valuable information about the learning experiences of individuals. New methodologies in data mining and learning analytics provide the potential to move beyond the use of these data to inform accountability and compliance to identify optimum pathways through learning environments for individuals. The challenge is maximizing the benefits that can be gained from analysis of these different types of data, allowing for a comprehensive understanding of policy, practice, and conditions that affect education and STEM learning.

The use of these diverse data sets could lead to actionable knowledge that will help with the development of improved teaching and learning systems that provide robust feedback at the individual level. These systems would benefit students, by providing immediate feedback on learning progress, as well as educators by helping them assess pedagogical approaches at the student level. Analytics could focus on identifying patterns that inform beyond-compliance questions, develop forecasting systems to identify early students at risk, and track and monitor the interventions the learners experience that help them become career and college ready. Such knowledge can help educators respond more effectively and timely to the learning needs of individuals.

Access to data sets for educational purposes is improving as new processes by which memoranda of understanding across multiple stakeholders are negotiated. However, there are still barriers to the access that need to be addressed. The development of common data dictionaries and standards has increased the interoperability of databases, but more research and development is needed. The structure of large scale databases differs across scientific and educational domains, including differences in the ways that data are stored and curated. These differences potentially present barriers to the effective use of such data for helping transform learning environments, both now and in the future.

We seek innovative ideas that have potential to transform the way teachers approach teaching and learners approach learning, including ideas for (a) optimizing STEM learning in current K-20 educational environments, either formal or informal; (b) providing models for next-generation practices in K-20 education, either formal or informal; and (c) integrating current formal and informal education practices or providing models for next-generation integration. We encourage research in STEM education to look at how large scale data is transforming the ways that research is conducted in the STEM disciplines, such as nanotechnology, genomics and astronomy.

Important contributions have been made in these areas, but important challenges remain:

1. What sorts of collaborations of researchers from education and other disciplines are needed to develop visions, teams and capabilities dedicated to integrating the micro- and macroscopic elements of educational data to inform these visions, teams and capabilities?

2. What new techniques and technologies are needed to analyze the disparate data sets found in the educational environment? What can be learned from the technologies and practices developed for investigations using large data sets in science and engineering fields? Are subject-specific models needed?

3. Learning can take place at the individual level, as part of emerging "crowd-sourced" learning communities on the internet, or as part of more formal arrangements (e.g., schools and classrooms). What new data that are not being collected would be useful for personalizing instruction, improving student learning, improving student engagement, and providing rapid feedback to learners at any of these levels? What are the issues associated with collecting and analyzing the needed data?

4. How can the information extracted from large educational datasets be used to develop new teaching models that will increase our ability to deliver robust teaching and learning environments? What design changes are necessary to make future datasets richer sources of insights about learning?

5. How can heterogeneous datasets captured in educational environments be rendered interoperable to support improved models of student knowledge that take into account the diverse factors that can affect how students learn? How can interoperability problems with data from multiple learning environments be addressed to achieve better outcomes?

6. How can the information extracted from large datasets be represented and communicated to maximize its usefulness to both teachers and students in a real-time educational setting? What delivery mechanisms are most effective for specific learning environments?

7. How can educational datasets from different learning environment be integrated with the large-scale accountability and administrative databases to inform outcomes and learning? How can the datasets be used to forecast student learning success and identify factors that are associated with performance?

Key advances in teaching and student learning environments will require multidisciplinary teams of investigators. Expertise will be needed from educators, education researchers, behavioral scientists, computer scientists, software developers as well as individuals from other science disciplines and backgrounds that can contribute to understanding student behavior, defining pedagogical approaches that take advantage of increased understanding, and visualizing actionable data in a manner that can be used practically and inspirationally in an education setting.

II. PROGRAM DESCRIPTION

The goal of this activity is to foster novel, transformative, multidisciplinary approaches that address the use of large data sets to create actionable knowledge for improving teaching and learning environments (formal and informal) in the medium term, and to revolutionize learning in the longer term. These approaches may be risky but should have the potential to rapidly advance the field.

The Ideas Lab

The Ideas Lab process entails participation in an intensive five-day residential workshop, the development of multidisciplinary collaborative proposals through a real-time and iterative review process, and, for the participant teams invited to submit full proposals, the subsequent submission of full, invited proposals. The Ideas Lab process was modeled on the "IDEAs Factory" program developed by the Engineering and Physical Sciences Research Council (EPSRC) of the United Kingdom. The concept of the IDEAs Factory program is to organize intensive interactive multidisciplinary workshops ("Sandpits") involving 20-30 participants, with the aim of developing new and bold approaches to address grand challenge questions for topics that could benefit from a new dimension in thinking. The participants are assisted by a team of professional facilitators and by a team of scientists with relevant expertise. These scientific experts, known as mentors, are not eligible for funds from the Ideas Lab, and therefore act as impartial referees of the process.

Interested PIs should respond to this solicitation by submitting preliminary proposals to apply for participation in the Ideas Lab activity, scheduled from October 7-11, 2013. Each potential participant must submit a preliminary proposal (1 preliminary proposal per person); ***no Co-PIs are permitted on the preliminary proposals***. Between 20 and 30 participants will be selected on the basis of the interests, expertise, and other characteristics described in their submitted preliminary proposals. Participants should be willing to engage in frank disclosure and assessment of ideas in a collegial and professional fashion. NSF program staff will assemble a team of mentors and provocateurs, selected for their relevant expertise, as well as professional facilitators to aid the workshop participants in the discussion of workshop topics and development of project ideas.

Submission of the preliminary proposal will be considered an indication of availability to attend and participate through the full course of the five-day residential workshop. The location of the Ideas Lab had not been finalized at the time of publication; information on the site, travel information, and other logistics will be provided to all selected participants. Travel and subsistence costs to attend the workshop will be reimbursed.

Participants in the Ideas Lab will frame a series of challenges in the approaches to the creation of actionable information from large data sets. Participants will be encouraged to frame novel challenges related to the use of large data sets in the teaching and learning environment. Mentors and participants will then engage in a real-time review process of constructive feedback to develop and refine promising ideas to address these challenges or novel approaches emerging from the Ideas Lab. Iterative project development activities will be used to select and advance the most meritorious, transformative, and innovative project ideas. It is expected that these activities and ideas will explore linkages with, and exploit leveraging from, other NSF activities such as Building Community and Capacity for Data-Intensive Research in the Social, Behavioral and Economic Sciences and in Education and Human Resources (BCC-SBE/EHR) and Core Techniques and Technologies for Advancing Big Data Science & Engineering (BIGDATA).

The recommendations provided by the Mentor Panel are advisory to the NSF. Within seven to fourteen days following the workshop, NSF will determine which participant teams will be invited to submit full proposals. The final funding decision(s) will occur after the full proposals have been received and reviewed. Only an invited full proposal will be considered for funding as a proposal submitted from the Ideas Lab.

III. AWARD INFORMATION

Anticipated Type of Award: Continuing Grant or Standard Grant

Estimated Number of Awards: 10 Up to 10 awards will be made in FY2014, pending availability of funds and the type, scale, and variety of project ideas developed at the Ideas Lab or submitted directly to NSF.

Anticipated Funding Amount: $5,000,000

Up to $3,000,000 will be available for FY2014 for successful proposals through the Ideas Lab, pending availability of funds and compelling proposals. Up to $2,000,000 in additional funds will be available in FY2014 for proposals in this competition not developed through the Ideas Lab, pending availability of funds.

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

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

PI Limit:

An individual may be included as a Co-PI or senior investigator on multiple full proposals.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

There are no limitations on the number of full proposals that can be submitted per PI.

However, preliminary proposals are required for individuals who wish to be participants in the Ideas Lab. Each potential participant for the Ideas Lab must submit a separate preliminary proposal (1 preliminary proposal per person). No Co-PIs are permitted.

Additional Eligibility Info:

None specified

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals *(required):* Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

Submission of Preliminary Proposals is required for participation in the Ideas Lab but is not required for full proposals that were not developed through the Ideas Lab. Please note, the Preliminary Proposal must come from one individual and cannot include CO-PIs or collaborators. Participants in the Ideas Lab will be selected on the basis of information submitted in the preliminary proposal. The applications are limited to two pages of "Project Description," that should be submitted as a preliminary proposal in the NSF FastLane system ONLY, not through Grants.gov. Standard NSF formatting guidelines will apply. See the NSF Grant Proposal Guide (GPG) for guidance.

The Project Description section of the preliminary proposal applications should conform to the following guidelines:

1) Page one:

- Provide a brief summary of your professional background (no more than one-half page).
- What expertise do you bring that is relevant to integrating large datasets to create actionable information to advance teaching and student learning environments (no more than one-half page)?

2) Page two:

Please spend some time considering your answers to the following questions. Your responses (no more than 150 words each) should demonstrate that you have suitable skills and aptitude to participate in the Ideas Lab (unrelated to your research track record).

- What is your personal experience with working in teams?
- How would you describe your ability to explain your research to non-experts?
- The Ideas Lab environment is especially suited to individuals who are willing to step outside their particular area of interest or expertise, who are positively driven, who enjoy creative activity, who can think innovatively and who can settle in easily in the company of strangers. Please describe an experience you have had in a comparable environment.
- What would you personally and professionally gain from participating in this Ideas Lab?

Applicants must include a Biographical Sketch and a Current and Pending Support document (prepared in accordance with standard NSF formatting guidelines). All other elements of a "full proposal" are waived (Project Summary, References Cited, Budget, Budget Justification, Facilities, Equipment and Other Resources). No appendices or supplementary documents may be submitted.

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

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

Important Proposal Preparation Information: FastLane will check for required sections of the 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.

Full proposals should contain the following information:

Project Summary: Each proposal must contain a summary of the proposed project not more than one page in length. 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 includes a description of the activity that would result if the proposal were funded and a statement of objectives and methods to be employed. The statement on intellectual merit should describe the potential of the proposed activity to advance knowledge. The statement on broader impacts should describe the potential of the proposed activity to benefit society and contribute to the achievement of specific, desired societal outcomes.

The Project Summary should be written in the third person, informative to other persons working in the same or related fields, and, insofar as possible, understandable to a scientifically or technically literate lay reader. It should not be an abstract of the proposal.

Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review. Additional instructions for preparation of the Project Summary are available in FastLane.

Project Description (Narrative):

Length of Project Description - Describe the research and education activities to be undertaken in 15 pages or less. Include the primary goals, hypotheses or research questions. Explain how the proposed project builds on pertinent literature that supports the proposed approaches. Address how large data sets will be used to advance STEM learning environments. Discuss how the project is innovative, novel, and/or transformative and how it will improve STEM teaching and learning environments (formal and informal) in the medium term. Describe the project's potential to help revolutionize learning in the longer term.

All projects must have an evaluation plan that is appropriate to the goals of the project and explicitly describes the approach that the project team intends to use in assessing its successes and failures and meeting its milestones and objectives. Project evaluations should be sufficiently distant from the project to be objective but should be designed to be of most help to the project team pursuant to its responsibilities to the field.

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. You can decide where to include this section within the Project Description.

Also note that there are 3 supplementary documents that are in addition to the Postdoctoral Researcher Mentoring Plan and the Data Management Plan required for all NSF proposals. These documents include a confirmation of access to data resources, a collaboration plan and a coordination plan.

Budgets:

All budget requests must be consistent with the project scope and duration. All budgets (grantee and subawards) must be accompanied by Budget Justifications that include itemizations corresponding to the FastLane or Grants.gov budget line item. Requested equipment must be essential components of projects deliverables.

Each subaward requires a complete set of Proposal Budget forms accompanied by a Budget Justification that includes the basis for selecting the subawardee as well as itemization of expenses and explanations.

Supplementary Documents:

Note: Supplementary Documents are distinct from Appendices, as stipulated in the Grant Proposal Guide: Appendices may not be included unless a formal deviation has been authorized. See GPG Chapter II.A for more information about deviations.

Note: The 15-page Project Description must provide sufficient information for reviewers to make reasoned judgments about the proposed work.

Supplementary Documents (Required):

Postdoctoral Researcher Mentoring Plan. All proposals that include funding for Postdoctoral researchers must submit a one page Postdoctoral Researcher Mentoring Plan in the supplementary documents section otherwise the proposal will be returned without review (see GPG Chapter II.C.2.j. for additional instructions for preparation of this section).

Data Management Plan. FastLane will not permit submission of a proposal that is missing a Data Management Plan. Plans for data management and sharing of the products of research, including preservation, documentation, and sharing of data, samples, physical collections, curriculum materials and other related research and education products should be described in no more than two pages labeled "Data Management Plan" (see GPG Chapter II.C.2.j for additional instructions for preparation of this section). For more information and the instructions for proposals submitted to the Directorate for Education and Human Resources (EHR) see: http://www.nsf.gov/bfa/dias/policy/dmp.jsp.

Confirmation of Access to Data Resources. Letters of agreement to participate from all appropriate organizations that provide the context for data collection or play a substantial role in ensuring access to required resources are required. Projects that propose to access specific datasets must include confirmation of permission to access the datasets.

Collaboration Plan: Any collaborative project funded through this program must have a signed Collaboration Agreement between the partners that clarifies the contributions and rights of each partner before the start of any grant. NSF attaches great importance to the dissemination of research findings and the publishing of information about the research they support in the public domain. However, all dissemination and publication must be carried out in the manner agreed in the project's Collaboration Agreement.

Coordination Plan: The Coordination Plan must include 1) a description of the specific roles of the collaborating PIs, Co-PIs, other Senior Personnel and paid consultants at all organizations involved; 2) description of how the project will be managed across institutions and disciplines; 3) identification of the specific coordination mechanisms that will enable cross-institution and/or cross-discipline scientific integration (e.g., workshops, graduate student exchange, project meetings at conferences, use of videoconferencing and other communication tools, software repositories, etc.); and 4) specific references to the budget line items that

support these coordination mechanisms.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

C. Due Dates

- **Preliminary Proposal Due Date(s)** ***(required)*** (due by 5 p.m. proposer's local time)*:*

  August 19, 2013

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

  December 09, 2013

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There are two paths towards final submission of proposals to this activity - through the Ideas Lab or through direct submission of a full proposal. Applicants who did not participate in the Ideas Lab or who did participate but were not invited to submit a full proposal may submit full proposals by the December 9, 2013 deadline. Participation in the Ideas Lab is not required to submit a full proposal.

D. FastLane / Grants.gov Requirements

- **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. 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. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. 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. 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

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*. 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 core strategies 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 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 variety of learning perspectives.

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

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

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

Additional Solicitation Specific Review Criteria

This activity, particularly the Ideas Lab approach, is designed to support the development and implementation of creative and innovative project ideas that have the potential to transform research paradigms and/or solve intractable problems. We anticipate that awards made through this solicitation will be high-risk/high-impact, as they represent new and unproven ideas, approaches and/or technologies. Projects that involve the application of novel, collaborative, or interdisciplinary approaches will therefore receive priority during the consideration process. In addition, if the full proposals are derived from the Ideas Lab, the full proposals will be evaluated to determine if the scientific themes/objectives in the project are congruent with the ideas presented at the Ideas Lab, and if any significant changes in project scope or resources from those presented at the Ideas Lab have been justified.

B. Review and Selection Process

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

Stage 1:

Selection of Ideas Lab Participants:

Three to five appropriate and qualified persons external to NSF will be selected to serve as a Selection Panel for the Ideas Lab. These individuals will be subject matter experts for the specific topic of the Ideas Lab. The Selection Panel, and potentially an occupational psychologist, will review the preliminary proposals submitted by applicants and will advise NSF on participant selection. Final selection decisions regarding participation in the Ideas Lab will be made by the NSF.

Overall, the Selection Panel will seek to ensure that a balance of expertise is present at the Ideas Lab; their assessment will be based on the specific criteria outlined below:

- The ability to develop new and highly original research ideas;
- The potential to contribute to research between disciplines;
- The ability to work in a team across academia and industry;
- The ability to explain research to non-experts; and
- The potential to contribute to research on the use of large datasets.

Submission of the preliminary proposal will be considered an indication of commitment to attend and participate through the full course of the five-day residential Ideas Lab on October 7-11, 2013 should the proposer be invited. The decisions of NSF about whom to invite will be final and binding.

Stage 2:

Applicants selected by the NSF will participate in the Ideas Lab workshop, building collaborations and refining ideas. It is anticipated that proposals developed through the Ideas Lab would feature the following:

- Novel highly multidisciplinary research projects, clearly reflecting the distinctive opportunity for creating such projects that the Ideas Lab provides;
- Clear evidence that the team has the capability to deliver its project as a high quality multidisciplinary activity; and
- Clear relevance and potential to make a distinctive and novel contribution to addressing the research challenges of improving student teaching and learning environments.

Stage 3:

Full proposals submitted directly to the program (those proposals submitted by a PI(s) who was not an Ideas Lab participant or a PI who was an Ideas Lab participant but was not invited to submit a full proposal) will be reviewed by a panel of outside reviewers. Proposals resulting from the Ideas Lab will be reviewed by the Mentor Panel. In each case, funding recommendations will be made by NSF.

NSF is striving to be able to inform applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the submission deadline for the full proposal and ends when the Division Director accepts the Program Officer's recommendation.

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 deadline or target date, or receipt date, whichever is later. 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

A. Notification of the Award

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

B. Award Conditions

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

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

C. Reporting Requirements

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

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

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

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

VIII. AGENCY CONTACTS

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

General inquiries regarding this program should be made to:

- Doris L. Carver, Program Director, EHR/DGE, telephone: (703) 292-5038, email: dcarver@nsf.gov
- Edith Gummer, Program Director, EHR/DUE, telephone: (703) 292-5110, email: egummer@nsf.gov
- Nandini Kannan, Program Director, MPS/DMS, telephone: (703) 292-8584, email: nkannan@nsf.gov
- Janet Kolodner, Program Director, CISE/IIS, telephone: (703) 292-8930, email: jkolodne@nsf.gov

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "My NSF" 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. "My NSF" 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.

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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

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

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

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

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

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

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230