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Cyber-Enabled Sustainability Science and Engineering (CyberSEES)

PROGRAM SOLICITATION
NSF 13-500

National Science Foundation

Directorate for Computer & Information Science & Engineering
Division of Advanced Cyberinfrastructure

Directorate for Geosciences
Division of Polar Programs

Directorate for Engineering

Directorate for Mathematical & Physical Sciences

Directorate for Biological Sciences

Directorate for Social, Behavioral & Economic Sciences

Directorate for Education & Human Resources

Semiconductor Research Corporation

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

December 04, 2012

First Tuesday in December, Annually Thereafter

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

February 05, 2013

First Tuesday in February, Annually Thereafter

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.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Cyber-Enabled Sustainability Science and Engineering (CyberSEES)

Synopsis of Program:

The Cyber-Enabled Sustainability Science and Engineering (CyberSEES) program aims to advance interdisciplinary research in which the science and engineering of sustainability are enabled by new advances in computing, and where computational innovation is grounded in the context of sustainability problems.

The CyberSEES program is one component of the National Science Foundation's Science, Engineering, and Education for Sustainability (SEES) activities, a foundation-wide effort aimed at addressing the challenge of sustainability through support for interdisciplinary research and education. In the SEES context, a sustainable world is one where human needs are met equitably without harm to the environment or sacrificing the ability of future generations to meet their own needs.

Computational approaches play a central role in understanding and advancing sustainability. CyberSEES supports research on all sustainability topics that depend on advances in computational areas including optimization, modeling, simulation, prediction, and inference; large-scale data management and analytics; advanced sensing techniques; human computer interaction and social computing; infrastructure design, control and management; and intelligent systems and decision-making. Additionally, the widespread, intensive use of computing technologies also introduces sustainability challenges and motivates new approaches across the lifecycle of technology design and use.

This program is a joint effort of all of the NSF organizations listed on the cover page and the Semiconductor Research Corporation (SRC), through its Energy Research Initiative (ERI) program. While the scope of CyberSEES is broad as detailed herein, the NSF and SRC ERI collaboration within CyberSEES focuses on cyber-enabled sustainability research that addresses computational aspects of smart infrastructures, in particular the smart electric grid.

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.

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

- 47.041 --- Engineering
- 47.049 --- Mathematical and Physical Sciences
- 47.050 --- Geosciences
- 47.070 --- Computer and Information Science and Engineering
- 47.074 --- Biological Sciences
- 47.075 --- Social Behavioral and Economic Sciences
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 12 to 20

Anticipated Funding Amount: $12,000,000 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:

Due to this program's focus on interdisciplinary, collaborative research, a minimum of two collaborating investigators (PIs/Co-PIs) working in different disciplines is required. Applicants are urged to review the interdisciplinary, collaborative expectations of this program - described in the Program Description and Merit Review Criteria - which must be reflected in the project plans and project teams of all competitive proposals.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI or Co-PI: 2

An individual may appear as Principal Investigator (PI), Co-PI, or Senior Personnel (or any other similar designation) in no more than two proposals submitted in FY 2013 in response to this solicitation. Applicants are responsible for ensuring that they comply with these restrictions. This eligibility constraint will be strictly enforced in order to treat everyone fairly and consistently. In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on earliest date and time of proposal submission (e.g., the first two proposals received will be accepted and the remainder will be returned without review). No exceptions will be made.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Submission of Letters of Intent is required. 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.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

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

C. Due Dates

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

  December 04, 2012

  First Tuesday in December, Annually Thereafter

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

  February 05, 2013

  First Tuesday in February, Annually Thereafter

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: Additional award conditions apply. Please see the full text of this solicitation for further information.

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

TABLE OF CONTENTS

I. INTRODUCTION

The Cyber-Enabled Sustainability Science and Engineering (CyberSEES) program aims to advance interdisciplinary research in which the science and engineering of sustainability are enabled by new advances in computing, and where computational innovation is grounded in real life, domain specific challenges.

The CyberSEES program is one component of the National Science Foundation's Science, Engineering, and Education for Sustainability (SEES) activities, a foundation-wide effort aimed at addressing the challenge of sustainability through support for interdisciplinary research and education. In a SEES context, a sustainable world is one where human needs are met equitably without harm to the environment or sacrificing the ability of future generations to meet their own needs. Meeting this formidable challenge requires a substantial increase in our understanding of the integrated system of society, the natural world, and the alterations humans bring to Earth.

As noted in the 2012 National Academies Report "Computing Research for Sustainability," [1] a rich interplay is developing between computing research and other disciplines to address these challenges. Interdisciplinary approaches built around equal partnerships and real sustainability problems are expected to lead to compelling progress across multiple dimensions. Envision a world where

- Smart electric grids match consumer needs with electricity generation and storage using algorithms that integrate power generation from a large number of sources and maintain stability, efficient transmission, distribution and usage. Customers and utilities interact via a digital interface that motivates lower energy use and monitors consumption while maintaining privacy.
- Data from technologies such as satellites and geographic sensors are used for precision agriculture which allows farmers to monitor and increase yields while minimizing consumption of resources (e.g., water, fertilizer) and environmental impact.
- Sensor networks deployed in extreme environments (such as the Arctic or deep undersea) are designed to continuously collect data and extract usable knowledge. The networks are resistant to equipment failures, sensor degradation, environmental variability, and other challenges posed by such environments.
- Sustainable built infrastructure systems (such as transportation, communications, and water supply systems) are designed, improved, and scaled up using computational tools and cyberinfrastructure that can simulate, analyze, and visualize the complex interactions between human, environmental, and technological systems.
- Information technology systems guide and manage extreme events, man-made or natural, based on fundamental understanding of human behavior, organization, and communication, and provide tools for intelligent and timely sharing of information and decision making.

To achieve these goals, computational approaches play a central role in understanding and advancing sustainability science and engineering.

The CyberSEES program supports research and education projects on all sustainability topics in which advances in computing are integral, including the areas of optimization, modeling, simulation, prediction and inference; large-scale data management and analytics; advanced sensing techniques; human computer interaction and social computing; infrastructure design, control and management; and intelligent systems and decision-making. Information technologies, computational solutions, and advances in cyberinfrastructure are essential to understanding the complex interactions and tradeoffs tied to immediate and emerging sustainability challenges in many critical areas, including climate change, natural resource depletion, loss of biodiversity, extreme events, energy, sustainable infrastructure, and human well-being on a resource-constrained planet. Additionally, the widespread, intensive use of computing technologies also introduces sustainability challenges and motivates new approaches across the lifecycle of technology design and use.

SEES activities span the entire range of scientific domains at NSF and place a focus on supporting interdisciplinary research and education, building partnerships and linkages, and developing a workforce that can understand and address sustainability issues. In particular, all SEES projects must consider the social, behavioral, and economic requirements of creating long-term, viable sustainable systems, and incorporate those dimensions in the proposed research. Further information about NSF SEES activities can be found at http://www.nsf.gov/sees.

This program is a joint effort of all of the NSF organizations listed on the cover page and the Semiconductor Research Corporation (SRC) through its Energy Research Initiative (ERI) program. While the scope of CyberSEES is broad, the NSF and SRC ERI collaboration within CyberSEES focuses on cyber-enabled sustainability research that addresses computational aspects of smart infrastructures, in particular the smart electric grid.

[1] National Research Council. 2012. *Computing Research for Sustainability*. National Academy Press, Washington, D.C.

II. PROGRAM DESCRIPTION

A. Scientific Scope

This Cyber-Enabled Sustainability Science and Engineering (CyberSEES) solicitation aims to advance computing and information sciences research and infrastructure in tandem with other disciplines to develop analyses, methods, prototypes, and systems that lead to an increased understanding of sustainability and to solutions to sustainability challenges. Proposals are expected to forge interdisciplinary collaborations among the computer and information sciences, social and natural sciences, mathematical sciences, engineering, and associated cyberinfrastructure to address challenging sustainability problems.

Computational challenges are woven into many areas of sustainability research and their solutions are opening up possibilities for radical new approaches and unforeseen opportunities. Close intellectual partnerships among computing and other disciplines are essential to inform new approaches to these integrative challenges, respecting the specific characteristics of complex phenomena, data, and models; understanding the tradeoffs and consequences inherent to design and decision processes; and effectively dealing with limitations and constraints of computational techniques. Some prominent underlying challenges are outlined below. These descriptions are meant only as examples of integrative challenges, not to limit the scope of program interests.

Large-scale Data Analysis and Management. Data sets used in many sustainability related topics are challenging because of their complexity (such as control variables in smart infrastructures), heterogeneity (such as social or behavior data), or variability and uncertainty (such as environmental sensor data). Additionally, sustainability data often has distinct short term and long term end uses, and data sets must be appropriately curated with these uses in mind. The sustainability context requires attention to issues such as the use, management, and preservation of data over a large range of time scales; data modeling and ontologies; metadata extraction, management, and data provenance; and decision making based on data from different sources, of different qualities, and with widely differing ontologies and semantics.

Robust Observation, Sensing, and Inference. Monitoring of human, built and natural systems, such as hydrologic or atmospheric phenomenon; species migrations; water, gas, or electricity distribution systems, requires scalable observation infrastructures. Effective infrastructures must be nondisruptive, easily deployed and managed, robust under sensor failures, and/or satisfy applicable security or privacy requirements. These monitoring systems must be able to operate unattended for long periods of time and be remotely configurable, controllable, and testable for correct operation. Interdisciplinary research is needed on new methods, designs and algorithms for managing data streams, data analysis, synthesis, and inference as well as the design and optimization of complex sensor systems.

Modeling of Complex Systems. Behavior in systems facing sustainability challenges, from caribou migration to power generation, is the result of complex interactions between human, built, and natural systems. Modeling, simulating, analyzing, and optimizing these systems may require combinations of physics- or economics-based models, model-based reasoning, and statistical models built from data, or interactions involving entities or individuals with different and often conflicting interests. New interdisciplinary research is needed for accurate and efficient methods of tackling complexity, scaling, uncertainty quantification, reliability, coupling between systems, and constrained optimization in order to achieve needed performance.

Dynamic and Intelligent Decision Making. Solving sustainability problems, particularly those relating to systems near tipping points (such as extreme events), often requires contending with dynamically evolving or unstable situations. These scenarios present challenges to modeling and decision making due to inadequate or changing data, resource constraints, fast response needs, and safety and security concerns. A key characteristic of these environments is the need to continuously assimilate new data as it becomes available and to effectively handle new or altered constraints. Techniques are also needed to proactively discover such changing constraints within these environments. Additionally, both dynamic and static sustainability related data sets can leverage intelligence and machine learning methods to mine for hidden patterns and extract previously unknown information, and move the field from data driven hypothesis testing to data enabled discovery.

Control and Management of Infrastructure. Smart management of built systems such as electric grids, variable wind and solar power generators, and other energy infrastructures; transportation systems; manufacturing systems; and homes and buildings requires comprehensive and flexible control systems that satisfy performance, policy, reliability, and other constraints. The design and study of these systems will require new computing research and knowledge in areas such as resource management algorithms, systems analysis, real time computing and communications. The human and organizational contexts of control systems must be well understood and reflected in system design, in order to make them usable and useful.

Human-centered Systems. Large and long-lived impacts on sustainability will depend on human behavior, human factors, and collaboration across large communities. Sociotechnical systems built on sound understanding of people, organizations, and how to inform and assist them, will play a key role in sustainability efforts. Computational approaches will lead to tools and systems that support engagement and decision making by the public; collecting, modeling, and presenting information about resource usage via usable interfaces, appropriate visualizations, and persuasive technology; preference elicitation and decision support/automated decision making for effective and efficient use of resources; and models, methods and tools for dissemination and increasing awareness of sustainable practices.

The interdisciplinary challenges considered above are invariably shaped by human, societal, and economic factors and need to be considered. Most monitoring and control solutions need to consider issues such as the human interface, security and privacy, socio-cultural norms, non-compliance, herding behavior, economic incentives, and deployability in the real world. Sustainable systems must be designed for transparency, legitimation, and participation.

As information and communication technologies are applied with increasing intensity to address sustainability issues, there is a parallel challenge of sustainability of the computing and networking systems themselves. In particular, as computing and communication technologies-- from mobile phones to massive data centers-- proliferate, challenges in managing their consumption of energy, materials, and other resources have become a critical sustainability issue. CyberSEES also welcomes interdisciplinary research that addresses holistic, integrative approaches to sustainable computing and information technologies and systems, including consideration of design and use with impact across the lifecycle in mind.

As the SEES research community increases in number of researchers and breadth of scientific participation, the shared computing and communication infrastructure must allow easy and timely sharing of data and computational tools to advance interdisciplinary SEES research. CyberSEES welcomes cyberinfrastructure research that connects currently distinct SEES research activities.

The SRC Energy Research Initiative (ERI) is interested in cyber-enabled sustainability research that addresses computational aspects of smart infrastructures, in particular the smart electric grid. Challenges include but are not limited to efficient and secure electrical power management at multiple scales-from grid-level to personal systems- and integration of renewable energy resources and home energy systems into an aware and enabled electric grid. Relevant research may fall under any or all of the challenges listed above for the CyberSEES program as a whole.

B. Award Types

The CyberSEES solicitation will support two types of proposals:

- Type 1 proposals with total budgets (including indirect costs) not exceeding $300,000 over a period of 2 years. These are smaller proof-of-concept, capacity building, or exploratory research and education projects led by two or more investigators.
- Type 2 proposals with total budgets (including indirect costs) not exceeding $1,200,000 over a period of up to 4 years. These proposals are for integrative research and education projects, suitable for collaborative teams led by two or more investigators.

For both types of projects, the requested budget must be clearly justified and must be commensurate with the goals of the effort. In particular, it is expected that most projects will be smaller than the limits indicated here.

C. CyberSEES Project Requirements

Competitive CyberSEES projects must satisfy the following requirements, which represent defining characteristics of the CyberSEES solicitation. Further information on these requirements can be found in the Review Criteria section of this document.

- The research must be well-grounded in sustainability issues.
- The research objective must advance computing or cyberinfrastructure knowledge, while enabling research in other disciplines.
- The team composition must be synergistic and interdisciplinary, and must consist of at least two investigators from distinct and different scientific disciplines.
- The project must address education and workforce development in sustainability science.

Depending on the sustainability problems and solutions discussed in the proposal, some of these attributes will be more important and thus require more in-depth articulation than others.

D. Example CyberSEES Proposal Topics

Below are several examples of possible CyberSEES proposal topics. These examples are not intended to be prescriptive and do not imply any priority or special consideration of the areas covered by them. They are only provided as illustrations of the types of topics that a CyberSEES proposal could address. PI's are encouraged to consider application of computing and communications to a wide range of sustainability issues.

> Design, implementation, and operation of sensors and sensor systems are critical components of sustainability solutions and pose challenges due to operation in very harsh and changing environments. The challenges may include the lack of manual accessibility for long periods of time, extreme temperature variability, difficulties in energy harvesting, degradation of sensors, undesired sensor movement because of winds, currents, or wildlife, sensor failures, difficulties in data evacuation, and the impacts of all these factors on data quality.
>
> Smart electric grids for cities need to balance consumer need with electricity generation. In a dense urban environment, there may be millions of outlets (e.g. private homes, large offices, electric car charging stations) and numerous types of generators (e.g. wind, solar, gas, coal) with different costs, time variation of output, and sustainability footprints. Advancements will be needed in computing areas such as algorithms for demand and response management that account for human behavior and their privacy concerns while at the same time maintaining the integrity, stability, and security of the grid in spite of integration of power from a large number of highly variable sources.
>
> Within the SEES research community there are currently distinct research activities whose data and computational capabilities could further advance other emerging SEES-related interdisciplinary research and collaboration. As the SEES research community expands and diversifies, cyberinfrastructure research that connects currently distinct SEES research activities would position the community for greater success. Of particular interest are new meta data models, new forms and methods of visualization, new types of middleware, and innovative frameworks for multimodels.
>
> As the use of computing devices proliferates throughout the world, the life cycles of the devices are getting shorter for a variety of reasons that include competitive marketing, rapid technological advances, and business models that hide costs of devices. However, this poses increasing problems of safe disposal and use of Earth's resources. Research on holistic understanding of business/marketing practices, user needs and attitudes, design, disposal, reuse and recycling issues, and incentive structures for sustainable behavior could go a long way in informing potential solutions.
>
> Built infrastructure systems are critically central to the functioning of our society. These systems provide vital services such as transportation, electric power, communications, water supply, and wastewater treatment. The systems are large, complex, and interdependent. Simulation, analysis, and visualization of the sustainability (as well as vulnerability and resilience) of these systems, and proposed improvements to them, are often impeded by computational complexity resulting from exponential scaling behavior. The computational challenges are exacerbated when human aspects, necessary for realistic modeling, are included in simulations through such approaches as agent-based modeling. Breakthroughs in handling these computational problems, posed in the context of sustainability issues, are sought. Moreover, increasing computational power offers the conceptual vision of transitioning these infrastructures to "smart" systems that are more efficient, robust, and safe. Yet, significant challenges must be overcome to achieve the vision of "smart" infrastructures.

III. AWARD INFORMATION

We expect that $12 million will be made available in FY 2013 to support 12-20 awards.

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

Projects selected for joint funding by NSF and SRC ERI will be funded through separate NSF and SRC ERI funding instruments. For each such project, NSF support will be provided via an NSF grant and SRC ERI support will be provided via an SRC ERI contract.

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:

Due to this program's focus on interdisciplinary, collaborative research, a minimum of two collaborating investigators (PIs/Co-PIs) working in different disciplines is required. Applicants are urged to review the interdisciplinary, collaborative expectations of this program - described in the Program Description and Merit Review Criteria - which must be reflected in the project plans and project teams of all competitive proposals.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI or Co-PI: 2

An individual may appear as Principal Investigator (PI), Co-PI, or Senior Personnel (or any other similar designation) in no more than two proposals submitted in FY 2013 in response to this solicitation. Applicants are responsible for ensuring that they comply with these restrictions. This eligibility constraint will be strictly enforced in order to treat everyone fairly and consistently. In the event that an individual exceeds this limit, proposals received within the limit will be accepted based on earliest date and time of proposal submission (e.g., the first two proposals received will be accepted and the remainder will be returned without review). No exceptions will be made.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent***(required):***

A letter of intent is required for every project submitted for consideration by CyberSEES in FY13. The letter must be submitted via FastLane no later than the date specified in this solicitation. If a collaborative proposal is planned, a single letter of intent should be submitted by the lead institution. Each letter is limited to one page, and must include the following information:

Project Title, prefixed by "CyberSEES:Type 1:" or "CyberSEES:Type 2:" depending on whether a Type 1 or Type 2 proposal is planned.

The Investigator Team, listing each investigator's name, departmental and institutional affiliations, areas of expertise, and role in the project (PI, Co-PI, Senior Personnel, Consultant, or other as appropriate).

A Project Synopsis, emphasizing the project vision and multidisciplinary approach.

These letters of intent are not used as pre-approval mechanisms for the submission of proposals and no feedback is provided to the submitters. The Letters of Intent are not reviewed but are used to assess the overall response to the solicitation, and to help NSF anticipate requirements for proposal review.

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

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

The standard NSF Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide instructions for proposal preparation apply, with the following additions.

A. Cover Sheet

FastLane Users: Proposers must identify this program solicitation number in the program announcement/solicitation block on the Cover Sheet and select "Cyber Enabled Sustainability" from the FastLane org. unit pull-down list. The project title must begin with the tag "CyberSEES:Type 1:" or "CyberSEES:Type 2" depending on whether it is a Type 1 or Type 2 proposal. In case of multiple proposals submitted by different institutions as a collaborative group, they all should have the same title and begin with the tag "Collaborative Research:" prior to the CyberSEES tag.

Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. Refer to Section VI.1.2 of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. The project title must follow the same rules as described above for FastLane users.

Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Project Description (Structure and Page Limits for Type 1 and Type 2 Proposals)

The project description of Type 1 proposals is limited to a maximum of 10 pages. For Type 1 proposals, investigators are encouraged to incorporate the elements described below as appropriate to their project needs and space limitations.

The project description of Type 2 proposals is subject to the GPG limit of 15 pages. Type 2 proposals must be structured according to the sequence of sections described below.

Vision Statement. The project description of a Type 2 proposal must begin with a concise statement of the project vision, situating an integrative, collaborative research project within a clearly articulated context of larger sustainability goals. It is understood that the proposed research may focus only on a piece of this vision, but the relationship of the proposed research to the overall vision must be articulated here. The vision statement must also briefly address important human, social, behavioral, economic, and adoption issues that are relevant, whether or not they are directly addressed within the proposed research.

Background and Significance. The proposal must provide adequate background for reviewers to judge the novelty, uniqueness, and significance of the proposed research.

Research Plan. The proposed research must approach fundamental research from an interdisciplinary perspective that integrates computing and communications with domain sciences and engineering to address the sustainability issues of interest. The proposal must describe a synergistic, systems approach by which the team addresses the scientific challenges of addressing a sustainability challenge.

Evaluation Plan: Every Type 2 proposal must include an evaluation plan that discusses how the success of the activities supported by the CyberSEES program will be assessed. The evaluation needs of individual projects may vary considerably. The evaluation approach should be appropriate to the vision of the project, addressing relevant technical objectives as well as inputs and impacts on appropriate stakeholders.

C. Supplementary Documents

Type 2 proposals must also include a *management and collaboration plan*, submitted as a supplementary document not exceeding 3 pages in length. The management plan should discuss (a) the specific roles, qualifications, and synergy of the collaborating PIs, Co-PIs, other Senior Personnel, and paid consultants at all organizations involved; (b) how the project will be managed across institutions and disciplines.

International and/or industrial collaborations that enhance the proposed project activities are strongly encouraged. Plans for international, industrial, or cross-institutional experiences for students should be clearly described, including timing, duration, and logistical arrangements for visits, and roles of specific project personnel.

Data Management Plan: Proposals must include a data and information management plan that describes how access to quality-controlled and fully-documented data and information by researchers, and others, will be achieved at no more than incremental cost and within a reasonable time during the course of the award, e.g., via a recognized data repository. The plan should address, as appropriate, provisions for reuse and derivative use, archival plans, and preservation of access for both research and non-research communities. If applicable, policies and provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements should be included.

Additional Instructions for Candidates for NSF-SRC ERI Joint Funding

Proposals to be considered for joint funding by NSF and SRC ERI must include a statement of consent from the proposing institution(s) that indicates NSF may share with SRC ERI the proposal, reviews generated for the proposal, and related information. The statement of consent must be uploaded into the Supplementary Docs section in Fastlane or Grants.gov. Proposals that do not contain this statement will not be considered for joint funding by NSF and SRC ERI.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

Other Budgetary Limitations:

Proposal budgets should cover costs of travel to participate in grantees' meetings, most likely in the Washington, D.C. area.

- Type 1 awards should include costs to travel to one grantee meeting
- Type 2 awards should include costs to travel to two grantee meetings
- Proposals receiving co-funding from SRC ERI will be asked to include the cost to travel to one additional meeting.

This program will support the costs of US-based scientists and their students. International collaborators are encouraged to seek support from their respective funding organizations. Funding guidelines for involving international collaborators allow the following expenses to be included in the NSF budget:

- Travel expenses for US scientists and students participating in exchange visits are an integral part of the project.
- Limited project-related expenses for international partners to engage in research activities while in the United States as project participants.
- Project-related expenses for US participants to engage in research activities while abroad.

Budget Preparation Instructions:

The CyberSEES solicitation will support two types of proposals:

- Type 1 proposals with total budgets (including indirect costs) not exceeding $300,000 over a period of 2 years. These are smaller proof-of-concept, capacity building, or exploratory research and education projects led by two or more investigators.
- Type 2 proposals with total budgets (including indirect costs) not exceeding $1,200,000 over a period of up to 4 years. These proposals are for integrative research and education projects, suitable for collaborative teams led by two or more investigators.

For both types of projects, the requested budget must be clearly justified and must be commensurate with the goals of the effort. In particular, it is expected that most projects will be smaller than the limits indicated here.

C. Due Dates

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

  December 04, 2012

  First Tuesday in December, Annually Thereafter

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

  February 05, 2013

  First Tuesday in February, Annually Thereafter

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

In addition to the standard NSF review criteria of Intellectual Merit and Broader Impacts identified in the Grant Proposal Guide, proposals submitted in response to this solicitation will be evaluated on the following additional criteria:

Well-Grounded in Sustainability Issues. Does the proposal demonstrate a clear connection between the research and substantive sustainability issues of societal significance? Does it consider critical social, economic, and environmental systems within the scope of the research?

Broadly Applicable Advances in Computing in Tandem with Other Disciplines. Does the proposal include research that contributes to advancements in fundamental computer and information science and engineering? Do these advancements enable research in other disciplines that would otherwise have been difficult or impossible before the innovation? To what extent will it lead to the development of high-quality resources that will be useful to the research community at large? Does it leverage and advance existing NSF cyberinfrastructure or other efforts of the SEES research community? To what extent does the project address the relevant social, behavioral, economic and human issues connected with the sustainability problem(s) being tackled?

Synergistic, Interdisciplinary Team. Does the collaboration productively bring together new combinations of investigators, approaches, or resources with appropriate expertise to effectively tackle the sustainability issues being addressed?

Education and Workforce Advancements. Does the proposal address issues related to the promotion of inter-disciplinary education to advance sustainability science and prepare next generation workforce to address complex sustainability problems? To what extent does the project promote public awareness of sustainability issues? Does it support development of ways to educate future researchers, technical workers, students, and the general public about inherent complexities of sustainability? Does it assist current researchers in addressing challenges of sustainability research and education? To what extent will it provide unique collaborative research experiences for participating students and early-career researchers? Proposals may consider education and workforce development, or both, as important components in a proposal. Workforce development might include activities targeted for K-12, undergraduate, and graduate students. Education and learning may involve formal classroom instruction, as well as venues such as museums, science centers, or other informal settings.

Quality and Appropriateness of the Management Plan. Are the specific roles of each collaborating investigator clear? Is the collaborative activity coordinated efficiently and effectively? Are appropriate outcome dissemination plans (e.g. software, data, publications) available to potential stakeholders? Are the proposed collaborations and partnerships, including industry and international collaborations as appropriate, well conceived and well planned? Is the proposed timeline of activities adequate and appropriate?

B. Review and Selection Process

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

Reviewers will be asked to 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.

NSF will manage and conduct the review process of proposals submitted in accordance with NSF standards and procedures. For proposals including a statement of consent and considered for joint funding by NSF and SRC ERI, the review and award recommendations will be coordinated by a Joint NSF and SRC Working Group (JWG) of programs officers from both NSF and SRC. Relevant information about proposals and reviews of proposals will be shared between the participating organizations as appropriate. The JWG will recommend meritorious proposals for award at appropriate funding levels.

NSF Process: 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.

Special Award Conditions:

Individual awards selected for joint funding by NSF and SRC ERI will be funded through separate NSF and SRC ERI funding instruments. NSF awards will be made in FY 2013 as continuing or standard grants. SRC ERI awards will be made as SRC contracts. Either organization may supplement a project without requiring the other party to provide any additional funds.

All joint or separate awards involving SRC ERI funds must also include an executed agreement pertaining to intellectual property, including publications and patent rights, signed by the representatives of the awardee organization and SRC ERI. SRC ERI contracts provide for non-exclusive, royalty free rights to all SRC ERI members for any intellectual property generated as a result of the SRC ERI-funded research.

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.

NSF and SRC ERI will manage their respective awards/contracts in accordance with their own guidelines. Awardees will submit annual project reports to NSF via FastLane, subject to NSF procedures. Awardees will also submit annual reports to SRC ERI, subject to SRC ERI procedures.

SRC ERI will organize and conduct annual reviews and will require certain deliverable reports to monitor the program and project progress. SRC ERI will seek to provide structured involvement of industry in the research and review process and will undertake the organization and non-travel costs of the annual review.

PIs receiving funding from SRC will be expected to attend annual SRC ERI grantee review meetings for the purpose of sharing research progress with SRC ERI member company representatives as well as other interested individuals. A SRC ERI grantee meeting can coincide with the NSF grantee meeting. Thirty days before each of these meetings, the principal investigator will provide SRC ERI an annotated presentation of research results for posting on the SRC ERI web site.

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:

- Kenneth Whang, CISE, telephone: (703) 292-5149, email: kwhang@nsf.gov
- Theodore (Ted) Baker, CISE, telephone: (703) 292-8608, email: tbaker@nsf.gov
- Phillip Regalia, CISE, telephone: (703) 292-8910, email: pregalia@nsf.gov
- Ni-Bin Chang, GEO, telephone: (703) 292-8549, email: nchang@nsf.gov
- Irene Qualters, OCI, telephone: (703) 292-2339, email: iqualter@nsf.gov
- David McGinnis, SBE, telephone: (703) 292-7307, email: dmcginni@nsf.gov
- Michael Steuerwalt, MPS, telephone: (703) 292-4860, email: msteuerw@nsf.gov
- Julie A. Dickerson, telephone: (703) 292-8167, email: jdickers@nsf.gov
- David Haury, EHR, telephone: (703) 292-5102, email: dhaury@nsf.gov
- Bruce K. Hamilton, ENG, telephone: (703) 292-8320, email: bhamilto@nsf.gov
- Erica Key, OPP, telephone: (703) 292-8029, email: ekey@nsf.gov
- Paul Werbos, ENG, telephone: (703) 292-8339, email: pwerbos@nsf.gov
- Robert Havemann, SRC ERI, telephone: (919) 941-9443, email: Bob.Havemann@src.org

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
Office of the General Counsel
National Science Foundation
Arlington, VA 22230