National Nanotechnology Coordinated Infrastructure (NNCI)

PROGRAM SOLICITATION
NSF 15-519

National Science Foundation

Directorate for Engineering

Directorate for Mathematical & Physical Sciences

Directorate for Computer & Information Science & Engineering

Directorate for Biological Sciences

Directorate for Geosciences

Directorate for Social, Behavioral & Economic Sciences

Directorate for Education & Human Resources

Office of International and Integrative Activities

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

February 02, 2015

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

April 03, 2015

IMPORTANT INFORMATION AND REVISION NOTES

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised NSF Proposal & Award Policies & Procedures Guide (PAPPG) (NSF 15-1), which is effective for proposals submitted, or due, on or after December 26, 2014. The PAPPG is consistent with, and, implements the new Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (Uniform Guidance) (2 CFR § 200).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

National Nanotechnology Coordinated Infrastructure (NNCI)

Synopsis of Program:

Over the past decade of its authorized award life, the National Nanotechnology Infrastructure Network (NNIN) has enabled major discoveries, innovations, and contributions to education and commerce by providing researchers from academia, small and large companies, and government with open access to university user facilities with leading-edge fabrication and characterization tools, instrumentation, and expertise within all disciplines of nanoscale science, engineering, and technology. The National Science Foundation is now moving forward with the new National Nanotechnology Coordinated Infrastructure (NNCI) as the successor to the NNIN.

This solicitation establishes a competition for individual university user facility sites positioned across the nation. A Coordinating Office will then be selected competitively at a later stage from among the selected sites to enhance their impact as a national infrastructure of user facility sites. The ultimate selection of user facility sites will include capabilities and instrumentation addressing current and anticipated future user needs across the broad areas of nanoscale science, engineering, and technology.

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.

- Lawrence Goldberg, ENG/ECCS, telephone: (703) 292-5373, email: lgoldber@nsf.gov

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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
- 47.079 --- International and Integrative Activities (IIA)

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 10 to 15

NSF plans to make approximately 10-15 individual awards for shared user facility sites.

Anticipated Funding Amount: $500,000 to $2,000,000

NSF plans to provide individual awards at a range of $500,000 to a maximum of $2,000,000 per year, depending on the plans and scope of capabilities.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Academic institutions accredited in, and having a campus located in, the US are eligible to submit or participate in individual proposals for shared user facility sites.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

A US academic institution may submit or participate in only one individual site proposal submitted in response to this solicitation. An academic institution that is awarded as a shared user facility site may also propose later to be the Coordinating Office.

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

There are no restrictions or limits.

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 required

- **Full Proposals:**
    - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
    - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

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

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

- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

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

    February 02, 2015

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

    April 03, 2015

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:

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.

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I. INTRODUCTION

Introduction

Over the past decade of its authorized award life, the National Nanotechnology Infrastructure Network (NNIN) has enabled major discoveries, innovations, and contributions to education and commerce by providing researchers from academia, small and large companies, and government with open access to university user facilities with leading-edge fabrication and characterization tools, instrumentation, and expertise within all disciplines of nanoscale science, engineering, and technology. The National Science Foundation is now moving forward with the new National Nanotechnology Coordinated Infrastructure (NNCI) as the successor to the NNIN.

The National Nanotechnology Initiative (NNI) 2014 Strategic Plan[1] emphasizes the importance and critical need for the U.S. to sustain a dynamic infrastructure and toolset to advance nanotechnology, and in particular the academic infrastructure represented by NNIN. In addition, the President's Council of Advisors on Science and Technology (PCAST) 2014 Report[2] to the President and Congress on the Fifth Assessment of the NNI recommends strong support for nanoscale infrastructure networks such as NNIN to ensure the effective training of a new generation of transdisciplinary scientists and engineers.

NSF sought input from the science and engineering community on a possible future nanotechnology infrastructure support program through a Dear Colleague Letter (DCL 14-068). A workshop was then conducted of recognized national experts to develop a vision of how such a future program could be structured and to identify the key needs for the user communities over the coming decade.[3]

With this background and community input, NSF has developed this solicitation to create the NNCI. The solicitation establishes a competition for individual university user facility sites positioned across the nation. A Coordinating Office will then be selected competitively at a later stage from among the selected sites to enhance their impact as a national infrastructure of user facility sites. The ultimate selection of user facility sites will include capabilities and instrumentation addressing current and anticipated future user needs across the broad areas of nanoscale science, engineering, and technology.

1. National Nanotechnology Initiative Strategic Plan, February 2014, Washington, DC: http://www.nano.gov/node/1113.
2. PCAST, Report to the President and Congress on the Fifth Assessment of the National Nanotechnology Initiative, October 2014, Washington, DC:
   http://www.whitehouse.gov/sites/default/files/microsites/ostp/PCAST/pcast_fifth_nni_review_oct2014_final.pdf.
3. Report on Workshop for a Future Nanotechnology Infrastructure Support Program, August 18-19, 2014, Arlington, VA:
   https://www.src.org/newsroom/src-in-the-news/2014/656/.

II. PROGRAM DESCRIPTION

Overall Approach to the NNCI

The competition for individual sites will be for consideration of large and small university-based user facilities, including those at minority-serving institutions, that are geographically distributed and with diverse and complementary capabilities to support current and anticipated future user needs across the broad spectrum of nanoscale science, engineering, and technology domains. The selected individual sites will have autonomy in their operation and management, but will be required to act in concert with a Coordinating Office that will be separately competed and chosen at a later stage. Some sites may choose to partner with facilities at regional or smaller institutions that would bring specific capabilities for users and benefits to student training. The overall collection of selected sites and their capabilities will provide users with cost-effective access both to the specialized tools, processes, and expertise to support complex multi-step fabrication at the nanoscale level for structures, materials, devices, and systems, as well as to the associated instrumentation for characterization, analysis, and probing at these dimensions. The program aims to make these capabilities broadly available to the nation's researchers in academe, industry, and government to help catalyze new discoveries in science and engineering and to stimulate technological innovation.

Technical Capabilities in the Coordinated Infrastructure

The broad spectrum of domain capabilities in this coordinated infrastructure is intended to encompass: physical-, chemical-, and biological-based nanostructures, materials, devices, and systems; electronic, optical, photonic, magnetic, mechanical, thermal, chemical, bioengineering, biomedical, and fluidic nanodevices and systems; nanoscale building blocks and nanostructured materials, composites, coatings, and surfaces; geophysical, geochemical, and environmental nanostructures and processes; synthetic biology, and fabrication in soft matter including biological interfaces; heterogeneous integration of complex, three-dimensional nanoscale systems to create new functionality; hierarchical design and fabrication to build nanoscale systems across multiple dimensional scales, including modeling and simulation tools that complement and support these activities; prototyping, process integration, and testing of manufacturing concepts, including high-speed roll-to-roll fabrication processes; and other areas, as appropriate.

Some promising research opportunities that could be enabled include: formation of new system architectures and heterogeneous materials, engineered at the nanoscale to integrate formerly disparate electronic, photonic, mechanical, chemical, and thermal properties into nanosystems, for functions such as energy conversion and storage, dissipation of heat, precision sensing, and local actuation; bio-inspired, self-healing, responsive materials; structures and devices supporting research in the life sciences and biomedical applications; synthesis of nanoparticles for study of nanotoxicity; sensors for environmental science and monitoring; ultrafast sensors for imaging and recording of chemical, physiological, and biochemical processes; new, more energy efficient devices and circuits for communication, storage and processing of digital information, including quantum information; and devices and circuits for new information processing architectures such as neuromorphic computing.

Some of the sites will have widely used nanofabrication capabilities applicable to diverse areas, while some sites may offer critical, highly specialized tools and processes to support a focused subset of nanoscience and technology. They will enable support for exploration and development of potential new applications of nanotechnology. Appropriate characterization techniques should be intended principally in feedback control of fabrication processes, though access may be needed in specific fields to unique, valuable, and specialized characterization capabilities, either on-site or by remote operation.

Considerations for Individual Site Proposals

Proposing institutions are encouraged to include a broad range of technical capabilities in their individual user facility site proposals, but can also choose to focus on particular subfields within their areas of expertise. Some sites may choose to partner with facilities at regional or smaller institutions that would bring specific capabilities for users and benefits to student training. The Site Director, who is the Principal Investigator for the individual site proposal, will be the key individual for management of the individual site and will work in concert with the other Site Directors and the Coordinating Office, and with the NSF.

Important: Please see "Facilities, Equipment, and Other Resources" section in this Solicitation for requirements of facilities and equipment.

Sites should demonstrate that they have the ability to manage shared user facilities and to understand and serve the needs of external users, including those from companies as well as from academia. They should highlight how they will support a rich user base with broad accessibility and affordable user fee structure. They should show how NSF funds will leverage those of the university and other resources to grow the numbers of external users. Sites must embrace a culture of open access to researchers for any research project of merit, with protection of intellectual property, and mechanisms for encouraging non-traditional users from diverse disciplines. They should have an organizational structure that allows coordination of complex process steps and tools for integrated tasks, and acceptance of experimental risks associated with non-standard processes and materials. They should have strong underlying internal research programs that provide critical research mass and knowledge base in developing new processes, methodologies, and instrumentation. They should have a plan for supporting a professional technical staff with requisite expertise to enable external users to plan and carry out experiments with a rapid cycle time, and to instruct in laboratory safety, process methods, and instrumentation usage. Sites should provide an accessible web portal to instruct potential users how to gain access to the facility, and to describe the facility's technical capabilities, tools, and instrumentation. They should have a plan for data management and sharing of the products of research. They should also have methods for assessment and quantifiable metrics of overall site performance and impact, including those for educational and outreach activities.

Nanotechnology facilities provide unique opportunities to infuse innovative education with research at the frontiers of the field. Sites should provide clear, focused strategies for integrating forefront science and engineering with education, including plans for assessing effectiveness and spreading promising practices. Learning experiences, resources, and tools for graduate and

undergraduate students and postdoctoral associates, as well as educational outreach and workforce development plans, should leverage the unique strengths of their user facility. These may address, for example, engaging participants in community colleges, pre-college grades, informal science settings, and international education experiences. Sites should also provide outreach programs to potential users in the broader science and engineering communities, including those from startups and small businesses, whose work could benefit from advanced fabrication and instrumentation capabilities. They should assess and utilize regional needs and opportunities to broaden the participation of groups underrepresented in science and engineering among students, faculty, staff, management, and in outreach activities. The sites should have plans for knowledge dissemination to the broader research, education, and technology communities. They should demonstrate how they will complement and connect to other local resources, such as business incubators, prototyping, and manufacturing facilities. The range and scope of the education and outreach activities are expected to be commensurate with the size of the requested budgets.

Sites having particular expertise in the social and ethical implications of nanotechnology are encouraged to integrate the instruction and study of those aspects into their proposals that can leverage their user community base, and which relate to the capabilities of their respective user facilities.

Role of the Coordinating Office

Following selection and award of the individual sites, NSF will hold a meeting of the Site Directors to discuss recommendations to significantly enhance the impact of this investment that will lead to a coordinated national infrastructure of user facility sites for nanotechnology. A Coordinating Office, to be located at one of the awarded institution sites, will then be competed and chosen to provide the coordinating function. The Director of the Coordinating Office will be a key individual for developing management strategies and operational plans in concert with the Site Directors of the individual user facilities, and will serve as a principal contact person with the NSF.

The Coordinating Office will be responsible for establishing a comprehensive web portal to ensure close linkage among the individual facility websites such that they present a unified face to the user community of overall capabilities, tools, and instrumentation. It will also work with all sites in ways to guide users regarding which site or sites, which instruments, and which processes would enable users to complete their projects most successfully. The Office will help to coordinate and disseminate best practices for national-level education and outreach programs across sites, as well as the instruction and study of social and ethical implications of nanotechnology. It will seek to harmonize capabilities for modeling and simulation in nanoscale fabrication and characterization across sites, and provide effective coordination with the NSF-supported Network for Computational Nanotechnology (NCN). The Office will establish an external advisory board of distinguished members from academia, industry, and government to provide advice and guidance through the Coordinating Office.

The Office will work with the individual sites to establish uniform methods for assessment and quantifiable metrics of overall site performance and impact, including those for educational and outreach activities. It will help to share best practices and laboratory safety and training procedures across all sites. It will engage all sites in a planning process to explore emerging areas of nanoscale science, engineering, and technology that can lead to future growth of the external user base. It will coordinate the acquisition needs for specialized instrumentation across all sites to enhance new areas of research growth. The Office will also coordinate data management across all sites and the dissemination of shared knowledge to research, education, and technology communities, as well as in enhancing connections with other nationally funded academic centers or networks and facilities supported by government, the private sector, and international partners.

III. AWARD INFORMATION

Approximately $16 million total funds will be available in this competition for each year of a five-year duration of FY 2015-2019, depending on the availability of funds. NSF intends to provide individual awards to support approximately 10-15 university user facility sites at a range of $500,000 to a maximum of $2,000,000 per year, depending on the plans and scope of their capabilities. Proposing institutions can include partnerships with other university user facility sites under subawards. All awards will be made as cooperative agreements with each submitting institution site. The initial award commitments will be for five years and may be renewed once for an additional five years, subject to external merit review. Limited new competitions may be held, based on available funds, to address critical needs in nanotechnology or to replace non-performing sites or the Coordinating Office.

The awarded institutions will be eligible to compete at a later stage to establish a Coordinating Office that will provide coordination of the individual user facility sites as a national infrastructure of sites. The institution selected for the Coordinating Office will receive a separate award with funds for purposes of management, outreach, and related coordinating activities. Funds allocated for the Coordinating Office will be approximately $700,000 per year.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Academic institutions accredited in, and having a campus located in, the US are eligible to submit or participate in individual proposals for shared user facility sites.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

A US academic institution may submit or participate in only one individual site proposal submitted in response to this solicitation. An academic institution that is awarded as a shared user facility site may also propose later to be the Coordinating Office.

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

There are no restrictions or limits.

Additional Eligibility Info:

> Non-academic U.S. institutions and organizations, including national laboratories and private-sector companies, as well as international institutions, may participate in such proposals using their own resources.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(required):*

For NSF planning purposes for the review process, a non-binding letter of intent to submit an individual user facility site proposal to this Solicitation must be sent by the date listed at the beginning of this solicitation. The letter of intent (in clear text, 1-page limit, with no attachments) should list the PI/Site Director, the institution, and any other participating institutions. Provide a brief summary discussion of the proposed site in terms of its principal focus areas and capabilities, the funds likely to be requested, and whether the submitting institution intends to be considered for the Coordinating Office.

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 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.

See Chapter II.C.2 of the GPG for guidance on the required sections of a full research proposal submitted to NSF. Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions.

Proposals must contain the items listed below and adhere to the specified page limitations. No additional information may be provided by links to web pages.

Cover Page:

- FastLane Users: Proposers must identify this program solicitation number by selecting "National Nanotechnology Coordinated Infrastructure" from the program Announcement/Solicitation Box, which will automatically populate the NSF Unit of Consideration with the correct NSF organization and program. The project title must begin with "NNCI:".
- Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. In Field 2, Unit of Consideration, enter 07010000 for the Division Code and 7601 for the Program Code. The project title must begin with "NNCI:".

Project Summary: Provide a summary description of the proposed user facility site that conveys its objectives, key features, and principal focus areas in a manner that will be informative to a general technical audience. As required in FastLane, the project summary is limited to 1 page and must address within separate text boxes the Overview, the Intellectual Merit, and the Broader Impacts of the proposed activity.

Table of Contents: The Table of Contents is generated by FastLane and cannot be edited.

Project Description: The project description section contains the following items **a** through **h**, and is limited to a combined total length of 15 pages, inclusive of tables, figures, or other graphical data.

- a. **List of Participants:** Provide a list, showing institution and departmental affiliation, of the Site Director, and other senior level personnel expected to have an important role in the user facility site.
- b. **Vision and Goals:** Describe the vision and goals for the proposed user facility site, including its principal focus areas and potential in contributing to the nation's research and education infrastructure for nanoscale science, engineering, and technology.
- c. **Capabilities of the Individual Site:** *Important: Please see "Facilities, Equipment, and Other Resources" section in this Solicitation for requirements of facilities and equipment.* Describe the extent of fabrication and characterization instrumentation capabilities, the breadth of coverage of research fields and needs, and the nature of user services to be provided. Present evidence of capability of operating as a shared user facility that can serve both external and internal users, including those from companies as well as from academia. Describe how external users will apply to the facility, how non-traditional users will be encouraged, how projects will be accepted, and how users can be accommodated both on site

and remotely. Discuss how NSF funds will be leveraged with university and other resources to grow the numbers of external users. Describe plans for professional staffing, accommodating external users, encouraging non-traditional users, user training, user fee structure, and intellectual property policy. Describe the in-house research programs of principal faculty members that underpin the site's capabilities and which would enable it to support development of new processes, tools, and instrumentation. Describe the planning process for acquisition and development of new tools and instrumentation needed to position the facility at the frontier over the duration of the award. Discuss plans to develop any connections with other nationally funded academic centers or networks and facilities supported by government, the private sector, and international partners.

   d. **Education, Outreach, and Knowledge Dissemination:** State the specific goals and objectives of this component. Explain how innovative educational experiences infused with content from the frontiers of nanoscale science and engineering research for graduate and undergraduate students, postdoctoral associates, and others will be emphasized within the facility. Educational experiences may include research experiences for undergraduates and teachers, domestic and/or international, the development of instructional modules for incorporation into undergraduate curricula, and other novel educational resources and tools based on the scientific and technological endeavors at the facility. Describe educational outreach and workforce development plans, and how diversity and broadening participation will be promoted among students, faculty, staff, management, and outreach activities. Describe outreach plans intended to increase the external user base, to encourage non-traditional users from diverse communities, and to reach potential users from startups and small businesses, whose work could benefit from advanced fabrication and instrumentation capabilities. Discuss how the site may complement and connect to other local resources, such as business incubators, prototyping and manufacturing facilities. Describe provisions for innovative strategies to disseminate effective practices and knowledge to the broader research, education, and technology communities. The range and scope of the education and outreach activities are expected to be commensurate with the size of the requested budgets.

   e. **Social and Ethical Implications:** Sites proposing to conduct this work should describe plans for promoting the development of research infrastructure that will serve to enhance the instruction and study of social and ethical implications of nanotechnology that leverages the facility's user community base. Indicate the social and ethical issues that will be the core concerns. Such concerns may include one or more of the following: socio-technical integration, governance involving multiple stakeholder groups, responsible research and innovation, studies of risk analysis and risk perception, environmental justice, human health and safety, and public policy. Indicate local researchers likely to be involved, and describe how they will contribute to the infrastructure enhancing efforts. Describe plans to facilitate more broadly cooperation and interchange with other institutions.

   f. **Management:** Describe the management structure for the individual user facility site. Discuss the method of selection, duration, and responsibilities of the Site Director and other management individuals. Describe provisions for oversight, including an external advisory body, its composition, responsibilities, and means of advising site management. Describe the methods for managing the external users program and for integrating the activities with academic programs. Discuss the planning process to determine overall site requirements, including the development of a vision for future research directions, needs, and capabilities; allocation of resources; and prioritization of equipment acquisition, development, and staffing. Describe plans for assessment and quantifiable metrics of site performance and impact, including for education and outreach activities. Describe the processes for setting goals, including promoting significant participation of non-traditional users and external users.

   g. **Broader Impacts:** Discuss the broader societal impacts of the proposed user facility site, including plans for increasing overall public awareness. Discuss plans for broadening participation in nanoscale science and engineering research, education and outreach, the involvement of smaller schools, minority-serving institutions, and international partners, and the dissemination of results of the proposed studies on social and ethical aspects of nanotechnology.

   h. **Results from Prior NSF Support:** The PI or co-PI must provide information on any received awards funded by NSF in the past five years, with emphasis on an award most closely related to the current proposal. The Intellectual Merit and Broader Impacts of the award results must be discussed. See instructions in the NSF Grant Proposal Guide.

References Cited: Provide appropriate references.

Biographical Sketches: (2-page limit, each) Provide a biographical sketch for the PI, co-PI, and senior Personnel. The sketch should describe the individual's academic and professional history and may list up to five products most closely related to the proposed project; and up to five other significant products, whether or not related to the proposed project. In choosing what to include, emphasize information that will be helpful in understanding the strengths, qualifications, and specific impact the individual brings to the user facility site project. See instructions in the NSF Grant Proposal Guide.

Budget: Proposing institutions must provide annual budgets for each year of five years for their user facility site proposals. The FastLane system will automatically fill out the cumulative five-year budget. A submitting institution proposal is limited to receiving a maximum award of $2.0 million per year. The involvement of any other participating institution sites in the proposal must be included as subawards, and must also provide annual budgets. The major portion of NSF funds should be budgeted for operation and staffing of the user facility. NSF funds may also be budgeted for associated purposes including education and outreach activities and, when appropriate, for acquisition or development of necessary instrumentation, tools, or processes. NSF funds may not be budgeted for research purposes, with the exception of social and ethical implications studies.

Budget Justification (6-page limit): Provide a detailed justification for the funds requested in the major budget categories for the individual proposed site. This is important to enable NSF to perform a cost analysis for each individual item of cost. For any other participating sites included as subawards, provide an additional 3-page detailed justification for each. Describe the proposed allocation of funds with sufficient clarity to show how resources will be utilized in carrying out the proposed activities. For any instrument or other item requested in the first year, include sufficient specificity in the description, with explanation of the need, and any provision for maintenance and operating expenses.

Current and Pending Support: Provide for PI and co-PIs.

Facilities, Equipment and other Resources (5-page limit): Provide an aggregated description of the internal and external resources, both physical and personnel, that the institution and any collaborators will provide to the project that will enable an assessment of the adequacy to perform the proposed effort. Such information must be provided in this section, in lieu of other parts of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Describe the commitment of the institution to providing the necessary infrastructure, including laboratory, clean room, common space, and sharing of equipment, in support of external user communities. Describe the distinguishing fabrication and characterization tools, instrumentation, and processes that are available for the intended areas of focus, including the ability to accommodate and develop nonstandard processes and materials. Some proposing institutions may provide unique characterization tools and capabilities such as wet or gas-phase processing methods that do not need a clean room environment. Discuss plans for acquisition, where necessary, of new equipment, tools, and supporting technologies that will position and maintain their facilities at the frontier. Describe the provision for modeling and simulation tools in support of the fabrication and characterization processes. Provide details of existing or proposed resource commitments from other organizations, such as government, industry, private foundations, and international institutions that will contribute to operation of the facility.

Supplementary Documentation: Submit official supporting letters that verify resource commitments by the institution and by any

other participating institutions or organizations. Submit a plan for data management and sharing of the products of research (3-page limit), and a postdoctoral mentoring plan (1-page limit, if applicable).

B. Budgetary Information

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

C. Due Dates

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

    February 02, 2015

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

    April 03, 2015

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

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

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions

that are underrepresented in STEM disciplines, which is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

A. Merit Review Principles and Criteria

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

1. Merit Review Principles

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

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

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

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

2. Merit Review Criteria

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

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

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

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

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

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

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

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

Additional Solicitation Specific Review Criteria

In responding to the above NSF review criteria, reviewers will be asked to place emphasis on the following additional criteria for individual site proposals:

- Strength of fabrication and characterization capabilities provided, including those for a specific focus on subfields.
- Commitment of the institution to providing the necessary infrastructure for the shared user facility.
- Relevance of modeling and simulation capabilities supporting fabrication and characterization.
- Quality of educational experiences afforded, including attention to broadening participation.
- Quality of plans for outreach and knowledge dissemination.
- Quality of plans for inclusion of social and ethical implications studies, if applicable.
- Strength of supportive internal research programs and faculty.
- Effectiveness of management structure, plans, and ability to ensure high-quality external user services.
- Appropriateness of plans for assessment and metrics of site performance and impact, and for determining future needs.
- Appropriateness of the budget for accomplishing the work set forth in the proposal.

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 Reverse Site Review.

The review process will involve a combination of adhoc mail and panel review followed by a reverse site review panel.

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

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

TBD - Financial and Administrative Terms and Conditions:

Cooperative Agreement - Financial and Administrative Terms and Conditions for Large Facilities apply.

C. Reporting Requirements

For all multi-year awards, 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 an award , 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.

Post-award oversight will consist of an annual review by a reverse-site-review panel of external experts at NSF, although some on-site reviews may be held. A Business Systems Review will be held once within the five-year period of the award. The awardee will submit comprehensive annual project reports to NSF in advance of each annual review. The annual project reports will contain a program plan and budget for the next-year's funding increment.

Cooperative Agreement - Financial and Administrative Terms and Conditions for Large Facilities apply.

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:

- Lawrence Goldberg, ENG/ECCS, telephone: (703) 292-5373, email: lgoldber@nsf.gov

- Guebre X. Tessema, MPS/DMR, telephone: (703) 292-4935, email: gtessema@nsf.gov

- Michelle Bushey, MPS/CHE, telephone: (703) 292-4938, email: mbushey@nsf.gov

- Sally O'Connor, BIO/DBI, telephone: (703) 292-4552, email: socconor@nsf.gov

- Sankar Basu, CISE/CCF, telephone: (703) 292-7843, email: sabasu@nsf.gov

- David Lambert, GEO/EAR, telephone: (703) 292-4736, email: dlambert@nsf.gov

- Frederick Kronz, SBE/SES, telephone: (703) 292-7283, email: fkronz@nsf.gov

- David Brown, EHR/DUE, telephone: (703) 292-8831, email: drbrown@nsf.gov

- Graham Harrison, OIIA/ISE, telephone: (703) 292-7252, email: gharriso@nsf.gov

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this 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**   (703) 292-5111
>   (NSF Information Center)**:**
>
> - **TDD (for the hearing-impaired):**   (703) 292-5090
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> - **To Order Publications or Forms:**
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>   Send an e-mail to: nsfpubs@nsf.gov
>
>   or telephone: (703) 292-7827
>
> - **To Locate NSF Employees:**   (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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

Suzanne H. Plimpton
Reports Clearance Officer
Office of the General Counsel
National Science Foundation
Arlington, VA 22230

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