

# EPSCoR Research Infrastructure Improvement Program: Track-2 (RII Track-2)

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## Program Solicitation

NSF 08-595

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**National Science Foundation**

Office of the Director  
Office of Integrative Activities

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

January 09, 2009

### REVISION NOTES

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1. Research Infrastructure Improvement (RII) Program includes Track 1 and Track 2.
2. RII Track-2 proposals may only be submitted by consortia of eligible EPSCoR jurisdictions. No jurisdiction may participate in more than one proposal.
3. Cost Sharing is Required.
4. All RII Track-2 awards will be cooperative agreements.
5. Page Limitations apply.
6. RII Track-2 requests must be submitted as separately submitted collaborative proposals (see Chapter II, Section D.3. b of the NSF Grant Proposal Guide) and must be submitted via FastLane.

### SUMMARY OF PROGRAM REQUIREMENTS

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#### General Information

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**Program Title:**

EPSCoR RESEARCH INFRASTRUCTURE IMPROVEMENT PROGRAM

**Synopsis of Program:**

The Experimental Program to Stimulate Competitive Research (EPSCoR) is a program designed to fulfill the National Science Foundation's (NSF) mandate to promote scientific progress nationwide. The EPSCoR program is directed at those jurisdictions that have historically received lesser amounts of NSF Research and Development (R&D) funding. Twenty-five states, the Commonwealth of Puerto Rico and the U. S. Virgin Islands currently participate. Through this program, NSF establishes partnerships with government, higher education and industry that are designed to effect lasting improvements in a state's or region's research infrastructure, R&D capacity and hence, its national R&D competitiveness.

Research Infrastructure Improvement Program: Track-2 (RII Track-2) awards provide up to \$2 million per year for up to 3 years to consortia of EPSCoR jurisdictions to support innovation-enabling cyberinfrastructure of regional, thematic, or technological importance. A successful RII Track-2 proposal must describe a clear, comprehensive, and integrated cyberinfrastructure vision to drive discovery, and provide collective solutions to cyberinfrastructure challenges of regional and national importance. The proposal must also describe how robust, reliable environments, capabilities, and capacities will be provided

to deliver long term value across science and engineering disciplines. These awards will enhance discovery, learning, and economic development through the use of cyberinfrastructure.

**Cognizant Program Officer(s):**

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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
- 47.078 --- Office of Polar Programs
- 47.079 --- Office of International Science and Engineering
- 47.080 --- Office of Cyberinfrastructure

**Award Information**

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**Anticipated Type of Award:** Cooperative Agreement

**Estimated Number of Awards:** 6

**Anticipated Funding Amount:** \$12,000,000 in FY 2009 (pending quality of proposals and availability of funds)

**Eligibility Information**

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**Organization Limit:**

Proposals may only be submitted by the following:

- RII Track-2 proposals may only be submitted by consortia of eligible EPSCoR jurisdictions. No jurisdiction may participate in more than one proposal. The EPSCoR governing committee of each jurisdiction of the consortium, acting on behalf of that jurisdiction, must submit a separately submitted collaborative proposal (see Chapter II, Section D.3.b of the NSF Grant Proposal Guide).

**PI Limit:**

None Specified

**Limit on Number of Proposals per Organization:** 1

Eligible jurisdictions can participate in only one consortium, and can submit only one collaborative proposal.

**Limit on Number of Proposals per PI:** 1

**Proposal Preparation and Submission Instructions**

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**A. Proposal Preparation Instructions**

- **Letters of Intent:** Not Applicable

- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from the standard NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

## B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is Required (Percentage Level)
- **Cost Sharing Level / Amount:** 50%
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

## C. Due Dates

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

January 09, 2009

## Proposal Review Information Criteria

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**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

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**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.

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# I. INTRODUCTION

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Section 3(e) of the National Science Foundation (NSF) Act of 1950, as amended, states that: "...it shall be an objective of the Foundation to strengthen research and education in the sciences and engineering, including independent research by individuals, throughout the United States, and to avoid undue concentration of such research and education." Through its congressional mandate, NSF promotes and advances scientific progress nationwide. In 1978, public concern about undue geographical concentration of federal funding of academic research and development (R&D) led Congress to further authorize NSF to conduct the Experimental Program to Stimulate Competitive Research (EPSCoR). These congressional instructions, which established the Experimental Program to Stimulate Competitive Research, have been restated in subsequent congressional authorizations of the Foundation's budget. Eligibility for EPSCoR participation is restricted to those jurisdictions that have historically received lesser amounts of NSF R&D funding and have demonstrated a commitment to develop their research bases and to improve the quality of science, technology, engineering, and mathematics (STEM) research conducted at their universities and colleges. Twenty-seven jurisdictions including twenty-five states, the Commonwealth of Puerto Rico and the U. S. Virgin Islands currently participate in one or more elements of the NSF EPSCoR program. (See section I, paragraph C, for additional EPSCoR eligibility information).

### A. EPSCoR Mission and Goals

The mission of EPSCoR is to assist the National Science Foundation in its statutory function

"to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education."

EPSCoR goals are to:

- provide strategic programs and opportunities for EPSCoR participants that stimulate sustainable improvements in their R&D capacity and competitiveness, and
- advance science and engineering capabilities in EPSCoR jurisdictions for discovery, innovation, and overall knowledge-based prosperity.

### B. EPSCoR Objectives

The primary objective of EPSCoR is to stimulate research that is fully competitive in the disciplinary and multidisciplinary research programs of the National Science Foundation.

Specific EPSCoR objectives are to:

- catalyze key research themes that empower knowledge generation, dissemination, and application;
- activate effective jurisdictional and regional collaborations that advance scientific research, promote innovation, and benefit society;
- broaden participation in science and engineering (S&E) by institutions, organization, and people within EPSCoR jurisdictions; and
- use EPSCoR for development, implementation, and evaluation of future programmatic experiments that motivate positive change and progression.

Pursuit of these goals and objectives bolsters the capacity of jurisdictions to:

- enhance discovery and learning through utilization of cyberinfrastructure and other evolving technologies;
- develop the diverse, well-prepared, internationally competent and globally engaged STEM workforce necessary to sustain the nation's competitive edge;
- facilitate knowledge generation leading to economic development; and
- expand the scientific literacy of all citizens, and disseminate to them the importance of STEM

research and education.

### C. **Criteria for Eligibility to Participate in the Research Infrastructure Improvement Program: Track-2 (RII Track-2)**

Research Infrastructure Improvement Program: Track-2 (RII Track-2) and other EPSCoR program eligibility is based on two primary considerations:

- A jurisdiction's demonstrated commitment to develop its research bases and to improve the quality of science, technology, engineering, and mathematics (STEM) research conducted at their universities and colleges, and
- A jurisdiction's most recent three-year history of research funds awarded by NSF relative to the Foundation's total research budget for that same period.

Regarding the second consideration, a jurisdiction is eligible to participate in the RII Track-1, RII Track-2, and other EPSCoR programs if its level of research support is equal to or less than 0.75 percent of the total NSF research budget for that same period. Adjustments are made in the rare instances where a single large NSF-funded national or international facility skews the data. The NSF EPSCoR website lists these summary data and the [eligibility criteria](#). Twenty-five states, the Commonwealth of Puerto Rico and the U. S. Virgin Islands currently participate in NSF EPSCoR programs.

A newly eligible jurisdiction must submit a planning grant proposal before an RII Track-1 or RII Track-2 proposal can be submitted. A "new" EPSCoR-eligible jurisdiction is defined as a State, US Territory, or US Commonwealth that previously did not qualify via the established 0.75% criterion, but is declared eligible under the most recent publication of the annual NSF EPSCoR eligibility list ([eligibility criteria](#)). In order to compete for an RII Track-1 or RII Track-2 award the "new" jurisdiction must have successfully completed the planning grant process.

Eligible jurisdictions may seek such planning support to formulate a documented vision and implementation design for their research, education, innovation, and cyberinfrastructure strategies. An expected outcome from any supported planning activity is the submission of a competitive RII Track-1 or RII Track-2 proposal and subsequent proposals to NSF Directorates and Offices, which combine capacity-building with capability enhancement for addressing bold opportunities characterized by regional relevance and national importance.

A jurisdiction wishing to submit a planning grant proposal must notify the NSF EPSCoR Office with a letter of intention to submit and then meet with NSF EPSCoR officials to discuss the conceptual project, potential partners and estimated cost. Depending on the outcome of these discussions, the jurisdiction may be invited to submit an EPSCoR planning proposal, using NSF's grant proposal guidelines.

Any currently participating EPSCoR jurisdiction that does not meet the eligibility criteria for an RII competition will continue to be eligible for EPSCoR Co-Funding and EPSCoR Outreach funding (described below) for a period of three years.

### D. **EPSCoR Investment Strategies**

EPSCoR's investment portfolio is aligned with the Foundation's strategic outcome goals of DISCOVERY, LEARNING, RESEARCH INFRASTRUCTURE, and STEWARDSHIP:

- Discovery – Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit, and establishing the nation as a global leader in fundamental and transformational science and engineering.
- Learning – Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.
- Research Infrastructure – Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools.
- Stewardship – Support excellence in science and engineering research and education through a capable and responsive organization.

EPSCoR uses three major investment strategies to achieve its goal of improving the R&D competitiveness of researchers and institutions within EPSCoR jurisdictions. These strategies are Research Infrastructure Improvement Program: RII Track-1 and RII Track-2 awards, Co-Funding of disciplinary and multidisciplinary research, and Workshops and Outreach.

- Research Infrastructure Improvement Program: Track-1 (RII Track-1) Awards. RII Track-1 awards

provide up to \$4 million per year for up to five years. They are intended to improve the research competitiveness of jurisdictions by improving their academic research infrastructure in areas of science and engineering supported by the National Science Foundation and critical to the particular jurisdiction's science and technology initiative or plan. These areas must be identified by the jurisdiction's EPSCoR governing committee as having the best potential to improve the jurisdiction's future R&D competitiveness.

RII Track-2 awards provide up to \$2 million per year for up to three years as collaborative awards to consortia of EPSCoR jurisdictions to support innovation-enabling cyberinfrastructure of regional, thematic, or technological importance. These awards facilitate the enhancement of discovery, learning, and economic development of EPSCoR jurisdictions through the use of cyberinfrastructure and other technologies.

- Co-Funding of Disciplinary and Multidisciplinary Research. EPSCoR co-invests with NSF Directorates and Offices in the support of meritorious proposals from individual investigators, groups, and centers in EPSCoR jurisdictions that are submitted to the Foundation's research and education programs, and crosscutting initiatives. These proposals have been merit reviewed and recommended for award, but could not be funded without the combined, leveraged support of EPSCoR and the Research and Education Directorates. Co-funding leverages EPSCoR investment and facilitates participation of EPSCoR scientists and engineers in Foundation-wide programs and initiatives.
- Workshops and Outreach. The EPSCoR Office solicits requests for support of workshops, conferences, and other community-based activities designed to explore opportunities in emerging areas of science and engineering, and to share best practices in planning and implementation in strategic planning, diversity, communication, cyberinfrastructure, evaluation, and other areas of importance to EPSCoR jurisdictions (See [NSF 06-613](#)). The EPSCoR Office also supports outreach travel that enables NSF staff from all Directorates and Offices to work with the EPSCoR research community regarding NSF opportunities, priorities, programs, and policies. Such travel also serves to more fully acquaint NSF staff with the science and engineering accomplishments, ongoing activities, and new directions and opportunities in research and education in the jurisdictions.

**This solicitation describes the Research Infrastructure Improvement Program: Track-2 (RII Track-2).**

## II. PROGRAM DESCRIPTION

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### RII Track-2 Program Description

Essential to EPSCoR's goal of enhancing the competitive position of jurisdictions' research and research-based education in science and engineering are well-designed comprehensive cyberinfrastructure plans and strategies. This cyberinfrastructure can leapfrog impediments posed by limited physical infrastructure and can enable broad educational engagement at the frontiers of discovery and innovation in science and engineering. Well-articulated plans for the development, improvement, and deployment of cyberinfrastructure appropriate to pursuit of the goals of the consortium's science and technology initiatives are an expected element of the project description. The importance of cyberinfrastructure to the research and education activities of NSF is reflected in the Foundation's cyberinfrastructure strategic plan, *NSF's Cyberinfrastructure Vision for 21<sup>st</sup> Century Discovery* (<http://www.nsf.gov/pubs/2007/nsf0728/nsf0728.pdf>).

The science and engineering research that will be facilitated by the proposed cyberinfrastructure improvements and the appropriateness of the proposed cyberinfrastructure to those research activities will be the primary drivers for RII Track-2 investments. Such investments will facilitate discovery and innovation, and enable the development of a science and engineering workforce that has the knowledge and skills necessary to design and deploy as well as to adopt and apply cyber-based tools and services. Over the long term, RII Track-2 investments are expected to result in lasting improvements in the jurisdictions' abilities to more successfully pursue significant jurisdictional and regional opportunities in science and engineering having national and international importance. The RII Track-2 award is expected to add specific value to the consortium's academic cyberinfrastructure not generally available through other funding.

Each jurisdiction must utilize its EPSCoR governing committee, which works closely with leaders in academe, government, and the private sector. The committees will identify potential R & D improvement strategies and activities that are consistent with the jurisdictions' S&T plans, their associated cyberinfrastructure plans, and multi-jurisdictional cyberinfrastructure needs most likely to advance the further development of a nationally competitive cyber-enabled academic R&D capability.

In preparation for submitting an RII Track-2 proposal, the EPSCoR governing committees are expected to have undertaken recent comprehensive analyses of the strengths, barriers, and opportunities for further development of the collective

cyberinfrastructure in support of overall objectives in research, education, and innovation. The RII Track-2 proposal must describe the strategy and implementation mechanisms to develop, expand, use and sustain the cyberinfrastructure of the consortium. RII Track-2 projects should result in lasting improvements in jurisdictions' cyberinfrastructure for the successful pursuit of significant collaborative opportunities in science and engineering that may also have national importance. Successful cyberinfrastructure improvement plans are likely to be those that provide sound platforms and opportunities for enhanced academic R & D competitiveness, including plans for generation of support outside the EPSCoR program. Cyberinfrastructure improvement plans must include strategies for utilizing the diverse human, physical, and technological resources of the consortium. Also essential to the cyberinfrastructure improvement plans are mechanisms that have a high probability of realizing stated goals and objectives. Successful RII Track-2 projects will require shared collaborative vision, integrative management structures, and cross-jurisdiction implementation plans.

**N.B.: In all instances, clear specification of competitiveness goals, performance milestones, and a timetable for achieving such milestones is a requirement for EPSCoR support.**

Major relevant accomplishments from prior NSF EPSCoR support and a detailed plan for achieving sustainable success in science and engineering goals of the consortium, together with formative and summative evaluation plans with measurable metrics, must be included in the proposal. It is expected that the improvement strategies described in RII Track-2 proposals will enable researchers of the consortia to develop increased capacity to compete more effectively for new sources of funding outside the EPSCoR program. Finally, the RII Track-2 proposal should summarize the coordination and synergy among all of the consortium's participating jurisdictions, and with other NSF investments in each of the jurisdictions. The proposal should then define the leveraging role for the proposed NSF EPSCoR RII Track-2 project within these broader contexts.

Cyberinfrastructure enhancement strategies that sharply focus available resources on research and research-based education and innovation activities that are consistent with specified long-term objectives of the consortium and its member jurisdictions are most likely to be successful. In conjunction with this focus, the proposed education and innovation projects should be integrated with identified cyberinfrastructure activities. EPSCoR strives for improvements that will significantly increase the R&D capacity of a jurisdiction or region to enable stronger competitiveness in large scale and cross-cutting competitions. EPSCoR support of a proposed research improvement activity should not duplicate other available federal, jurisdictional, or institutional resources and should add significant value to increase competitiveness at the jurisdictional, or larger regional level.

In recent years NSF has launched an array of large scale cyber-enabled science initiatives, as well as national scale cyberinfrastructure facilities, such as Open Science Grid and TeraGrid. Some of these initiatives and infrastructures create opportunities for RII Track-2 proposals in connecting, leveraging, and contributing cyberinfrastructure resources, thus enabling resident scientists and engineers to become stronger members of their research communities.

#### **A. Examples of RII Track-2 Activities**

Examples of research cyberinfrastructure improvement activities that are consistent with NSF EPSCoR program objectives include, but are not limited to:

- Improvement and enhancement of regional high speed network infrastructure and service connecting multiple institutions to the national and international networking research and education fabrics;
- Deployment and operation of scientific instruments and sensors;
- Acquisition and support of new and distributed scientific computing resources and data storage services;
- Integration of existing cyberinfrastructure components delivered as a cohesive collaboration, research and learning environment;
- Integration, validation, and support of software tools, applications, and services needed to enable research and learning across science and engineering disciplines;
- Deployment of nationally competitive high-performance computing and networking capabilities that strengthen and enrich the cyberinfrastructure environment to enable more robust science and engineering research and education, and facilitate broader collaborative interactions with researchers at minority serving institutions within the consortium;
- Development of computing professionals, interdisciplinary teams, and enabling policies and procedures that are needed to achieve scientific breakthroughs made possible by cyberinfrastructure, paying particular attention to opportunities to broaden participation of underrepresented groups in STEM;
- Development of technical expertise to install, and maintain sophisticated cyberinfrastructures, including managing software versions and monitoring the content for its up-to-date use;
- Deployment and support of collaboration tools for large, spatially distributed research groups;
- Integration of collaboration techniques and tools to support virtual organizations (e.g., distance learning activities); and
- Establishment of a repository of validated and verified modeling and simulation tools and components for given research areas (e.g., climate change).

NSF recognizes there may be some software development associated with the integration activities in building cyber-enabled environments. Any software development supported by this program is expected to be made available to the community under an open license (<http://www.opensource.org>) with the software engineering process leveraging NSF's "NMI Build and Test" (<http://nmi.cs.wisc.edu>) facility for build and test activities.

In many cases, cyberinfrastructure improvement activities will result in new forms of connectedness, interoperation, and effective participation in national and international projects and virtual organizations.

Although researchers in EPSCoR jurisdictions are expected to utilize and benefit from the cyberinfrastructure improvements facilitated by the RII Track-2 awards, these awards are not the appropriate mechanisms to provide support for individual faculty research projects. Requests for support of such projects should be directed to NSF's research grant programs.

To ensure maximum impact of limited EPSCoR funds, requests for funding must:

- Contribute to the consortium's strategy for future research and innovation;
- Add significant and measurable value to research capability in S&T areas of high priority to the consortium as a whole and to member jurisdictions, as appropriate;
- Engage the full diversity of the consortium's resources in the STEM enterprise; and
- Present a detailed strategy to generate subsequent, sustained non-EPSCoR funding from federal, jurisdictional, or private sector sources.

## B. Eligible Activities

Proposals requesting funds for cyberinfrastructure improvement may include support for academic, jurisdictional, profit and non-profit organizations, as well as eligible individuals employed by such organizations both inside and outside the consortium. In addition, cooperative programs among research universities, predominantly undergraduate institutions, especially minority serving institutions within the consortium are eligible for EPSCoR support. In all cases however, Project Directors/Principal Investigators of proposed EPSCoR projects must be affiliated with research universities, agencies, or organizations within the participant jurisdiction. Whereas the proposed project may employ collaborations between EPSCoR and non-EPSCoR participants, EPSCoR funding can only be requested and used for the EPSCoR-based components. In addition, all activities carried out under an EPSCoR award are subject to the restrictions concerning eligible science, technology, engineering, and mathematics disciplines and activities detailed in the NSF Proposal and Award Policy and Procedures (PAPP) Guide found on the NSF website at [www.nsf.gov/pubs/policydocs/papp/gpg07140.pdf](http://www.nsf.gov/pubs/policydocs/papp/gpg07140.pdf).

## III. AWARD INFORMATION

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**Anticipated Type of Award:** Cooperative Agreement

**Estimated Number of Awards:** 6

**Duration:** Award duration of up to 3 years

**Anticipated Funding Amount:** Up to \$12 million in FY 2009 (pending quality of proposals and availability of funds)

**Limitation of Awards:**

- RII Track-2 award amount not to exceed \$2 million per year.
- Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

## IV. ELIGIBILITY INFORMATION

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## Organization Limit:

Proposals may only be submitted by the following:

- RII Track-2 proposals may only be submitted by consortia of eligible EPSCoR jurisdictions. No jurisdiction may participate in more than one proposal. The EPSCoR governing committee of each jurisdiction of the consortium, acting on behalf of that jurisdiction, must submit a separately submitted collaborative proposal (see Chapter II, Section D.3.b of the NSF Grant Proposal Guide).

## PI Limit:

None Specified

## Limit on Number of Proposals per Organization: 1

Eligible jurisdictions can participate in only one consortium, and can submit only one collaborative proposal.

## Limit on Number of Proposals per PI: 1

## V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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### A. Proposal Preparation Instructions

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**Full Proposal Instructions:** Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-PUBS (7827) or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

The following instructions are specific to proposals submitted to the Research Infrastructure Improvement Program: Track-2 (RII Track-2) competition and supplement the NSF GPG:

- The jurisdiction's EPSCoR governing committee shall designate a fiscal agent/proposing organization for the project.
- Proposals must be submitted as separately submitted collaborative proposals, with each organization requesting a separate award.
- The lead organization's submission must include a proposal cover sheet, project summary, project description, references cited, biographical sketches, budgets, and budget justification, current and pending support, and facilities, equipment and other resources for its jurisdiction.
- The non-lead organization's submission (or organizations' submissions) must include all of the above for their jurisdiction except the project summary, project description, and references cited, which are the same for all collaborating jurisdictions.
- All collaborative proposals must clearly describe the roles to be played by the other organizations, specify the managerial arrangements, and explain the advantages of the multi-organization effort within the project description.

**The proposal section labeled Project Description may not exceed 25 pages total, including text and any graphic or illustrative materials. Page limitations also apply to specific subsections of the proposal. Proposals that exceed the page limitations or that do not contain all items described below will be returned without review.**

## PROJECT DESCRIPTION REQUIREMENTS

The RII Track-2 proposal must include the following elements:

1. **NSF Cover Sheet**
2. **Project Summary (3 pages maximum).** Provide a summary of the project, including research and education goals, and innovative use of the cyberinfrastructure proposed. In separate statements provide a succinct summary of the intellectual merit and broader impacts of the proposed project. Proposals that do not address the intellectual merit and broader impacts of the proposed project in separate statements will be returned without review.

3. **Table of Contents.** The table of Contents is automatically generated and cannot be edited.
4. **Project Description (25-pages maximum).** The project description details the science and engineering research and research-based education that will be facilitated by the proposed cyberinfrastructure improvements and the appropriateness of that cyberinfrastructure to the proposed activities. It should describe the current status of the consortium's cyberinfrastructure for academic research and research-based education, the science and engineering plans and goals, and how the cyberinfrastructure for which NSF support is being requested will enable successful pursuit of those goals. It should also describe how the proposed activities will engage the full diversity of the consortium's resources in the STEM enterprise. The project description must include the shared collaborative vision, integrative management structure and cross-jurisdiction implementation plans. Elements of the project description are:
- 4.1 **Status.** The current status of the consortium's cyberinfrastructure landscape.
- 4.2 **Results from Relevant Prior Support.** Results from relevant prior NSF support and summary of the relevance of that support to the proposed project activities.
- 4.3 **Cyberinfrastructure-enabled Science and Engineering Projects.** A comprehensive description of the project activities, including the research and research-based education components that promise to stimulate sustainable improvements in Research and Development capacity and competitiveness; a comprehensive description of the cyberinfrastructure improvements, and their associated specific goals, objectives, timelines, and milestones. This section must also show how the project as presented positions the consortium for future cyberinfrastructure improvement activities that develop a diverse science and engineering workforce and provide opportunities to enhance knowledge and skills to design and deploy as well as adopt and apply cyber-based tools and services. Finally, a compelling rationale for how use of the requested cyberinfrastructure will yield the desired objectives and outcomes, and a description of the intellectual partnership on which the project is based must be provided.
- 4.4 **Diversity Plan.** A description of the current state of diversity within the consortium's science and technology enterprise and clearly articulated plans for improvement – including specific goals, milestones, and timelines – to increase that diversity as an integral part of the cyberinfrastructure improvement activities for which support is being requested. This diversity includes all types, e.g., institutional, individual, disciplinary, geographic, etc.
- 4.5 **Dissemination and Communication Plan.** A clearly articulated plan to communicate results, benefits, and processes of cyber-enabled research and research-based education to all citizens to build scientific literacy and strengthen the educational and research capacity throughout the consortium.
- 4.6 **Evaluation and Assessment Plan.** A comprehensive evaluation and assessment plan. The plan, including milestones, must show the metrics selected to assess and evaluate demonstrable impacts and achievements of the cyber-enabled activities. The plan should detail annual metrics that indicate how the project is progressing. The plan should include review and evaluation of cyber-enabled activities by a group of diverse, independent, **external** experts during the award performance period.
- 4.7 **Sustainability Plan.** A plan for long-term sustainability of the proposed cyber-enabled activities. The plan must clearly describe the strategy for sustaining the impacts and achievements of the project beyond the award performance period, and must include milestones.
- 4.8 **Management and Coordination Plan.** The plan must describe how the project will be managed across the consortium; identify specific coordination mechanisms that will enable cross-jurisdiction, and cross-discipline scientific integration; describe coordination plans as they apply to the adoption, integration, deployment, and use of the proposed cyberinfrastructure; and identify the budget line items that support these coordination mechanisms. The management and coordination plan must also provide a description of the roles of all organizations, description of managerial arrangements, and an explanation of the advantages of the multi-jurisdictional efforts of the consortium.
5. **References Cited.** References cited in the project description should be listed here.

6. **Biographical Sketches.** Biographical sketches must be included; biographical sketches for consortium participants must be submitted by each jurisdiction in the consortium. In choosing what to include, emphasize information that will be helpful for understanding the strengths, qualifications, and specific impact each individual brings to the project. In addition, the lead organization must submit a listing of **all** participants in aggregate for the project and for each participating jurisdiction, detailing the participant's role and institution.
7. **Budget Pages and Budget Justification.** Complete budget pages for each year of support (1-5). Each jurisdiction must submit budget and budget justifications, current and pending support, and facilities, equipment, and other resources for its organization.

Proposers are reminded to identify the program solicitation number (NSF 08-595) 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.

## B. Budgetary Information

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### Cost Sharing:

Cost sharing at a level of 50 percent of the amount requested from NSF is required for all proposals submitted in response to this solicitation. The proposed cost sharing must be shown on line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal.

Only items which would be allowable under the applicable cost principles, if charged to the project, may be included in the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost sharing toward projects of another Federal agency may not be counted towards meeting the specific cost-sharing requirements of the NSF award.

All cost sharing amounts are subject to audit. Failure to provide the level of cost-sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

### Other Budgetary Limitations:

Funding requests can be for durations of up to 3 years. Annual budgets for NSF support cannot exceed \$2 million.

## C. Due Dates

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

January 09, 2009

## D. FastLane Requirements

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

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

## VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF

proposal preparation requirements. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal.

## A. NSF Merit Review Criteria

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

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

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

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

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

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

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

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

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

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

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

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

### **Additional Review Criteria:**

Reviewers for the RII Track-2 competition will also consider the following specific aspects of intellectual merit and broader impacts:

1. ***Strategic Fidelity and Impact*** - Are the proposed cyberinfrastructure development plans in concert with the needs of the consortium? Are the proposed cyberinfrastructure improvement plans and strategies appropriate and responsive to the strengths, barriers, and opportunities identified in the proposal? Is the project likely to have a meaningful impact on cyber-enabled research and research-based education capacity and capability within the consortium? Is the cyberinfrastructure likely to enhance capacity for discovery, innovation, and education in science and engineering? Is there ample evidence that the project will strengthen the consortium's ability to address scientific issues of relevance to the consortium and/or of

national importance? Is there an appropriate level of integration among shared facilities and research partners? Does each proposed component contribute to an identifiable strategy for intensifying competitiveness in research and innovation?

2. **Value Added** - Do the proposed activities add value at the institutional, jurisdictional and regional levels in research, education and innovation? How will the magnitude of the additional value be measured? Does the project advance the jurisdictions' innovation and economic development plans through greater emphasis on creativity, inventiveness, technology transfer, potential commercialization, and national R&D competitiveness? Do the proposed activities promote organizational connections and linkages within and between jurisdictions, schools, private and public sector? Are the scope and depth of the proposed activities appropriate to achieve the greatest project impacts? Are the leadership, faculty and student teams diverse in gender, race, and ethnicity and will the proposed strategic plan result in increased diversity in the jurisdiction's and/or nation's workforce?
3. **Diversity** – Are the diversity plans likely to be effective in broadening participations (e.g., institutions, including minority serving institutions, women and underrepresented groups in STEM, persons with disabilities, and economically disadvantaged, rural, and/or first generation college students) in the research and education activities of the proposed project? Will the proposed activities likely achieve a significant impact in the targeted research and education populations within the consortium? Does the proposal offer novel and effective ways to reach non-traditional populations and underrepresented groups in STEM?
4. **Dissemination and Communication** - Will the proposed internal communications network enable the efficient sharing of data and information among the project's partners? Does the network take advantage of cyberinfrastructure and integrate with the cyberinfrastructure plan? Is there a coordinated process for the collection and dissemination of major project results to audiences that include, for example, the scientific community, the member jurisdictions, other EPSCoR jurisdictions and the general public? Does the described process contain a communication pathway to the NSF EPSCoR Office?
5. **Evaluation and Assessment** - Are there clear and appropriate metrics and criteria for measuring project accomplishments according to a well-defined schedule? Is there a process described for metric-related data capture, processing, interpretation and timely reporting? Is it evident how the evaluation process and results will be used by project leadership for monitoring and management? Are there appropriate formative and summative evaluation plans for assessing current status, major impacts, and future directions? Are the proposed external review processes and review groups appropriate?
6. **Sustainability** - Are the plans for sustainability clear, reasonable and viable? What is the potential for the proposed activities to foster and sustain the activities and/or innovation in the long-term following EPSCoR support? How will each of the project's partners contribute to sustainability and how will the partnership evolve to ensure future progress in research, research-based education and innovation?
7. **Management and Coordination** - Is the management and coordination plan clearly structured and likely to be effective? Do the Project Directors and the management team demonstrate the vision, experience and capacity to manage a complex, multi-faceted research, education, and knowledge transfer enterprise? Are the memberships and roles of the jurisdictions' EPSCoR governing committees and external advisors plainly identified, and is their involvement in the project apparent, logical, and free of conflicts of interest? Are plans for technical assistance appropriate and are the anticipated providers of such assistance appropriately qualified?

## B. Review and Selection Process

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

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

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

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### A. Notification of the Award

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

### B. Award Conditions

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An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); \* or 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](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 [pubs@nsf.gov](mailto:pubs@nsf.gov).

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

#### Special Award Conditions:

The annual and final reports must include identification of numbers of women and members of other underrepresented groups in faculty and staff positions and as participants in the activities funded by the award.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

### C. Reporting Requirements

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

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

## VIII. AGENCY CONTACTS

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General inquiries regarding this program should be made to:

- Denise M. Barnes, Program Director, 1122, telephone: (703) 292-5179, fax: (703) 292-9047, email: [dbarnes@nsf.gov](mailto:dbarnes@nsf.gov)
- Kevin L. Thompson, Program Director, 1160, telephone: (703) 292-8962, fax: 703 292-9060, email: [kthomps@nsf.gov](mailto:kthomps@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto:fastlane@nsf.gov).
- Simona Gilbert, telephone: (703) 292-7216, email: [sgilbert@nsf.gov](mailto:sgilbert@nsf.gov)

## IX. OTHER INFORMATION

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The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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

## ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which



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

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

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

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

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

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

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

## PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

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



collection of information, including suggestions for reducing this burden, to:

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

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