

# ***INFORMATION TECHNOLOGY RESEARCH***

## ***Program Solicitation***

### ***NSF 00-126***

DIRECTORATE FOR BIOLOGICAL SCIENCES

DIRECTORATE FOR COMPUTER AND INFORMATION SCIENCE AND ENGINEERING

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES

DIRECTORATE FOR ENGINEERING

DIRECTORATE FOR GEOSCIENCES

DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES

DIRECTORATE FOR SOCIAL, BEHAVIORAL AND ECONOMIC SCIENCES

OFFICE OF POLAR PROGRAMS

DIVISION OF INTERNATIONAL PROGRAMS

#### **DEADLINES:**

**Small Projects: Full proposals due January 22-24, 2001**

**Group Projects: Pre-proposals due November 27-29, 2000  
Full proposals due April 9-11, 2001**

**Large Projects: Pre-proposals due December 4-6, 2000  
Full proposals due April 23-25, 2001**

**See Summary of Program Requirements for details.**



**NATIONAL SCIENCE FOUNDATION**

## SUMMARY OF PROGRAM REQUIREMENTS

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### GENERAL INFORMATION

**Program Title:** INFORMATION TECHNOLOGY RESEARCH

**Synopsis of Program:**

Advances in Information Technology (IT) have dramatically transformed the way in which our entire society lives, works, learns, communicates, and does business. In particular, the conduct of science and engineering has been profoundly altered, so that it is possible today to work on problems in these areas at unprecedented levels of speed, precision, and detail. In education, IT has the potential to make available in the remotest corners of earth the highest levels of learning, information, and analysis. To enhance the positive effects of these transformations, our research programs must be expanded considerably, and the supply of high-quality trained personnel must be substantially increased. The National Science Foundation wishes to fund innovative, high payoff research, which explores new scientific, engineering, and educational areas in IT. This is the second year for the Information Technology Research (ITR) Program. This year's solicitation is considerably broadened to include not only fundamental research in IT, but also new applications of IT in all scientific, engineering, and educational areas, as well as innovative infrastructure to support IT research and education.

**Cognizant Program Officers:**

Individual directorate contacts are:

- Dr. Paul Chapin (SBE), [pchapin@nsf.gov](mailto:pchapin@nsf.gov), 703-292-7265
- Dr. John Cherniavsky (EHR), [jchernia@nsf.gov](mailto:jchernia@nsf.gov), 703-292-5136
- Dr. Eric Itsweire (GEO), [eitsweir@nsf.gov](mailto:eitsweir@nsf.gov), 703-292-7593
- Dr. Michael Lesk (CISE), [mlesk@nsf.gov](mailto:mlesk@nsf.gov), 703-292-8930
- Dr. John Lynch (OPP), [jlynch@nsf.gov](mailto:jlynch@nsf.gov), 703-292-7417
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- Dr. Stefan Thynell (ENG), [sthynell@nsf.gov](mailto:sthynell@nsf.gov), 703-292-8371

**Supplemental Information Related to This Solicitation:**

For additional information related to the ITR initiative, Awards Listings for ITR 2000, responses to Frequently Asked Questions (FAQ), and expanded discussions of suggested research topics, see the ITR Home Page at <http://www.itr.nsf.gov>.

**Applicable Catalog of Federal Domestic Assistance (CFDA) Numbers**

- 47.074 (BIO), 47.070 (CISE), 47.076 (EHR), 47.041 (ENG), 47.050 (GEO), 47.049 (MPS), 47.075 (SBE), 47.078 (OPP).

**ELIGIBILITY INFORMATION**

- **Organization Limit:** Only U. S. academic institutions and non-profit research institutions may submit pre-proposals and full proposals.
- **PI Eligibility Limit:** No individual may appear as PI or co-PI on more than two proposals or pre-proposals. This means that an individual may submit two pre-proposals for Large or Group projects, or two proposals for Small projects, or one of each. The full proposal following a pre-proposal does not count against this limit.
- **Limit on Number of Proposals:** No institution may submit more than one proposal (including collaborative proposals) for a Large project. An institution may, however, appear any number of times as a subawardee on other institutions' proposals of any size. An eligible institution may submit more than one pre-proposal for Large projects, but only one full proposal with a budget of more than \$5 million total may be submitted from any university as lead organization.

**AWARD INFORMATION**

- **Anticipated Type of Award:** Standard and Continuing grants comprising (1) Small (typically individual investigator) projects, (2) Group projects or (3) Large projects. Throughout this solicitation, "Small" projects are those with total budgets up to \$500,000; "Group" projects are those with total budgets above \$500,000 and up to \$5 million (and annual budgets up to \$1 million); "Large" projects are those with total budgets up to \$15 million (and annual budgets up to \$3 million). For all project sizes, these budgets are total amounts including subawardees and indirect costs. In the case of collaborative proposals, the thresholds apply to the sum of the proposal budgets. No project may have a duration exceeding five years.
- **Estimated Number and Type of Awards:** The number and type of awards are dependent upon funding. The distribution of awards among the categories is subject to the number and quality of proposals received in the competition. If proposals follow past patterns, NSF expects to spend 30-40% of the funding on Small projects, 40-50% on Group projects, and 10-30% on Large projects. For the purpose of estimating the number of awards to be made, NSF projects that the average Small award will be \$150,000 per year or \$450,000 total; that the average Group award will be \$500,000 per

year or \$2,500,000 total; and that the average Large award will be \$2 million per year or \$10 million total.

- **Anticipated Funding Amount:** An increase of approximately \$192 Million has been requested for this initiative in Fiscal Year 2001. The actual funding level depends on Congressional action. NSF anticipates that half or more of the total ITR budget in 2001 will fund basic IT research. The rest of the funding will be divided between research on IT applications and IT infrastructure. The anticipated date of awards is September, 2001.

## PROPOSAL PREPARATION AND SUBMISSION SUMMARY

### *A. Proposal Preparation Instructions: Supplemental Preparation Guidelines*

- **The program contains supplements to the standard GPG proposal preparation guidelines. Please see the full program solicitation for further information.**
- This program allows for additional pages beyond those specified in the NSF *Grant Proposal Guide* (GPG) (NSF 00-2) to 1) explain international collaborations, 2) describe management plans for Large projects, and 3) present results of prior research for Large projects. See section V for further detail. Special instructions for the form and content of pre-proposals are also given there. All proposal and pre-proposal titles must begin with “ITR/” followed by a two-letter code identifying the technical area of the proposal and a colon (:). For example, the title of a proposal sent to the technical area “Information Management” must begin with “ITR/IM:”. Please see Section V.A.1. for further information on the codes for each technical area.

### *B. Budgetary Information*

- **Cost Sharing Requirements:** No cost sharing is required.
- **Indirect (F&A) limitations:** None.
- **Other Budgetary Limitations:** None.

### *C. Deadlines*

All deadlines are given as three-day ranges. Each institution has a deadline within this range determined by its ZIP code, as explained in Section V.C. This staggered submission is used to level the proposal processing load.

- **Pre-proposal Deadlines:**
  - Small projects: No pre-proposals are required.
  - Group projects: Pre-proposals are mandatory and are due by November 27-29, 2000.
  - Large projects: Pre-proposals are mandatory and are due by December 4-6, 2000.
  - **Pre-proposal review feedback is binding. Only pre-proposals that are invited by NSF may submit a full proposal for a Group or Large project.** NSF will

return feedback to Group pre-proposal PIs by the week of February 26, 2001, and to Large pre-proposal PIs by the week of March 5, 2001.

- **Full Proposal Deadlines:**
  - Small projects: Full proposals are due by January 22-24, 2001.
  - Group projects: Full proposals are due by April 9-11, 2001.
  - Large projects: Full proposals are due by April 23-25, 2001.

#### *D. FastLane Requirements*

- **FastLane Submission:** FastLane is required for all pre-proposals and full proposals.
- **FastLane Contact:** FastLane User Support at 1-800-673-6188 or [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

### **PROPOSAL REVIEW INFORMATION**

- **Merit Review Criteria:** National Science Board approved criteria apply, plus an additional criterion mentioned in this solicitation (section VI).

### **AWARD ADMINISTRATION INFORMATION**

- **Award Conditions:** Standard NSF award conditions apply. A site visit schedule may be negotiated as part of the award conditions for Large projects.
- **Reporting Requirements:** Standard NSF Reporting Requirements apply.

## **I. INTRODUCTION**

The National Science Foundation is committed to extending the Information Technology Research (ITR) program that began in Fiscal Year 2000. Support is available for up to five years to encourage longer-term research projects with more ambitious goals. The purpose of this program is to augment the knowledge base and increase the workforce needed to enhance the value of Information Technology (IT) for everyone. IT will be essential for solving critical national problems in areas such as fundamental science and engineering, education, the environment, health care, and government operations. But new fundamental understandings are required to make optimal progress. To meet these needs, this solicitation requests proposals in the following three categories:

- Fundamental research in IT;
- Applications of IT across the sciences and engineering; and
- Extensions of IT education and infrastructure.

**Fundamental Research in IT:** As in the first year (FY2000), this year's ITR program maintains its primary focus on basic IT research in all areas of computer, computational and information sciences. This research should be innovative and high-risk and offer the possibility of major

breakthroughs. NSF expects to catalyze activities that expand our understanding in all areas and uses of IT. This focus of ITR is particularly concerned with research that will apply to future generations of information technologies as well as to those that are available today.

**Applications of IT across the Sciences and Engineering:** ITR is expanded from last year to include new research in the sciences, engineering, and education that is facilitated by advances in IT, and research in IT that supports advances in other areas. This research may involve new approaches in computation or a new use of computation to solve challenging scientific and engineering problems. It supports the symbiosis of IT with science, engineering, and education.

**Extensions of IT Education and Infrastructure:** ITR is also expanded to include some kinds of infrastructure proposals. Specifically, requests for infrastructure that would provide access to IT to various underrepresented communities, regions and social groups may receive ITR support this year. Equipment requests should be limited to those needed to support the research, education and outreach goals of a proposal.

Increased education in and societal benefits from IT are important goals of this program. Therefore, all proposals are expected to discuss the educational and/or societal impact of the proposed research. Proposal budgets should have as their first priority funding for students and postdocs rather than faculty, permanent professional staff or consultants. Requesting funding for academic year faculty salaries (i.e., release time or course buy-outs) is discouraged, and special justification must be provided for such requests. Proposals and included subawards from non-academic institutions should explicitly describe the educational impact and value of the project. Research projects in academic institutions should contribute to educational needs by training students, developing new research foci at the institution, or increasing the breadth and depth of IT research activities in U.S. universities.

## II. PROGRAM DESCRIPTION

For reviewing purposes, the ITR program is divided into three classes by size of budget, with different size classes having different deadlines, and five major technical research areas. The [Size Classes](#) section below describes the criteria by which each class will be evaluated. PIs should familiarize themselves with these classes to ensure that they submit to the correct deadline. The [Major Technical Areas](#) section below describes some of the research topics covered in each area. NSF understands that some research proposals might combine several technical areas; we encourage such proposals, and will arrange for their multi-disciplinary review.

### SIZE CLASSES

To ensure that proposals with roughly comparable scope and objectives are reviewed together, ITR proposals are divided into three classes by budget. While each class will be reviewed as a separate group, all size classes will be reviewed using the same standard NSF criteria: 1)

intellectual merit, 2) broader impacts, and an additional criterion described in section VI. All pre-proposals and proposals must address all these criteria. In particular, all proposals of all budget sizes must describe their broader impact (Criterion 2), and the expectation for innovative and explicit contributions to Criterion 2 as the size of the project increases.

Pre-proposals are required for Group and Large projects. These pre-proposals will be reviewed by people outside of NSF who are experts in the field of work proposed. Feedback from these reviews will be binding. Only projects that are invited by NSF are eligible to submit full proposals. Only one full proposal (or set of collaborative proposals) may be submitted for each invited pre-proposal. PIs are encouraged to contact one of the cognizant NSF program officers before submitting a pre-proposal for a Group or Large project.

Each university may only submit one large full proposal as lead institution. Should NSF identify more than one pre-proposal from a university as worthy of encouragement, the university must choose which one to follow up as a full proposal.

### ***1. SMALL PROJECTS (UP TO \$500,000 TOTAL BUDGET)***

Innovative, high-risk, and long-term information technology research is essential for achieving America's 21st century aspirations. We are specifically encouraging proposals that can be characterized as: preliminary work on untested and novel ideas; ventures into emerging technology areas; new approaches to current problems; small-scale, but intensive, research partnerships across disciplines (or across areas within disciplines); efforts which can catalyze innovative advances; switches in a PI's established research area; and other fresh starts that can work to establish and to maintain the flow of good ideas and trained professionals in information technology. All proposals must address NSF Criterion 2 (broader impact) and discuss their contributions to this goal.

### ***2. /GROUP PROJECTS (UP TO \$5 MILLION TOTAL BUDGET, AND UP TO \$1 MILLION IN ANY SINGLE YEAR)***

In this size class, we are encouraging proposals that describe substantial and ambitious research projects (e.g., multi-disciplinary research with multiple PIs and/or institutions). Similar to the expectations for Small projects, a high premium is placed on innovation in fundamental IT research, IT applications, or IT education and infrastructure. While high-risk and high-payoff proposals are encouraged, it is also expected that the Group project descriptions will provide some evidence of preliminary research to justify their approach. These projects should additionally explain why a budget of this size is required to carry out this research. Generally, the larger the budget, the more carefully its size must be justified. All proposals must address the educational and societal impact of the proposed research (Criterion 2). Proposals for Group projects should describe plans for distributing the results of their research. They should strive to assist relevant scientists and engineers to use their results in ways that go beyond traditional academic publications.

### **3. LARGE PROJECTS (UP TO \$15 MILLION, TOTAL BUDGET, AND UP TO \$3MILLION IN ANY SINGLE YEAR)**

In this size class, we are encouraging proposals that allow for very large, long-term coordinated research efforts. In some ways, these projects are like NSF Engineering Research Centers or Science and Technology Centers. Proposals for Large projects should address IT research that is innovative in terms of its ideas, scale, or integration of its parts. Proposals in this size class should carefully justify the need for an effort of such magnitude. They must also address the educational and societal impact of the proposed research (Criterion 2). It is also very important that the project be an integrated whole rather than a collection of independent pieces. Proposals in this class must contain an explicit management plan appropriate to the coordination of the proposed activities and which demonstrates the advantages of the large project structure.

NSF has particular responsibility for educational and community-extending activities. We expect that Large projects will include one or more community-extending concepts such as undergraduate education activities, programs to address the under-representation of women and minorities in IT, links to non-research institutions, or participation by institutions in EPSCoR states.

NSF expects that the knowledge generated by the Large projects will be useful to the science and engineering communities. Proposals in this class must address plans for distributing software, data or other products developed in the course of the research. The project should strive to assist users by 1) maintaining software repositories with documented, portable implementations of algorithms and other software tools, 2) hosting tutorials and workshops to promote community interest, understanding, and use of new methods, 3) increasing the level of education in IT-related disciplines at either the undergraduate or graduate level, 4) publishing technical specifications and schematics of hardware designs, 5) making databases and unique hardware accessible on the Web, or 6) some other alternative means. **Note**: Grant Proposal Guide section VII-K on Legal Rights To Intellectual Property.

#### **MAJOR TECHNICAL AREAS**

Information Technology is a broad subject, with applications throughout the sciences, engineering, education, the economy, the humanities, and society in general. It deals with how we use information, how we compute, and how we communicate. It affects our educational system, our economy, and our society. Needs for new information are urgent in many of these areas, and in many cases problems will need research that covers many parts of the IT field and other areas. Thus any division is at least partly artificial, given the interrelationship of computation, information, communication, and application. The classification here is for practical reasons, and interdisciplinary, broad-front approaches are encouraged. This year, in particular, we are looking for research that includes IT but also extends into other areas of scientific and scholarly research and education,



Although NSF has divided ITR into five broad technical areas to help organize knowledgeable reviewers, we encourage collaboration within and across these areas. We understand that some projects will be relevant to several ITR areas, either because they combine several topics or because a single topic is relevant to more than one area. NSF welcomes proposals that combine major technical areas, and will review them appropriately. Within each of the broad technical areas, several example topics and areas of emphasis are mentioned. These are meant as examples of what is possible, and *not* as limitations on the content of proposals. NSF encourages researchers from all scientific disciplines to submit innovative research proposals on any aspect of IT. NSF particularly encourages proposals that contribute to fundamental understanding of both IT and other scientific disciplines.

For additional information regarding each of the following technical areas along with additional examples of research topics that are of specific interest to various NSF Directorates, the prospective PI is encouraged to visit the ITR Home Page at <http://www.itr.nsf.gov>.

### ***1. SYSTEMS DESIGN AND IMPLEMENTATION (ITR/SY)***

Proposals to the Systems Design and Implementation area should advance the state of the art in building IT systems. These advances may come at any level of the system, including fundamental models of computation, algorithm design and analysis, signal processing, system architecture, human/computer interfaces, or software engineering. Projects that emphasize the interfaces between levels or integrate multiple levels are also welcome. High-risk, high-payoff ideas that offer chances for “quantum leaps” in the capabilities of computers are particularly welcome.

The end goal of any project in this area should be fundamental scientific understanding that will lead to quantitatively better IT systems. Possible areas for improvement include better reliability and security, easier usability, greater (theoretical or practical) capability, wider extensibility, higher performance, smaller size, or lower power. Better methods for measuring IT systems to verify these qualities (or others) are also of interest.

Areas of emphasis within this technical area include: **Software** - research to improve our ability to create new kinds of software systems; **Human Computer Interfaces** - research that increases our understanding of human abilities and our skill at using this understanding to improve interface methods; **Revolutionary Computing** – research that looks beyond current computer architectures, either by studying new fundamental devices or by proposing radically new architectures that make the best use of these new devices; and **Fundamental IT Models** - research on fundamental IT models, including mathematical methods that underlie many areas of IT.

### ***2. PEOPLE AND SOCIAL GROUPS INTERACTING WITH COMPUTERS AND INFRASTRUCTURE (ITR/PE)***

Proposals to this ITR area should develop new knowledge about the interaction among people, groups, computing applications, communications networks, and information infrastructures across distances and in various social, cultural, legal, economic, educational and ethical contexts. New theories, models, concepts, and design principles that incorporate an understanding of social and technical systems are encouraged as well as empirical studies that map the landscape of social change and transformation and that point the way to improvement of educational methods and technology using IT. Proposals should address basic research, applications and infrastructure topics that increase the value of IT to all sectors of society and the ability of individuals and social groups to participate in and contribute to advances in IT.

Areas of emphasis within this technical area include: **Social and Economic Implications of Information Technology** - research that develops new knowledge about how digital economies and societies are organized and have consequences, and how privacy, intellectual property, value systems, and forms of social control are effectively integrated into social and economic contexts and influence the design, deployment, use and consequences of IT; **Universal Access**- research that extends human capabilities for those with limitations of vision, hearing, or motor skills, and also offers promise for helping all users; **Universal Participation** – research that develops new knowledge about the motivations and barriers to the use of IT, particularly as they are linked to social class, gender, ethnicity, age, disabilities, occupation, and regional and international variations; **Community-Expanding Infrastructure** – extending access to IT to those areas and societal groups now facing difficulties in accessing IT services and resources; **Information Technology in the Social and Behavioral Sciences** – research that provides demonstration tests of new Internet-based research techniques, such as online interviews, online surveys, and online laboratory experiments; **IT Workforce** - research focused on issues related to attracting and sustaining a strong IT workforce; and **IT and Education** – research focused on creating new knowledge relevant to education in IT or the use of IT in improving learning and education.

### ***3. INFORMATION MANAGEMENT (ITR/IM)***

This area will support research to improve the ability to generate, communicate, organize, store and analyze data and knowledge in various areas of science and engineering. Efforts aimed at construction of high-quality datasets and the creation and maintenance of important data resources for science may also be supported. Quality, accessibility, and usability are important benefits provided by new IM technology. Thus, fundamental research foci include knowledge modeling, scientific collaboratories, data mining, database access technology, and embedded intelligent systems.

Areas of emphasis within this technical area include: **Content and Access Research** - fundamental research activities dealing either with online content (transforming the kind, quality or amount of material online) or with access (increasing the utility of online information via research on quality, economics, searching, or other related areas); **Data Analysis** - improved hardware, software, and methods useful for gathering, analyzing and visualizing data from experiments and simulations; **Environmental Informatics** - research on new information

systems and technology that support in-situ data collection (e.g., instrumentation of the environment via arrays of sensors) and integration of data collected at different spatial and temporal scales of resolution; **Geoscience Modeling and Representation** - studies that enable better use of online data about the earth, in particular the modeling and integration of large scale datasets in the geosciences and about the Earth system and geosciences in general; **Biological Informatics** - research on advanced computational algorithms and functional linkages among diverse biological databases, including those arising from functional genomics and computational simulations, and supporting technology for tele-medicine; **Informatics in Mathematical and Physical Sciences** - research directed toward the proposed National Virtual Observatory, and novel applications of the internet including specialized digital libraries, large-scale data transfers and electronic publishing; **Information Research, Repositories, and Testbeds** - research on techniques needed to build and support a ubiquitous content infrastructure, providing seamless retrieval across many kinds of scientific data and the computational humanities; and **Content Resources** - creation and support of online data that facilitates scientific research.

#### ***4. APPLICATIONS IN SCIENCE AND ENGINEERING (ITR/AP)***

ITR proposals in the Applications in Science and Engineering area should focus on novel solutions to problems in science and engineering using IT. Successful projects in this area will make it possible to solve new problems, to produce qualitatively or quantitatively better solutions to existing problems, or to attack cases of problems more complex than those solvable today. This theme specifically supports projects that use computation to answer important questions in disciplinary science; the project need not involve fundamental IT advances *per se* (although such advances are of course desirable). Applications of IT to any research area normally supported by NSF are welcome: biology, education, engineering, geosciences, mathematics and physical sciences, or social, behavioral and economic sciences. This theme also supports fundamental IT research with strong relevance to scientific and engineering calculations, including numeric, symbolic, and geometric algorithms; high-performance hardware and software systems for scientific applications; scientific and information visualization; problem solving environments and other scientific software; and other areas of computational science.

However, NSF particularly encourages projects which promise to make simultaneous advances in fundamental IT and disciplinary science. IT has already made significant contributions to all areas of science and engineering. As a result of the continued advancement in computer technology, simulation algorithms, and software development, scientists now have new computational approaches to research that complement the traditional theoretical and experimental methodologies. Likewise, scientific applications have led to many advances in fundamental IT. NSF hopes to catalyze even more of these cross-disciplinary successes. For this reason, Large and Group projects would likely be significantly strengthened by collaborations crossing scientific area boundaries.

Areas of emphasis within this technical area include: **Computer Simulation**- research involving fundamental mathematical and computational techniques for the modeling and analysis of real-world physical systems; **Data Models** – new kinds of data models that represent uncertainty and ambiguity inherent in real-world systems and design; **Scientific Algorithms** - new algorithms and their implementations useful for numeric, symbolic, or geometric computation; **Scientific Data Analysis** – improved hardware, software, and methods useful for gathering, analyzing, and visualizing data from scientific experiments and simulations; **Visualization** - research on visualizing large data sets or other innovative ways of presenting and interacting with data; **Advanced Computation in Biological Sciences** – analysis of biological information, simulation of biological systems, visualization in computational biology; **Advanced Computation in Engineering**– research on engineering simulations and process modeling for the service sector; **Advanced Computation in the Geosciences** – research that enhances computational models and capacity in the geosciences community; **Advanced Computation in the Mathematical and Physical Sciences** – research that enhances our ability to understand the universe at all length and time scales; and **Advanced Computation in the Social and Behavioral Sciences** – modeling and simulation of cognitive systems, including knowledge, language, perception, and motor control, and of economic and social systems.

#### ***5. SCALABLE INFORMATION INFRASTRUCTURE FOR PERVASIVE COMPUTING AND ACCESS (ITR/SI)***

Proposals in the Scalable Information Infrastructure area should advance the technical infrastructure to support human to human, human to computer, and computer to computer remote communication. Of special importance are issues relating to both scaling and improved functionality of the infrastructure. These include work in communications devices and technologies, communications processing and coding, networking, and middleware support for distributed applications, in addition to understanding the increasing complexity of these systems.

Areas of emphasis within this technical area include: **Scalability** - proposals that address scalability in breadth and depth of penetration of networks both by improvements to current technologies and new architectural approaches, including issues of connection to homes, schools and small businesses, increases in both physical and functional capabilities, and understanding the increasing complexity of such infrastructure through both simulation and modeling; **Security, Privacy and Integrity of the Information Infrastructure** - proposals concerned with authentication, authorization, privacy, assurance, and integrity of the networked information infrastructure; **Sensors and Sensor Networks** - proposals on methods for organizing and summarizing sensor data, multi-layer approaches to the integration and coordination of large numbers of networked sensors, ways to integrate such data into simulation and control systems, and power management; **Tetherfree Communication and Networking**- proposals that will lead to tether-free communications with seamless access independent of location, including innovative device and antenna design, power management, network protocol, systems, and user interface design and integration, and supporting technologies as a component of broadly based

wireless / tetherfree systems; **Remote Access and Control of Experimental Facilities** - proposals that address the issues related to remote operation of facilities such as accelerators and telescopes, and as well as robotic, autonomous observation and exploration in remote regions that are otherwise dangerous, difficult or expensive to access in any other way; and **Tele-immersion** - proposals that explore novel approaches to the provision of the tele-immersion experience, including devices, networking infrastructure, the applications themselves as well as management of them, and evaluation of such efforts.

### III. ELIGIBILITY INFORMATION

- **Organization Limit:** Only U. S. academic institutions and non-profit research institutions may submit pre-proposals and full proposals.
- **PI Eligibility Limit:** No individual may appear as PI or co-PI on more than two proposals or pre-proposals. This means that an individual may submit two pre-proposals for Large or Group projects, or two proposals for Small projects, or one of each. The full proposal following a pre-proposal does not count against this limit.
- **Limit on Number of Proposals:** No institution may submit more than one proposal (including collaborative proposals) for a Large project. An institution may, however, also appear any number of times as a subawardee on other institutions' proposals of any size. An eligible institution may submit more than one pre-proposal for Large projects but NSF will only accept one full proposal for a Large project from any institution. Should NSF identify more than one pre-proposal from an institution as worthy of encouragement, the university must choose which to develop into a single full proposal to submit in this size class.

NSF encourages proposals that collaborate with international researchers, for-profit corporations, and national laboratories. However, in keeping with our desire to stress educational benefits of this funding, proposals will only be accepted from U.S. institutions of higher education and from U.S. non-profit institutions with a strong educational component. For-profit organizations, government laboratories operated by other agencies and foreign institutions may not apply directly; they may receive subawards, but such subawards must be justified by explaining what unique capability is being made accessible. In no case will NSF support salaries of regular Federal employees of other agencies.

### IV. AWARD INFORMATION

Under this solicitation, proposals may be submitted in any of three size classes:

- Small projects, which may request up to \$500,000 in total budget;

- Group projects, which may request up to \$5 million in total budget, and up to \$1 million in any single year; and
- Large projects, which may request up to \$15 million in total budget, and up to \$3 million in any single year.

A proposal in any size class may request funding for any duration up to five years. NSF expects to make awards in each of these size classes and in a variety of durations. The distribution of awards between the size classes will depend on the number and quality of proposals received in the competition in each class. If proposals follow past patterns, NSF expects to spend 30-40% of the funding on Small projects, 40-50% on Group projects, and 10-30% on Large projects. For purposes of estimating the number of funded projects, NSF projects that Small project budgets will average about \$450,000, Group project budgets will average about \$2,500,000, and Large project budgets will average about \$10 million. NSF has requested approximately \$192 million for the ITR initiative in FY01. The actual funding level depends on Congressional action. NSF anticipates that half or more of the total ITR budget in 2001 will fund basic IT research. The rest of the funding will be divided between research on IT applications and IT infrastructure. The anticipated date of awards is September, 2001.

## **V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS**

### **A. Proposal Preparation Instructions**

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) (NSF 01-2). The complete text of the GPG is available electronically on the NSF Web Site at: <http://www.nsf.gov/pubs/2001/nsf012/start.html>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

No letters of intent are required.

Proposers are reminded to identify the program solicitation number (NSF 00-126 ) in the program solicitation block on the proposal Cover Sheet (NSF Form 1207). Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may result in exclusion of the proposal from the ITR competition. "INFORMATION TECHNOLOGY RESEARCH" will automatically be entered as the first NSF organizational unit for consideration. If desired, proposers may choose another NSF program as the secondary organizational unit for consideration. NSF expects to use the secondary organizational unit in assigning the proposal for review. However, NSF reserves the right to reassign proposals as needed to obtain the best technical review.

***Pre-proposal instructions.***

1. **Pre-proposal Titles:** to assist NSF staff in sorting pre-proposals for review, pre-proposal titles should begin with "ITR/XX:" where XX is one of SY, PE, IM, AP, or SI, corresponding to the major technical areas of the solicitation. Titles such as "ITR/SY+PE:" are acceptable for cross-area efforts. NSF will, however, make the final decision on where to review each pre-proposal.
2. **Multi-institutional Projects:** only one pre-proposal should be submitted. If a full proposal is invited, it may be submitted as a single proposal (with subawards), or as a set of collaborative ("linked") proposals.
3. **Project Description:** a pre-proposal project description is limited to five pages
  - **Management Plan:** Up to one additional page is allowed in pre-proposals for Large projects to discuss the management plan for the research. This should be appended to the project description
  - **Prior Results:** Not required for pre-proposals.
4. **References Cited:** may be included
5. **Biographical Information:** limited to two pages per PI and co-PI in pre-proposals.
6. **Budget:** Prepare a one-page cumulative budget for the full duration of the project. The budget need not be detailed but should be sufficient for reviewers to grasp the intended scale of the proposed project. (In FastLane, enter your cumulative budget in Budget Year 1. FastLane will automatically fill out a cumulative budget for your proposal.) The lead institution should include the budget information for the other institutions as subawards. The budget justification should describe the subawardee budgets in enough detail to judge the scope of the project at each institution; typically this would include total personnel, equipment, travel, and other direct and indirect costs.
7. **Supporting Letters:** Do not include letters of support with pre-proposals. If the PI(s) anticipates providing such letters with the full proposal, and believes that it is important for the referees to know about these letters, a brief description of the supporting information may be included in the 5-page project description of the pre-proposal.
8. **Current or Pending Support:** not required for pre-proposals.
9. **Cover Page (Form 1207):** No signed certification pages (NSF Form 1207, page 2) are required for pre-proposals.
10. **List of all Personnel Associated with the Pre-Proposal:** All pre-proposals must include one page in the Supplementary Documents section listing the names and

institutional affiliations of *all* persons associated with the project. This is to assist NSF in identifying conflicts with referees.

11. **International Collaborations :** Pre-proposals involving international collaborations may include one page in the supplementary documents section describing the international aspects of the work.

### ***Full proposal instructions***

Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the *Grant Proposal Guide (GPG)*, NSF 00-2, and FastLane is required. The complete text of the GPG (including electronic forms) is available electronically on the NSF web site at <http://www.nsf.gov>. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone 301-947-2722 or by email from [pubs@nsf.gov](mailto:pubs@nsf.gov). Only pre-proposals that are invited by NSF are eligible for submission as full proposals. Only one full proposal (or set of collaborative proposals) may be submitted for each invited pre-proposal.

GPG rules should be followed with the following additions:

1. **Proposal Titles:** To assist NSF staff in sorting proposals for review, proposal titles should begin with "ITR/XX:" where XX is one of SY, PE, IM, AP, or SI, corresponding to the major technical areas of the solicitation. Titles such as "ITR/SY+PE:" are acceptable for cross-area efforts. Proposals for Small projects involving applications in a particular scientific discipline may also choose to give the label of the NSF directorate primarily concerned with that research area (e.g., a title may begin with "ITR/AP(GEO):" or "ITR/PE(SBE):". NSF will, however, make the final decision on where to review each proposal.
2. **Project Description:** Up to three additional pages are allowed for Large projects to discuss the management plan for the research.
3. **Prior Results:** Up to one additional page per PI or co-PI is allowed in the project description of proposals for Large projects to describe the results from prior NSF support. Only those results relevant to the proposed project should be described.
4. **List of all Personnel Associated with the Proposal:** All proposals must include one page in the Supplementary Documents section listing the names and institutional affiliations of *all* persons associated with a proposal. This is to assist in identifying conflicts with referees.
5. **International Collaborations :** proposals may include two pages in the Supplementary



Documents section describing the international aspects of the work. These pages should identify the names and institutions of the international collaborators, the nature and goals of their research, and the international synergies and benefits to be gained from the collaboration.

### **B. Cost Sharing Requirements**

No cost sharing is required for this program.

### **C. Deadlines/Target Dates**

Deadlines vary according to the size of the budget for the proposal or pre-proposal. All deadlines are given as three-day ranges. (See below.) Institutions whose 5-digit ZIP code ends with 9, 8, or 7 must submit by the first day of the range; institutions whose 5-digit ZIP code ends with 6, 5, or 4 must submit by the second day of the range; institutions whose 5-digit ZIP code ends with 3, 2, 1, or 0 must submit by the last day of the range. All deadlines are 5:00 p.m. PI's local time (for example, the deadline for a university in Oregon will be 8 p.m. in Washington, DC.). This staggered submission is used to level the proposal processing load. For multi-institutional collaborative proposals, the deadline applies to each submitting institution separately. Universities with multiple sites should use the postal ZIP code associated with their sponsored research office.

#### ***Small projects with total budgets up to \$500,000.***

No pre-proposals are required.

Full proposals are due January 22-24, 2001 via FastLane.

#### ***Group projects with total budgets up to \$5 million, and annual budgets up to \$1 million.***

Pre-proposals are mandatory and are due November 27-29, 2000 via FastLane.

Following the review of the pre-proposals, PIs will be given feedback via email by the week of February 26, 2001 either inviting or prohibiting the submission of a full proposal. This feedback will be binding; only pre-proposals that are invited by NSF are eligible for submission as full proposals. Each full proposal must reference the pre-proposal number on the cover sheet; only one full proposal (or set of collaborative proposals) may be submitted for each invited pre-proposal.

Full proposals are due April 9-11, 2001 via FastLane.

#### ***Large projects with total budgets up to \$15 million, and annual budgets up to \$3 million.***

Pre-proposals are mandatory and are due December 4-6, 2000 via FastLane.

Following the review of the pre-proposals, PIs will be given feedback via email by the week of March 5, 2001 either inviting or prohibiting the submission of a full proposal. This feedback will be binding; only pre-proposals that are invited by NSF are eligible for submission as full proposals. Each full proposal must reference the pre-proposal number on the cover sheet; only one full proposal (or set of collaborative proposals) may be submitted for each invited pre-proposal. Each institution may submit only one Large full proposal as lead institution; should NSF indicate that more than one pre-proposal from an institution is worthy of encouragement, the university must choose the one to develop into a full proposal.

Full proposals are due April 23-25, 2001 via FastLane.

#### **D. FastLane Requirements**

Proposers are required to prepare and submit all proposals for this Program Solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>.

*Submission of Signed Cover Sheets.* After submission of the proposal electronically via FastLane, proposers are required to submit one signed copy of the Cover Sheet (NSF Form 1207, Pages 1 and 2). (**NOTE:** NSF is currently assessing the results from two pilot projects regarding use of electronic signatures in submission of proposals to NSF. Upon completion of this assessment, an addendum may be issued to the Grant Proposal Guide that revises the proposal certification process). The Cover Sheet must be postmarked (or provide a legible proof of mailing date assigned by the carrier) within five working days following the electronic submission of the proposal and forwarded to the following address:

National Science Foundation  
DIS-Fastlane Cover Sheet  
4201 Wilson Blvd.  
Arlington, VA 22230

All letters of support should be scanned into the supplementary document section; no paper should be mailed to NSF. Scanning should be done at resolutions not higher than 400 dpi unless there are exceptional reasons for higher quality.

For cost and technical reasons, the Foundation cannot, at this time, reproduce proposals containing color. Therefore, PIs generally should not rely on colorized objects to make their arguments. PIs who must include in their project descriptions very high resolution graphics or other graphics where exact color representations are required for proper interpretation by the reviewer, must submit the required number of copies of the **entire** paper proposal (including the signed paper copy of the proposal Cover Sheet) for use in the review process. This submission is in addition to, not in lieu of, the electronic submission of the proposal via FastLane.

Upon submission of the proposal, the proposing organization will be notified of the required number of paper copies of the proposal that must be submitted to NSF. The exact number of copies required will appear in an electronic message at the time of FastLane submission and will depend on the NSF Division selected. Such proposals must be postmarked (or provide a legible proof of mailing date assigned by the carrier) within five working days following the electronic submission of the proposal.

Unless the proposal contains very high-resolution graphics or other graphics where exact color representations are critical to the review of the proposal, proposers **should not** send in paper copies.

## **VI. PROPOSAL REVIEW INFORMATION**

### **A. NSF Proposal Review Process**

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or educational project. Program Officers charged with the oversight of the review process select these reviewers. NSF invites the proposer to suggest at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

Proposals will be reviewed against the following general review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she 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 and original 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., according to gender, ethnicity, disability, geographic region, 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?

Principal Investigators should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both of the above-described NSF merit review criteria. NSF staff will give these elements careful consideration 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 Criterion: Innovation in Information Technology***

As a part of the intellectual merit of a pre-proposal or full proposal, ITR emphasizes the importance of novel, high-risk, and high-impact research. Is the proposal highly innovative, rather than an incremental improvement on standard ideas? Does it promise exciting advances, even if there is some chance of failure?

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

## **B. Review Protocol and Associated Customer Service Standard**

All proposals will be carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. The proposals and pre-proposals will be reviewed by a combination of mail review and/or panel review. NSF may choose to perform site visits or reverse site visits (inviting applicants to NSF to make presentations) for some of the proposed Group and Large projects.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal or pre-proposal. The Program Officer assigned to manage the proposal's or pre-proposal's review will consider the advice of reviewers and will formulate a recommendation. For proposals and pre-proposals for Group and Large projects, Program Officer recommendations will be reviewed and compared to other ITR recommendations in the same size class before final decisions are made.

NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if deadlines or target dates are not used by the program. The interval ends when the Division Director accepts the Program Officer's recommendation.

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 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 Officer does so at its own risk.

## **VII. AWARD ADMINISTRATION INFORMATION**

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

Notification of pre-proposal evaluation will be sent by e-mail directly to the Principal Investigator. The evaluation will either invite or prohibit submission of a full proposal. The e-mail will include the recommendation, verbatim copies of the reviews, and any summaries made during the review process. Note that the recommendation is binding; only pre-proposals that are invited by NSF will be permitted to submit a full proposal.

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 Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator.

### **B. Award Conditions**

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the

amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1)\* or Federal Demonstration Partnership (FDP) Terms and Conditions \* and (5) any NSF brochure, program guide, announcement or other NSF issuance that may be incorporated by reference in the award letter. Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

\*These documents may be accessed electronically on NSF's web site at [http://www.nsf.gov/home/grants/grants\\_gac.htm](http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone 301.947.2722 or by e-mail from [pubs@nsf.gov](mailto:pubs@nsf.gov).

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, (NSF 95-26) available electronically on the NSF web site at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is 202.512.1800. The GPM may be ordered through the GPO web site at <http://www.gpo.gov>.

### **C. Reporting Requirements**

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. Large and Group projects may be site visited one or more times. Particularly for Large projects, NSF anticipates that a successful review of progress after approximately two years of work will be essential for the authorization of later funding.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented an electronic project reporting system, available through FastLane. 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.

### **D. New Awardee Information.**

If the submitting organization has never received an NSF award, it is recommended that the

organization's appropriate administrative officials become familiar with the policies and procedures in the NSF *Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 97-100) includes information on: Administration and Management Information, Accounting System Requirements and Auditing Information, and Payments to Organizations with Awards. This information will assist an organization in preparing documents that NSF requires to conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at <http://www.nsf.gov/cgi-bin/getpub?/nsf97100>.

## **VIII. CONTACTS FOR ADDITIONAL INFORMATION**

General inquiries should be made to the INFORMATION TECHNOLOGY RESEARCH PROGRAM via email to [itr@nsf.gov](mailto:itr@nsf.gov) or to one of the cognizant program officers listed in the summary of program requirements. There will also be a FAQ page; see <http://www.itr.nsf.gov>. For questions related to the use of FastLane, contact the FastLane help line at 800-673-6188 or via email to [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

## **IX. OTHER PROGRAMS OF INTEREST**

The NSF Guide to Programs is a compilation of funding for research and education in science, mathematics, and engineering. The NSF Guide to Programs is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices listed in Appendix A of the GPG. Any changes in NSF's fiscal year programs occurring after press time for the Guide to Programs will be announced in the NSF Bulletin, available monthly (except July and August), and in individual program announcements. The Bulletin is available electronically via the NSF web site at <http://www.nsf.gov/home/ebulletin>. Subscribers can also sign up for NSF's Custom News Service (<http://www.nsf.gov/home/cns/start.htm>) to be notified of new funding opportunities that become available.

## **ABOUT THE NATIONAL SCIENCE FOUNDATION**

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 292-8636.

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, FIRS at 1-800-877-8339.

The National Science Foundation is committed to making all of the information we publish easy to understand. If you have a suggestion about how to improve the clarity of this document or other NSF-published materials, please contact us at [plainlanguage@nsf.gov](mailto:plainlanguage@nsf.gov).

## **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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Pursuant to 5 CFR 1320.5(b), an agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Information Dissemination Branch, Division of Administrative Services, National Science Foundation, Arlington, VA 22230, or to Office of Information and Regulatory Affairs of OMB, Attention: Desk Officer for National Science Foundation (3145-0058), 725 - 17th Street, N.W. Room 10235, Washington.

OMB Clearance Number: OMB 3145-0058

Publication Number: NSF 00-126 (Replaces NSF 99-167)