High End Computing University Research Activity (HECURA)

Program Solicitation

NSF 06-503

***Replaces Document* NSF 04-569**

National Science Foundation
Directorate for Computer and Information Science and Engineering
Division of Computing & Communication Foundations
Division of Computer & Network Systems
Division of Information and Intelligent Systems

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

February 03, 2006

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

High End Computing University Research Activity (HECURA)

Synopsis of Program:

Progress in science and engineering to a large degree depends on access to computing resources and ability to utilize them. Modern high-end computing (HEC) systems, comprised of thousands to tens-of-thousands of processors, can address previously intractable applications. However, observation- and simulation-driven applications require high throughput input/output (I/O) capabilities, large data storage capacities, and tools for efficiently finding, processing, organizing and moving data. Data-management challenges include the need to access large volumes of data produced by different applications, in numerous locations, and in various formats.

Although storage capacity and processing power are growing rapidly, data bandwidth and access times are not keeping pace. The performance gap between HEC processing power and storage device performance points to the need for massively parallel I/O systems to maintain application throughput. The ability to efficiently map I/O operations between tens-of-thousands of distributed memories and hundreds-of-thousands of storage devices is a formidable problem that calls for research.

The High-End Computing University Research Activity (HECURA) initiative invites research and education projects in I/O, file and storage systems design for efficient, high throughput data storage, retrieval and management in the HEC environment. National Science Foundation (NSF), Defense Advanced Research Project Agency (DARPA), and other funding agencies are especially interested in hardware and software tools for design, simulation, benchmarking, performance measurement and tuning of file and storage systems.

Supported areas include but are not limited to:

- File systems research
- Quality of Service
- Security

- I/O middleware
- Archives/Backups as extensions to file systems
- Novel storage devices for the I/O stack
- I/O architectures
- Management, reliability and availability at scale
- Future file systems related protocols
- Hardware and software tools for design and simulation of I/O, file and storage systems.
- Efficient benchmarking, tracing, performance measurement and tuning tools of I/O, file and storage systems

Cognizant Program Officer(s):

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- Brett D. Fleisch, Program Director, Directorate for Computer & Information Science & Engineering, Division of Computer and Network Systems, 1175 N, telephone: (703) 292-8950, fax: (703) 292-9010, email: bfleisch@nsf.gov
- Le Gruenwald, Program Director (Data Management Systems), Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1125 S, telephone: (703) 292-8930, fax: (703) 292-9073, email: lgruenwa@nsf.gov

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

- 47.070 --- Computer and Information Science and Engineering

Eligibility Information

- **Organization Limit:** None Specified.
- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 15 awards with cumulative budgets of $500K-$1M for durations of up to 3 years.
- **Anticipated Funding Amount:** $10,000,000 The anticipated funding amount is subject to availability of funds.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** Standard GPG Guidelines apply.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. submitter's local time):
  February 03, 2006

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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I. INTRODUCTION

The way in which scientific and engineering research is conducted has radically changed in the past two decades as simulation and computation are being increasingly used to augment, and in many cases replace, physical experimentation and the construction of prototypes. Complex systems can be analyzed and better understood through computer models. In many instances, such as in astrophysics or climate modeling, computational simulation is the principal method for exploring concepts and ideas. Complex human-made objects such as aircraft and advanced drugs might be better designed through computational optimization and computer-based experimentation and testing. Computation will inexorably play a more critical role, not only in coping with advanced scientific and engineering challenges, but in solving societal and environmental problems and in improving the nation’s economic productivity and competitiveness.

In response to the High End Computing Revitalization Task Force (HECRTF) recommendations, http://www.nitrd.gov/subcommittee/hec/hecrtf-outreach/hec-ura/index.html, an interagency group presently consisting of NSF, DOE Office of Science, NNSA, NASA, DARPA and NSA, started a pilot program called High-End Computing University Research Activity (HECURA) to address basic research in the area of HEC. In FY04 NSF and DARPA jointly funded Software Tools for High-End Computing (ST-HEC) program, focused on research and education projects in the area of software tools and compilers for HEC http://www.nsf.gov/pubs/2004/nsf04569/nsf04569.pdf.

Since the first ST-HEC solicitation, representatives from industry, academia and government laboratories have stressed the need for hardware and software tools for design, simulation, benchmarking, performance measurement, and tuning of file and storage systems. As a result of a workshop on File Systems and I/O Research and Development http://www.nitrd.gov/subcommittee/hec/workshop/20050816_storage/, NSF, DARPA, and other funding agencies recognized a great need for research in I/O, file and storage systems design for efficient, high throughput data storage, retrieval and management in the HEC environment.

This solicitation supports research and education projects in the area of I/O, file and storage systems for HEC. All proposals should be submitted to NSF, and will be reviewed using NSF's merit review process. NSF, DARPA, and other funding agencies will participate in the review process.

II. PROGRAM DESCRIPTION

The HECURA initiative invites research projects in I/O, file and storage systems design for efficient, high throughput data storage, retrieval and management in the HEC environment. NSF, DARPA and other funding agencies are especially interested in hardware and software tools for design, simulation, benchmarking, performance measurement and tuning of file and storage systems.

Supported areas include but are not limited to:

- File systems research
- Quality of Service
- Security
- I/O middleware
- Archives/Backups as extensions to file systems
- Novel storage devices for the I/O stack
- I/O architectures
- Management, reliability and availability at scale
- Future file systems related protocols
- Hardware and software tools for design and simulation of I/O, file and storage systems
- Efficient benchmarking, tracing, performance measurement and tuning tools of I/O, file and storage

Suggested research topics are explained in detail below.

- **File Systems Research.** In recent years a number of scalable global parallel file systems for the HEC environment have become available. These file systems have shown to scale bandwidth well for large well-aligned operations. However, a number of problem areas remain: scaling metadata operations to tens of thousands of operations per second; management of trillions of files; bandwidth scaling for small and unaligned I/O; user space file systems components; and, new layouts for file management beyond the current directory tree paradigm.

- **Quality of Service (QoS).** QoS refers to the network capability to control and predictably service selected network traffic. Because global sharing of parallel file systems is becoming wide spread, more research is needed in the area of providing prioritized deterministic performance in the presence of multiple complex parallel applications running concurrently with other non-parallel workload. Innovative approaches are sought in dealing with workloads that may vary up to seven orders of magnitude in performance requirements. In addition, research in dynamically adaptive end-to-end QoS throughout the entire I/O stack including hardware and software will be considered.

- **Security**. Security in file systems often is sacrificed for performance or usability. There are many areas of security that need to be addressed: usability; long-term key management; distributed authentication; dealing with security overhead; and, end-to-end encryption that can be managed over a long period of time.

- **I/O middleware.** I/O middleware is an all-important part of the overall I/O software stack. Middleware is used today

to bridge the gap between high-level I/O data management software and the file system. Middleware provides the primary parallel interface to I/O and is also beginning to be of some assistance in dealing with small and unaligned I/O. There are a number of areas in need of research activities including but not limited to: more active distributed persistent caching to further assist with small and unaligned I/O; research into what caching is appropriate at all levels of the I/O stack; exploitation of active storage concepts; exploitation of remote direct memory access (RDMA) and one-sided operations; and, possible assistance with reliability at scale for client process migration.

- **Archives/Backups as extensions to file systems.** Research is needed on how to make file system interfaces more suitable for archiving and backup operations.

- **Novel storage devices for the I/O stack.** Novel storage devices are on the horizon. The primary question to be answered is, how can the HEC community best utilize these devices? Research will be considered in areas including, but not limited to, integrating these devices into the hierarchy, metadata operation applications, combining traditional and novel devices for structured data, reliability and availability at scale (RAS) applications, and assistance in dealing with small and unaligned I/O operations.

- **I/O Architectures.** Although I/O architectures with intelligence in the network or near the disk drive, as well as cluster architectures that contain I/O nodes, have been around for many years, the ability to truly exploit these concepts beyond initial and simple usage has been elusive. Research topics include, but are not limited to, taking advantage of intelligence distributed throughout the stack for caching, active participation in application/data aware reconfigurable I/O, and novel uses of active storage for archive or other storage paradigms while dealing with associated RAS issues.

- **Management, reliability and availability at scale (RAS).** Management and RAS are areas that are reasonably well understood at current scale. However, management of RAS and performance in the presence of failure at large scale (hundreds-of-thousands of disk devices and hundreds of metadata servers) need to be addressed. Research topics include, but are not limited to: novel approaches to management and RAS such as self management, healing, and tuning (often referred to as autonomics); use of virtual machines and novel devices to assist in the management and RAS testing and implementation; and, power management for processing and storage in the future HEC sites.

- **Future File Systems related protocols.** The future of HEC depends on evolving standards that must be supported by prototyping research and validation. Research efforts are needed in extending existing standards to assist HEC applications with high degrees of concurrence, as well as in the desirable features of new standards for data storage and movement. Research in server-to-server communications concepts will be also considered.

- **Hardware and software tools for design, simulation of I/O, file and storage systems**. Mapping of I/O operations between tens or hundreds-of-thousands of distributed memories and tens or hundreds-of-thousands of storage devices is a complex task. Tools that allow design and simulation of I/O, file and storage systems interactions will help with building efficient, high throughput data storage, retrieval and management systems.

- **Efficient benchmarking, tracing, performance measurement and tuning tools of I/O, file and storage systems.** Increasing the speed and number of processors is not sufficient for observation- and simulation- data-intensive applications. File and storage system bandwidth and access time can become bottlenecks. Current benchmarks used for HEC system performance evaluations are mostly concerned with Flops (floating operations per second). To achieve a balanced evaluation of HEC system performance, new efficient hardware and software user-friendly tools for benchmarking, performance measurement and tuning of I/O, file and storage systems are needed.

Funded proposals will support single- and multiple-investigator projects within the I/O, file systems and data storage systems research topics described above. Research collaborations are encouraged with industry, non-profit organizations, federal laboratories and Federally Funded Research and Development Centers (FFRDCs), including DOE National Laboratories. The resulting HECURA award portfolio will advance the high-end computing research frontier in I/O, file systems and data storage systems, build national education and workforce capacity (including undergraduate, graduate, and faculty development and training), and impact HEC.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program announcement/solicitation.

IV. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds. The estimated number of awards is 15 for awards with cumulative budgets of $500K-$1M for durations of up to 3 years. NSF anticipates that awards will be made by the end of September 2006. The anticipated funding amount is $10,000,000, subject to availability of funds.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program announcement/solicitation number (06-503) in the program announcement/ 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

Cost Sharing:

Cost sharing is not required by NSF in proposals submitted under this Program Solicitation.

C. Due Dates

Proposals must be submitted by the following date(s):

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

February 03, 2006

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/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. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

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 education project. These reviewers are selected by Program Officers charged with the oversight of the review process. 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.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). 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 he/she is qualified to make judgments.

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., 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?

NSF staff 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.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc 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.

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual award.

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. 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 and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division 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.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC). 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 Website at http://www.nsf.gov/awards/managing/. Paper copies of these documents may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II,

available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=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 Website 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.

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.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Almadena Y. Chtchelkanova, Program Director, Directorate for Computer & Information Science & Engineering, Division of Computing and Communication Foundations, 1115 N, telephone: (703) 292-8910, fax: (703) 292-9059, email: achtchel@nsf.gov
- Michael J. Foster, Division Director, Directorate for Computer & Information Science & Engineering, Division of Computing and Communication Foundations, 1115 N, telephone: (703) 292-8910, fax: (703) 292-9059, email: mfoster@nsf.gov
- Wei Zhao, Division Director, Directorate for Computer & Information Science & Engineering, Division of Computer and Network Systems, 1175 N, telephone: (703) 292-8950, fax: (703) 292-9010, email: wzhao@nsf.gov
- Michael J. Pazzani, Division Director, Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1125 S, telephone: (703) 292-8930, fax: (703) 292-9073, email: mpazzani@nsf.gov
- Jose Munoz, Deputy Office Director/Senior Scientific Advisor, Office of the Director, Office of Cyberinfrastructure, 1145 S, telephone: (703) 292-8970, fax: (703) 292-9060, email: jmunoz@nsf.gov
- Brett D. Fleisch, Program Director, Directorate for Computer & Information Science & Engineering, Division of Computer and Network Systems, 1175 N, telephone: (703) 292-8950, fax: (703) 292-9010, email: bfleisch@nsf.gov
- Le Gruenwald, Program Director (Data Management Systems), Directorate for Computer & Information Science & Engineering, Division of Information and Intelligent Systems, 1125 S, telephone: (703) 292-8930, fax: (703) 292-9073, email: lgruenwa@nsf.gov

For questions related to the use of FastLane, contact:

- Anton Jiggetts, Program Assistant, Directorate for Computer & Information Science & Engineering, Division of Computing and Communication Foundations, 1115 N, telephone: (703) 292-8910, fax: (703) 292-9059, email: ajiggett@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 or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's MyNSF News Service (http://www.nsf.gov/mynsf/) 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, although some programs may have special requirements that limit eligibility.

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 GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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

  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; 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.

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, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

OMB control number: 3145-0058.