

ADVANCED
COMPUTATIONAL
RESEARCH

Program Announcement

Replaces NSF 97-27

DIVISION OF ADVANCED COMPUTATIONAL
INFRASTRUCTURE AND RESEARCH

DIRECTORATE FOR COMPUTER AND INFORMATION
SCIENCE AND ENGINEERING

NATIONAL SCIENCE FOUNDATION

PROGRAM OBJECTIVES

The Advanced Computational Research Program, formerly known as the New Technologies Program, is a program supporting computational science by focusing on enabling technologies for high performance computing. The Program supports the range of technologies needed to advance the state of the art in high performance computing, and bring advanced computing and simulation capabilities to bear on fundamental problems throughout the sciences and engineering.

As pointed out in many documents and reports, computer simulation has now joined theory and experimentation as a third path to scientific knowledge. Simulation plays an increasingly critical role in all areas of science and engineering. However, as the uses of simulation expand, the need for high performance computing of increasing power, flexibility, and utility grows proportionately.

The Advanced Computational Research Program focuses on the full spectrum of research activities designed to fill this need. The Program makes two and three year grants to U.S. universities and other nonprofit research institutions for support of scientists and engineers. The program typically funds fifteen to twenty new proposals a year, with award sizes ranging from \$200,000 to \$600,000 over three years, though both larger and smaller awards are possible.

FOCUS AREAS

The Program will consider proposals dealing with all aspects of high performance computing. However, in recent years, the program has funded proposals principally in three focus areas:

Software environments and tools

- Performance evaluation and prediction
- Application specific environments
- Metacomputing and web-based computing
- Tools for dynamic and adaptive computations
- Preprocessors, compilers and run-time systems for high performance computing
- Innovative tools for parallel computing

Visualization and data management

- Scientific visualization
- Applications of virtual reality in scientific computing
- Remote visualization and computational steering

- Parallel input/output and file systems
- Innovative uses of visualization and I/O science

High performance algorithms

- Parallel numerical algorithms and libraries
- Algorithm scalability studies
- Latency tolerant algorithms
- Very high performance computing applications
- Innovative uses of high performance computing

The list of topics here should be considered representative, rather than exclusive. However, proposals relating to these focus topics and to combinations of them are especially welcome. In all cases, the relationship to high performance computing should be made explicit in the proposal. Novelty of approach and development of new methodology should be stressed.

Also, the Program may, from time to time, solicit proposals on specific subtopics of the three focus areas. These may reflect added emphasis on existing topics (e.g. use of virtual reality in scientific visualization) or new areas of research (e.g. support for a newly-discovered class of numerical algorithms).

PROPOSAL SUBMISSION AND DEADLINES

The Program changed to use of deadlines several years ago. Deadlines facilitate comparative review of proposals by either mail or panels, and enable the Program to provide quicker response to proposers. In most cases proposals will be reviewed by panels focusing on a particular area, but the Program reserves the right to use mail review as well, as needed.

Time-critical proposals, e.g. workshops, will be handled by internal or mail review, as usual. Please contact the Program Director to ascertain suitability before submitting such proposals.

The Program will continue to have at least one deadline per year in each of these focus areas. Current deadlines may be found on the Program's web page at:

<http://www.cise.nsf.gov/acir/acr>.

Proposals may be submitted either by mail, or by the NSF FastLane system. FastLane is a set of Web-based programs allowing direct electronic submission to NSF. FastLane can be accessed using a Web browser with forms capability (e.g. Netscape Navigator). Please see the FastLane home page for details:

<https://www.fastlane.nsf.gov>.

To submit a proposal by mail, send 15 copies to:

Advanced Computational Research Program
Suite 1122, National Science Foundation
4201 Wilson Blvd., Arlington VA, 22230.

PROPOSAL REVIEW AND BUDGET

Proposals are encouraged from scientists and engineers associated with U.S. universities and other nonprofit research institutions. Support may be used for graduate student support, equipment and supplies, indirect costs, travel, visiting researchers, and academic release time.

Proposals submitted in response to this program announcement will be reviewed by panel or mail review in accordance with the NEW merit review criteria approved by the National Science Board on March 28, 1997 (NSF 97-72). The new merit review criteria are:

- What is the intellectual merit and quality of the proposed activity?

The following are suggested questions that the review will consider in assessing how well the proposal meets this criterion. Each reviewer will address only those questions that he/she considers relevant to the proposal and for which he/she is qualified to make judgments.

How important is the proposed activity to advancing knowledge and understanding within its own field and 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 prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposal activity? Is there sufficient access to resources?

- What are the broader impacts of the proposed activity?

The following are suggested questions that the reviewer will consider in assessing how well the proposal meets the criterion. Each reviewer will address only those questions that he/she considers relevant to the proposal for which he/she is qualified to make judgments.

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, 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?

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 learner perspectives. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF Staff will give it careful consideration in making funding decisions.

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. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

INQUIRIES AND PROPOSAL PREPARATION

Inquiries about this program may be directed to:

Advanced Computational Research Program
Division of Advanced Computational
Infrastructure and Research
National Science Foundation
4201 Wilson Blvd., Arlington, VA 22230

Or contact the Program Director, (703) 306-1962, acr_pd@nsf.gov. Potential applicants are encouraged to discuss their ideas with the Program Director in advance.

Instructions for the preparation of an NSF proposal, information on proposal processing and general grant conditions are included in the publication Grant Proposal Guide (GPG), NSF 99-2, available on the World Wide Web via

<http://www.nsf.gov/cgi-bin/getpub?gpg>.

Unless specified otherwise in the Announcement, the procedures and conditions stated in that publication will apply.

Grants awarded as a result of this announcement are administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions," or FDP-III, "Federal Demonstration Partnerships Phase III General Terms and Conditions," depending on the grantee organization. Copies of these documents are available at no cost from the NSF Forms and Publications Unit, phone (703) 306-1130, or e-mail: pubs@nsf.gov. More comprehensive information is contained in NSF Grant Policy Manual (NSF 95-26) for sale through the Superintendent of Documents, Government Printing Office, Washington, DC 20402.

GENERAL INFORMATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees 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) 306-1636.

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 regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

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 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.

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: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

OMB#3145-0058
P.T. 34
K.W. 1004000

NSF 98-168
(Replaces NSF 97-27)

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NSF 98-168
(Replaces NSF 97-27)