

# MATHEMATICAL SCIENCES RESEARCH INSTITUTES

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## *Program Solicitation*

DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES

DIVISION OF MATHEMATICAL SCIENCES

**PROPOSAL DEADLINE:** *February 2, 1998*



NATIONAL SCIENCE FOUNDATION

## INTRODUCTION

The Division of Mathematical Sciences (DMS) of the National Science Foundation (NSF) has traditionally used the individual investigator award as the principal mechanism for supporting fundamental research in the mathematical sciences. DMS also recognizes the importance of fostering group interactions to promote progress both in the science and its applications. These interactions are becoming increasingly important as progress in research becomes more dependent on knowledge from disparate areas of the mathematical sciences and other areas of science and engineering.

Fostering interactions within the mathematical sciences community and between mathematical scientists and other scientists and engineers, can be accomplished in a variety of ways. Institutes have been an especially effective mechanism for fostering such interactions. In 1980, the National Science Foundation established two research Institutes in response to the solicitation *Mathematical Sciences Research Institutes*. The purpose of the Institutes was to stimulate research in diverse problem areas among both established mathematical scientists and promising younger researchers. The initial awards were on a five-year trial basis. Since then there have been periodic merit reviews and evaluations. Annual renewal funding for these Institutes continues through the present. However, periodic reevaluation of all such awards is desirable, and in that light the Institutes activity of DMS is being recompeted.

DMS anticipates supporting several institutes. These institutes may have different missions but will allow scholars and researchers to come together and share ideas, thus contributing to the identification and solution of important problems in the mathematical sciences.

## DESCRIPTION

Consistent with the NSF Strategic Plan (NSF 95-24, *NSF in a Changing World*), institutes are expected to develop intellectual capital and promote the integration of research and graduate education. The Division of Mathematical Sciences is seeking proposals for Institutes that will address these goals in the environment of the coming century.

This solicitation broadly describes the nature and scope of an institute, but a strong effort has been made not to be too prescriptive. There are many possible models and variations that may be considered, including the traditional and existing Institutes, regional institutes or consortia of such, conference centers, or distributed institutes ("Centers Without Walls"). Proposers should describe their innovative and creative ideas as they describe their visions for these institutes. The proposals should include information that will enhance the definition of and planning for the institutes, define mission and goals, describe how the desired goals will be achieved and how it will be determined that these goals have been accomplished. The proposing groups are encouraged to construct the appropriate organization and structure that will maximize the effectiveness and impact of their strengths and resources.

The institutes are intended to be foci of excellence in the mathematical sciences that reach out to other scientific and engineering disciplines and across the mathematical sciences. The atmosphere should be conducive to a general exchange of ideas, with concen-

trated activities in areas of great current interest changing over the course of the award.

An institute will be expected to be broad in its intellectual scope and coverage, and to reach across much of the spectrum of the Mathematical Sciences. Since many advances in mathematical sciences arise from the interaction between the mathematical sciences and other disciplines, we encourage the exploration and demonstration of linkages and partnerships with research groups in other disciplines, other kinds of research institutions (*e.g.*, National Labs), and industry.

The leadership of an institute should be provided by a small group, including a director and possibly an associate director, as well as an external governing committee. The director of an institute should be a respected researcher in the mathematical sciences of demonstrated organizational, management, and leadership ability, as well as of recognized stature within the scientific community. An Institute's scientific guidance should be provided by a committee of scientists from several institutions, not all necessarily colleges and universities.

The process of selection of activities should be described, including the generation and evaluation of suggestions for activities and the interaction and consultation between the institute leadership and the appropriate committees.

## WHO MAY SUBMIT PROPOSALS

Proposals submitted in response to this solicitation will be accepted from colleges, universities, and other nonprofit institutions in the United States. Multi-institutional consortiums are permitted, but a single entity must accept overall management responsibility in dealing with the NSF.

## AWARD SIZE AND DURATION

Proposals should be written with a five year plan. It is expected that any awards made will be NSF grants or cooperative agreements of at least \$1 million per year for five years, to support the activities of the Institutes, with the initial operation starting in Fall 1999<sup>1</sup>. Up to five awards will be made. Proposers should describe programs with budgets necessary to accomplish their goals and identify additional sources of support. As mentioned above, it is expected that the Institutes will be funded for an initial period of five years, with annual reviews of their activities and a third year, in-depth, evaluation of their efforts. Any newly-funded institute should be able to manage a full complement of activities no later than the beginning of its second year of support.

A second five-year award may be considered if progress is deemed acceptable. Institutes created as a result of this solicitation will not be funded for more than ten years without going through a recompetition.

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<sup>1</sup>Proposals for smaller awards are more appropriately addressed in the context of the Group Infrastructure Grants Program Solicitation (NSF96-153)

## PREPARATION OF PROPOSALS

The program announcement block of the cover sheet should indicate "NSF 97-23." Proposals submitted in response to this Program Solicitation should be prepared and submitted in accordance with the guidelines contained in the NSF *Grant Proposal Guide (GPG)*, NSF 95-27, except as indicated below. Single copies of the *GPG* are available at no cost from:

NSF Publications and Supplies Unit  
4201 Wilson Blvd.  
Room P-15  
Arlington, VA 22230  
Telephone: (703) 306-1130, or  
via e-mail from Internet: pubs@nsf.gov

All the required forms can be found in the *Grant Proposal Guide*. Required are one original and nine copies of:

- (a) Cover page with institutional certifications - NSF Form 1207 (7/95).
- (b) Information about Principal Investigators/Project Directors - NSF Form 1225 (8/93) - one copy only to be attached to the original signed proposal.
- (c) Project Summary, up to 250 words - NSF Form 1358 (1/94).
- (d) Table of Contents - NSF Form 1359 (7/95).
- (e) The Project Description is subject to strict page limitations, as described below. **These page limits will be strictly enforced.** The Project Description consists of **each** of the following items:

Detailed description of the intellectual focus of the institute activities, the rationale for the institute, its overall goals, and expected impact. A description of plans for future institute growth and resource development. **This section is not to exceed 20 pages total.**

A description of the planned scientific activities. A five year plan (with "ramp-up" activities for new institutes) should be described, as well as plans to respond quickly to particularly timely or fast-breaking scientific opportunities. It is expected that the Institutes will be able to manage a full complement of activities no later than the beginning of the second year of support. **This section is not to exceed 5 pages total.**

A description of the plans for human resource development, including the selection and involvement of researchers at early stages in their career development (this may include advanced graduate students) and members of under-represented groups. **This section is not to exceed 3 pages total.**

A description of the planned dissemination and outreach activities. **This section is not to exceed 2 pages total.**

A statement of goals and outcomes expected, and a description of how the impact of the institute activities will be demonstrated and evaluated. **This section is not to exceed 3 pages total.**

A description of the organizational structure of the institute. Clearly outline the proposed management structure, mechanisms for focusing institute activities, methods for selecting and integrating research emphases, criteria for selection of participants, allocating funds and equipment, and managing the involvement of other groups. **This section is not to exceed 5 pages total.**

**Proposals not adhering to these page limitations will be returned.**

- (f) Bibliography.
- (g) A full description of the total level of current and pending support from all sources using NSF Form 1239 (7/95).
- (h) Biographical sketches. For all key personnel, please provide a brief biographical sketch, in accordance with the instructions on NSF Form 1362 (7/95). Do not exceed two pages per person for the sketch. For each individual, include up to **one** additional page describing how that individual will contribute to the mission and goals of the proposed institute.
- (i) Budget. Include a proposed five year budget using NSF Form 1030 (7/95), separate annual budgets for each year, and a detailed budget justification/explanation (up to 3 pages).
- (j) Letters of commitment for this project from the participating institution(s). These should include commitments for funds, space, faculty and staff positions, equipment, and access to facilities. Indicate specific dollar amounts for each. Describe support from other sources, including funds, facilities, and staff.
- (k) A description of the facilities (including laboratories and computational facilities) that will be made available to the institute.
- (l) Documentation of collaborative arrangements of significance to the proposal through letters of commitment may be included in an appendix. This will be the only appendix permitted. Only letters of commitment will be permitted; "endorsement" letters may **not** be included.

## SUBMISSION OF PROPOSALS

Mail ten (10) copies of each proposal, including one copy bearing original signatures, to:

Solicitation No. NSF 97-23  
Proposal Processing Unit (PPU)  
National Science Foundation  
4201 Wilson Boulevard, Room P60  
Arlington, VA 22230

Only one (1) copy of NSF Form 1225, Information about Principal Investigator/Project Director, should be sent, attached to the original proposal.

**An additional single copy should be sent at the same time to:**

Program Director for Special Projects,  
Division of Mathematical Sciences  
Room 1025  
National Science Foundation  
4201 Wilson Boulevard  
Arlington, VA 22230

**Proposals submitted in response to this solicitation must be:**

- (1) received by NSF no later than February 2, 1998; or
- (2) be postmarked no later than five (5) days prior to the deadline date; or
- (3) be sent via commercial overnight mail no later than two (2) days prior to the deadline date.

**Proposals not meeting these conditions will be returned.**

## PROPOSAL REVIEW

Proposals will be evaluated through a competitive external merit review process which may consist of a combination of mail and panel review. Reviewers will be requested to base their comments on the selection criteria below. Based on this initial review, a number of proposals that appear most promising will be identified for site visits. Although the site visit review will focus on all aspects of the proposal, Foundation staff will indicate what additional information may be needed in advance of the review.

Proposals will be reviewed in accordance with established Foundation procedures using the four main criteria described in the *GPG*. They include the intrinsic merit of the research, the capability of the investigators, the utility or relevance of the research, and the effect of the research on the infrastructure of science and engineering in the areas covered in this announcement. Specific criteria that will be used in the evaluation process include:

- The capabilities of the institute leadership, including management and organizational ability of the proposed director, and the commitment of the proposed leadership team;
- The quality and likely effectiveness of the management plan (including plans for interaction among the institute staff);
- The qualifications of the scientific personnel involved in the project;
- The quality of the proposed scientific activities and the overall impact on the mathematical sciences community, as well as the broader scientific and engineering community;
- The breadth of coverage of the spectrum of the Mathematical Sciences;
- Design, structure and management of the operation of the institute, including method of selection of activities and method of selection of participants;
- The quality and appropriateness of the Institute's education and training components, especially plans to attract, involve, and mentor researchers early in their career paths, and plans

for incorporating under-represented groups into the activities of the institute;

- The extent to which communication and interaction with other areas of science and engineering are fostered. This may include linkages and partnerships with other university research groups or industry, national laboratories, non-profit organizations, etc;
- Suitability of location with regard to office space, computing environment, access to library facilities, and housing, as well as contact with leading mathematical scientists;
- The quality and likely effectiveness of proposed dissemination and outreach activities;
- The clarity of the mission and goals, and the quality of the evaluation plan;
- The reasonableness and appropriateness of the budget;
- Quality and likely effectiveness of plans for future institute growth and resource development;
- The level and quality of the commitments (including, but not limited to, funds, space, staff, equipment, and access to facilities) to the institute from the submitting institutions and from other sources;

## INQUIRIES

Questions about the program may be addressed to:

Program Director for Special Projects, or to [dms-inst@nsf.gov](mailto:dms-inst@nsf.gov)

## GRANT ADMINISTRATION

Awards made 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 Partnership General Terms and Conditions," depending on the grantee organization. Cooperative agreements are subject to NSF's Cooperative Agreements General Conditions (NSFCA-1). Copies of these documents are available at no cost from the NSF Forms and Publications Unit, telephone (703) 306-1130, or via e-mail [pubs@nsf.gov](mailto:pubs@nsf.gov) (Internet). More comprehensive information is contained in the NSF Grant Policy Manual (NSF 95-26, July 1995), for sale through the Superintendent of Documents, Government Printing Office, Washington, DC 20404. The telephone number at GPO is (202) 783-3238 for subscription information.

## REPORTING REQUIREMENTS

Upon completion of the project, a Final Project Report (NSF Form 98A), including Part IV Summary, will be required. NSF will send the form with Part I information

preprinted to the Principal Investigator (Project Director) approximately one month prior to the grant's expiration date. Applicants should review the sample form in the GPG prior to proposal submission so that appropriate tracking mechanisms are included in the proposal plan to ensure that complete information will be available at the conclusion of the project.

The Foundation provides awards for research in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research related programs described here. 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 subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

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 projects. See the program announcement or contact the program coordinator at (703) 306-1636.

Privacy Act and Public Burden. The information requested on proposal forms is solicited under the authority of the National Science Foundation Act of 1950, as amended. It will be used in connection with the selection of qualified proposals and 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 application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers, and researchers as necessary to complete assigned work; and to other government agencies in order to coordinate programs. See Systems of Records, NSF 50, Principal Investigators/Proposal File and Associated Records, and NSF-51, 60 Federal Register 4449 (January 23, 1995). Reviewer/Proposal File and Associated Records, 59 Federal Register 8031 (February 17, 1994). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your 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 or any other aspect of this collection of information, including suggestions for reducing this burden, to Herman G. Fleming, Reports Clearance Officer, Division of Contracts, Policy, and Oversight, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230.

The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing impairment to communicate with the Foundation about NSF programs, employment, or general information. To access NSF TDD, dial (703) 306-0090; for FIRS, 1-800-877-8339.

This program is described in the Catalog of Federal Domestic Assistance category 47.049 (Mathematical and Physical Sciences).

OMB No. 3145-0058  
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NSF 97-23