

MAJOR RESEARCH INSTRUMENTATION (MRI) PROGRAM

*Instrument Development and
Acquisition Solicitation*

OFFICE OF SCIENCE AND TECHNOLOGY INFRASTRUCTURE

DEADLINE: *January 30, 1998*

Note: For future competitions, updates of this solicitation will be published on the NSF's Homepage



NATIONAL SCIENCE FOUNDATION

BACKGROUND

The Major Research Instrumentation Program (MRI) is designed to improve the condition of scientific and engineering equipment and facilities for research and research training in our Nation's academic institutions. This program seeks to improve the quality and expand the scope of research and research training in science and engineering, and to foster the integration of research and education by providing instrumentation for research-intensive learning environments.

Proposals submitted in response to this program solicitation will be competing for about \$50 million in Fiscal Year 1998. The overall proposal funding rate for the FY 1997 MRI competition was approximately 33%.

GOALS

The goals of the MRI Program are to:

- Support the acquisition, through purchase, upgrade, or development, of major state-of-the-art instrumentation for research, research training, and integrated research/education activities at U.S. institutions;
- Improve access to and increase use of modern research and research training instrumentation by scientists, engineers, and graduate and undergraduate students;
- Enable academic departments or cross-departmental units to create well-equipped learning environments that integrate research with education;
- Foster the development of the next generation of instrumentation for research and research training; and
- Promote partnerships between academic researchers and private sector instrument developers.

SCOPE

The MRI Program assists in the acquisition or development of major research instrumentation by U.S. institutions that is, in general, too costly for support through other NSF programs. The maintenance and technical support associated with these instruments are also supported. Proposals may be for a single instrument, a large system of instruments, or multiple instruments that share a common research focus. Computer systems, clusters of advanced workstations, networks, and other information infrastructure components necessary for research are encouraged. Proposals for computer networks as general purpose equipment will not be reviewed. **A list of assorted instruments or general lab equipment that do not share a common research or research training focus will not be reviewed. Instrumentation requested exclusively for standard S&E**

courses will also not be reviewed. This program will not support renovation or modernization of research facilities or fixed equipment (see definitions). Note: The MRI Program will not review a duplicate proposal submitted to another NSF instrumentation program .

Awards for instrumentation will range from \$100,000 to \$2 million. Lesser amounts will be considered in proposals from non-Ph.D. granting institutions, from mathematical sciences, or from the social, behavioral and economic science communities.

ELIGIBLE INSTITUTIONS

Proposals may be submitted by U.S. institutions of higher education, independent nonprofit research institutions, research museums, and legally incorporated consortia thereof. An institution may submit up to three proposals: two proposals for instrument acquisition or development, plus a third solely for instrument development. In addition, an institution may be included as a member of a consortium submitting a separate proposal, clearly labeled as such in the proposal's title. A consortium may also submit a proposal, through a U.S. university, for instrumentation to be used at a Federally Funded Research and Development Center (FFRDC). Small businesses are eligible for instrument development support as private sector partners with submitting universities.

ELIGIBLE FIELDS OF SCIENCE AND ENGINEERING

Proposals will be considered for instrumentation used for any NSF-supported field of science, mathematics, and engineering. The research activities using this instrumentation need not be supported by NSF or the Federal government. The Program will not provide support for instrumentation to be used in the conduct of disease-oriented research, including the etiology, diagnosis or treatment of physical or mental disease, abnormality or malfunction in human beings or animals, or the design and testing of drugs for treatment of such conditions.

INSTRUMENT DEVELOPMENT

The academic research enterprise relies on and produces new generations of sophisticated research instrumentation and software simulations thereof. The right design, development, and manufacturing processes can yield new instruments that are more widely used, open up new areas of research and research training, and have potential as commercial products. This competition seeks to expand the research community's capabilities by supporting the development of new instruments (or their software simulations) with enhanced performance. "Performance" includes: accuracy, reliability, resolving power, throughput speed, sample capacity, flexibility of operation, breadth of application, user-friendliness, and cost of acquisition, operation, and maintenance. Individual investigators and teams of researchers are encouraged to apply for instrument development support. NSF is taking the initiative in stimulating development of the next generation of research instrumentation by allowing institutions to submit a third proposal

that targets instrument development. NSF particularly encourages collaborations between disciplinary scientists who are knowledgeable in unique instrumentation areas and private sector experts in the area of instrument manufacture. Working together within a framework of concurrent engineering, such partnerships have the potential to create new products with wide scientific and commercial impact. These academic research/private sector partnerships must be performed in the United States. The "United States" is defined as the 50 states, territories and possessions of the United States, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, the Trust Territory of the Pacific Islands, and the District of Columbia.

ELIGIBLE PROJECT COSTS

Eligible project costs are those total project costs (comprising the NSF award plus the institution's cost sharing) that are properly and reasonably allocable to the research instrumentation based on the percentage of time that it is used for research and research training. For instrument acquisition proposals, eligible project costs include: costs of instrument purchase, installation, commissioning, and calibration. The direct and indirect costs of operation, maintenance, and other appropriate technical support during the award period are also eligible. For instrument development proposals, eligible project costs include all of the items listed above, as well as the direct and indirect costs associated with support for personnel engaged in the instrument development effort.

COST SHARING/MATCHING REQUIREMENTS

Cost sharing at a level of **30% of total eligible project costs** is required. The minimum award from NSF will be \$100,000 (except for non-Ph.D. granting institutions, mathematical sciences, and the social, behavioral and economic sciences), and the maximum award will be \$2 million. The minimum total project cost will therefore be \$143,000 (assuming 30% cost sharing). The cost sharing may come from any private or non-Federal public source and may be in cash or in kind, fairly valued (see OMB Circular A-110, Section.23). **Manufacturers' discounts are encouraged for reducing total project costs, but are not eligible institutional cost sharing.** For instrument acquisition projects, eligible cost sharing may include partial purchase of the instrumentation and costs of instrument installation and calibration. In addition, an institution may provide as cost sharing the direct and indirect costs of supplies and personnel directly associated with operation and maintenance of the instrumentation, up to a yearly limit equivalent to 10% of the total instrument hardware cost in each year of the award period (up to three years). For instrument development projects, eligible cost sharing includes all items eligible for instrument acquisition projects. In addition, an institution may provide as cost sharing the direct and indirect costs of supplies and personnel directly associated with instrument design, development, operation, and maintenance, up to a yearly limit equivalent to 10% of the total instrument hardware cost in each year of the award period (up to five years).

Institutional cost sharing must occur during the award period.

PROPOSAL FORMAT REQUIREMENTS AND ELECTRONIC SUBMISSION

Proposals must be submitted electronically using the NSF FastLane system for electronic proposal submission and review, available through the World Wide Web at the FastLane home page (<http://www.fastlane.nsf.gov>). Instructions for electronic submission can be found by accessing the FastLane home page. Since this process is fairly new to many users, it is advised that the proposal preparation and submission process be done early. General information about NSF's policies and procedures on proposals, declinations, and awards is contained in Grant Proposal Guide (NSF 98-2) and can be located on the NSF homepage (<http://www.nsf.gov>).

In order to use NSF FastLane to prepare and submit a proposal, you must use a browser that supports multiple buttons and file upload (e.g., Netscape 3.0 and above for Windows, UNIX, or Macintosh). In addition, Adobe Acrobat Reader is needed to view and print forms. Adobe Acrobat Exchange 2.0 or above, Adobe Distiller 2.0 or above, or Acrobat 3.X (which includes Adobe Exchange and Distiller) is needed for creating PDF files. To access the FastLane Proposal Preparation application, your institution needs to be a registered FastLane institution. A list of registered institutions and the FastLane registration form are located on the FastLane home page.

For questions or problems concerning submitting a MRI proposal via FastLane, please contact a FastLane User Support person at electronic mail: mriflane@nsf.gov or phone (703) 306-1142 {If you reach the automated attendant, please dial extension 4686}. For non-FastLane questions related to the MRI competition, please contact the MRI program at mri@nsf.gov or at (703) 306-1040.

Proposals that do not adhere to the format below or the stated page limitations will not be reviewed.

Submission Deadline and Timing:

Proposals must be received electronically by 5 PM, EST, **January 30, 1998**. A signed paper copy of the Proposal Cover Sheet, Certification Page, and letters of commitment to institutional cost-sharing must arrive by **February 5, 1998**.

Structure and Content:

1. *Cover Page* (Form 1207). On the cover page, select Major Research Instrumentation as the designated organizational unit. The project title should identify the scientific discipline(s) for which the instrumentation is requested, should convey the primary purpose of the proposal, e.g., "Acquisition of ____" or "Development of ____," and should specify if the proposal is being submitted by a consortium. The requested amount shown on the cover page should be the amount requested from NSF, not the total eligible project costs.

2. *Information about Principal Investigators/Project Directors* (Form 1225 is automatically generated by FastLane).
3. *Paginated Table of Contents* (Form 1359 cannot be edited and is automatically completed by FastLane)
4. *Project Summary* (Maximum length, 1 page). Describe the proposed major research instrumentation, the type of research/research training conducted, and the activity that would result if the project is funded by NSF.
5. *Project Description* (Maximum length, 15 pages, including all figures and charts). Please note: When preparing the Project Description in Fastlane, this section must include items A-E. If item A, “Results from Prior NSF Support” is not applicable, the project description should contain items B-E.
 - a) *Results from Prior NSF Support* (Maximum length, 5 pages). Include this section only if the PI(s) has received NSF support for instrumentation.
 - b) *Research Activities* (Maximum length, 10 pages; 6 suggested for instrument development). Describe the research and research training activities and projects to be conducted with the desired instrumentation, and sources of support, if any. In narrative or tabular form, list by number and type (e.g., senior personnel, postdoctoral fellows, graduate students, undergraduate students) the personnel using the instrumentation for research and research training on a regular basis.
 - c) *Description of the Research Instrumentation and Needs* (Maximum length, 2 pages; 6 suggested for instrumentation development). Provide a technical description of the requested instrumentation, including manufacturer and model number. The description should be comprehensive enough to allow reviewers to evaluate the extent to which the equipment is essential and appropriate. A listing and/or description of related instrumentation currently available at or near the submitting institution should be provided, and the request should be justified in this context. For development of new instrumentation, present the design concept, rationale, and development methods in sufficient detail to allow evaluation of its technical feasibility. Provide preliminary results from existing equipment, or appropriate calculations or models to show the performance (e.g., sensitivity, capacity, stability, resolution or signal-to-noise ratio) to be achieved by the new instrument. Justify the necessity and adequacy of the new instrumentation for the proposed research projects, with reference to existing instruments.
 - d) *Impact of Infrastructure Projects* (Maximum length, 2 pages). Describe how the instrumentation will contribute to meeting the research and educational goals of the institution or consortium. Indicate how the instrumentation will

attract researchers and students, particularly underrepresented groups and women pursuing advanced degrees in science and engineering, and improve the quality of their research training. For instrument development proposals, discuss the potential impact of this activity on the Nation's academic research infrastructure. Describe how students will be involved and how their education will be enhanced through development efforts. If the development effort involves a private sector partner, submit a letter of agreement describing their role with the signed cover sheet.

- e) *Project and Management Plans* (Maximum length, 1 page). Outline procedures for allocating instrument time if appropriate. Describe user fees if any are planned. Provide plans for the maintenance, operation, and technical support of the instrumentation, and for attracting new users.
6. References Cited.
 7. Budget and Funding. Provide a single cumulative budget page (Form 1030) presenting **only those eligible project costs that NSF is being asked to fund. Institutional cost sharing should be shown on Line M, Form 1030.** The budget justification, which must not exceed three-pages, should itemize and explain all eligible project costs, assign each to either the NSF request or institutional cost sharing, and explain the basis for all cost estimates. Specify the sources and amounts of cost sharing funds (e.g., state appropriations, department funds, private sources); the steps necessary to obtain cost sharing funds; and a projection of when they will be available. **A letter of commitment to institutional cost sharing from the appropriate institutional officer must accompany the signed cover sheet. Documentation indicating price quotes of largest items may also be submitted with the signed cover sheet.**
 8. *Current and Pending Support* (Form 1239). Provide a form for the PI, Co-PI, and each major user of the instrumentation listed in 5b, above. If an individual has no current or pending support (other than this proposal), completion of the form is not required. FastLane will automatically generate a form indicating that no current and pending support was provided for that individual.
 9. *Biographical Sketches*. Each copy must include the collected two-page biographical sketches of the PI, Co-PI, and senior personnel who are major users of the relevant research instrumentation, listing no more than five recent publications most relevant to the research and research training using the requested instrumentation. Also identify the individual responsible for the instrumentation and provide his/her brief vitae, including relevant experience Do NOT send copies of the publications. Where the number of senior personnel is large, limit the number of biographical sketches.

10. Letter to Director, OSTI, of Institutional Cost Sharing Commitment (**required**) and Letters of Industrial Partnership (optional) should be submitted with the signed cover sheet and certification page. Letters are not to be submitted over FastLane.

NOTE: No other items are to be included. Proposals containing items other than those required above will not be reviewed.

Where To Submit:

Proposals for the Major Research Instrumentation Program must be submitted electronically to NSF no later than 5 PM, on **January 30, 1998**. **Note:** A signed paper copy of the Proposal Cover Sheet, Certification Page, and letters of commitment to institutional cost-sharing and industrial partnerships must be mailed to the address below to arrive by **February 5, 1998**.

Office of Science and Technology Infrastructure
Major Research Instrumentation Program
National Science Foundation
4201 Wilson Boulevard, Room 1270
Arlington, VA 22230

REVIEW AND SELECTION

Proposals will be reviewed in the appropriate NSF division. PIs will receive an acknowledgment with a proposal number and a three-letter prefix for the cognizant division. Proposals will be evaluated in accordance with established NSF procedures and the revised merit review criteria described in the GPG.

Evaluation Criteria:

1. What is the intellectual merit of the proposed activity?

How important is the requested instrument in advancing knowledge and understanding within the proposed field or across different fields? How well qualified is the proposer (individual or team) who will use or develop the instrumentation? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the use of the requested instrumentation in the research activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is the instrumentation appropriate and required for current and expected research and training activities? Are there sufficient institutional resources to maintain and operate the requested instrument?

2. What are the broader impacts of the proposed activity?

Will the proposed acquisition or development of the instrumentation advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed instrumentation help broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.) in research and training activities? To what extent will the proposed instrumentation be used to enhance the institution's academic scientific and engineering infrastructure for research and education? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Additional Considerations

In addition to the two evaluation criteria stated above, NSF will consider the following factors in making MRI awards:

- Instrument development with a private sector partner.
- The ability to demonstrate the shared use of the instruments for research and/or research training.
- Whether the research and/or research training served by the instrumentation advances the goals and aligns with the goals and core strategies articulated in “NSF In A Changing World,” the Foundation’s strategic plan (NSF 95-24.)
- The program is committed to supporting quality proposals from non-Ph.D. granting and minority institutions.
- Geographic distribution and distribution across Ph.D. and non-Ph.D. granting institutions.

AWARDS

NSF awards will be grants that range from approximately \$100,000 (exceptions listed above) to a maximum of \$2 million. Award durations are not expected to exceed three years, except awards for the development of major research instrumentation which may be made for up to five years. It is anticipated that award decisions will be announced in the Fall 1998.

NSF awards will stipulate that the awardee is responsible for contributing the specified and agreed upon amount of cost sharing during the award period. In light of this requirement, NSF funds will not be awarded until required cost sharing commitments have been assured. **A letter from an institutional officer stating the amount and source of eligible cost sharing, and assuring availability and commitment of these funds**

during the proposed award period must accompany the signed cover sheet for an award recommendation to be processed. In addition, NSF award conditions may specify special reports, on-site inspections, or other requirements.

NSF requires prospective grantees to furnish, upon request by NSF's Division of Grants and Agreements, basic organization and management information that will assist the NSF Grant Officers in assessing their financial and managerial responsibility. These requirements are described in the NSF Grant Policy Manual (July 1995), particularly Chapters IV and V. Grants awarded as a result of this solicitation 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.

INQUIRIES

Inquiries about the NSF Major Instrumentation Program should be addressed to:

Office of Science and Technology Infrastructure
Major Research Instrumentation Program
National Science Foundation
Room 1270
4201 Wilson Boulevard
Arlington, VA 22230
(703) 306-1040
E-Mail: mri@nsf.gov (Internet)

DEFINITIONS

The following definitions apply to the Major Research Instrumentation Program and this program solicitation:

Institution: A separate legal and fiscal entity, whether at the central or system level, main campus level, or branch campus level, which can receive awards and which is separately and consistently identified at that level by NSF.

Institutions of Higher Education: Institutions legally authorized and accredited at the college level by a nationally recognized accrediting agency to offer and which are offering at least a two-year program of college-level studies leading toward a degree.

Independent Nonprofit Research Institutions: Independent legal entities, other than institutions of higher education, which are generally recognized as separately incorporated, nonprofit, tax exempt organizations, and which conduct research as one of their primary purposes.

Research Museums: Independent nonprofit science museums, zoological parks, aquaria, natural history museums, etc., which conduct research as one of their primary purposes.

Consortia: Legally recognized groups consisting exclusively of two or more eligible institutions. For the purposes of evaluation and review, a consortium proposal will be identified with the institution where the requested research instrumentation is located.

Research Facilities: The bricks-and-mortar physical plant in which sponsored or unsponsored research activities (including research training) take place, including related infrastructure, systems (e.g., HVAC and power systems, toxic waste removal systems), and fixed equipment.

Fixed Equipment: The permanent components of a research facility that are integral (i.e., built in, rather than affixed) to the facility (e.g., clean rooms, fume hoods, elevators, growth chambers, laboratory casework); their removal would affect the integrity or basic operation of the facility.

Research Training: Training of individuals (including advanced undergraduates, graduate students, postdoctoral fellows, and faculty) in research techniques where such activities utilize the same facilities as research activities. Research training does not include introductory science or engineering instruction, whether in a classroom or instructional laboratory.

Minority Institutions: Historically Black colleges and universities defined as "part B institutions" by section 322(2) of the Higher Education Act of 1965 (20 U.S.C. 1061(2)) and other institutions whose enrollments are: (a) more than 50 percent of a combination of any of the following groups: Alaskan Native (Eskimo or Aleut), American Indian, Afro/American Black, Hispanic, or Native Pacific Islander; or (b) 20 percent or more of any one of the above eligible minorities.

Non-Ph.D. Granting Institutions: Two- and four-year colleges and universities that have produced fewer than 20 Ph.D.s or D.Sci.s in all NSF-supported disciplines during the two previous academic years.

Private Sector: A business that is: 1) independently owned and operated, has its principal place of business in the United States, and is organized for profit; and 2) at least 51 percent owned, or in the case of a publicly owned business, at least 51 percent of its voting stock is owned by United States citizens or lawfully admitted permanent resident aliens.

RELATED NSF PROGRAMS FOR RESEARCH INSTRUMENTATION

Program Title	Brochure	Telephone
Chemistry Research Instrumentation and Facilities	NSF 97-2	703-306-1840
Instrumentation for Materials Research	NSF 94-108	703-306-1810
Advanced Technologies and Instrumentation Program, Division of Astronomical Sciences	No Publication #	703-306-1828
Scientific Computing Research Equipment for the Mathematical Sciences	NSF 96-153	703-306-1870
Earth Sciences Instrumentation and Facilities	NSF 96-50	703-306-1558
Ocean Science Research, Ocean Technology and Interdisciplinary Coordination Program	NSF 93-163	703-306-1584
Engineering Research Equipment*	No Publication #	703-306-1360
Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Laboratories	NSF 96-11 (electronic only)	703-306-1472
Instrument Development for Biological Research	NSF 96-90 (electronic only)	703-306-1472
Multi-user Biological Equipment and Instrumentation Resources	NSF 96-91 (electronic only)	703-306-1472
Instrumentation and Laboratory Improvement	NSF 97-29	703-306-1667
Computer Information Science & Engineering Research Infrastructure	NSF 97-146	703-306-1980
Instrumentation Grants for Research in Computer and Information Science and Engineering	NSF 96-113	703-306-1980
Social, Behavioral, and Economic Science Instrumentation (contact Dr. John Yellen)	NSF 95-13	703-306-1759
Small Business Innovation Research	NSF 97-64	703-306-1391

Information on the above NSF Instrumentation Programs can be retrieved by accessing the individual Directorate websites on the NSF Home page (<http://www.nsf.gov>).

*(Note: As of FY 1998, the Directorate for Engineering will no longer have a separate "Research Equipment Grant" Program). Access the Directorate for Engineering's webpage to retrieve information on the types of support available for the acquisition of specialized equipment and/or instrumentation.

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 Gail A. McHenry, Reports Clearance Officer, Information Dissemination Branch, National Science Foundation, 4201 Wilson Boulevard, Suite 245, 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.

Catalog of Federal Domestic Assistance Numbers:

- 47.041 Engineering Grants
- 47.049 Mathematical and Physical Sciences
- 47.050 Geosciences
- 47.070 Computer and Information Science and Engineering
- 47.074 Biological Sciences
- 47.075 Social, Behavioral, and Economic Sciences
- 47.076 Education and Human Resources
- 47.078 Polar Programs

OMB# 3145-0058

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