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Major Research Instrumentation Program (MRI)

Instrument Development and Acquisition

Program Solicitation
NSF 01-171

National Science Foundation
Office of Integrative Activities
Directorate for Biological Sciences
Directorate for Computer and Information Science and Engineering
Directorate for Education and Human Resources
Directorate for Engineering
Directorate for Geosciences
Directorate for Mathematical and Physical Sciences
Directorate for Social, Behavioral, and Economic Sciences
Office of Polar Programs

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

Fourth Thursday in January Annually

REVISIONS AND UPDATES

Revised cost share requirements for non-Ph.D. granting institutions. Cost sharing is no longer required for non-Ph.D. granting institutions. Additionally, minor word changes were made for consistency purposes.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Major Research Instrumentation Program (MRI)
Instrument Development and Acquisition

Synopsis of Program:

The Major Research Instrumentation Program (MRI) is designed to increase access to scientific and engineering equipment 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. The MRI program encourages the development and acquisition of research instrumentation for shared use across academic departments, among research institutions, and in concert with private sector partners.

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 is also supported. Proposals may be for a single instrument, a large system of instruments, or multiple instruments that share a common or specific research focus.

Cognizant Program Officer(s):

- Joseph F. Burt, Senior Staff Associate, Office of the Director, Office of Integrative Activities, 1270 N, telephone: (703) 292-8040, fax: (703) 292-9040, email: jburt@nsf.gov

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

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

Eligibility Information

- **Organization Limit:**

  Proposals may be submitted by U.S. institutions of higher education, independent nonprofit research institutions, research museums, and legally recognized consortia. A legally recognized consortium may also submit a proposal through a U.S. institution of higher education for instrumentation to be used at a Federally Funded Research and Development Center (FFRDC). Small businesses are eligible for instrument development support as a subaward through submitting U.S. institutions.

  Institutions eligible to participate in the NSF Research in Undergraduate Institutions (RUI) program may submit a RUI proposal to the MRI program. Follow all MRI guidelines for preparation and submission of your proposal. Identify the proposal as an MRI/RUI proposal in the project title on the proposal cover sheet. Include the Certification of RUI Eligibility and the RUI Impact Statement as described in the RUI program announcement, available at http://www.nsf.gov/cgi-bin/getpub?nsf00144.

- **PI Eligibility Limit:** None Specified.
- **Limit on Number of Proposals:** An institution may submit up to three proposals to the MRI program. An institution may submit up to two proposals for instrument acquisition. If an institution submits three proposals, at least one of the three proposals submitted must be for instrument development. However, two or all three proposals may be for instrument development. In addition, an institution may be included as a member of a legally recognized consortium submitting a separate proposal, clearly labeled as such in the proposal's title.

Award Information

- **Anticipated Type of Award:** Standard Grant
- **Estimated Number of Awards:** 300
- **Anticipated Funding Amount:** $75,000,000 (pending availability of funds)

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** The program announcement/solicitation contains supplements to the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full program announcement/solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is Specialized. Please see the full funding opportunity document for further information.
- **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 proposer's local time):
  Fourth Thursday in January Annually

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria. Additional merit review considerations apply. Please see the full funding opportunity document for further information.

Award Administration Information

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

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I. INTRODUCTION

The Major Research Instrumentation Program (MRI) is designed to increase access to scientific and engineering equipment 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. The MRI program encourages the development and acquisition of research instrumentation for shared use across academic departments, among research institutions, and in concert with private sector partners.

II. PROGRAM DESCRIPTION

MRI Program 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.

MRI Program 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 is also supported. Proposals may be for a single instrument, a large system of instruments, or multiple instruments that share a common or specific 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 or specific research or research training focus will not be reviewed. Instrumentation requested exclusively for standard Science and Engineering (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.

Instrument Development

NSF is stimulating the development of the next generation of research instrumentation by encouraging institutions to submit proposals that target instrument development. Individual investigators and teams of researchers are encouraged to apply for instrument development support.

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.

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. (NSF does not consider the acquisition of individual pieces of equipment to be combined in a new system to be instrument development.) 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.

III. ELIGIBILITY INFORMATION

Eligible Institutions

Proposals may be submitted by U.S. institutions of higher education, independent nonprofit research institutions, research museums, and legally recognized consortiums of eligible institutions. A legally recognized consortium may also submit a proposal through a U.S. institution of higher education 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.

Institutions eligible to participate in the NSF Research in Undergraduate Institutions (RUI) program may submit a RUI proposal to the MRI program. Follow all MRI guidelines for preparation and submission of your proposal. Identify the proposal as an MRI/RUI proposal in the project title on the proposal cover sheet. Include the Certification of RUI Eligibility and the RUI Impact Statement as described in the RUI program announcement, available at http://www.nsf.gov/cgi-bin/getpub?nsf00144.

Proposal Limit

An institution may submit up to three proposals to the MRI program. An institution may submit up to two proposals for instrument acquisition. If an institution submits three proposals, at least one of the three proposals submitted must be for instrument development. However, two or all three proposals may be for instrument development. In addition, an institution may be included as a member of a legally recognized consortium submitting a separate proposal, clearly labeled as such in the proposal's title.

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 medical research and education paradigms or 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.

Eligible Project Costs

Eligible project costs are those total project costs (comprising the NSF award plus the institution's cost sharing, if required) 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. Direct and indirect costs associated with research projects to be conducted using the requested instrumentation (including researchers' salary and students' stipends) are not eligible costs under the MRI program.

IV. AWARD INFORMATION

Proposals submitted in response to this program solicitation will be competing for about $75 million, pending availability of funds, in Fiscal Year 2003. The overall proposal funding rate for the FY 2002 MRI competition was approximately 40%. In Fiscal year 2002, awards to non-Ph.D. granting institutions totaled approximately 30% of the available funding of $75 million. This funding rate for non-Ph.D. granting institutions is expected to continue in FY 2003.

Awards for instrumentation will range from $100,000 to $2 million. Proposals requesting funding at the low end of this range tend to have a higher funding rate than proposals at the high end. The average MRI award amount for the period FY1997-FY2002 was approximately $312,000.

Proposals requesting less than $100,000 will be considered only from non-Ph.D. granting institutions, or from the disciplines of mathematical science or social, behavioral, and economic science at any eligible institution. Proposers may request an award period up to three years for

acquisition proposals and up to five years for development proposals.

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/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

In addition to the GPG, MRI proposals must be prepared in accordance with all applicable FastLane guidelines and with the following instructions: (Note: Where these instructions and those in the Grant Proposal Guide do not agree, these instructions take precedence.)

1. **Cover Sheet.** On the cover sheet, where asked to identify a program announcement/solicitation number, select the number for this solicitation, "NSF 01-171 Major Research Instrumentation program solicitation." Where asked to identify the NSF Unit Consideration, select the appropriate Division to consider your proposal. "Major Research Instrumentation" will be automatically selected as the program for your proposal.

   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. **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 NSF funds the project.

3. **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* (Suggested maximum length, 5 pages). Include this section only if the PI(s) has received NSF support for instrumentation.

   b. *Research Activities* (Suggested 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 who will use the instrumentation for research and research training on a regular basis. Letters of support should be scanned into the Supplementary Documents section of your FastLane proposal and submitted electronically as part of your proposal.

   c. *Description of the Research Instrumentation and Needs* (Suggested maximum length, 2 pages; 6 suggested for instrumentation development). Provide a technical description of the requested instrumentation, including manufacturer and model number. Proposers are strongly encouraged to submit manufacturers' quotes for instrument acquisition proposals. Written quotes from manufacturers should be scanned into the Supplementary Documents section of your FastLane proposal and submitted electronically as part of the proposal. 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* (Suggested 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 example, the proposal could demonstrate that faculty at women's colleges and minority-serving institutions will have access to the instrumentation.) 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. This letter should be scanned into the Supplementary Documents section of your FastLane proposal and submitted electronically as part of the proposal.

e. *Project and Management Plans* (Suggested 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. Where appropriate, describe management plans for instrument development oversight where third parties are involved.

4. **Biographical Sketches.** Your proposal must include the two-page biographical sketches of the PI, Co-PI(s), and senior personnel who are major users of the relevant research instrumentation, in accordance with GPG Chapter II, Section 5.a. through e. Also, identify the individual responsible for the instrumentation and provide his/her brief vita, including relevant experience. DO NOT send copies of publications. Where the number of senior personnel is large, limit the number of biographical sketches.

5. **Budget and Funding.** Provide a single cumulative budget page presenting only those eligible project costs that NSF is being asked to fund. Cost sharing should be shown on Line M on the proposal budget. In FastLane, enter your cumulative budget in Budget Year 1. FastLane will automatically fill out a cumulative budget for your proposal. (Note: Refer to the section on Budgetary Information later in this solicitation for step-by-step instructions for calculating cost sharing.) 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 to the Director, OIA, of commitment to cost sharing from the appropriate institutional officer must be scanned into the Supplementary Documents section of your FastLane proposal and submitted electronically as part of the proposal. The letter of institutional cost-sharing commitment should state the amount and source of eligible cost sharing and should assure availability and commitment of these funds during the proposed award period. Documentation indicating price quotes of large items must also be scanned and submitted as part of the proposal.

6. **Current and Pending Support.** Provide a form for the PI, Co-PI(s), and each major user of the instrumentation for whom a biographical sketch is submitted. If an individual has no current or pending support (other than this proposal), completion of the form is not required.

7. **Facilities, Equipment, and Other Resources.** This section is not required for Major Research Instrumentation proposals.

8. **Letters.** A Letter to the Director, OIA, of Institutional Cost-Sharing Commitment (required), Letters of Industrial Partnership (optional), Letters of Support (optional), and Manufacturers' quotes should be scanned into the Supplementary Documents section of your FastLane proposal and submitted electronically as part of the proposal. Hardcopies should not be mailed to NSF.

9. **List of Suggested Reviewers (optional).** Proposers may include a list of suggested reviewers whom they believe are especially well qualified to review the proposal. Proposers may also list persons they would prefer not review the proposal, indicating why.

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

Proposers are reminded to identify the program announcement/solicitation number ((01-171)) in the program announcement/solicitation block on the proposal Cover Sheet. 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:

The minimum award from NSF will be $100,000 (except for awards to non-Ph.D. granting institutions or awards to any eligible institution in the mathematical sciences or the social, behavioral, or economic sciences) and the maximum award will be $2 million. The minimum and maximum award amounts represent NSF's contribution to the project and do not include the institution's cost sharing.

For the purposes of the MRI program, a Non-Ph.D. granting institution is defined as a two- or four-year college or university that has produced fewer than 20 Ph.D.'s or D.Sci.'s in all NSF-supported disciplines during the two previous academic years. The following sections explain how to calculate the cost sharing requirement for your MRI proposal, how to enter your cost sharing amount and requested amount in the proposal budget, and what costs may be included in your cost sharing.

Cost Sharing for Acquisition Proposals

Cost sharing is not required for non-Ph.D. granting institutions. For Ph.D. granting institutions, cost sharing at a level of 30% of total eligible project costs is required. To calculate your cost sharing requirement for an acquisition proposal:

1. Add all eligible project costs for your proposal to determine total project cost. These costs include cost of purchase, installation, commissioning, and calibration of the instrumentation; and direct and indirect costs of operation, maintenance, and other appropriate technical support (including related personnel and supply costs) during the award period.
2. *If you are a Ph.D. granting institution*, your cost sharing requirement is 30% of your total project cost.
3. Enter your cost sharing amount, as determined above, on Line M of the proposal budget. All entries in the column titled, "Funds Requested By Proposer," on the proposal budget should reflect only those costs that you are requesting from NSF. Line L should reflect the total amount that you are requesting from NSF.
4. *For acquisition proposals*, 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 limit equivalent to 10% of the total instrument hardware cost, in each year of the award period (up to three years).

Note: Manufacturers' discounts are encouraged for reducing total project cost, but are not eligible institutional cost sharing.

Cost Sharing for Development Proposals

Cost sharing is not required for non-Ph.D. granting institutions. For Ph.D. granting institutions, cost sharing at a level of 30% of total equipment cost is required. To calculate your cost sharing requirement for a development proposal:

1. Determine total equipment cost by adding all equipment costs to be included in your proposal. NSF defines equipment as an item of property that has an acquisition cost of $5,000 or more (unless the organization has established lower levels) and an expected service life of more than one year. This cost is entered on line D of the proposal budget.
2. *If you are a Ph.D. granting institution*, your cost sharing is 30% of total equipment cost.
3. Enter your cost sharing amount, as determined above, on Line M of the proposal budget. All entries in the column titled, "Funds Requested By Proposer," on the proposal budget should reflect only those costs that you are requesting from NSF. Line L should reflect the total amount that you are requesting from NSF.
4. *For development proposals*, cost sharing may include all costs that are eligible to be included as cost sharing 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 limit equivalent to 10% of the total instrument hardware cost, in each year of the award period (up to five years).

Note: Manufacturers' discounts are encouraged for reducing total project cost, but are not eligible institutional cost sharing.

Cost sharing must occur during the award period.

The proposed cost sharing must be shown on Line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal. Only items which would be allowable under the applicable cost principles, if charged to the project, may be included as the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in-kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost-sharing toward projects of another Federal agency may not be counted towards meeting the specific cost-sharing requirements of the NSF award. All cost-sharing amounts are subject to audit. Failure to provide the level of cost-sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

C. Due Dates

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

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

Fourth Thursday in JanuaryAnnually

Full proposals must be submitted via FastLane by 5:00 PM, submitter's local time, on the fourth Thursday of January, 2003, and annually thereafter.

All supplementary documents, including the required letter of cost sharing commitment, any letters of support, letter of industrial partnership, and manufacturers' price quotes, must be uploaded or scanned into the Supplementary Documents section of your FastLane proposal and submitted as part of the proposal. Do not send hard copies to NSF.

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: http://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 judgements.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?
How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., 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.

Additional Review Criteria

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

- Partnering with the private sector for instrument development;
- 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 the Foundation's strategic plan (available on the NSF homepage at http://www.nsf.gov);
- Commitment of the MRI program to supporting quality proposals from non-Ph.D. granting and minority-serving institutions;
- Geographic distribution and distribution across Ph.D. and non-Ph.D. granting institutions;and
- Management plans for oversight of acquisition of instruments to be developed by third parties.

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.

NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. 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 also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). 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/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

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/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO 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:

- Joseph F. Burt, Senior Staff Associate, Office of the Director, Office of Integrative Activities, 1270 N, telephone: (703) 292-8040, fax: (703) 292-9040, email: jburt@nsf.gov

General inquiries about the NSF Major Research Instrumentation Program should be addressed to:

Office of Integrative Activities
Major Research Instrumentation Program
National Science Foundation, Room 1270
4201 Wilson Boulevard
Arlington, VA 22230
(703) 292-8040

E-Mail: mri@nsf.gov

The Office of Polar Programs strongly encourages MRI proposals related to all aspects of polar research supported by the Foundation. For any proposals requiring access to the polar regions or polar logistical support, investigators must contact appropriate OPP program managers for guidance about submitting information needed to assess logistical support requirements. This should be done during proposal development. For proposals requiring access to the arctic, contact Simon Stephenson (703-292-7435 or sstephen@nsf.gov). For proposals requiring access to the antarctic, contact one of the following managers: for projects related to antarctic marine research, contact Alexander Sutherland (703-292-8032 or alsuther@nsf.gov); for all other antarctic projects, contact Brian Stone (703-292-8032 or bstone@nsf.gov).

For questions related to the use of FastLane, contact:

- Fastlane Help Desk, telephone: 1-800-673-6188, email: fastlane@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

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

Many NSF programs offer announcements 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 Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

RELATED NSF PROGRAMS FOR RESEARCH INSTRUMENTATION

Program Title	Brochure	Telephone

Chemistry Research Instrumentation and Facilities	NSF 00-81	703-292-4953
Instrumentation for Materials Research	NSF 02-009	703-292-4943
Advanced Technologies and Instrumentation Program, Division of Astronomical Sciences	No Publication # http://www.nsf.gov/mps/ast/ati.htm	703-292-4892
Scientific Computing Research Environment for the Mathematical Sciences	NSF 01-16	703-292-4863
Earth Sciences Instrumentation and Facilities	Earth Sciences? Website: http://www.geo.nsf.gov/ear/if/guide.htm	703-292-8558
Ocean Technology and Interdisciplinary Coordination Program (OTIC)	Ocean Sciences' Website: http://www.geo.nsf.gov/cgi-bin/showprog.pl?id=39&div=oce No Publication #	703-292-8580
Oceanographic Instrumentation Program (Shipboard instrumentation only)	NSF 00-39 http://www.geo.nsf.gov/cgi-bin/showprog.pl?id=47&div=oce	703-292-8580
Instrument Development for Biological Research	NSF 98-119 (electronic only)	703-292-8470
Multi-user Biological Equipment and Instrumentation Resources	NSF 98-137 (electronic only)	703-292-8470
Computer and Information Science and Engineering Minority Institutions Infrastructure (MII)	NSF 96-15	703-292-8980
Computer Information Science and Engineering Research Infrastructure (RI)	NSF 00-5	703-292-8980
Computer and Information Science and Engineering Research Resources (CISE-RR)	NSF 01-100	703-292-8980
Information Technology Research (ITR)	NSF 02-168	703-292-8900
Small Business Innovation Research (SBIR)	NSF 01-28	703-292-8330

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).

X. DEFINITIONS

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

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.

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, laboratory casework); their removal would affect the integrity or basic operation of the facility.

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.

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.

Instrument Development: 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; and user-friendliness. NSF does not consider the acquisition of individual pieces of equipment to be combined in a new system to be instrument development.

Minority Serving 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, Black or African American, 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.

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.

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

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.

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: (301) 947-2722
- **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.

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