Major Research Instrumentation Program: (MRI)
Instrument Acquisition or Development

PROGRAM SOLICITATION
NSF 13-517

REPLACES DOCUMENT(S):
NSF 11-503

National Science Foundation

Office of International and Integrative Activities

Directorate for Biological Sciences

Directorate for Computer & Information Science & Engineering

Directorate for Education & Human Resources

Directorate for Engineering

Directorate for Geosciences

Directorate for Mathematical & Physical Sciences

Directorate for Social, Behavioral & Economic Sciences

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

February 21, 2013

January 23, 2014

Fourth Thursday in January, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

- The MRI program has introduced specific tracks for the acquisition (Track 1) and development (Track 2) of a research instrument, and provided guidance that must be followed when applying for each track.
- A template certification of institution type has been included which must be included as a supplemental document to certify the awardee organization as a Ph.D.-granting institution, a non-Ph.D.-granting institution or a non-degree-granting organization per MRI definitions (see Section IV). This template supersedes certification formats that may have previously been used in MRI proposals.
- A template for the budget breakdown has been provided that must be used in the Budget Justification to specify the amounts being requested of NSF and (when required) the organization's cost sharing.
- Reference to the NSF Innovation Corps (I-Corps) Teams program is provided for consideration as instrument development efforts in possible MRI awards progress.
- Proposals requesting over $1 million should address the potential impact of the instrument on the research community of interest and at the regional or national level when appropriate. For large multi-user instruments that provide service beyond a single institution, concrete plans for enabling access by external users (including those from non-Ph.D. and/or minority-serving institutions) through physical access and/or cyberinfrastructure should be presented, and the uniqueness of the requested instrumentation should also be described.
- A statement has been added noting that instruments to be deployed in the field may require additional information to assess compliance with any applicable laws such as the National Environmental Policy Act, National Historic Preservation Act, and Endangered Species Act.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Major Research Instrumentation Program (MRI)
Instrument Acquisition or Development

Synopsis of Program:

The Major Research Instrumentation Program (MRI) serves to increase access to shared scientific and engineering instruments for research and research training in our Nation's institutions of higher education, and not-for-profit museums, science centers and scientific/engineering research organizations. This program especially seeks to improve the quality and expand the scope of research and research training in science and engineering, by supporting proposals for shared instrumentation that fosters the integration of research and education in research-

intensive learning environments. Each MRI proposal may request support for the acquisition (Track 1) or development (Track 2) of a single research instrument for shared inter- and/or intra-organizational use; development efforts that leverage the strengths of private sector partners to build instrument development capacity at MRI submission-eligible organizations are encouraged.

To accomplish the program's goals, the MRI program assists with the acquisition or development of a shared research instrument that is, in general, too costly and/or not appropriate for support through other NSF programs. The instrument is expected to be operational for regular research use by the end of the award period. For the purposes of the MRI program, a proposal must be for *either* acquisition (Track 1) *or* development (Track 2) of a single instrument or for equipment that, when combined, serves as an integrated research instrument (in contrast to requests for multiple instruments that enable research in a common or focused research domain, which MRI does not support). The MRI program does not support the acquisition or development of a suite of instruments to outfit research laboratories/facilities or that will be used to conduct independent research activities simultaneously.

Instrument acquisition or development proposals that request funds from NSF in the range $100,000-$4 million may be accepted from any MRI-eligible organization. Proposals that request funds from NSF less than $100,000 may also be accepted from any MRI-eligible organization for the disciplines of mathematics or social, behavioral and economic sciences and from non-Ph.D.-granting institutions of higher education for all NSF-supported disciplines.

Cost-sharing of precisely 30% of the total project cost is required for Ph.D.-granting institutions of higher education and for non-degree-granting organizations. Non-Ph.D.-granting institutions of higher education are exempt from cost-sharing and cannot include it. National Science Board policy is that voluntary committed cost sharing is prohibited.

Please see the solicitation text for definitions of organizational types used by the MRI program.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Stephen P. Meacham, telephone: (703) 292-7599, email: smeacham@nsf.gov

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

- 47.041 --- Engineering
- 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
- 47.079 --- International and Integrative Activities (IIA)
- 47.081 --- Office of Experimental Program to Stimulate Competitive Research

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 175 awards - Proposals that request funds from NSF in the range $100,000-$4 million may be accepted from any MRI-eligible organization. Proposals that request funds from NSF less than $100,000 may also be accepted from any MRI-eligible organization for the disciplines of mathematics or social, behavioral and economic sciences and from non-Ph.D.-granting institutions of higher education for all NSF-supported disciplines.

Anticipated Funding Amount: $90,000,000 - Proposals submitted in response to this program solicitation will be competing for about $90 million, pending availability of funds and quality of proposals. Up to $35 million of these funds will be available to support proposals requesting $1-$4 million from NSF, depending on overall proposal pressure and quality.

Eligibility Information

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Organizations that may apply for the MRI program:

    Submission Eligibility

    Proposals may only be submitted by domestic (United States) organizations located in the United States, its territories or possessions, as follows:

    1. Institutions of higher education (Ph.D.-granting and non-Ph.D.-granting), acting on behalf of their faculty members, that are accredited in and have a campus in the United States, its territories or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions.

    2. Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, that include (but are not limited to) independent museums and science centers, observatories, research laboratories, professional societies, and similar organizations that are directly associated with the Nation's research or educational activities. These organizations must have an independent, permanent administrative organization (e.g., an office of sponsored research) located in the United States, its territories or possessions, and have 501(c)(3) tax status.

3. To facilitate access to unique instrumentation for a broad user base of U.S. scientists and engineers, and to encourage collaboration and sharing of state-of-the-art instrumentation, the MRI program accepts proposals from consortia of organizations. Consortium proposals may be submitted as follows:

3a. Legally incorporated, not-for-profit consortia including two or more submission-eligible organizations as described in items (1) and (2) above may submit proposals on behalf of the consortium. The cover sheet must clearly indicate the consortium nature of the proposal in the title. Such a consortium is one with an independent administrative structure (e.g., an office of sponsored research) located in the United States, its territories or possessions and 501(c)(3) status.

3b. Submission-eligible organizations as described in items (1) and (2) above may submit proposals on behalf of other consortia. The cover sheet must clearly indicate the consortium nature of the proposal in the title, and it must identify a PI and co-PI(s) from at least two MRI submission-eligible organizations participating in the consortium. These consortium proposals may also include as partners U.S. organizations that are not eligible to submit MRI proposals.

4. Commercial U.S. organizations, especially small businesses with strong capabilities in scientific or engineering research or education, are eligible for instrument development support only through subawards as private sector partners with submitting organizations; they may not submit proposals. Such partnerships must be substantive and meaningful, and build capacity for instrument development within MRI submission-eligible organization(s). Title to the resulting instrument should be retained by the submitting organization(s). Commercial organizations must be based in the United States, its territories or possessions.

Prospective PIs may contact the cognizant MRI program officers regarding organizational eligibility, and for information on other NSF funding opportunities for instrumentation; see also Section IX for a list of related NSF programs for research instrumentation.

Additionally:

- **MREFC-related Proposals:** The MRI program will not accept proposals for an instrument that augments an NSF Major Research Equipment and Facilities Construction (MREFC) project if that project is not receiving operations funding outside of the MREFC account.
- **FFRDC-related Proposals:** Proposals for the acquisition or development of an instrument to be located at a facility of another Federal agency or one of their Federally Funded Research and Development Centers (FFRDCs) must be submitted as a consortium proposal by an MRI submission-eligible organization as described in item 3(b) above. The proposal must include the facility/FFRDC (or its managing organization) as a partner in the consortium, even if the role of the FFRDC in the project is solely to house the instrument. The instruments must make unique contributions to the needs of researchers elsewhere or establish access to new multi-user facilities. The current list of FFRDCs can be found at: http://www.nsf.gov/statistics/ffrdclist/. Preliminary inquiry to the cognizant MRI point of contact should be made before preparing a proposal for submission.

Organization Categories

All MRI eligible organizations belong to one of the following three categories:

A. *Ph.D.-granting institutions of higher education* are accredited colleges and universities that have awarded more than 20 Ph.D.s or D.Sci.s in all NSF-supported fields during the combined previous two academic years. Additionally, any organization that awards Ph.D. or D.Sci. in NSF-supported fields is considered to be a Ph.D.-granting institution if the only degrees it awards in NSF-supported fields are post-Bachelor's degrees.

B. *Non-Ph.D.-granting institutions of higher education* are accredited colleges and universities (including two-year community colleges) that award Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./D.Sci. degrees in all NSF-supported fields during the combined previous two academic years.

C. *Non-degree-granting organizations* are those that do not award Associate's degrees, Bachelor's degrees, Master's degrees, and/or Ph.D.s or D.Sci.s. Non-degree-granting organizations also include institutions of higher education that award all of their degrees outside of NSF-supported fields.

Please review NSF's Guide to Programs for NSF-supported fields of science, mathematics and engineering at http://www.nsf.gov/funding/browse_all_funding.jsp.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Three (3) as described below.

If three proposals are submitted, at least one of the proposals must be for instrument development (i.e., no more than two proposals may be for instrument acquisition).

To ensure a balanced instrumentation award portfolio at diverse organizations, across varied research topics, and in support of a broadly inclusive science and engineering workforce across the entire Nation, the MRI program requires that an MRI-eligible organization may, as a performing organization, submit or be included as a significantly funded [1] subawardee in no more than three MRI proposals. To promote instrumentation development, the program requires that if an organization submits or is included as a significantly funded [1] ubawardee in three MRI proposals, at least one of the three proposals must be for (Track 2) instrument development.

NSF reserves the right to carefully examine development (Track 2) proposals to ensure that they meet the requirements for this proposal type (see Section II). If a proposal submitted as development is deemed to be an acquisition proposal either before or during the review, the proposal is subject to return without review or decline.

[1]An unfunded collaboration does not count against the submission limit. Inclusion as a funded subawardee on a development (Track 2) proposal at a level in excess of 20% of the total budget request from NSF, or as a funded subawardee on any acquisition (Track 1) proposal, will be counted against an organization's proposal submission limit. Separately submitted linked collaborative proposals of either type (Track 1 or Track 2) count against the submission limit of each of the submitting organizations. However, if a subaward to an organization in a *development (Track 2) proposal* is 20% or less of the proposal's total budget request from NSF, the subawardee's submission limit will not be affected. For subawards within a linked collaborative proposal, the 20% threshold applies to the budget request from NSF in the proposal containing the subaward(s), not to the combined budget request from NSF for the collaborative project.

Note: The 30% cost-sharing requirement applies to only the portion of the total project cost budgeted to non-exempt organization(s), including those participating through subawards. When required, cost-sharing must be precisely 30%. Cost sharing is required for Ph.D.-granting institutions of higher education and for non-degree-granting organizations. Non-Ph.D.-granting institutions of higher education are exempt from cost-sharing and cannot provide it. National Science Board policy is that voluntary committed cost sharing is prohibited. See section V.B. for specific information on cost-sharing calculations and the solicitation text for definitions of organizational types used for the MRI program.

Limit on Number of Proposals per PI or Co-PI:

There are no restrictions or limits.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not required

- **Preliminary Proposal Submission:** Not required

- **Full Proposals:**
    - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
    - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide).

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is required. Please see the full text of this solicitation for further information.

- **Indirect Cost (F&A) Limitations:** Not Applicable

- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

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

    February 21, 2013

    January 23, 2014

    Fourth Thursday in January, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this solicitation for further information.

TABLE OF CONTENTS

I. INTRODUCTION

A. Program Goals

The Major Research Instrumentation (MRI) Program serves to increase access to shared instrumentation for scientific and engineering research and research training in our Nation's institutions of higher education and not-for-profit-museums, science centers and scientific/engineering research organizations. This program especially seeks to improve the quality and expand the scope of research and research training in science and engineering, by supporting proposals for shared instrumentation that fosters the integration of research and education in research-intensive learning environments. Each MRI proposal should request support for the acquisition (Track 1) or development (Track 2) of a single research instrument for shared inter- and/or intra-organizational use; development efforts that leverage the strengths of private sector partners to build instrument development capacity at MRI submission-eligible organizations are encouraged. The MRI Program is intended to assist with the acquisition or development of a single research instrument that is, in general, too costly and/or not appropriate for support through other NSF programs. An instrument provided through the MRI program is expected to be operational for regular research use by the end of the award period.

For the purposes of the MRI Program, proposals must be for *either* acquisition (Track 1) *or* development (Track 2), and must be for only a single instrument or for equipment that when combined serves as an integrated research instrument (in contrast to requests for multiple instruments that enable research in a common or focused research domain, which MRI does not support). An integrated research instrument means that an ensemble of equipment that defines the instrument enables a specific research experiment or type of research experiment to be undertaken; separating or removing an element or component of such an integrated instrument would and preclude any experiments from occurring or succeeding. The MRI program does not support the acquisition or development of a suite of instruments to outfit research laboratories/facilities or to conduct independent experiments simultaneously. Similarly the MRI program does not fund common, general purpose ancillary equipment that would normally be found in a laboratory and/or is relatively easily procured by the institution. Further guidance on appropriate requests can be found in the MRI FAQs at http://www.nsf.gov/od/iia/programs/mri.

B. Recent History

The America COMPETES Act of 2007 (Public Law 110-69) establishes the maximum award limit for MRI proposals commensurate with the budget for the program. For the current MRI competition, the maximum amount of an award under the program is $4 million. Proposals that request funds from NSF in the range $100,000-$4 million will be accepted from all eligible organizations. Proposals that request funds from NSF less than $100,000 will be accepted from all eligible organizations for the disciplines of mathematics or social, behavioral and economic sciences and from non-Ph.D.-granting institutions of higher education for all NSF-supported disciplines.

Cost-sharing at the level of (precisely) 30% of the total project cost is required for Ph.D.-granting institutions and non-degree-granting organizations. Only non-Ph.D.-granting academic institutions of higher education are exempt from the cost-sharing requirement and cost sharing by these institutions may not be provided. Inclusion of voluntary committed cost sharing is prohibited. Please see definitions of organization types used by the MRI program (Section IV).

II. PROGRAM DESCRIPTION

A. General Information

1. MRI Program Purpose and Goals

The primary purpose of the MRI program is to facilitate scientific and engineering research and research training through the acquisition or development of a major research instrument. The MRI program does not support requests for general purpose ancillary laboratory equipment or multiple instruments that serve to outfit a laboratory or research environment. The MRI program also does not support the acquisition or development of instrumentation used primarily for science and engineering education courses (this and other uses of the instrumentation may serve to facilitate the broader impacts of the project).

An MRI proposal must conform to the program's primary goals of:

- Supporting the acquisition of a shared major state-of-the-art instrument, thereby improving access to, and increased use of, a modern research and research training instrument by scientists, engineers, and graduate and undergraduate students;

  or

- Fostering the development of next generation of major instrumentation, resulting in a new type of instrument that is more widely used, and/or open up new areas of research and research training;

  and

- Enabling academic departments, disciplinary and cross-disciplinary units, and organizations and multi-organization collaborations to integrate research with education and thereby enhance research training of the next generation of scientists and engineers.

  An MRI proposal may also address additional program goals which include:

- Supporting the acquisition and development of research instrumentation that makes use of, advances, and/or expands the Nation's cyberinfrastructure and/or high performance computing capability (while avoiding duplication of services already provided by NSF investments). MRI proposals that are aligned with the evolving NSF vision (see "Cyberinfrastructure Framework for 21st Century Science and Engineering" at http://www.nsf.gov/pubs/2010/nsf10015/nsf10015.pdf), including those that support development of computational and data-intensive science and engineering programs, or that provide pathways to regional and national infrastructure, are strongly encouraged.
- Promoting substantive and meaningful partnerships for instrument development, including partnerships between the academic and private sectors. MRI proposals involving partnerships with applicability to NSF-supported centers, including the NSF Industry/University Cooperative Research Centers (I/UCRCs) program are encouraged. Such proposals are expected to create innovative ideas or products with wide scientific or commercial impact. Investigations of commercial impact may be supported through the NSF's Innovation Corps (I-Corps) Team program (http://www.nsf.gov/news/special_reports/i-corps/program.jsp); as MRI development projects mature, applications to this program are strongly encouraged.

2. MRI Program Scope

The MRI program assists in the acquisition or development of major research instrumentation that is, in general, too costly or not appropriate for support through other NSF programs. An MRI proposal must be for either the acquisition or development of a single instrument or for equipment that when combined serves as an integrated research instrument.

a. Instrument Acquisition (Track 1)

The science and engineering research enterprise relies on the availability of modern instrumentation, much of which can be acquired with little/no modification from existing sources. An acquisition (Track 1) proposal is characterized by a purchase requiring limited personnel and having little risk to complete. An MRI acquisition proposal is characterized by a demonstrated need for the purchase or upgrade of a generally available, yet sophisticated, instrument with little or no modification. MRI does not support the lease of a research instrument. The MRI program does not support requests for general purpose ancillary laboratory equipment or multiple instruments that serve to outfit a laboratory or research environment. An acquisition proposal must meet these guidelines to be considered for MRI support.

b. Instrument Development (Track 2)

The academic research enterprise relies on new generations of sophisticated research instrumentation and NSF encourages individual investigators, and teams of researchers, to apply for instrument development support. A development (Track 2) proposal is characterized by a demonstrated need for a new or extensively upgraded instrument that can provide enhanced or potentially transformative use and performance, open up new areas of research and research training, and/or have potential as a commercial product. "Performance" may include accuracy, reliability, resolving power, throughput speed, sample capacity, flexibility of operation, breadth of application, user-friendliness, and/or new types of measurement or information gathering. MRI development efforts tend to require longer timescales for completion than acquisition efforts, and involve design, construction, testing and commissioning such that the equipment cost may not represent the largest portion of the budget. A development proposal also tends to involve greater risk to complete.

The MRI program does not consider the acquisition of individual pieces of equipment simply combined in a new system, the mere purchase of an upgrade, or the development of enabling technologies, devices, products or techniques to constitute instrument development. Spiral development efforts that do not lead to a stable, long-term research instrument at the end of the award period are not appropriate for MRI support. The purchase of a computer(s) and the subsequent porting of application-specific software also does not constitute instrument development.

A development proposal with a commercial partner(s) must be substantive, meaningful and build capacity for instrument development within MRI submission-eligible organizations; a proposal that "outsources" the development to the commercial partner will be considered to be an acquisition proposal by the MRI program. A development proposal must describe the improved performance of the new instrument over existing options and the expected impact of this new instrument on the broader research community.

NSF reserves the right to carefully examine development proposals to ensure that they are appropriate for this proposal category and adequately distinguish between instrument development and instrument acquisition or research. A development proposal must meet the above guidelines to be considered for MRI support.

The MRI program will NOT support proposal requests for any of the following:

- Construction, renovation or modernization of rooms, buildings or research facilities - this category refers to the space where sponsored or unsponsored research activities (including research training) occur, whether "bricks-and-mortar", mobile, or virtual;
- Large, specialized experimental facilities that are constructed with significant amounts of common building material using standard building techniques. Instruments in general can be decoupled from the structure or environment that contains them;
- General purpose and supporting equipment; this category includes (but is not limited to) general purpose ancillary computers or laboratory instruments. Supporting equipment refers to basic, durable components of a research facility that are integral to its operation (e.g., fume hoods, elevators, laboratory casework and cryogen storage systems);
- Sustaining infrastructure and/or building systems; this category may include electrical and plumbing systems, routine multi-purpose computer networks, standard safety features, and other general purpose systems (e.g., HVAC, electrical generation and distribution systems, toxic waste removal systems, and telecommunications equipment).
- General purpose platforms or environment; this category may include (but is not limited to) general purpose fixed or non-fixed structures or manned vehicles whose role is to host or transport an instrument.
- Instrumentation used primarily for science and engineering education courses; other programs at NSF (e.g., the Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES) program -

) provide funding for the development of exemplary courses and teaching practices, including instrumentation to support such projects.

Proposals seeking support for the above items/activities are subject to return without review (if noncompliance is established prior to review) or decline (if noncompliance is established as a result of the merit review).

B. Eligible Fields of Science and Engineering

Proposals for a major research instrument will be considered for all NSF-supported fields of science, mathematics, and engineering. Researchers using this instrument need not be supported by NSF or the Federal government.

The program will not provide support for instrumentation to be used in medical education (such as medical school courses). Instrumentation intended for research with disease-related goals, including work on the etiology, diagnosis or treatment of physical or mental disease, abnormality, or malfunction in human beings or animals, is normally not supported. Instrumentation for research on animal models of such conditions or the development or testing of drugs or other procedures for their treatment also is not eligible for support. However, instrumentation for bioengineering research, with diagnosis- or treatment-related goals that applies engineering principles to problems in biology and medicine, while also advancing engineering knowledge, is eligible for support. Instrumentation for bioinformatics, biocomputing and bioengineering research to aid persons with disabilities also is eligible.

III. AWARD INFORMATION

Proposals submitted in response to this program solicitation will be competing for about $90 million, depending on availability of funds and quality of proposals.

Proposals that request funds from NSF in the range $100,000-$4 million will be accepted from all eligible organizations. Proposals that request funds from NSF less than $100,000 will also be accepted from all eligible organizations for the disciplines of mathematics or social, behavioral and economic sciences and from non-Ph.D.-granting institutions of higher education for all NSF-supported disciplines.

Proposers may request an award period up to three years for acquisition proposals and up to five years for development proposals. The anticipated earliest starting date is August 01 in the year of the proposal's submission.

IV. ELIGIBILITY INFORMATION

Who May Submit Proposals:

Proposals may only be submitted by the following:

- Organizations that may apply for the MRI program:

  Submission Eligibility

  Proposals may only be submitted by domestic (United States) organizations located in the United States, its territories or possessions, as follows:

  1. Institutions of higher education (Ph.D.-granting and non-Ph.D.-granting), acting on behalf of their faculty members, that are accredited in and have a campus in the United States, its territories or possessions. Distinct academic campuses (e.g., that award their own degrees, have independent administrative structures, admissions policies, alumni associations, etc.) within multi-campus systems qualify as separate submission-eligible institutions.

  2. Not-for-profit, non-degree-granting domestic U.S. organizations, acting on behalf of their employees, that include (but are not limited to) independent museums and science centers, observatories, research laboratories, professional societies, and similar organizations that are directly associated with the Nation's research or educational activities. These organizations must have an independent, permanent administrative organization (e.g., an office of sponsored research) located in the United States, its territories or possessions, and have 501(c)(3) tax status.

  3. To facilitate access to unique instrumentation for a broad user base of U.S. scientists and engineers, and to encourage collaboration and sharing of state-of-the-art instrumentation, the MRI program accepts proposals from consortia of organizations. Consortium proposals may be submitted as follows:

  3a. Legally incorporated, not-for-profit consortia including two or more submission-eligible organizations as described in items (1) and (2) above may submit proposals on behalf of the consortium. The cover sheet must clearly indicate the consortium nature of the proposal in the title. Such a consortium is one with an independent administrative structure (e.g., an office of sponsored research) located in the United States, its territories or possessions and 501(c)(3) status.

  3b. Submission-eligible organizations as described in items (1) and (2) above may submit proposals on behalf of other consortia. The cover sheet must clearly indicate the consortium nature of the proposal in the title, and it must identify a PI and co-PI(s) from at least two MRI submission-eligible organizations participating in the consortium. These consortium proposals may also include as partners U.S. organizations that are not eligible to submit MRI proposals.

  4. Commercial U.S. organizations, especially small businesses with strong capabilities in scientific or engineering research or education, are eligible for instrument development support only through subawards as private sector partners with submitting organizations; they may not submit proposals. Such partnerships must be substantive and meaningful, and build capacity for instrument development within MRI submission-eligible organization(s). Title to the resulting instrument should be retained by the submitting organization(s). Commercial organizations must be based in the United States, its territories or

possessions.

Prospective PIs may contact the cognizant MRI program officers regarding organizational eligibility, and for information on other NSF funding opportunities for instrumentation; see also Section IX for a list of related NSF programs for research instrumentation.

Additionally:

- **MREFC-related Proposals:** The MRI program will not accept proposals for an instrument that augments an NSF Major Research Equipment and Facilities Construction (MREFC) project if that project is not receiving operations funding outside of the MREFC account.
- **FFRDC-related Proposals:** Proposals for the acquisition or development of an instrument to be located at a facility of another Federal agency or one of their Federally Funded Research and Development Centers (FFRDCs) must be submitted as a consortium proposal by an MRI submission-eligible organization as described in item 3(b) above. The proposal must include the facility/FFRDC (or its managing organization) as a partner in the consortium, even if the role of the FFRDC in the project is solely to house the instrument. The instruments must make unique contributions to the needs of researchers elsewhere or establish access to new multi-user facilities. The current list of FFRDCs can be found at: http://www.nsf.gov/statistics/ffrdclist/. Preliminary inquiry to the cognizant MRI point of contact should be made before preparing a proposal for submission.

Organization Categories

All MRI eligible organizations belong to one of the following three categories:

A. *Ph.D.-granting institutions of higher education* are accredited colleges and universities that have awarded more than 20 Ph.D.s or D.Sci.s in all NSF-supported fields during the combined previous two academic years. Additionally, any organization that awards Ph.D. or D.Sci. in NSF-supported fields is considered to be a Ph.D.-granting institution if the only degrees it awards in NSF-supported fields are post-Bachelor's degrees.

B. *Non-Ph.D.-granting institutions of higher education* are accredited colleges and universities (including two-year community colleges) that award Associate's degrees, Bachelor's degrees, and/or Master's degrees in NSF-supported fields, but have awarded 20 or fewer Ph.D./D.Sci. degrees in all NSF-supported fields during the combined previous two academic years.

C. *Non-degree-granting organizations* are those that do not award Associate's degrees, Bachelor's degrees, Master's degrees, and/or Ph.D.s or D.Sci.s. Non-degree-granting organizations also include institutions of higher education that award all of their degrees outside of NSF-supported fields.

Please review NSF's Guide to Programs for NSF-supported fields of science, mathematics and engineering at http://www.nsf.gov/funding/browse_all_funding.jsp.

Who May Serve as PI:

There are no restrictions or limits.

Limit on Number of Proposals per Organization:

Three (3) as described below.

If three proposals are submitted, at least one of the proposals must be for instrument development (i.e., no more than two proposals may be for instrument acquisition).

To ensure a balanced instrumentation award portfolio at diverse organizations, across varied research topics, and in support of a broadly inclusive science and engineering workforce across the entire Nation, the MRI program requires that an MRI-eligible organization may, as a performing organization, submit or be included as a significantly funded [1] subawardee in no more than three MRI proposals. To promote instrumentation development, the program requires that if an organization submits or is included as a significantly funded[1] subawardee in three MRI proposals, at least one of the three proposals must be for (Track 2) instrument development.

NSF reserves the right to carefully examine development (Track 2) proposals to ensure that they meet the requirements for this proposal type (see Section II). If a proposal submitted as development is deemed to be an acquisition proposal either before or during the review, the proposal is subject to return without review or decline.

[1]An unfunded collaboration does not count against the submission limit. Inclusion as a funded subawardee on a development (Track 2) proposal at a level in excess of 20% of the total budget request from NSF, or as a funded subawardee on any acquisition (Track 1) proposal, will be counted against an organization's proposal submission limit. Separately submitted linked collaborative proposals of either type (Track 1 or Track 2) count against the submission limit of each of the submitting organizations. However, if a subaward to an organization in a *development (Track 2) proposal* is 20% or less of the proposal's total budget request from NSF, the subawardee's submission limit will not be affected. For subawards within a linked collaborative proposal, the 20% threshold applies to the budget request from NSF in the proposal containing the subaward(s), not to the combined budget request from NSF for the collaborative project.

Note: The 30% cost-sharing requirement applies to only the portion of the total project cost budgeted to non-exempt organization(s), including those participating through subawards. When required, cost-sharing must be precisely 30%. Cost sharing is required for Ph.D.-granting institutions of higher education and for non-degree-granting organizations. Non-Ph.D.-granting institutions of higher education are exempt from cost-sharing and cannot provide it. National Science Board policy is that voluntary committed cost sharing is prohibited. See section V.B. for specific information on cost-sharing calculations and the solicitation text for definitions of organizational types used for the MRI program.

Limit on Number of Proposals per PI or Co-PI:

There are no restrictions or limits.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

Important Proposal Preparation Information: FastLane will check for required sections of the full proposal, in accordance with *Grant Proposal Guide* (GPG) instructions described in Chapter II.C.2. The GPG requires submission of: Project Summary; Project Description; References Cited; Biographical Sketch(es); Budget; Budget Justification; Current and Pending Support; Facilities, Equipment & Other Resources; Data Management Plan; and Postdoctoral Mentoring Plan, if applicable. If a required section is missing, **FastLane will not accept the proposal.**

Please note that the proposal preparation instructions provided in this program solicitation may deviate from the GPG instructions. If the solicitation instructions do not require a GPG-required section to be included in the proposal, insert text or upload a document in that section of the proposal that states, "Not Applicable for this Program Solicitation." Doing so will enable FastLane to accept your proposal.

Please note that per guidance in the GPG, the Project Description must contain, as a separate section within the narrative, a discussion of the broader impacts of the proposed activities. Unless otherwise specified in this solicitation, you can decide where to include this section within the Project Description.

___**1**. **Cover Sheet**

FastLane Users: Select this MRI program solicitation number from the pull down list. Where asked to identify the NSF Unit of Consideration, select the most appropriate Division within an NSF Directorate or the most appropriate Office to consider your proposal. "Major Research Instrumentation" will be automatically selected as the program for your proposal. Selection of more than one unit for consideration may facilitate review of multi-/cross-/inter-/trans-disciplinary efforts when two or more research areas are significantly involved (PIs are especially encouraged to submit a list of suggested reviewers, as a *Single-Copy Document,* for these types of proposals - see the GPG or NSF Grants.gov Application Guide for additional information).

Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration. Select "Major Research Instrumentation" as the program for your proposal. Please note that simultaneously submitted collaborative applications must be submitted via FastLane as Grants.gov does not currently support this functionality.

The project title must be concise and convey the primary purpose of the proposal, e.g., "MRI: Acquisition of ____," or "MRI: Development of ____." Consortium project titles must also be identified in the title: "MRI Consortium: Acquisition of ___," or "MRI Consortium: Development of ___."

NSF proposals identify only a single PI and up to four co-PIs with those titles. For the purposes of the MRI program, other major participants may be indicated as "senior personnel." Please see the GPG for guidance on the inclusion of senior personnel.

Note: NSF reserves the right to assign proposals to programs that are deemed to be the most appropriate for review. PI selection of Divisions and/or Offices is advisory to NSF.

___**2. Project Summary** (maximum length, 1 page).

Each proposal must contain a summary of the proposed project not more than one page in length. The Project Summary consists of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity.

___**3**. **Project Description** (maximum length, 15 pages, including all figures and charts). The project description must include subsections (a)-(e), and address the intellectual merits and broader impacts of the proposed effort per GPG or NSF Grants.gov Application Guide guidelines. Suggested lengths for individual subsections are provided for guidance only.

a. **Information about the Proposal**

a1. Instrument Location and Type (included as part of the overall Project Description page limit).

- Indicate in a single separate line the physical location of the proposed instrument as follows, Instrument Location: _____. **Note:** Instruments to be deployed in the field may require additional information to assess compliance with any applicable laws such as the National Environmental Policy Act, National Historic Preservation Act, and Endangered Species Act.
- Additionally, the following information is requested *solely* to assist the MRI program in tracking and reporting on the most common, broad types of instruments the program has funded. The categories below do not represent a list of MRI-eligible instruments and the information provided has no bearing on proposal acceptance or proposal funding decisions. On a single separate line, using the codes below (and also available at http://www.nsf.gov/od/iia/programs/mri), please indicate the instrument type as follows, Instrument Code: _____.

CODE	MRI INSTRUMENT CATEGORY	EXAMPLES
MRI-21	Microscopes	Light, Electron, Scanning Probe Microscopes
MRI-24	Spectrometers	Spectrum and Protocol Analyzers, Mass, NMR, Other Spectrometers
MRI-29	3D Imaging Systems	Tomography Systems, X-ray Diffractometers, Functional MRI systems
MRI-31	Cyberinstrumentation	Computation/Data Intensive/Visualization Systems
MRI-34	Nano/Micro-fabrication	Lithography/Patterning, Thin Film Deposition Tools
MRI-39	Testbeds	Including Data Clusters
MRI-41	Genome Sequencers	
MRI-44	Wet Lab Instruments	Bio Assay / Chemical Assay / Chromatography / Sorting / Separation Instruments
MRI-49	Telescopes/Detectors	Telescopes, CCDs, IR Arrays, Spectrographs
MRI-51	Remote/Autonomous Sensors	Distributed Environmental Sensor Networks, Remote Sensing (radar, sonar, etc.) Instruments
MRI-54	Motion/Eye Tracking	
MRI-59	Structural Deformation Sensor Systems	
MRI-61	Sub-atomic Particle Detector/Array	
MRI-64	Bulk Property Measurement	
MRI-69	Particle Image Velocimetry	
MRI-71	Other	Robots, Robot Swarms

a2. *ONLY REQUIRED FOR TRACK 2 PROPOSALS:* Justification for submission as a Development (Track 2) proposal (suggested length: up to 1 page). Section II.A.2 ("MRI Program Scope") describes characteristics of acquisition (Track 1) and development (Track 2) proposals. In this section of the Project Description you must justify your selection of a Track 2 submission by describing the characteristics that qualify your proposal as a development proposal.

For development (Track 2) proposals, explicitly address the questions below. In all cases briefly explain as appropriate.

- Is the end result of the effort a stable shared-use instrument, rather than technology development, a device, a product or a technique?
- Does the instrument provide significant new capabilities not available from an instrument provided by a vendor?
- Does the instrument development effort build capacity for such activities in an MRI submission-eligible organization(s)?
- Does the instrument development require design work that must be undertaken/has been undertaken in-house, rather than through published designs in the literature?
- Does the instrument development require/benefit from a team of scientists/engineers/technicians that bring a variety of skills to the project?
- Does the instrument development require a significant number of person-hours, more so than simple "assembly" of purchased parts?
- Does the instrument development require timeframes for completion that are longer than are required for plug-and-play or assembled instruments?
- Does the instrument development require the use of a machine shop or a testbed to fabricate/test unique components?
- Does the instrument development effort have potential risks in achieving the required specifications, and hence requires a risk mitigation plan?

Although all of the above may not be required to qualify for a Track 2 proposal, the more of these characteristics that apply, the more solidly the effort fits as a development effort (even if there is substantial acquisition of component parts).

NSF staff and/or reviewers will use this section to evaluate the appropriateness of your proposal for submission as acquisition (Track 1) or development (Track 2). Proposals submitted as development (Track 2), but deemed to be acquisition (Track 1) or otherwise inappropriate for Track 2 submissions are subject to return without review (if noncompliance is established prior to review) or decline (if noncompliance is established as a result of the merit review).

b. Research Activities to be Enabled (suggested length: up to 9 pages for instrument acquisition; up to 4 pages for instrument development). Describe the research and research training activities and projects that will be enabled with the desired instrumentation, and any sources that may support those activities and projects. Researchers using this instrumentation need not be supported by NSF or the Federal government, but reviewers should understand how users of the instrument will support and disseminate their research. In narrative or tabular form describe the personnel by research area, number, and type (e.g., senior personnel, postdoctoral fellows, graduate students, undergraduate students). Include only those who will most actively use the instrumentation for research and research training on a regular basis. Other more minor users of the instrument, when applicable, should be described in a more condensed format.

This section must also include "Results from Prior NSF MRI Support" if the PI or any of the co-PIs have participated as PIs or co-PIs in NSF MRI awards within the past five-year period. This section also should include information on the operations and maintenance, downtime and usage history on the previously funded instrument. If the PI or co-PIs have not participated as PIs or co-PIs in NSF MRI awards within the past five-year period, standard GPG reporting requirements for "Results from Prior NSF Support" should be followed with preference given to a discussion of any instrumentation awards. Please see the GPG or NSF Grants.gov Application Guide for additional guidance on information that must be provided.

c. *Description of the Research Instrumentation and Needs* (Suggested length: up to 2 pages for instrument acquisition; up to 6 pages for instrument development).

An acquisition proposal should include a technical description of the requested instrumentation, including manufacturer and model number where appropriate. This section should clearly explain why the requested equipment is needed. The existence and availability of comparable instrumentation (at organizations in close geographical proximity, or otherwise accessible through collaborations or cyberinfrastructure) should be outlined in the Facilities, Equipment & Other Resources - see Section 8 below.

For a proposal to develop an instrument, present the rationale for the new instrument, the design concept, and the development strategy and methods in sufficient detail to allow for the evaluation of its technical feasibility. Reviewers must be able to evaluate the expected capabilities of the instrument upon completion, and its likely availability for shared use at the end of the award period. Provide appropriate preliminary results from existing equipment, or appropriate calculations and/or models to indicate the added utility or enhanced performance (e.g., reliability, 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 instruments that are currently available.

For any proposal that purports to represent an integrated research instrument, explain how the acquisition or development effort meets the MRI guidance for an integrated instrument.

Proposals involving large collaborations should describe the importance and priority of the requested instrument in the overall efforts being undertaken by the collaboration. A supplemental document (see Section V.A.9.g) confirming the priority is encouraged.

d. *Impact on Research and Training Infrastructure* (suggested length: up to 2 pages). Describe how the instrument will serve to attract researchers and make a substantial improvement in the institution's capabilities to conduct leading-edge research. Describe how the instrument will improve the quality of student education, research and research training. Any proposal requesting direct student support in operations and maintenance or development efforts must justify that involvement in terms of both project needs and the training of the next generation of instrumentalists (reviewers will be asked to evaluate the appropriateness of this type of involvement). Proposals should also address how the instrumentation will broaden the participation in science and engineering research by women, underrepresented minorities, and persons with disabilities.

Proposals requesting over $1 million should address the potential impact of the instrument on the research community of interest and at the regional or national level when appropriate. For large multi-user instruments that provide service beyond a single institution, concrete plans for enabling access by external users (including those from non-Ph.D. and/or minority-serving institutions) through physical access and/or cyberinfrastructure should be presented, and the uniqueness of the requested instrumentation should also be described.

e. *Management Plan* (suggested length: up to 2 pages for instrument acquisition; up to 2 pages for instrument development). To be considered by the MRI program, all proposals *must* include a management plan, as outlined below.

Instrument acquisition proposals (Track 1). Given the relatively high operations and maintenance costs of major research instrumentation, investigators seeking support for such instrumentation *must* provide detailed business and management plans with information on space, technical staffing for operations and maintenance, training of users, access for external users, and the sources of funding and plans for long-term operations and maintenance, including:

- Describe the facility in which the instrument will be placed.
- Specify how and by whom the requested instrumentation will be operated and maintained (both during the award period and longer-term). Inclusion of a letter documenting the performing organization's commitment to operations and maintenance is required as a supplemental document.
- Describe the anticipated costs and the technical expertise needed to maintain and operate the instrument. If the expertise is not currently available, describe how it will be obtained.
- Describe procedures for allocating the instrument time, if appropriate, and describe plans for attracting and supporting new users. Include information on anticipated usage and downtime.

Sufficient detail should be given to enable reviewers to evaluate whether the project includes appropriate technical expertise and infrastructure to allow effective usage of the instrument by the end of the award period, as well as facilitate multi-user accessibility.

Instrument development proposals (Track 2). Given the often complex nature of instrument development efforts, investigators seeking support for such an instrument *must* provide detailed management plans for the design, construction and commissioning phases of the project, including discussion of required personnel and anticipated costs in each phase of the project, risk mitigation, and knowledge transfer upon completion, including:

- Describe the design, construction and commissioning phases of the project, including the work breakdown structure of the project activities (i.e., activities broken into tasks). Include a description of parts and materials, the estimated deliverables, associated timelines and the anticipated cost of each activity.

Describe the technical expertise that is needed, and that will be available, to execute each activity. Describe the organization of the project staff and methods of assessing performance. For each member of the team, include a description of the responsibilities and explain why a given position is necessary for the completion of the design and construction of the new instrument.

- Assess the risks associated with each activity and describe potential methods for mitigating the risks, and for re-analyzing and modifying the project plan to keep it within scope, schedule and budget.
- Include plans for making the instrument design readily available to other researchers, for example by means of publications, by transferring the technology to other U.S. academic, industrial, or government laboratories, and/or by commercializing the instrument.
- Include plans for the long-term operations and maintenance of the instrument, including procedures for allocating time on the instrument if appropriate. Describe plans for attracting and supporting new users and information on anticipated usage and downtime if appropriate. Inclusion of a letter documenting the performing organization's commitment to operations and maintenance is required as a supplemental document.

Sufficient detail should be provided to allow reviewers to analyze the likely success, cost and benefit of the development effort.

Note: Proposals for the acquisition or development of an instrument to be located at an organization other than, or away from, the submitting organization must describe the rationale for performance of all or part of the project at the specified location(s) and provide, if appropriate, a (one-page maximum) supplementary document providing the host organization's commitment to house the instrument. For the purposes of this solicitation, use of instruments at NSF's Antarctic facilities is considered to be field deployment and a supplementary document from the host facility is not required. Please see the GPG for additional requirements for specifying the Project/Performance Site Primary Location.

___**4**. **References Cited**. The format must follow the guidelines as given in the GPG or NSF Grants.gov Application Guide.

___**5**. **Biographical Sketches**. The proposal must include two-page biographical sketches of the PI and any Co-PI(s) (i.e., those personnel listed on the cover sheet), as well as any designated senior personnel (see Section V.A.1) who are major users/developers of the relevant research instrumentation. If applicable, also provide a separate biographical sketch of the individual responsible for the management of the instrument. *These are the only Biographical Sketches that are allowed.* The format for biographical sketches should follow the guidelines as given in the GPG or NSF Grants.gov Application Guide.

___**6. Budget and Budget Justification.** Provide yearly and cumulative budget pages, listing those eligible project costs that NSF is being asked to fund. *The cumulative amount requested represents NSF's contribution to the total project cost (TPC) and does not include the organization's cost sharing (when required).* The total project cost should be clearly stated in the budget justification (which must not exceed three pages) and **must be itemized in table form using the following template (with the number of entries utilized as appropriate)** that, as appropriate, assigns funding to the request from NSF or (when necessary) the organization's MRI-eligible cost-sharing.

	ITEM	YEAR 1		YEAR 2		YEAR 3		YEAR 4		YEAR 5		TOTAL	
		NSF Request	Cost Sharing	NSF Request	Cost Sharing	NSF Request	Cost Sharing	NSF Request	Cost Sharing	NSF Request	Cost Sharing	NSF Request	Cost Sharing
1		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
2		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
3		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
4		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
5		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
6		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
7		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
8		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
9		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
10		$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	TOTAL	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	*$0*	*$0*

The Total Project Cost (TPC) is the sum of the last two cells in the last two columns in the last row.

All budget items (including those for operations and maintenance in acquisition proposals and personnel support in development proposals) must be well-justified and commensurate with the scale and complexity of the instrument and/or development effort.

The budget justification must explain the basis of the cost estimate. When cost sharing is required, specify the sources and amounts of the cost-sharing funds and a projection of when they will be available. *Note that cost-sharing, when required, is an eligibility requirement, and must come from MRI-eligible non-Federal sources and must occur during the award period. Inclusion of voluntary committed cost sharing is prohibited. See Section V.B. for detailed budgetary information.*

___**7**. **Current and Pending Support**. Provide a listing for only the PI and Co-PIs (i.e., those listed on the cover sheet), as well as designated senior personnel (see Section V.A.1).

___**8**. **Facilities, Equipment, and Other Resources**. Provide a listing of similar and/or related instrumentation at or near the performing organization as "Other Resources."

___**9**. **Supplementary Documents**. For Grants.gov users, supplementary documents should be attached in the R&R Other Project Information Form. *The first page of the Supplementary Documents section should contain a list, in order, of the documents contained in this section.*

Required:

a. For all proposals: For each organization receiving funds, provide **on institutional letterhead from each sponsored research office**, the following statement classifying the organization(s) as either non-Ph.D.-granting, Ph.D.-granting, or non-degree-granting (as defined in Section IV). Statements **must** follow *only* the format indicated below.

To: NSF MRI Coordinator

By signing below I certify that _____(*organization*)_____ is classified as _____(*select one: non-Ph.D.-granting/Ph.D.-granting/non-degree-granting*)_____ as defined in Section IV of the MRI solicitation.

Signed: _____ Print Name:_____

Title of Signatory:_____

Date: _____

_____

Each proposal must contain this statement(s). No other letter(s)/statement(s) classifying the institution type(s) will be permitted.

b. For all proposals: Include a letter documenting the commitment(s) for operations and maintenance of the instrument (during the award period and longer term). This letter (two-page maximum) should also list the MRI awards made to the organization during the previous five years and briefly describe the status of the instrumentation obtained from each award.

c. For all proposals: *All* proposals *must* include a supplementary document of no more than two pages labeled "Data Management Plan". Please see the Grant Proposal Guide for further information.

d. For all proposals. Inclusion of itemized vendor quotes is required for all MRI proposals. Although a proposal might reference and have a quote(s) for a specific make and model, the proposer is reminded that his/her organization's approved procurement processes must be utilized to establish the appropriate item(s) to be purchased.

e. When applicable: Proposals that include subawards (except for development proposals with subawards to institutions that do not exceed 20% of the total amount requested from NSF), must include statements from subawardee sponsored research offices, acknowledging that this proposal is included as part of their submission limit. Otherwise, an organization may exceed its submission limit, with the result that the proposal including the subaward will be returned without review.

f. When applicable: Each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. The mentoring plan must not exceed one page.

g. When applicable: A letter (one-page maximum) documenting the organization's commitment for required cost-sharing, if applicable, must be included.

h. When applicable: If a proposed effort involves a private sector partner, a large collaboration or an organization (as opposed to an individual(s)) serving as a partner, a letter (one page maximum) confirming the participation must be included. Proposals involving large collaborations are encouraged to utilize this letter to document the priority of the requested instrument in the overall efforts being undertaken by the collaboration.

i. When applicable: If the proposal involves organizations other than the submitting organization, list all partners.

j. When applicable: Proposals for the acquisition or development of an instrument to be located at an organization other than the submitting organization must provide a (one-page maximum) supplementary document stating the host organization's commitment to house the instrument. For the purposes of this solicitation, use of instruments at NSF's Antarctic facilities is considered to be field deployment and a supplementary document from the host facility is not required.

Encouraged:

a. Statements from *individuals*, on institutional letterhead, confirming substantive collaboration efforts and/or usage of the instrument may be submitted, but they *must* follow *only* the format indicated below.

To: NSF MRI Coordinator

By signing below I acknowledge that I am listed as a collaborator and/or major user of the instrument on this MRI proposal, entitled "_____(*proposal title)*_____," with _____(*PI name)*_____ as the Principal Investigator. I agree to undertake the tasks assigned to me, as described in the proposal, and I commit to provide or make available the resources therein designated to me.

Signed: _____ Print Name:_____

Date: _____ Institution:_____

_____

The proposal body itself should describe the nature and need for a collaboration, and/or describe the major users and their need for the instrument. Statements of collaboration beyond that specified above, including letters of support/endorsement, are not allowed. Each statement must be signed by the designated collaborator/user. Requests to collaborators for these statements should be made by the PI well in advance of the proposal submission deadline, since they must be included at the time of the proposal submission.

Not Allowed:

a. Statements of collaboration beyond that specified above, including letters of support/endorsement, are not allowed.

b. Impact Statements and Eligibility Statements from the NSF "Research in Undergraduate Institutions" (RUI) program are not allowed; the certification statement indicating the type of performing organization, as defined by the MRI program, is instead required for MRI proposals.

c. Documentation that refers to other proposals being submitted by an organization (e.g., letters indicating which projects were selected through an internal competition) are not allowed.

d. Other documentation not specifically required or encouraged above is not allowed.

___**10**. **Single Copy Documents**

Encouraged:

List of Suggested Reviewers (optional, but encouraged). Proposers are encouraged to submit a list of suggested reviewers (including affiliation) whom they believe are especially well qualified to review the proposal as a "Single-Copy Document"; *this is especially encouraged for multi/inter/trans-disciplinary proposals.* Proposers may also list persons they would prefer not review the proposal, indicating why. Please see the GPG or NSF Grants.gov Application Guide for additional information.

NOTES:

1. The following information applies only for those MRI proposals that will be reviewed in the Office of Polar Programs:

The Office of Polar Programs (OPP) strongly encourages MRI proposals related to all aspects of polar research supported by the Foundation. For any proposals requiring access to the polar regions, investigators must contact appropriate OPP Science Program Officers (http://www.nsf.gov/staff/staff_list.jsp?org=PLR&from_org=PLR) for guidance about submitting information needed to assess logistical support requirements (if any); this (in coordination with the cognizant MRI program officer to ensure MRI compliance) should be done during the proposal preparation stages.

B. Budgetary Information

Cost Sharing: Cost Sharing is required

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 (2 CFR § 215.23). 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 required by the NSF solicitation and 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.

Administrative requirements related to cost sharing may be found in 2 CFR § 215.23, "Cost Sharing or Matching." For additional information on cost principles consult: 2 CFR Part 220, Cost Principles for Educational Institutions (OMB Circular A-21); or 2 CFR Part 230, Cost Principles for Nonprofit Organizations (OMB Circular A-122), as applicable.

Other Budgetary Limitations:

Eligible Project Costs

The amount of the NSF request should be based on the net price of the instrumentation, including all academic discounts and other special purchase arrangements.

a. Acquisition proposals (Track 1): Eligible project costs are limited to instrument purchase, installation, commissioning, and calibration, and the direct and indirect costs of operations and maintenance, and other appropriate technical support during the award period. Requests for operations and maintenance must be justified in terms of the scale and scope of the instrumentation. Salary support, including fringe benefits and indirect costs, is allowed *only* for personnel directly involved in operations and maintenance of the instrument. Any request for personnel must justify the skill level and time commitment of the person responsible for operations and maintenance. Any proposal requesting direct student support in operations and maintenance must justify the involvement in terms of both instrument needs and the training the next generation of instrumentalists – reviewers will be asked to evaluate the appropriateness of this type of involvement. Training costs that are directly related to proper operations and maintenance are eligible, but expenses associated with the training of users are not allowed. Support for research to be conducted with the instrument, outreach, and publication costs are not allowed, nor is travel associated with conferences and/or collaborations.

b. Development proposals (Track 2): Eligible project costs are limited to parts and materials needed for the construction of the instrument, commissioning costs (including relevant operations and maintenance expenses), as well as the direct and indirect costs associated with support of personnel engaged strictly in the instrument development effort. Requests for personnel support must include a description of the responsibilities of the project co-workers and explain why a given position is necessary for the completion of the design, construction and commissioning of the new instrument. Any proposal requesting direct student support in development efforts must justify the involvement in terms of both project needs and training the next generation of instrumentalists – reviewers will be asked to evaluate the appropriateness of this type of involvement. Sufficient detail should be given to allow reviewers to analyze the cost of the new technology. Support for research to be conducted using the instrument *after* commissioning, along with long term operations and maintenance, is not allowed. Travel costs that are integral to the development work are eligible expenses, but travel associated with conferences and training is not allowed.

Note: A supplementary Data Management Plan is required for all NSF proposals submitted after January 18, 2011. The intent is to ensure that awards conform to NSF policy on the dissemination and sharing of research results, which provides that investigators are expected to share with other researchers, at no more than incremental cost and within a reasonable amount of time, the primary data, samples, physical collections, software, curriculum materials, and other supporting materials created or gathered in the course of work under NSF grants. As a result MRI eligible expenses include incremental costs associated with the implementation (but not the operation) of this plan.

Checklist

____ Is the subject matter appropriate for the MRI program? Refer to Section II.A for General Information on the MRI program.

____ Is the subject matter appropriate for NSF? Refer to Section II.B: Eligible Fields of Science and Engineering.

____ Is the performing organization adhering to the proposal submission limit? Refer to Section IV.

____ Are font sizes and margins consistent with the Grant Proposal Guide?

____ **Cover Sheet** (Refer to Section V.A: Full Proposal Preparation Instructions):

    ___ Is the proposal properly identified as " MRI:Acquisition", " MRI:Development", " MRI Consortium:Acquisition", or " MRI Consortium:Development" on the Cover Sheet?

    ___ If the instrument is to be placed at a facility of another Federal agency or one of their FFRDCs, has the proposal been properly structured and identified as a Consortium proposal?

____ **Project Summary** (Refer to Section V.A: Full Proposal Preparation Instructions):

    ___ Is the Project Summary 1 page or less in length?

    ___ Does the Project Summary consist of an overview, a statement on the intellectual merit of the proposed activity, and a statement on the broader impacts of the proposed activity?

____ **Project Description** (Refer to Section V.A: Full Proposal Preparation Instructions):

___ Is the Project Description 15 pages or less in length, and does it also address both Intellectual Merit and Broader Impacts?

___ When appropriate, does Section a2 of the Project Description clearly convey that the proposal is for instrument development (Track 2)?

___ Has the location of the instrument been identified and explained?

___ Are Results from Prior MRI Support, if applicable, addressed?

___ Has an adequate management plan been included in a separate section?

____ **Budget:** (Refer to Section V.B on Budgetary Information):

___ Are all of the items in the budget eligible costs?

___ Is the magnitude of the budget request consistent with the solicitation and the proposed project?

___ Is a subaward included as part of the proposal? If yes, has the amount of the subaward been included in the Budget Pages, and has a separate subaward budget been included? If applicable, is there a statement from the subawardee sponsored research office certifying that this proposal is included in the organization's proposal limit?

____ **Is cost-sharing required?**

___ If yes, is the correct amount (precisely 30% of the total project cost, *not* 30% of the NSF request) listed in the Budget Pages?

___ If yes, is there a letter (one-page maximum) of commitment from the organization, included in the supplemental documentation, confirming the source and availability of funds?

____ **Supplemental Documents:** Refer to Section V.A: Proposal Preparation Instructions.

__ Has a (up to two pages) Data Management Plan been included?

__ Is there a template-provided statement(s) indicating the type (Ph.D.-granting institution of higher education, non-Ph.D.-granting institution of higher education, or non-degree-granting organization) of each performing organization, including subawardees?

__ Is there a (two-page maximum) letter that documents the organization's commitment for operation and maintenance of the instrument, and also includes a list and status of the MRI awards made to the organization during the previous five years?

__ Have vendor quotes been provided?

__ If applicable, is a postdoctoral mentoring plan included?

__ Is the proper format of any included statements of collaboration followed?

__ Has *only* required or encouraged supplemental documentation been included?

__ Have all subawardees (when applicable) included statements acknowledging that this proposal is included in their submission limit?

____ **Single Copy Documents**

__Is an optional, but encouraged, list of suggested reviews included?

Proposals must meet administrative and technical requirements to be accepted for the MRI competition. The following are some key reasons for Return without Review:

- **Proposals that contain an empty Data Management Plan.**
- **Proposals that do not contain, as supplemental documents, a signed statement from each sponsored research office (including subawardees) classifying the performing organization as either non-Ph.D.-granting, Ph.D.-granting, or non-degree-granting; see Section IV for definitions of organization type as used by the MRI program.**
- **Applicable proposals that do not indicate appropriate levels of cost-sharing, including required documentation demonstrating organizational cost-sharing commitment (Sections V.A and V.B). Cost-sharing at the level of 30% of the total project cost is required for Ph.D.-granting institutions of higher education and for non-degree-granting organizations. Only non-Ph.D.-granting institutions of higher education are exempt from the cost-sharing requirement. Please see Section IV for definitions of organization types as used by the MRI program.**
- **Proposals that do not contain the Project Summary, including an overview and separate statements on intellectual merit and broader impacts will not be accepted by FastLane or will be returned without review.**
- **Proposals that do not clearly justify submission as development (Track 2) proposals.**
- **Proposals requesting funding to support postdoctoral researchers that do not include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. The mentoring plan must not exceed one page;**
- **Proposals describing activities that fall outside of the scope of those supported by the MRI program (Section II.A).**
- **Proposals describing activities that fall outside of the scope of those supported by NSF (Section II.B).**
- **Proposals that exceed an organization's submission limit (Section IV).**
- **Proposals to place an instrument at a facility of another Federal agency or one of their FFRDCs that are not submitted by consortia (Section IV).**
- **Proposals for instruments that augment the scope of an NSF Major Research Equipment and Facilities Construction (MREFC) project that is not receiving operations funding outside of the MREFC account (Section IV).**
- **Proposals that do not contain required supplemental documentation, or that contain supplemental documentation other than those required and/or encouraged by the MRI program (as prescribed in Section V.A) and by the Grant Proposal Guide(GPG).**
- **Proposals that do not conform to font, margin and page limitations.**
- **Proposals that do not contain a Management Plan in the Project Description (Section V.A).**
- **Applicable proposals that do not contain "Results from Prior MRI Support" or (if there is no Prior MRI Support) results from other NSF support in the Project Description (Section V.A).**

C. Due Dates

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

    February 21, 2013

    January 23, 2014

    Fourth Thursday in January, Annually Thereafter

D. FastLane/Grants.gov Requirements

For Proposals Submitted Via FastLane:

To prepare and submit a proposal via FastLane, see detailed technical instructions available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www.grants.gov/web/grants/applicants.html. In addition, the NSF Grants.gov Application Guide (see link in Section V.A) provides instructions regarding the technical preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

Proposers that submitted via FastLane are strongly encouraged to use FastLane to verify the status of their submission to NSF. For proposers that submitted via Grants.gov, until an application has been received and validated by NSF, the Authorized Organizational Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: http://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- **Intellectual Merit:** The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- **Broader Impacts:** The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
    a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
    b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

Additional Solicitation Specific Review Criteria

Within the evaluation criteria stated above, MRI program reviewers will assess the following:

All Proposals.

- The extent to which the proposed project will make a substantial improvement in the institution's capabilities to conduct leading-edge research, to provide research experiences for undergraduate students using leading edge-facilities, and to broaden the participation in science and engineering research by women, underrepresented minorities and persons with disabilities.

Instrument Acquisition Proposals.

- The extent of shared use of the instrumentation for research and/or research training.
- Whether the management plan includes sufficient infrastructure and technical expertise to allow effective usage of the instrument; and provides the organization's commitments for operations and maintenance.
- Whether the request for operations and maintenance is justified and reasonable in magnitude. If direct support for student involvement in operations and maintenance is requested, reviewers will be asked to evaluate the involvement in terms of both instrument needs and training the next generation of instrumentalists.
- Plans for using the new or enhanced research capability in research and research training.
- For instrument acquisition proposals of $1 million or above, proposals should address the potential impact of the instrument on the research community of interest and at the regional or national level when appropriate.

Instrument Development Proposals:

- The appropriateness of submission as a development (Track 2) proposal.
- The adequacy of the management plan. Does the plan have a realistic, detailed schedule? Are mechanisms in place to deal with potential risks?
- The availability of appropriate technical expertise to design and construct the instrument. If direct support for student involvement in development efforts is requested, reviewers will be asked to evaluate the involvement in terms of both project needs and training the next generation of instrumentalists.
- The appropriateness of the cost of the new technology.
- The need for development of a new instrument. Will the proposed instrument enable enhanced performance over existing instruments, or new types of measurement or information gathering? Is there a strong need for the new instrument in the larger user community?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

Reviewers will be asked to evaluate proposals using two National Science Board approved merit review criteria and, if applicable, additional program specific criteria. A summary rating and accompanying narrative will be completed and submitted by each reviewer. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF strives to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. Large or particularly complex proposals or proposals from new awardees may require additional review and processing time. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director acts upon the Program Officer's recommendation.

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. After an administrative review has occurred, Grants and Agreements Officers perform 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.

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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 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.B. for additional information on the review process).

B. Award Conditions

An NSF award consists of: (1) the award notice, 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 notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is

contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). Within 90 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the NSF *Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at
http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

The following topics should be addressed in all MRI annual and final project reports:

For Instrument Acquisition Proposals

- Status of order, delivery, and installation;
- Brief description of research projects that were enabled by the instrument;
- Number of students with hands-on experience, to include demographic information (indicate undergraduate or graduate, gender, ethnicity/race, disability, major). Note: provide percentages for demographic data; do NOT identify specific students by ethnicity, race or disability status;
- A list of the research groups granted access and the titles of the research and institutional affiliation, to include both on-campus and outside users;
- Data on usage and downtime;
- A short description of the management plan, noting deviations from the plan as described in the proposal;
- Changes in sources and/or scheduling of cost-sharing;
- Description of setbacks and resulting change of plans; and
- Information on broader impacts activities to date.

For Instrument Development Proposals

- Status of development effort to date;
- Number of student participants, to include demographic information (indicate undergraduate or graduate, gender, ethnicity/race, disability, major). Note: provide percentages for demographic data; do NOT identify specific students by ethnicity, race or disability status;
- Information on broader impacts activities to date;
- New industrial partnerships;
- Technology transfer (e.g., design and/or instrument);
- A short description of the management plan, noting deviations from the plan as described in the proposal;
- Changes in sources and/or scheduling of cost-sharing;
- Description of setbacks and resulting change of plans; and
- Modifications in timeline.

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Stephen P. Meacham, telephone: (703) 292-7599, email: smeacham@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

Additional contact information for NSF's Major Research Instrumentation Program is as follows:

    Office of International and Integrative Activities
    Major Research Instrumentation Program
    National Science Foundation, Room 935
    4201 Wilson Boulevard
    Arlington, VA 22230

(703) 292-8040

E-Mail: mri@nsf.gov

Website: http://www.nsf.gov/od/iia/programs/mri

IX. OTHER INFORMATION

The NSF website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this website by potential proposers is strongly encouraged. In addition, "NSF Update" is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. "NSF Update" also is available on NSF's website at https://public.govdelivery.com/accounts/USNSF/subscriber/new?topic_id=USNSF_179.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

RELATED NSF PROGRAMS FOR RESEARCH INSTRUMENTATION (*current at the time of publication*)

CROSSCUTTING: Improvements in Facilities, Communications, and Equipment at Biological Field Stations and Marine Laboratories (FSML) (NSF 12-505)

CROSSCUTTING: High Performance Computing System Acquisition: Towards a Petascale Computing Environment for Science and Engineering (NSF 11-511)

BIO: Instrument Development for Biological Research (IDBR) (NSF 10-563)

CISE/CNS: Computing Research Infrastructure (CRI) (NSF 11-536)

ENG: Small Business Innovation Research Program Phase I (SBIR/STTR) (NSF 12-605)

GEO/EAR: Earth Sciences: Instrumentation and Facilities (EAR/IF) (NSF 11-544)

GEO/OCE: Oceanographic Centers and Facilities: Oceanographic Instrumentation (NSF PD 98-5410)

GEO/OCE: Oceanographic Technology and Interdisciplinary Coordination Program (OTIC) (NSF PD 98-1680)

MPS/AST: Advanced Technologies and Instrumentation (ATI)

OCI: Strategic Technologies for CyberInfrastructure (NSF PD 11-7684)

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 55,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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**   (703) 292-5111
  (NSF Information Center)**:**

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**

  Send an e-mail to: nsfpubs@nsf.gov

  or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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