Chemistry Research Instrumentation and Facilities: Departmental Multi-User Instrumentation (CRIF:MU)

PROGRAM SOLICITATION
NSF 09-546

REPLACES DOCUMENT(S):
NSF 08-539

National Science Foundation

Directorate for Mathematical & Physical Sciences
   Division of Chemistry

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

June 23, 2009

Fourth Tuesday in June, Annually Thereafter

June 22, 2010

Fourth Tuesday in June, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 11-1, was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in NSF 11-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 18, 2011, must also follow the guidelines contained in NSF 11-1.

Cost Sharing: The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG)* Chapter II.C.2.g(xi) for further information about the implementation of these recommendations.

Data Management Plan: The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Postdoctoral Researcher Mentoring Plan: As a reminder, 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. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Revision Notes:

There have been a number of clarifications and updates to the CRIF:MU solicitation, including the following:

A list of common issues that may result in a proposal being **Returned without Review** has been added (see below). PIs are encouraged to look at this section carefully;

The maximum number of CRIF:MU proposals allowed is now one per institution.

The maximum request per award for instrument acquisition remains at $500,000 but the maximum amount for personnel associated with cyber-enhanced projects is $100,000 over the cost of the instrumentation. This value of $100,000 includes indirect costs. Therefore, the maximum award will be for a net value of $600,000 (Section III);

A specific template has been provided that *must* be used when including statements from collaborating institutions (Section V.A). Statements of collaboration beyond that specified, including letters of support/endorsement are not allowed;

Proposals must meet administrative and technical requirements to be accepted by the CRIF:MU program. The following are some key reasons for Return without Review:

Proposals describing activities that fall outside of the scope of those generally supported by the Chemistry Division and the CRIF program (Section II);

Proposals that exceed an organization's submission limit of one (Section IV);

Proposals that represent standard research projects that do not support shared use of the instrumentation for research and research training (Section VI);

Proposals that request instrumentation with only a small research component and those to be used primarily for standard chemistry

courses; (Other programs at NSF (e.g., the Course, Curriculum, and Laboratory Improvement program, CCLI) provide funding for the development of exemplary courses and teaching practices, including instrumentation to support such projects.)

Proposals that do not contain required supplemental documentation or that contain supplemental documentation other than those required and/or encouraged by the CRIF:MU program (as described 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 separately address the Intellectual Merit and Broader Impacts review criteria in the Project Summary;

Proposals that do not contain an Operation and Maintenance Section in the Project Description (Section V.A);

Proposals that do not contain Results from Prior NSF Support for the past five years (MRI Chemistry and CRIF:MU Support) in the Project Description (Section V.A);

Proposals that do not contain results in the Project Description on how CRIF:MU instrumentation proposals awarded after January 1, 2007 enhanced participation by underrepresented groups (Section V.A); and

Proposals that do not contain a Departmental Plan for Broadening Participation (Section V.A).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Chemistry Research Instrumentation and Facilities: Departmental Multi-user Instrumentation (CRIF:MU)

Synopsis of Program:

The Chemistry Research Instrumentation and Facilities Program (CRIF) is structured to enable the National Science Foundation's Division of Chemistry to respond to a variety of needs for infrastructure that promotes research and education *in areas traditionally supported by the Division* (NSF Chemistry Homepage).

The Departmental Multi-User Instrumentation component of CRIF (CRIF:MU) provides funds to universities, colleges, and consortia thereof for the purchase of multi-user instruments. The maximum request is $500,000 for instrumentation. Up to an additional $100,000, including indirect cost, may be requested for personnel who are needed to support cyber-enhanced projects if the instrument is cyber-enabled.

Cognizant Program Officer(s):

- Carlos A. Murillo, 1055, telephone: (703) 292-4970, email: cmurillo@nsf.gov

- Robert Kuczkowski, telephone: (703) 292-4454, email: rkuczkow@nsf.gov

- Charles D. Pibel, telephone: (703) 292-4971, email: cpibel@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 20 depending upon award size and the quality of proposals

Anticipated Funding Amount: $6,800,000 per fiscal year, depending upon the availability of funds

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

- Only academic institutions in the U.S. and U.S. territories may submit proposals.

PI Limit:

The principal investigator must be the chemistry department chairperson or equivalent. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, government laboratories, or international institutions. No CRIF:MU award funds may go directly to industry, government laboratories or international institutions.

Limit on Number of Proposals per Organization:

One per institution. Principal investigators are strongly encouraged to consult with the cognizant program officers before submitting cyber-enabled instrumentation requests.

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable

- **Preliminary Proposal Submission:** Not Applicable

- **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:** Inclusion of voluntary committed cost sharing is prohibited.

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

- **Other Budgetary Limitations:** Not Applicable

C. Due Dates

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

    June 23, 2009

    Fourth Tuesday in June, Annually Thereafter

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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: Additional award conditions apply. Please see the full text of this solicitation for further information.

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

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I. INTRODUCTION

The Chemistry Research Instrumentation and Facilities Program (CRIF) is structured to enable the National Science Foundation's Division of Chemistry to respond to a variety of needs for infrastructure--instrumentation and facilities--that promotes research and education in areas traditionally supported by the Division (NSF Division of Chemistry Homepage). The Departmental Multi-User Instrumentation component of CRIF provides funds to universities, colleges, and consortia thereof for the purchase of multi-user instruments or upgrades of existing equipment. Proposals to enable remote access to existing instruments will also be considered.

II. PROGRAM DESCRIPTION

The NSF Division of Chemistry recognizes that opportunities for expanding the frontiers of knowledge and for education of our technical workforce require access to state-of-the-art instrumentation. The CRIF:MU program is a vehicle for these investments. Because acquiring and upgrading instruments can be costly, the Division leverages its investment by making CRIF:MU awards to groups of chemical scientists in academic departments rather than to individuals, who may obtain instrumentation through individual investigator awards. Investigators are reminded that CRIF:MU proposals will only be reviewed if the majority of the research projects described therein are in areas normally supported by the Division of Chemistry.

The Division encourages investigators to exploit advances in networking, web-based tools and other facets of cyberinfrastructure in order to facilitate broader access to the requested instrumentation.

The Division is also committed to broadening participation of underrepresented groups within the chemical sciences because increasing the participation of diverse U.S. citizens including women and underrepresented minorities by creating opportunities and enabling their contributions is essential to the health and vitality of science and engineering. Underrepresented minorities include persons with disabilities and people whose representation in science and engineering is less than their representation in the population: African-Americans, Hispanics, and Native Americans, including American Indians, Alaskan Natives and Pacific Islanders. The Division of Chemistry has incorporated this principle into its department-oriented solicitations by requiring a departmental plan for broadening participation as supplemental information. In 2007, a joint DOE, NIH, NSF workshop dealt with issues on how to achieve racial and ethnic equity in Chemistry.

III. AWARD INFORMATION

Approximately $6.8 million per fiscal year will fund approximately 20 awards as standard or continuing grants depending upon the quality of proposals and the availability of funds. Awards will have a three-year duration and are non-renewable. Award size is limited to $500,000 for instrumentation. Up to $100,000 over the cost of the instrument, including indirect cost, may be requested for personnel who are needed to support cyber-enhanced projects if the instrument is cyber-enabled.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members. Such organizations also are referred to as academic institutions.

- Only academic institutions in the U.S. and U.S. territories may submit proposals.

PI Limit:

The principal investigator must be the chemistry department chairperson or equivalent. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, government laboratories, or international institutions. No CRIF:MU award funds may go directly to industry, government laboratories or international institutions.

Limit on Number of Proposals per Organization:

One per institution. Principal investigators are strongly encouraged to consult with the cognizant program officers before submitting cyber-enabled instrumentation requests.

Limit on Number of Proposals per PI:

None Specified

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.

This solicitation contains information that supplements the GPG or NSF Grants.gov Application Guide proposal preparation guidelines.

Cover Sheet: The title of the proposal should include the type of instrument(s) requested, but not the manufacturer or the model number. An example of an appropriate title is: "Acquisition (or Upgrade) of an X-Ray Diffractometer." If cyberinfrastructure is to be exploited to enable broader access, the word "cyber" should be included in the title. Effective dates may be February 1 (or later) of the year following submission of the proposal. The anticipated duration of the CRIF:MU awards is three years.

Project Summary: In one page maximum, describe the proposed shared research instrumentation, the type of research and research training it will enable, and the activities that would result if NSF funds the project. Proposals that do not *separately* address both merit review criteria (**intellectual merit and broader impacts**) within the one-page Project Summary will be returned without review.

Project Description: The project description should address the general NSF review criteria (intellectual merit and broader impacts) as well as the CRIF:MU-specific review criteria.

The Project Description must address the following topics. The total length of the Project Description cannot exceed fifteen pages. Non-conforming proposals will be returned without review.

- Results from Prior NSF Support. Results of all NSF instrumentation awards in the last five years made to the proposing department through CRIF:MU and Chemistry Division-administered Major Research Instrumentation (MRI) programs must be included, regardless of the identity of the PI on the prior award(s). For CRIF:MU awards resulting from proposals submitted after January 1, 2007, include results on how the instrumentation enhanced participation by underrepresented groups. Reviewers will be asked to comment on the quality of the prior work described in this section of the proposal.
- Description of Instrument(s) and Rationale for Selection. Describe in this section the instrument(s)/upgrade(s) requested or plans to enable remote access on existing instrumentation. Special features needed in the requested instrument and any necessary accessories should be justified, both in this section and in the descriptions of research projects. For example, in a proposal for a high-field, multi-nuclear NMR spectrometer, the need for high-resolution, dispersion, and multi-nuclear capabilities must be justified by the proposed research uses and by departmental development strategies. If similar or related instruments exist in the department or elsewhere in the institution, the relation to the requested instrument should be indicated and the need for the additional instrument justified through usage data and by reference to new capabilities or enhanced capacity. Details on software and/or firmware such as screen-sharing software, electronic lab notebooks, and web-controlled cameras that will be purchased or developed to support remote access should be provided, if applicable. Any inter-institutional cooperation for leveraging the effectiveness of this investment in infrastructure should be described and supported by letters submitted as supplemental documents.
- Operation and Maintenance. This section should specify how and by whom the requested instrumentation is to be operated and maintained. For related existing instrumentation within the user community, information on usage and downtime should be included. Pertinent data on income from, and cost of, instrument services for the preceding year, including user charges, salaries of support personnel, maintenance contracts, shop charges, and other expenses, should be included. Details regarding scheduling, safety and training should also be included. If applicable, plans for enabling remote access must be provided in this section. Such plans should describe protocols for security, data acquisition, data processing, data archiving, training (including off-site users), user interface, and scalability. If personnel costs for cyber-enabled instrumentation are requested, justification must be provided, including details of the work to be carried out by said personnel. Cyberinfrastructure implementation must go beyond simple use of commercial capabilities provided by the instrument manufacturer, or commercially already developed program and codes. In addition, biosketches must be provided for all personnel for whom support is requested.
- Proposed Research. This section should summarize pertinent research projects in the context of the broad research themes of the major users of the proposed instrument(s). Projects currently supported by the Division of Chemistry should be identified. Research project summaries of major users should provide enough information for reviewers to assess scientific merit, the projected use of the proposed instrument, and the need for special features or accessories. Research descriptions should be provided for no more than six major users; other users should be listed by name only. Projects ineligible for NSF support (e.g., drug development work) should not be included.
- Broadening Participation. This section should address how the acquisition or upgrade of the requested instrumentation supports the departmental plan for broadening participation of underrepresented groups. While the departmental plan itself will not be assessed as part of the proposal review, it must be included as a supplemental document.

References Cited: The format must follow the guidelines given in the GPG.

Biographical Sketches: This section should include biographical sketches (two pages each) for the Principal Investigator (chair or equivalent), co-PIs, all major users and any personnel who will be supported to implement cyber-related use of the instrumentation. Consult the Grant Proposal Guide or NSF Grants.gov Application Guide for proper format. To aid the NSF Program Director in identifying conflicts of interest that must be avoided during review, all investigators, major users and other personnel must include a list of researchers with whom they have collaborated during the past four years, and the names of their graduate and postdoctoral advisors.

Budget: PIs may request up to $500,000 for the acquisition or upgrade, installation, commissioning, and calibration of an instrument, and supporting hardware and software. Additional funds for up to $100,000 over the cost of the instrumentation, including indirect cost, may be requested to support cyber-related personnel only if the proposed instrument will be accessible to remote users, or if the request involves modification of an existing instrument to allow remote access. For successful proposals, the amount of the NSF award will be based on the net price of the instrumentation to the institution, including all academic discounts and other special purchase arrangements. This information must be documented in a quotation provided in Supplementary Documents. Single research instruments, research instrumentation systems, and ensembles of research instruments that enable a particular research

thrust may be requested. No funds will be provided for instrument maintenance, extended warranty or operation. However, for those proposals involving the use of cyberinfrastructure to enhance accessibility, funds may be requested for personnel to support this endeavor for up to the full duration of the award (three years).

Current and Pending Support: A summary of all extant research support from all sources must be provided for the PI, co-PIs, all major users and other personnel. If these individuals do not have research support, a statement explicitly stating this must be included. Disclosure is required if proposals for the same or related instrumentation are planned or pending with other funding sources.

Supplemental Information: Itemized manufacturers quotes, including all discounts, for the requested instrumentation are required. They must be scanned into the Supplementary Documents section of the FastLane proposal and submitted electronically as part of the proposal. Letters documenting collaborations at other institutions must also be submitted in this section. The statements from individuals confirming substantive collaboration efforts and/or usage of the instrumentation from collaborating institutions *must* follow the format indicated below:

> To: CRIF:MU Program Officers
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>
> By signing below I, ____(name)____, acknowledge that I am listed as a collaborator and/or instrument user on the CRIF:MU proposal, entitled "_____ *proposal title*_____", with _____*PI name*_____ as the Principal Investigator. I agree to perform 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: _____
>
>
> Institution:_____
>
>
> Date: _____

If submitting via Grants.gov, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form.

Departmental Plan for Broadening Participation: A departmental plan for broadening participation (maximum 3 pages) is required and must be included in the Supplementary Documents section of the proposal. While the plan is not formally prescribed, it is recommended that the following applicable criteria be included:

- *Leadership*—Indicate how the department addresses its responsibilities with respect to broadening participation and practices good citizenship. (Discuss specific activities in which the department engages to promote broadening participation such as community outreach, department role as a campus leader).
- *Strategic planning*—Describe how the department sets strategic directions, determines key action plans, and assesses quality of its processes (e.g., recruitment, hiring, promotion, and retention) with regard to broadening participation. (Example: identifying any past patterns or current practices that have been obstacles to broadening participation and how to alter them).
- *Statistics and analysis*—Describe how the department collects, uses, and analyzes data to inform and update the department's strategic planning with respect to broadening participation. (Example: assessing changes in participation of underrepresented groups as undergraduate chemistry majors). To track progress, provide tracking statistics on underrepresented minorities and underrepresented groups. If an award is made, these data will set a baseline for further evaluation in annual reports. These data, if in tabular form, should be limited to a maximum of one page, and will not be counted for the three-page limit.
- *Human resource focus*—Discuss how the department enables its workforce and students to develop its potential and how this population is aligned with the department's objectives with regard to broadening participation. (Examples: leadership training, family-friendly policies, mentoring for skill set training, other resources.)
- *Results*—Discuss how the department will track progress and encourage change in attitudes and procedures to improve involvement of underrepresented groups. (Example: implementing changes in recruitment practices or tenure committee compositions).

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited

C. Due Dates

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

    June 23, 2009

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D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

    Detailed technical instructions regarding the technical aspects of preparation and submission via FastLane are 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.

    Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within

five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: https://www.fastlane.nsf.gov/fastlane.jsp.

- **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. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: http://www.grants.gov/CustomerSupport. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding 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.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program where they will be reviewed if they meet NSF proposal preparation requirements. 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 who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the 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.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

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

> **What are the broader impacts of the proposed activity?**
> How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

NSF staff also will give careful consideration to the following in making funding decisions:

> ***Integration of Research and Education***
> One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

> ***Integrating Diversity into NSF Programs, Projects, and Activities***
> Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

> **Additional Review Criteria:**
>
> - How does the proposed instrumentation impact the technical work of the PIs and, where appropriate, their collaborators at remote locations? Will research conducted with the requested instrumentation advance knowledge and understanding in the relevant fields? Do prior research results from this user community indicate that the instrumentation will be used effectively? Will the results of the research conducted using the instrumentation be broadly disseminated?
> - What is the extent of ***shared*** use of the instrumentation for research and research training?
> - Does the department have the technical expertise and infrastructure to make effective use of the new or enhanced instrumentation? Is the plan for management and maintenance of the instrumentation appropriate and does it facilitate multi-user accessibility?
> - If applicable, are there detailed plans for remote access to the instrumentation, including training, security, the user interface, and data archiving and sharing?

- Is there a plan to use the new or enhanced instrumentation in teaching, training and learning? How will the instrumentation impact the educational programs of the user communities?
- How will acquisition or upgrade of the requested instrumentation support the departmental plan for broadening participation? Will participation by underrepresented groups be enhanced by the instrumentation? How well does the proposed activity expand the pool and recruitment of underrepresented minorities in science?

In cases of comparable merit, priority will be given to requests that strengthen research activities already supported by the Division of Chemistry and that broaden participation of underrepresented groups in science through use of cyberinfrastructure.

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 formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

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 is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program 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 letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Research Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. 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.

Special Award Conditions:

Instruments funded under this program are intended for the use of a department or a group of investigators. The title to the instrumentation will vest with the awardee institution. **The instrumentation will remain at the awardee institution even if the PI, co-PI or other major users transfer to another institution.**

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 before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after 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 that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of

annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report 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.

In addition to the above, the following topics should be addressed in all CRIF:MU annual and final project reports:

- Status of instrument order, delivery, and installation;
- Brief description of research projects that were enabled by the instrument;
- Number of users with hands-on experience, to include demographic information (indicate undergraduate/graduate/postdoc/faculty, gender, ethnicity/race, and disability). Note: do NOT identify specific users by gender, ethnicity/race, or disability;
- 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;
- Description of setbacks and resulting changes of plans;
- Information on broader impacts activities to date;
- Linkage to the departmental plan for broadening participation.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Carlos A. Murillo, 1055, telephone: (703) 292-4970, email: cmurillo@nsf.gov

- Robert Kuczkowski, telephone: (703) 292-4454, email: rkuczkow@nsf.gov

- Charles D. Pibel, telephone: (703) 292-4971, email: cpibel@nsf.gov

For questions related to the use of FastLane, contact:

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

- Paul G. Spyropoulos, Computer Specialist, 1055 S, telephone: (703) 292-4968, fax: (703) 292-9037, email: pspyropo@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.

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, National Science Foundation Update is a free e-mail subscription service 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 Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the NSF web site.

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

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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 40,000 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 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.

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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:**

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The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records, " 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
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Arlington, VA 22230

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