Chemistry Research Instrumentation and Facilities: Cyberinfrastructure and Research Facilities (CRIF:CRF)

Program Solicitation
NSF 07-518

Replaces Document(s):
NSF 06-512

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Chemistry

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

February 02, 2007

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the NSF FastLane system. 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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Chemistry Research Instrumentation and Facilities (CRIF:CRF)

Synopsis of Program:

The Division of Chemistry of the National Science Foundation (NSF) , under the umbrella of the Chemistry Research Instrumentation and Facilities Program (CRIF), has provided support to research institutions and

consortia for the establishment of regional or national instrumentation facilities, the purchase of departmental research instrumentation, and the development of state-of-the-art equipment. With the prior two solicitations (05-555 and 06-512), the instrumentation facilities component of the CRIF Program was expanded to address the growing importance of cyber-enabled chemistry in the research endeavor. Preference will be given to cyber-enabled chemistry proposals that are distinct from the projects represented by the FY05 and FY06 awards (CHE-0535542; CHE-0535640; CHE-0535656; CHE-0535710; CHE-0625419; CHE-0626111; CHE-0626305; CHE-0626354). The Chemistry Research Instrumentation and Facilities: Cyberinfrastructure and Research Facilities (CRIF:CRF) Program provides funding to build a foundation for cyber-enabled chemical research and education, and to establish and support multi-user instrumentation research facilities with unique capabilities in the chemical sciences. This is structured to enable NSF, through its Division of Chemistry, to respond to a variety of needs for infrastructure to support basic research and education in chemistry.

Cognizant Program Officer(s):

- Celeste Rohlfing, Program Director, 1055 S, telephone: (703) 292-4962, fax: (703) 292-9037, email: crohlfin@nsf.gov

- Robert L. Kuczkowski, Program Officer, 1055 S, telephone: (703) 292-4953, fax: (703) 292-9037, email: rkuczkow@nsf.gov

- Wade Sisk, telephone: (703) 292-8840, email: wsisk@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Continuing Grant

Estimated Number of Awards: 3 to 6   depending upon award size and the quality of proposals. Duration of awards is up to five years initially. For instrumentation facilities proposals, 1-2 awards can be expected up to $1,500,000 per year. For cyber-enabled chemistry proposals, 2-4 awards can be expected averaging $500,000 per year.

Anticipated Funding Amount: $4,000,000   depending upon the availability of funds in FY07.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Only academic institutions or non-profit research organizations in the U.S. and U.S. territories may submit proposals.

PI Limit:

The principal investigator must be affiliated with an academic institution or non-profit research organization in the U.S. and U.S. territories. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, government laboratories, or international institutions. No CRIF:CRF award funds may go directly to industry, government laboratories or international institutions.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable

- **Full Proposals:**

    - Full Proposals submitted via FastLane: 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/bfa/dias/policy/docs/grantsgovguide.pdf/)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.

- **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):

    February 02, 2007

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: Standard NSF reporting requirements apply

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I. INTRODUCTION

For over thirty years, the CRIF Program has provided support to research institutions for the establishment of regional or national instrumentation facilities, the purchase of departmental research instrumentation, and the development of state-of-the-art equipment. Due to the different nature of these requests, the Division of Chemistry has separated the components of this infrastructure program into three stand-alone competitions: (a) the CRIF: Department Multiuser Instrumentation Program, or CRIF:MU (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf05578); (b) the CRIF: Instrument Development Program, or CRIF:ID (http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf04534); and (c) the CRIF: Cyberinfrastructure and Research Facilities Program, or CRIF:CRF (this solicitation). CRIF:CRF will provide funds to research organizations and consortia of research organizations to build a foundation for cyber-enabled chemical research and education; and to establish and support multi-user research facilities with unique capabilities in the chemical sciences. This program is structured to enable NSF, through its Division of Chemistry, to respond to a variety of needs for infrastructure to support basic research and education in chemistry. Under this program, investigators may seek funding to establish and support either centers for the development of cyber-enabled chemical research, or regional or national instrumentation facilities. Preference will be given to cyber-enabled chemistry proposals that are distinct from the projects represented by the FY05 and FY06 awards (CHE-0535542; CHE-0535640; CHE-0535656; CHE-0535710; CHE-0625419; CHE-0626111; CHE-0626305; CHE-0626354).

a. **Research Facilities**

Research facilities are meant to serve as unique resources that enable access to state-of-the-art instrumentation that is too expensive or specialized for an individual faculty member or typical departmental multi-user facility. A research facility is distinctly different from a departmental instrument center, in that it provides for unique or nearly unique instrumentation or other resources that are too expensive to be widely available or must be custom-made or developed. A research facility typically requires a permanent staff to operate and maintain instrumentation and to provide service to a national or regional user community. It is anticipated that there will be only a few facilities and that there will not be more than one facility in a given technical area. These facilities are expected to serve the state-of-the-art instrumentation needs for a wide community of users and simultaneously to support core research in the development of next-generation instrumentation and instrumental methods. Instrumentation in this context is to be construed in a broad sense to include physical equipment, computational capabilities, and software. Research facilities are also encouraged to exploit or develop cyberinfrastructure (see below) in order to maximize accessibility of the instrumentation and other resources.

Specialized equipment and software dedicated for use in particular chemistry research projects are normally funded as part of individual investigator awards, along with personnel and other direct project costs. Major instruments and computing environments shared and maintained for multiple uses by researchers in a department may be funded through the CRIF:MU and Major Research Instrumentation programs (see Section IX). In contrast, CRIF:CRF supports large single instruments or collections of instruments that are unique because of their capabilities and/or because they represent new models for the operation of facilities that provide extraordinary research opportunities.

b. **Cyberinfrastructure**

As described in the report, "Revolutionizing Science and Engineering Through Cyberinfrastructure: Report of the NSF Blue-Ribbon Advisory Panel on Cyberinfrastructure," the manner in which scientific and engineering research and education is conducted will be radically transformed by cyberinfrastructure. This report may be accessed at http://www.cise.nsf.gov/sci/reports/atkins.pdf. The NSF Division of Chemistry shares this vision and has held a workshop that has identified research and education frontiers that would be enabled by investments in cyberinfrastructure. The report from this workshop may be accessed at http://bioeng.berkeley.edu/faculty/cyber_workshop/, and general information about cyber-enabled chemistry may be found at www.nsf.gov/chem/cyber. A National Research Council report, "Information and Communications," also identifies opportunities in cyberinfrastructure in the chemical sciences and is available at http://books.nap.edu/catalog/10831.html.

Cyberinfrastructure is enabling new chemical research and education activities through grid computing, community databases, remote access to instrumentation, electronic support for geographically dispersed collaborations, and other web- and grid-accessible services. A team of researchers in a virtual laboratory can now assemble distributed expertise and resources to target chemical research and educational priorities. Advances in cyberinfrastructure in areas such as scientific portals, workflow management, computational modeling, and data and molecular visualization will clearly impact the day-to-day practice of chemistry in the near future. Moreover, the access to expertise and resources that cyberinfrastructure provides holds the potential to broaden participation in the chemical sciences to create a truly inclusive national and international community. To achieve this vision, certain characteristics of the chemistry research community – specifically, the broad range of its computational techniques and data types and its large number of independent data producers – pose unique challenges that will need to be overcome. Close interaction between practicing chemists and information technology developers, iterative approaches to software development and deployment, and mechanisms to share best practices will all be critical in advancing a cyber-enabled chemistry community. It should be noted that specialized software dedicated to an individual investigator's research project would not be supported through the CRIF:CRF program, as it is normally supported as part of an individual investigator award.

For FY07, preference will be given to cyber-enabled chemistry proposals that are distinct from the projects represented by the FY05 and FY06 awards (CHE-0535542; CHE-0535640; CHE-0535656; CHE-0535710; CHE-0625419; CHE-0626111; CHE-0626305; CHE-0626354). Note also that all proposals submitted in response to this solicitation are subject to program-specific review criteria (see Section VI. A) in addition to the standard NSF criteria on intellectual merit and broader impacts.

II. PROGRAM DESCRIPTION

The CRIF:CRF Program accepts proposals for the support of cyberinfrastructure projects and for national or regional facilities that would provide unique computational and/or state-of-the-art instrumentation capabilities for research to a broad community of chemical scientists.

Examples of cyberinfrastructure projects might include developing freely distributed computational codes that take advantage of grid technologies; networking of analytical instrumentation to provide remote access for educational/home/commercial use; and establishing digital libraries and repositories for sharing of chemical data. Advances in areas such as scientific portals, workflow management, computational modeling, remote use of instrumentation, and data and molecular visualization provide other examples of the rich opportunities associated with the development of cyberinfrastructure.

A CRIF:CRF research facilities project provides for unique instrumentation capabilities that are either too expensive to be widely available or must be custom-made or developed. A CRIF:CRF research facilities project typically requires a permanent staff to operate and maintain instrumentation, and to provide service to a national or regional user community. Projects for the design and development stage of a large facility can also be considered under the CRIF:CRF program. PI's are strongly encouraged to consult with Division of Chemistry staff before submitting a cyberinfrastructure or research facilities proposal to CRIF:CRF.

CRIF:CRF projects are expected to serve the state-of-the-art software and/or instrumentation needs for a wide community of users and simultaneously to support core research in the development of cyberinfrastructure and/or next-generation instrumentation. The proposal should document these cyberinfrastructure and/or instrumentation needs and describe the research community the project would serve. For FY07, preference will be given to cyber-enabled chemistry proposals that

are distinct from the projects represented by the FY05 and FY06 awards (CHE-0535542; CHE-0535640; CHE-0535656; CHE-0535710; CHE-0625419; CHE-0626111; CHE-0626305; CHE-0626354).

Successful proposals will initially be supported by the Division of Chemistry of NSF for a period of up to five years, depending upon merit review through the CRIF:CRF program and the availability of funds. Annual progress reports will be required. On-site evaluations will be made during the award period.

III. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

Anticipated Type of Award: Continuing Grant.

Estimated Number of Awards: 3 to 6 - depending upon award size and the quality of proposals -- Up to five year awards initially. For instrumentation facilities proposals, 1-2 awards can be expected up to $1,500,000 per year. For cyber-enabled chemistry proposals, 2-4 awards can be expected averaging $500,000 per year.

Anticipated Funding Amount: $4,000,000 depending upon the availability of funds in FY06.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Only academic institutions or non-profit research organizations in the U.S. and U.S. territories may submit proposals.

PI Limit:

The principal investigator must be affiliated with an academic institution or non-profit research organization in the U.S. and U.S. territories. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, government laboratories, or international institutions. No CRIF:CRF award funds may go directly to industry, government laboratories or international institutions.

Limit on Number of Proposals per Organization:

None Specified

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 pubs@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/bfa/dias/policy/docs/grantsgovguide.pdf). 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 pubs@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.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Proposals for the support of cyberinfrastructure or research facilities must include a full description of technical capabilities and the impact that these projects will make on chemical research and education. Investigators must identify the nature and size of the user community in the chemical sciences that will make principal use of the project's capabilities.

Cyberinfrastructure and research facilities are intended, in part, to stimulate the development of new software environments and/or instrumentation capabilities; proposals must therefore include a description of the project in sufficient detail for reviewers to evaluate its technical merit and its potential benefit to chemical research and education. Transfer of new knowledge or technology to various academic, industrial and government sectors is an important broader impact of CRIF: CRF projects, and partnerships involving these sectors as appropriate are encouraged. Plans for broad dissemination of the project's results will be considered in evaluation of the proposal.

CRIF:CRF instrumentation facilities proposals must include descriptions of the provisions for service operations, maintenance and development. Important elements include the management structure, qualifications of individuals in supervisory and support positions, external advisory structures, and partnerships. Requests for personnel support must include justification for each position and the responsibilities associated with the position. If a project will provide a service to users, the proposal should include a description of how user priority and user fees, if any, will be determined.

Detailed Proposal Format

NSF Cover and Certification Page. Enter this program solicitation number in the space indicated. Proposals should provide a title in the format: "CRIF:Facilities:..." or "CRIF:Cyber:..."

Form 1225 (Information about Principal Investigators/Project Directors) must be completed.

Project Summary (1 page maximum). The project summary should include the rationale for the project, the current and intended user community, the nature of the project, the areas of research and education to be enhanced, and the principal development goals. Both intellectual merit and broader impacts must be addressed in separate statements or the proposal will be returned without review.

Table of Contents. A table of contents will automatically be generated.

Project Description. This will be limited to 25 single-spaced pages. Within that overall page limitation, the proposal must address the following issues (a-g):

a. Rationale for and Impact of the Project. This introductory section should describe (1) the need for the proposed

cyberinfrastructure or research facility; (2) the unique capabilities and services it will bring to research and education in the chemical sciences; and (3) the community to be served, including the extent to which the project broadens participation in the chemical sciences.

b. Detailed Description. This section should provide a full description of the proposed project, including location, size, and major equipment to be purchased or constructed, software to be developed, services to be provided, and core research areas to be investigated. The plan should detail the instrument and/or software improvement and development component and explain how resources will be targeted at developing the next generation of research tools and techniques. Strategies to keep the proposed project at the forefront of research in the identified field must be described and necessary equipment upgrades planned and budgeted. Investigators should identify connections with other partners where appropriate, and the roles each will play in development. The proposal must contain a plan for evaluation of the feasibility of commercialization of the technical advances of the project in the case of instrumentation facilities, or dissemination of software in the case of cyberinfrastructure development.

c. Research Activities. This section should identify the senior on-site personnel supervising the project's research, development, and training; summarize their current research activities; and describe the research projects to be enhanced by the project. Numbers of additional personnel whose research and education would depend on the proposed project (e.g., postdoctoral fellows, graduate students, undergraduate students, K-12 teachers and students, informal science education organizations, international partners) should be estimated as closely as possible.

d. Service to the External Community. Because of the limited number of these projects, the PIs must demonstrate broad impact for a well-defined user community, and provide a plan for assessing performance and results of all activities supported by the project. For CRIF:CRF instrumentation facilities proposals, PIs must document the managerial, support personnel, advisory, and accounting structures necessary to fulfill the service objectives. For CRIF:CRF instrumentation facilities proposals, PIs must describe mechanisms for selecting proposals from users, for choosing among in-house activities, and for the allocation of resources.

e. Management Plan. For cyberinfrastructure projects, this section should describe a management plan including software maintenance, such as updates and archiving. For instrumentation facilities projects, this section should describe the management plan for direction, operation and maintenance of the proposed project. The management plan must identify the director and any senior personnel involved in the day-to-day operation of the project. The project must have an external advisory committee, selected in consultation with the NSF Division of Chemistry, to provide advice to the project management on operations, research directions and accessibility to the broader user community.

f. Education and Outreach. A CRIF:CRF project is a unique resource for education and training, for transfer of knowledge and technology, for exchanges of staff with other research organizations, and for outreach to communities currently underrepresented in science and engineering. Investigators should outline their plans to use the unique capabilities of the project to contribute to a stronger infrastructure in the chemical sciences through education and outreach activities.

g. Results from Prior Support. All senior personnel must report on results from prior NSF support, up to a maximum of 5 pages in total. All renewal applications for continued funding of NSF Chemistry-supported facilities or center grants, whether supported by CRIF or other Chemistry programs, must provide Results from Prior Support. Information is required on major breakthroughs in research, software, or instrument development, publications, patents, past outreach activities and their impact, and sponsored workshops or meetings. Also, a combined alphabetized list of all scientists, with current affiliations, who have collaborated with the PI, co-PIs and other senior personnel in the last 48 months or are otherwise affiliated with them including Ph. D. and post-doctoral mentors and students, must be included in the Supplementary Documentation section (see below).

Budget. This section should provide a detailed estimate and explanation of the total budget projected for establishment (or continuation) and operation of the cyberinfrastructure or research facility. Explain the basis for any cost estimates. Commitments of space, renovation, faculty, staff positions, or capital equipment should be detailed here, with estimated dollar values.

Biographical Sketches. Biographical sketches must be provided in the standard NSF format for the director, for all senior personnel whose core research activities would make major use of the facility/cyberinfrastructure project, and for any other senior personnel who would draw major salary support from the facility/cyberinfrastructure project.

Current and Pending Support. Current and pending support of two types must be summarized: (a) all current and pending support for the facility/cyberinfrastructure project, including any support from any source, received or pending, for support, repair, renovation, replacement, or construction of the proposed facilities in the previous five years; and (b) current and pending support (agency, award number, total award amount, expected duration, and topic) for all research projects of each

senior investigator.

Supplementary Documentation. A combined alphabetized list of all scientists, with current affiliations, who have collaborated with the PI, co-PIs and other senior personnel in the last 48 months or are otherwise affiliated with them including Ph. D. and post-doctoral mentors and students, must be included in the Supplementary Documentation section. For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

C. Due Dates

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

    February 02, 2007

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 and, if they meet NSF proposal preparation

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 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 with the proposer.

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 and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

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

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

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

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

Additional Review Criteria:

- Qualifications of the project management to meet multiple purposes of research, education, and service simultaneously;

- Capability of the project to provide a needed state-of-the-art resource for chemical research and education;

- Breadth of the chemical sciences community that is impacted;

- Anticipated effect on the development of instruments and/or software;

- Effectiveness of partnerships for transferring of new knowledge and technology to appropriate academic, industrial, and government sectors;

- Use of unique project resources to enhance education and training of students; and

- Extent to which the project broadens participation in the chemical sciences.

For renewal proposals, the following additional review criteria will be considered:

- Quality of the scientific results obtained;

- Continuing need for the project in terms of its impact on research and education in the chemical sciences; and

- Workforce impact (for example, information on students trained and other professional development).

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Adhoc Review or Panel Review or Site Visit Review or Reverse Site Review.

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review or Panel Review or Site Visit Review or Reverse Site Visit 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 date of receipt. 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 Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative 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/general_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpm.

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.

Failure to provide the required annual or final project reports 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.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Celeste Rohlfing, Program Director, 1055 S, telephone: (703) 292-4962, fax: (703) 292-9037, email: crohlfin@nsf.gov

- Robert L. Kuczkowski, Program Officer, 1055 S, telephone: (703) 292-4953, fax: (703) 292-9037, email: rkuczkow@nsf.gov

- Wade Sisk, telephone: (703) 292-8840, email: wsisk@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, MyNSF (formerly the Custom News Service)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 Regional 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. MyNSF also is available on NSF's Website at http://www.nsf.gov/mynsf/.

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.

Related Programs:

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 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.

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: pubs@nsf.gov

     or telephone: (703) 292-7827

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; 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
National Science Foundation
Arlington, VA 22230

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