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CHEMISTRY RESEARCH INSTRUMENTATION AND FACILITIES

Program Announcement

NSF 00-81

DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES
DIVISION OF CHEMISTRY

DEADLINE DATES:

- Departmental Multi-User Instrumentation: Third Monday of July, 2000; Second Monday of July, Annually Thereafter
- Instrumentation Development: Second Monday of January, Annually
- Chemistry Research Facilities:
  Preproposals: First Monday of December, Annually
  Full Proposals: First Monday of June, 2001; Annually Thereafter.

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SUMMARY OF PROGRAM REQUIREMENTS

GENERAL INFORMATION

Program Name: Chemistry Research Instrumentation and Facilities (CRIF) Program

Short Description/Synopsis of Program:

The Chemistry Research Instrumentation and Facilities (CRIF) Program of the National Science Foundation (NSF) provides funds to research institutions and consortia thereof for the purchase of multi-user instruments, for major instrumentation development and construction, and for the establishment and support of multi-user research facilities in the chemical sciences. This Program is structured to enable the National Science Foundation, through its Division of Chemistry, to respond to a variety of needs for infrastructure to undergird advanced research and education in chemistry. The NSF Division of Chemistry supports education and research activities in analytical, inorganic, organic, physical, materials, and surface chemistry. Instrumentation for related fields of research is provided through other NSF programs.

Cognizant Program Officer(s): Dr. Joan M. Frye, Program Director, Room 1055, Division of Chemistry, telephone (703) 306-1849, e-mail: jfrye@nsf.gov.

Applicable Catalog of Federal Domestic Assistance (CFDA) No.: 47.049 — Mathematical and Physical Sciences

ELIGIBILITY

- Limitation on the categories of organizations that are eligible to submit proposals:

  Proposals may be submitted by U.S. institutions of higher education and independent nonprofit research institutions.

- PI eligibility limitations:

  Multi-user Instrument Acquisition Proposal: PI must be department chair or equivalent

  Instrument Development Proposal: None

  Chemistry Research Facilities Proposal: None

Limitation on the number of proposals that may be submitted by an organization: **None.**

AWARD INFORMATION

- Type of award anticipated:

  Multi-user Instrument Acquisition Proposal: Standard Grant

  Instrument Development Proposal: Standard Grant

  Chemistry Research Facilities Proposal: Continuing Grant

- Award size and duration:

  Multi-user Instrument Acquisition Proposal: There is no pre-determined minimum or maximum award size. Three-year awards

  Instrument Development Proposal: There is no pre-determined minimum or maximum award size. Three-year awards

  Chemistry Research Facilities Proposal: A minimum of $500K/year. Five-year awards, renewable in three-year increments by competition.

- Number of awards anticipated in FY01:

  Multi-user Instrument Acquisition Proposal: 30-32 awards

  Instrument Development Proposal: 4-5 awards

  Chemistry Research Facilities Proposal: 0-2 awards

- Amount of funds available: **Approximately $8 million is expected to be available in FY 2001, contingent upon availability of funds.**

- Anticipated date of award notification:

  Multi-user Instrument Acquisition Proposal: **December 15th**

  Instrument Development Proposal: **June 15th**

  Chemistry Research Facilities Proposal: **February 15th (preproposal competition)**
  November 1st (full proposal competition)

PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS

- **FastLane Requirements:**

  - FastLane proposal preparation requirements: **Full FastLane proposal submission required.**

  - FastLane point of contact: **Paul Spyropoulos (703) 306-1022; chefl@nsf.gov**

- **Proposal Preparation Instructions**

  - Letter of Intent requirements: None

  - Preproposal requirements:

    Multi-user Instrument Acquisition Proposal: None

    Instrument Development Proposal: None

    Chemistry Research Facilities Proposal: Required

- Proposal preparation instructions: See *Proposal Preparation Instructions* section of this solicitation.

♦ **Budgetary Information**

- Cost sharing/matching requirements:

  Multi-user Instrument Acquisition Proposal: Consistent with Chemistry Division practice, the CRIF Program requires institutional cost sharing for the equipment/instrumentation portion of the award budget. The program requires no matching funds for the first $80,000 and will provide up to one-half of the funds in excess of $80,000 required for the purchase of the equipment or instrumentation. For example, for an instrument whose total purchase price is $120,000, the required institutional cost sharing is $20,000. Matching funds must be in cash, not in-kind, and be used towards the purchase of the requested instrument(s). The proposed cost sharing must be entered on line M of the proposal budget (NSF Form 1030.).

  Instrument Development Proposal: Same as for a Multi-user Instrument Acquisition Proposal (see above)

  Chemistry Research Facilities Proposal: For eligibility purposes, cost sharing at a level of 30% of the requested total amount of NSF funds is required. Institutional or state cost-share commitments, whether for construction or renovation of space, capital equipment purchase, or salary support, must be stated explicitly, and the source of the funds must be identified. The budget section should make it clear how combined NSF, institutional and user resources will be used to support all necessary costs. Both cash and in-kind cost sharing is permitted. The proposed cost sharing must be entered on line M of the proposal budget (NSF Form 1030).

- Indirect cost (F&A) limitations: **None**

♦ **Eligible Costs**

- **Multi-user instrumentation proposals:** costs of instrument purchase, installation, commissioning, and calibration. 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. 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 and operation.

- **Instrument development proposals:** all of the items listed above, as well as the direct and indirect costs associated with support for personnel engaged in the instrument development effort.

- **Chemistry research facilities proposals:** all costs of establishing and maintaining a facility, except for building construction and renovation. Facility organizers may request funds for:

  - acquisition of new instrumentation (either purchased from a manufacturer or built at the site) to establish the facility;

  - operation and maintenance, including support personnel;

  - core research (including student support);

  - instrumentation development, including regular upgrading of instrumentation to maintain state-of-the-art capabilities;

- salaries, travel, workshops, student training, supplies, participant support, and other miscellaneous expenses;

- Outreach activities such as workshops and conference presentations to make others aware of the availability and capabilities of the facility.

♦ **Deadline Dates**

- Departmental Multi-User Instrumentation: **Third Monday of July, 2000; Second Monday of July, Annually Thereafter**

- Instrumentation Development: **Second Monday of January, Annually**

- Chemistry Research Facilities:
  Preproposals: **First Monday of December, Annually**
  Full Proposals: **First Monday of June, 2001; Annually thereafter**

PROPOSAL REVIEW INFORMATION

♦ Merit Review Criteria: **Standard National Science Board approved criteria, with additional review criteria appropriate for each of the three Program subactivities. See details in the Proposal Review Information Section below.**

AWARD ADMINISTRATION INFORMATION

♦ Grant Award Conditions: **GC-1 or FDP III**

♦ Special grant conditions anticipated:

Multi-user Instrument Acquisition Proposal: Title to equipment provisions

Instrument Development Proposal: None

Chemistry Research Facilities Proposal: Renewal/phase-out provisions

♦ Special reporting requirements anticipated:

Multi-user Instrument Acquisition Proposal: None

Instrument Development Proposal: None

Chemistry Research Facilities Proposal:

Annual progress reports are required. These should provide information on the following: publications, patents and other significant research breakthroughs, names of external users with affiliations, outreach and education efforts, changes in extramural or institutional funding in support of the facility, and student involvement in facility research. The principal investigator should also provide information on any facility-sponsored conferences or workshops, the names of current advisory committee members, and a schedule of advisory committee meetings convened during the
reporting period. NSF may require additional special reports on occasion, in order to meet requirements under the Government Performance and Results Act. During thefive-year award period, a site visit will take place in the third year.

INTRODUCTION

Research and education in the chemical sciences depend critically on access to state-of-the-art instrumentation, from small equipment items used in individual research projects to major instruments shared and maintained for multiple uses by many researchers. Specialized equipment dedicated for use in particular chemistry research projects is normally funded as part of individual investigator awards, along with personnel and other direct project costs.

The Chemistry Research Instrumentation and Facilities (CRIF) Program of the National Science Foundation (NSF) provides funds to research institutions and consortia thereof for the purchase of multi-user instruments, for major instrumentation development and construction, and for the establishment and support of multi-user research facilities in the chemical sciences. This Program is structured to enable the National Science Foundation, through its Division of Chemistry, to respond to a variety of needs for infrastructure to undergird advanced research and education in chemistry. The NSF Division of Chemistry supports education and research activities in analytical, inorganic, organic, physical, materials, and surface chemistry. Instrumentation for related fields of research is provided through other NSF programs (see section on **Other NSF Instrumentation Programs** for details).

PROGRAM DESCRIPTION

The CRIF Program is designed to support the following three types of academic instrumentation research needs:

1. PURCHASE OR UPGRADE OF DEPARTMENTAL MULTI-USER INSTRUMENTATION

The Division of Chemistry recognizes the important role of chemistry instrumentation facilities in enabling research by a wide range of scientists who study problems at the molecular level. Such facilities play an important role for advancing multidisciplinary research. The main purpose of the multi-user instrumentation program is to enable research normally funded by the Division. Proposals will be considered for purchase or significant upgrade of major research instruments for use by a chemistry department or other groups of chemists.

For all such multi-user instrumentation proposals, the chemistry department head, chairperson, or equivalent must act as the Principal Investigator. Instruments awarded under this program are intended as assistance to a department or a group of investigators; they would not move to a new institution with any investigator. Group proposals for instruments to be used primarily in research not normally supported by the Division of Chemistry should be directed to the appropriate NSF division (see Other NSF instrumentation programs). However, multi-disciplinary proposals in which the majority of the proposed research is in areas of science supported by the Division of Chemistry will be considered. Proposals for instrumentation primarily for the benefit of one investigator are inappropriate for this program; however, such proposals will be considered by the appropriate subdisciplinary program within the Division, provided the research of the investigator is already supported through that program.

2. INSTRUMENTATION DEVELOPMENT

To help ensure that advances in fundamental science and technology are rapidly incorporated into instrumentation of broad importance to the chemistry community, proposals for the design and construction of new chemistry research instruments are eligible for consideration.

3. CHEMISTRY RESEARCH FACILITIES

The CRIF Program also accepts proposals for the support of major national or regional facilities, which would provide unique state-of-the-art instrumentation or computational capabilities and resources for research to a broad community of users in chemistry. This program is intended to complement, not duplicate, support for facilities and centers provided under other NSF programs such as those of the Office of Integrative Activities. Principal

Investigators are encouraged to consider carefully which program is best suited for their research needs. They should consult with Chemistry Division staff before submitting a preproposal for facility support to CRIF.

Definitions and General Considerations:

A facility is distinctly different from a departmental instrument center. It provides for unique or nearly unique instrumentation or other resources that are either too expensive to be widely available or must be custom-made or developed. A 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 such 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. Facilities under this definition must not encroach upon the service functions that are available in the private sector. Particular attention should be paid to the National Science Board's policy on the use and operation of NSF-supported research instrumentation and facilities (http://www.nsf.gov/pubs/1998/iin122/iin122.txt). The proposal (and the preproposal) should document the need for the facility and describe the research community it would serve. A facility might, for example, have its efforts divided into core research (15%) and host-institution research (10%), service to or collaboration with non-host-institution users (60%), and instrument improvement and development (15%).

The Chemistry Division does not set aside funds for the establishment of a pre-determined number of facilities. It will consider each request on its own merits against other possible uses for the same funds. Successful proposals will initially be supported by the Chemistry Division of NSF for a period of five years, with the possibility of multiple three-year renewals if the facility is successful in its core research, service, and instrument development functions, if this type of facility is still needed, and if the facility is a priority considering other potential uses of these funds. Annual progress reports will be required and used to assess these factors. On-site evaluations of all aspects of the facility operation will be made during the award period. There is no limitation on the number of renewals; however, the renewal proposal must compete on an equal footing with new proposals. In the event that an established facility is not renewed, a maximum of 50% base funding may be provided for an additional year for orderly phase-out of NSF support.

ELIGIBILITY

Proposals may be submitted by U.S. institutions of higher education and independent nonprofit research institutions. The PI on multi-user instrument acquisition proposals must be the department chair or equivalent. No such restrictions apply to instrument development or chemistry research facilities proposals.

AWARD INFORMATION

All awards made through this solicitation will be dependent upon the availability of funds and the quality of proposals received.

Multi-user Instrument Acquisition Proposal: Three-year awards. No pre-determined minimum or maximum award size.

Instrument Development Proposal: Three-year awards. No pre-determined minimum or maximum award size.

Chemistry Research Facilities Proposal: Five-year awards initially; renewable by competition for additional three-year increments. A minimum of $500K/year.

PROPOSAL PREPARATION & SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions.

Proposals submitted in response to this program announcement should be prepared and submitted in accordance with the general guidelines contained in the *Grant Proposal Guide* (GPG), NSF 00-2. The complete text of the GPG (including electronic forms) is available electronically on the NSF Web site at (http://www.nsf.gov/cgi-bin/getpub?gpg/). Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

Proposers are reminded to identify the program announcement number (NSF 00-81) in the program announcement/solicitation block on the NSF Form 1207, "*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.

B. Proposal Format

Purchase or Upgrade of Departmental Multi-User Instrumentation

The title of the proposal should include the type of instrument requested, but not the manufacturer's name or the model number. An example of an appropriate title is: "Purchase (or Upgrade) of an X-Ray Diffractometer."

Brevity will assist reviewers and Foundation staff in dealing effectively with proposals. Therefore, the Project Description (including Results from Prior NSF Support, which is limited to five pages) may not exceed 15 pages. Prior results may be summarized in fewer than five pages, giving the PI(s) the balance of the 15 pages for the Project Description. Figures, including charts, graphs, maps, photographs and other pictorial presentation are included in the 15-page limit. Conformance to the 15-page limit will be strictly enforced and may not be exceeded unless the deviation has been specifically authorized in writing prior to submission. Non-conforming proposals will be returned unreviewed.

The following topics must be addressed in the proposal (The number of pages indicated in the parentheses below is a suggestions only; the total length of the Project Description cannot exceed fifteen pages.).

Results from Prior NSF Support (1-5 pages). If the PI(s) has (have) received NSF funding in the past FIVE years, information on prior awards is required. Please consult the Grant Proposal Guide for details. In addition, results of any CRIF awards in the last five years for the benefit of the department must be included, regardless of the identity of the PI on the prior award. 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 (1-3 pages). Describe in this section the instrument(s) requested and alternatives where appropriate. 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 multinuclear 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. Any inter-institutional cooperation for maximizing the effectiveness of this investment in infrastructure should be described.

Itemized manufacturers' quotes are required. They must be scanned into the Supplementary Documents section of the FastLane proposal and submitted electronically as part of the proposal. (The Supplementary Documents section is not included in the 15-page limit.) **Hardcopies should not be mailed to NSF.** When justified by the reviewers' or

panelists' comments, the program director may recommend support at less than the requested level. If the institution feels that the recommended amount is not acceptable, it may reject the offer of an award. The program's recommendation is based on scientific judgment and optimal use of Federal funds and is not to be construed by the institution as negotiation of matching funds.

Operation and Maintenance (1-3 pages). This section should specify how and by whom the requested instrumentation is to be operated and maintained. For related existing instrumentation within the department, 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. Under no circumstances may operation and maintenance charges be included in the proposal budget.

Proposed Research (5-10 pages). This section should summarize pertinent research projects in the context of the broad research themes of the major users of the proposed instrument(s). The combined research descriptions are limited to a total of 10 single-spaced pages. 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 currently supported by the Division of Chemistry should be identified. Projects ineligible for NSF support (e.g., drug development work) should not be included.

The following two sections are not counted towards the 15 page limit.

Biographical Sketches. This section should include short biographical sketches (one page each) for the major users and for the Head or Chairperson (designated as Principal Investigator). Each one-page sketch should include a list of up to five publications most closely related to the proposed acquisition (See the Grant Proposal Guide, II.D.6 for proper format.). To aid the NSF Program Director in identifying conflicts of interest that must be avoided during review, major users 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.

Current and Pending Support. A summary of all extant research support from all sources must be provided for all major users. If proposals for the same or related instrumentation are planned or pending at other agencies or patrons, disclosure is required.

Instrumentation Development

These proposals should follow the general guidelines for research project proposals as outlined in the most recent edition of the Grant Proposal Guide (http://www.nsf.gov/cgi-bin/getpub?gpg/). The proposal title should be of the form: "Development (Construction) of a New..… for Chemistry Research."

The format is similar to that described above. In addition, the Introduction or Background section of the proposal must present an analysis of the need for the proposed instrumentation, including a projection of the uses and users in chemistry research. This section should detail the impact on molecular science that the new instrumentation may have. If the instrumentation is to be shared among multiple users in a Chemistry Department, brief descriptions of the research of the major users should be given. The main body of the proposal should provide a detailed description of the proposed instrument, plans for its design and construction, an analysis of problems to be overcome, preliminary work already completed, feasibility analysis, and an estimated time schedule for completion. Include also plans for transferring new knowledge or technology to U.S. industrial or governmental laboratories or U.S. instrument manufacturers.

The budget section of proposals for instrument development should indicate the total cost for construction of the equipment, apportioning estimated costs between personnel, supplies, equipment, and other costs. Requests for personnel support must include a description of the responsibilities of project co-workers and explain why a given position is necessary for the completion of the design and construction of the new instrument. Sufficient detail should be given to allow reviewers to analyze the cost of the new technology.

Chemistry Research Facilities

Preproposal

Preproposals are required to minimize expenditure of planning, writing, and reviewing time for proposals that might have limited prospects for success. The preproposal is primarily a concept paper. An appropriate title for preproposals is as follows: "Preproposal: National (or, Regional) Chemistry Research Facility for..." It is to be submitted via FastLane in letter format, limited to eight pages. The cover sheet with the signature of the institutional representative must be forwarded to NSF (see below). The preproposal must describe the general nature of the facility, present evidence that the facility is needed, that it can have a major impact on chemical research, and can be established and maintained at the proposed site by the proposed staff. Information about projected users of the facility and the costs to establish and maintain it at the state-of-the-art should be included. Preliminary plans for outreach, education and training, transfer of knowledge to the scientific community, and proposed partnerships in development should be outlined. A summary of anticipated start-up and annual maintenance costs is required.

The preproposal is an extremely important document for those contemplating establishment of a chemistry research facility. Only a small number of preproposals will be judged strong enough to warrant the preparation of a full facilities proposal, so the preproposal must be compelling. Providers of preproposals will be given preliminary notification by February 15 of their eligibility to submit a full proposal.

Proposal Format

Rationale for the Facility

Proposals for the support of a chemistry research facility must include a full description of the technical capabilities of the facility, what distinguishes it from a local, departmental, or university-wide facility, and the impact that these capabilities will make on new state-of-the-art chemical research. Investigators must identify the nature and size of the user community in the chemical sciences that will make principal use of the research facility, along with any evidence (e.g., citations of reports or studies) of that community's desire to pool resources in support of the facility.

Chemistry research facilities are intended, in part, to stimulate the development of new instrumentation or techniques; facilities proposals must therefore include a description of the instrument design or technique in sufficient detail for reviewers to evaluate the new technology and its potential benefit to chemical research. Transfer of new knowledge or technology to U.S. industrial or governmental laboratories or U.S. instrument manufacturers is an important way for fundamental research to contribute to U.S. economic growth. Plans for such transfer will be considered in evaluation of the proposal. Beneficial partnerships with private-sector instrument developers are encouraged.

Proposals for chemistry facilities must include descriptions of the provisions for service operations, maintenance and development. Important elements include the qualifications of the persons immediately in charge, support personnel at various levels, the management and external advisory structure, and the partners involved in instrument development. Proposals must indicate the intended sources of funds to meet personnel and maintenance costs. Requests for personnel support must include a description of the responsibilities of each position and why a given position is necessary for the successful operation of the facility. If user fees are involved, a description of how they will be assessed should be included. The proposal must include a management plan for dealing with questions of access by users.

Detailed Proposal Format

Proposals for Chemistry Research Facilities should provide a title in the format: "National (or, "Regional) Chemistry Research Facility for..." The body of the research proposal, exclusive of illustrations, required forms, references, biographical and budgetary materials, will be limited to 40 single-spaced pages. Within that overall page limitation, the proposal must address the following issues, item by item (length stipulations on individual proposal sections are only suggestions).

NSF Cover and Certification Page (NSF Form 1207, see GPG). Enter this program announcement number (NSF 00-81) in the space indicated.

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 center, the current and intended user community, the nature of the facility, the areas of research to be enhanced, and the principal instrument development goals.

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

Rationale for and Impact of Facility (5 pages). This introductory section should describe the need for the proposed facility: (1) the unique capabilities and services it will bring to research in the chemical sciences; (2) the community to be served (areas of chemistry, regional or national users, host institution faculty) by the facility; and (3) how it will contribute to meeting the research and educational goals of the host institution and research community. The rationale should summarize the planning history for the project, citing pertinent studies or reports. It should also describe how the facility will attract research workers and students, increase the number of students from underrepresented groups entering programs for advanced degrees in science and engineering, and improve the quality of research training and experience.

Detailed Description of the Research Facility (5 pages) This section should provide a full description of the proposed research facility including location, size, and major equipment to be purchased or constructed, services to be provided, and core research areas to be developed or enhanced. This section should assess limitations and constraints and their potential impact on research, service and training activities. Investigators should indicate the percentages of time and space in the facility that will be devoted to service, core research, education and training, and instrument development.

In-House (Core) Research Activities (10 pages) This section should identify the senior on-site personnel using the facility for research, development, and training; summarize their current research activities; and describe the research projects to be conducted in and enhanced by the research facility. Numbers of additional personnel whose research and education would depend on the proposed facility (e.g., postdoctoral fellows, graduate students, and undergraduate students) should be estimated as closely as possible.

Instrumentation Development Plan (5 pages) The plan should detail the instrument improvement and development component and explain how resources of the facility will be targeted at developing the next generation of research equipment. Strategies to keep the proposed facility 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 research and development organizations, including instrument manufacturers in the private sector, and the roles each will play in development. The proposal must contain a plan for evaluation of feasibility of commercialization of the technical advances of the facility.

Service to the External Community (5 pages) Because CRIF facilities are few in number, they must serve a national or large regional user community. Describe in detail the plan for making the facility accessible to external users. Document the managerial, support personnel, advisory, and accounting structures necessary to fulfill the service objectives. Describe mechanisms for selecting proposals from users, for choosing among in-house activities, and for the allocation of resources. Provide a plan for assessing performance and results of all activities supported by the facility.

Facility Management Plan (3 pages) This section should describe the management plan for direction and operation of the proposed facility. The management plan must identify the facility director and any senior personnel involved in the day-to-day operation of the facility and indicate the percentage of time to be devoted by each to the facility. This section should also outline the structure that will be established to advise the facility's management on operations, direction, and external relations with users. The facility must have an external advisory committee satisfactory to the NSF

Education and Outreach (3 pages) A facility is a unique resource for special education, 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 a facility to contribute to a stronger infrastructure in the chemical sciences through education and outreach activities.

Five-Year (New) or Three-Year (Renewal) Budget Estimate (3 pages for the budget justification plus six (new) or four (renewal) budget pages on NSF Form 1030 – one page for each year of the award and one page for the cumulative budget). This section should provide a detailed estimate and explanation of the total budget projected for establishment (or continuation) and operation of the facility and of the portion that the NSF is being asked to fund. Explain the basis for any cost estimates. Specify the expected sources and estimated amounts of cost-shared or matching funds (for example, state appropriations, endowment, debt financing, industrial contributions, etc.) and when they will be available. 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 (1 page each, GPG, NSF Form 1361) for the facility director, for all senior personnel whose core research activities would make major use of the facility, and for any other senior personnel who would draw major salary support from the facility.

Current and Pending Support. Current and pending support of two types must be summarized: (a) all current and pending support for the facility, including any support from any source, received or pending, for support, repair, renovation, replacement, or construction of the proposed or similar facilities in the previous five years; and (b) current and pending support (agency, award number, total cost amount, expected duration, and topic) for all research projects of each senior investigator from the host institution involved in the operation, management, research or training functions of the facility.

Renewal proposals should include all of the above information. In addition, a Results from Prior Support section should be included that lists all outside users of the facility with affiliation, information on major breakthroughs in research or instrument development, publications, patents, past outreach activities and their impact, and facility-sponsored workshops or meetings.

C. Budgetary Information

Cost Sharing Requirements.

Instrument Acquisition and Instrument Development Proposals: The CRIF Program requires institutional cost sharing for the equipment/instrumentation portion of the award budget. The program requires no matching funds for the first $80,000 required for the purchase of the equipment and instrumentation, but will provide up to one-half of the funds in excess of $80,000. Matching funds must be in cash, not in-kind, and be used towards the instrument(s) to be purchased.

Chemistry Research Facilities: For eligibility purposes, cost sharing at a level of 30% of the requested total amount of NSF funds is required. Institutional or state cost-share commitments, whether for construction or renovation of space, capital equipment purchase, or salary support, must be stated explicitly, and the source of the funds must be identified. The budget section should make it clear how combined NSF, institutional and user resources will be used to support all necessary costs. Both cash and in-kind cost sharing is permitted.

For all proposals submitted in response to this solicitation,the proposed cost sharing must be shown on line M on the proposal budget (NSF Form 1030.)

The amount of cost sharing must be shown in the proposal in enough detail to allow NSF to determine its impact on the proposed project. Documentation of availability of cost sharing must be included in the proposal.

Contributions may be made from any non-Federal source, including non-Federal grants or contracts (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost sharing toward projects of another Federal agency may not be counted towards meeting the specific cost-sharing requirements of the NSF grant. All cost-sharing amounts are subject to audit. Failure to provide the level of cost sharing reflected in the approved grant budget may result in termination of the NSF grant, disallowance of grant costs and/or refund of grant funds to NSF.

D. Proposal Due Dates.

Proposals **MUST** be submitted by 5:00 PM, local time, for the following categories:

- Departmental Multi-User Instrumentation: **Third Monday of July, 2000; Second Monday of July, Annually Thereafter**

- Instrumentation Development: **Second Monday of January, Annually**

- Chemistry Research Facilities:
  Preproposals: **First Monday of December, Annually**
  Full Proposals: **First Monday of June, 2001; Annually Thereafter**

E. FastLane Requirements.

Proposers MUST prepare and submit proposals using the NSF FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at (https://www.fastlane.nsf.gov/a1/newstan.htm).

Submission of Signed Cover Sheets. The signed proposal Cover Sheet (NSF Form 1207) must be postmarked (or provide a legible proof of mailing date assigned by the carrier) within five working days following the electronic submission of the proposal and forwarded to the following address:

National Science Foundation
Chemistry Research Instrumentation & Facilities Program
Chemistry Division/1055
4201 Wilson Blvd.
Arlington, VA 22230

A proposal may not be processed until NSF has received the complete proposal (including signed Cover Sheet).

For questions or problems concerning submitting a CRIF proposal via FastLane, please contact the divisional FastLane expert, Paul Spyropoulos (chefl@nsf.gov; phone (703) 306-1022). For non-FastLane questions related to the CRIF competition, please contact the CRIF program director, Joan M. Frye (jfrye@nsf.gov; phone (703) 306-1849).

PROPOSAL REVIEW INFORMATION

A. Merit Review Criteria.

Reviews of proposals submitted to NSF are solicitedfrom peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions; minority-serving institutions or adjacent disciplines to that principally addressed in the proposal.

Proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

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 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?

PIs should address the following elements in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give these factors careful consideration 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 learner 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 -- are 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.

Program-Specific Criteria:

Review of instrumentation proposals may involve ad hoc mail review, panel review, or a combination thereof, and may include site visits for Chemistry Research Facilities proposals. Evaluation of Chemistry Research Instrumentation proposals will be on the basis of the general criteria for review given above. Specific considerations for individual CRIF program proposals are as follows:

1. Departmental Multi-user Instrumentation:

- How does the proposed new or upgraded equipment impact the technical work of the department? Does the department have the technical expertise and infrastructure to make effective use of the new or enhanced equipment? Do prior research results from this department give confidence that the requested equipment will be used effectively? Will the research with this new equipment advance knowledge and understanding in the relevant fields? Is the plan for management and maintenance of the equipment appropriate and does it facilitate wide usage of the equipment?

- Is there a plan to use the new or enhanced equipment in teaching, training or learning? Will other institutions be involved? Do any of these plans enhance participation by underrepresented groups? Is there a plan to make the results of the work done using this equipment broadly available? How will the new or upgraded equipment impact the educational programs of the departments that use it?

In cases of comparable overall merit, priority will be given to supporting requests that would strengthen research activities already supported by the Division of Chemistry. Where appropriate, existing research project reviews and information on departmental strength (publications, education and training of chemistry students, development plans, extramural and institutional support) will be used by Division of Chemistry staff along with external reviews to assess the overall merit of instrumentation proposals.

2. Instrumentation Development:

- Is the proposed instrument unique? How widely useful within the scientific community would such an instrument be? Do the specific plans in the proposal and the prior work of the investigators indicate that the instrumentation will be successfully developed and utilized? How widely accessible will the instrument be?

- Is there a plan to use this new research capability in teaching, training or learning? Will the proposed instrumentation broaden the participation in science of underrepresented groups? Will other institutions have access to this equipment? Is there a plan to make the results of work done using this instrument broadly available? Are there plans to transfer the technology developed to U.S. industrial or governmental laboratories?

3. Chemistry Research Facilities:

- Competence of the facility management to meet multiple purposes of research, education, and service simultaneously;

- Capability of the facility to provide a needed state-of-the-art resource for chemical research;

- Usefulness of the facility as expressed by long-term commitment of the submitting institution, support of a national or regional community of users, and leveraging of limited Federal resources;

- Anticipated effect on rapid, efficient development of instruments and effective transfer of new knowledge and technology to other sectors of the U.S. science and technology enterprise;

- Use of unique resources to enhance education and training of students;
- Participation of groups underrepresented in science and engineering;
- Presence of cross-disciplinary research and a plan for transfer of knowledge.
- For renewal proposals the following additional criteria will be considered:
  - Breadth of involvement of the research community in the facility.
  - Quality of the scientific results obtained at the facility
  - Balance between internal and external users.
  - Continuing need for the facility.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. A program officer assigned to manage the proposal review will consider the advice of reviewers and will formulate a recommendation. NSF will be able to tell applicants whether their proposals have been declined or recommended for funding within six months for 95 percent of proposals. The time interval begins on the proposal deadline or target date or from the date of receipt, if deadlines or target dates are not used by the program. The interval ends when the division director accepts the program officer's recommendation.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants 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 an 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 Officer does so at its own risk.

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 (DGA). Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator.

B. Grant Award Conditions.

An NSF grant consists of: (1) the award letter, which includes any special provisions applicable to the grant 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 grant conditions, such as Grant General Conditions (NSF GC-1)* or Federal Demonstration Partnership Phase III (FDP) Terms and Conditions* and (5) any NSF brochure,

program guide, announcement or other NSF issuance that may be incorporated by reference in the award letter. Electronic mail notification is the preferred way to transmit NSF grants to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

* These documents may be accessed electronically on NSF's Web site at (http://www.nsf.gov/home/grants/grants_gac.htm). Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF*Grant Policy Manual* (GPM) Chapter II, (NSF 95-26) available electronically on the NSF Web site at (http://www.nsf.gov/cgi-bin/getpub?gpm). The GPM also is available in paper copy by subscription from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. The GPM may be ordered through the GPO Web site at (http://www.gpo.gov). The telephone number at GPO for subscription information is (202) 512-1800.

C. Reporting Requirements.

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after expiration of a grant, the PI also is required to submit a final project report. Approximately 30 days before expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

NSF has implemented a new electronic project reporting system, available through FastLane, which permits electronic submission and updating of project reports, including information on: project participants (individual and organizational); activities and findings; publications; and, other specific products and contributions. Reports will continue to be required annually and after the expiration of the grant, but PIs will not need to re-enter information previously provided, either with the proposal or in earlier updates using the electronic system.

Effective October 1, 1999, PIs are required to use the new reporting system for submission of annual and final project reports.

Special reports may be required for facility awards in order to meet NSF requirements under the Government Performance and Results Act.

D. New Awardee Information.

If the submitting organization has never received an NSF award, it is recommended that the organization's appropriate administrative officials become familiar with the policies and procedures in the NSF*Grant Policy Manual* which are applicable to most NSF awards. The "Prospective New Awardee Guide" (NSF 99-78) includes information on Administrative and Management Information; Accounting System Requirements and Auditing Information; and Payments to Organizations with NSF Awards. This information will assist an organization in preparing documents that NSF requires in order to conduct administrative and financial reviews of an organization. The guide also serves as a means of highlighting the accountability requirements associated with Federal awards. This document is available electronically on NSF's Web site at (http://www.nsf.gov/cgi-bin/getpub?nsf9978).

CONTACTS FOR ADDITIONAL INFORMATION

General inquiries should be made to the **Chemistry Research Instrumentation and Facilities Program**, Dr. Joan M. Frye, Program Director, Room 1055, Division of Chemistry, National Science Foundation, Arlington, VA 22230, telephone (703) 306-1849, email: jfrye@nsf.gov. For questions related to use of FastLane, contact Paul Spyropoulos, telephone: (703) 306-1022; email: chefl@nsf.gov.

OTHER PROGRAMS OF INTEREST

The NSF Guide to Programs is a compilation of funding for research and education in science, mathematics, and engineering. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter. Many NSF programs offer announcements concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSFprogram offices listed in Appendix A of the GPG.

Any changes in NSF's fiscal year programs occurring after press time for the Guide to Programs will be announced in the NSF Bulletin, available monthly (except July and August), and in individual program announcements. The Bulletin is available electronically via the NSF Web Site at (http://www.nsf.gov). The direct URL for recent issues of the Bulletin is (http://www.nsf.gov/od/lpa/news/publicat/bulletin/bulletin.htm). Subscribers can also sign up for NSF's Custom News Service to find out what funding opportunities are available.

OTHER NSF INSTRUMENTATION PROGRAMS

The CRIF Program cooperates with other NSF instrumentation programs in the joint review and co-funding of multidisciplinary instrument proposals for research uses that cross NSF divisional lines. Related NSF programs for research instrumentation and instrument development are listed below. In divisions that have no separate instrumentation program, instrumentation needs are provided for in regular research grant programs.

NSF 96-50 Earth Sciences Research/Instrumentation and Facilities

NSF 99-170 Instrumentation for Materials Research

NSF 98-132 Instrumentation Grants for Research in Computer and Information Sciences and Engineering

NSF 98-137 Multi-User Equipment and Instrumentation Resources for Biological Sciences

NSF 98-119 Instrument Development for Biological Research

NSF 99-57 Small Business Innovation Research

NSF 99-57 Small Business Technology Transfer

NSF 99-168 Major Research Instrumentation

NSF 97-143 Directorate for Engineering Support for Acquisition of Specialized Equipment and/or Instrumentation

For instructional instrumentation needed for undergraduate educational purposes in chemistry, application should be made through the Course, Curriculum and Laboratory Improvement/Adaptation and Implementation Program (NSF 99-53).

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

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 regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

We want all of our communications to be clear and understandable. If you have suggestions on how we can improve this document or other NSF publications, please email us atplainlanguage@nsf.gov.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at (http://www.nsf.gov/oirm/y2k/start.htm).

Catalogue of Federal Domestic Assistance (CFDA) No.: 47.049 — Mathematical and Physical Sciences Grants
OMB No.: 3145-0058