

**MULTI-USER EQUIPMENT AND INSTRUMENTATION
RESOURCES FOR BIOLOGICAL SCIENCES**

DIRECTORATE FOR BIOLOGICAL SCIENCES

Division of Biological Infrastructure

TARGET DATE: First Monday of October, Annually



NATIONAL SCIENCE FOUNDATION

MULTI-USER EQUIPMENT AND INSTRUMENTATION RESOURCES FOR BIOLOGICAL SCIENCES

PROGRAM OBJECTIVES:

The Directorate for Biological Sciences (BIO) at the National Science Foundation (NSF) announces its continued effort that began in the early 1980's to support purchase of multi-user instrumentation for research in biological sciences. The Multi-User Equipment and Instrumentation Resources for Biological Sciences (MUE) Program provides support to institutions to purchase expensive items of equipment that will be shared by a number of investigators having actively-funded research projects in areas supported by BIO. Applications are invited for instruments that cost at least \$40,000 per instrument or integrated system. This program will provide funds up to \$400,000 per application.

PROPOSAL DESCRIPTION:

The Multi-User Equipment and Instrumentation Resources for Biological Sciences (MUE) Program provides support for the purchase of major items of instrumentation, with funding ranging from \$40,000 to \$400,000, and that will be shared by a number of investigators having actively-funded research projects in areas supported by the Directorate for Biological Sciences. It is expected that some of the identified users have active NSF support. The MUE program will give priorities to proposals that involve multiple identified users with active NSF support. The program will support:

- the purchase of single items of biological equipment that cost at least \$40,000,

- the establishment of instrumentation resources consisting of several items of equipment with a related purpose, or the purchase of additional equipment for such resources, and
- shared computational resources. Applications for workstations and mid-range computing machines dedicated to broad research needs are appropriate as multi-user equipment proposals. Support is not provided for personal computers, personal workstations and printers.

The Division of Biological Infrastructure (DBI) supports instrumentation activities in support of research efforts in areas under the purview of the NSF Directorate for Biological Sciences. The work to be conducted using instrumentation provided under the Multi-User Equipment and Instrumentation Resources program must fall within the scope of divisions in the Directorate for Biological Sciences: Division of Biological Infrastructure (DBI), Division of Environmental Biology (DEB), Division of Integrative Biology and Neuroscience (IBN) and, Division of Molecular and Cellular Biosciences (MCB).

Instrumentation used in the conduct of disease-oriented research, including the etiology, diagnosis or treatment of physical or mental disease, abnormality or malfunction in human beings or animals, or the design and testing of drugs for treatment of such conditions is *not* appropriate for consideration.

Instrumentation for purely instructional purposes is not eligible under this program announcement. These types of proposals should be submitted to the Course, Curriculum, and Laboratory Improvement (CCLI) Program in the NSF Directorate for Education and Human Resources

(EHR). Reference the EHR web site at <http://www.ehr.nsf.gov/>.

The minimum cost of instrumentation eligible for this program is \$40,000. While there is no upper limit, a maximum NSF award will be \$400,000. Cost-sharing of at least 30% is required. (See Item 7 in the PROPOSAL FORMAT AND CONTENT section below for details.)

The Directorate for Biological Sciences understands that some pieces of equipment are sufficiently expensive that they are unlikely to be funded by a single Federal agency. For that reason, parallel multi-user equipment proposals may be sent to the NSF and to other Federal agencies for simultaneous review. It is important to identify on the Cover Sheet (NSF Form 1207) the other agencies to which parallel proposals are submitted, in order to facilitate coordinated funding if an award is made.

JOINT NSF/NIH MULTI-USER INSTRUMENTATION ACTIVITY

The Directorate for Biological Sciences (BIO) Multi-User Equipment and Instrumentation Resources program and the National Institutes of Health (NIH) National Center for Research Resources (NCR) Shared Instrumentation Grant (SIG) program encourage applications for joint funding for multi-user high-end instruments. For joint funding consideration at least one Principal Investigator or 40% of the major user groups must have active NSF support. Proposals that request a single instrument with a total purchase cost of more than \$500,000, and that would normally be eligible for submission to both NIH and NSF, may be submitted to NIH for joint funding with NSF by including the necessary NSF documentation in the NIH proposal. This documentation consists of both sides of the NSF Cover Sheet (NSF Form 1207) and a NSF budget sheet (Form 1030) for those expenses allocated to NSF. The budget justification

pages must clearly identify costs attributed to NIH, NSF, and the applicant institution. The agencies will review such proposals in a review group to be convened by NIH with NSF participation.

The SIG Program Announcement is published in a January issue of the NIH Guide for Grants and Contracts. There is only one deadline for receipt of applications for the SIG program each year, usually in March.

Interested applicants are strongly encouraged to consult with each agency's program officers prior to submitting an application to determine if the request is appropriate and what documentation is required.

REQUIREMENTS FOR SHARING MULTI-USER EQUIPMENT

The MUE program requires that proposals include an assurance that the requested instrumentation will be used by a minimum of three independent investigators. Such proposals may describe the research projects of no more than seven major user groups. It is expected that a majority of the major user groups will have outside, peer-reviewed funding and that some of the major users will have active NSF funding. Further at least one Principal Investigator or 40% of the major user groups must have active NSF funding. Additional use of this equipment in educational activities is encouraged, consistent with the research needs of the proposed projects. The proposed instrumentation must be managed by individuals who are competent to independently operate and use the proposed instrumentation in their individual research. The remaining users may function through collaborations; however, in no case may more than 60% of the instrument time be allocated to one research group and its collaborators. The MUE program encourages applications from user groups that include individuals from different departments and institutions.

Equipment proposals not meeting these guidelines can be considered by any of the disciplinary research programs in the Directorate for Biological Sciences. Individuals interested in single-user equipment should consult a program officer in the field of biological research corresponding to their interests.

In some cases, there may be a large number of research groups that would propose to make use of an instrument. For example, some computer systems may be used by more than one hundred user groups with no one group using more than a small percentage of instrument time. Proposals for this type of instrumentation should include research descriptions of up to seven representative user groups and summarize the research projects, funding, and other characteristics of the additional research groups in tabular format.

PROPOSAL FORMAT AND CONTENT

Proposals to Multi-User Equipment and Instrumentation Resources for Biological Sciences (MUE) **require electronic submission via the NSF FastLane system** in accordance with the guidelines provided in the "Instructions for Proposal Preparation" found in the *Grant Proposal Guide (GPG)*, NSF 98-2, Chapter II. The *GPG* is available on the NSF Web Site at the URL <http://www.nsf.gov/>. Include in proposals to MUE the components listed in *GPG*, Chapter II, Section D. State information in each component as clearly and concisely as possible for merit review. Take special care in adhering to the requirements for page limitations (see group proposals), font size, format of biographical sketches and appendix material. Reference guidelines governing group proposals in the *GPG*, Chapter II, Section D. Proposals not adhering to the requirements of the *GPG* are returned without review.

Guidelines are provided for specific sections as follows:

1. Cover Sheet

On the FastLane Proposal Cover Sheet click on the "Add Org Unit" button. Highlight "DIRECT FOR BIOLOGICAL SCIENCES" and click "OK". Scroll down to "DIV OF BIOLOGICAL INFRASTRUCTURE" and highlight "Instrumentation & Instrument Development/Multi-User Instrumentation". Clicking "OK" designates this program as the NSF organizational unit of consideration. Begin the title of the proposal with the name of the instrument (or category of instruments, in the case of a group of related instruments), for example, "A confocal microscope for...." Titles should include key words that are helpful in assigning reviewers to the proposal and for indexing. Avoid unnecessary language, such as "A purchase of a..." Multidisciplinary proposals may be reviewed jointly with other relevant NSF programs. Be sure to check the group proposal box on the cover page.

Designate a primary principal investigator (PI), who will sign the proposal cover sheet. Not more than four additional co-principal investigators (co-PIs) may be listed on the cover sheet. There must be at least three major users of the proposed instrumentation, and no more than seven (including the PI and co-PIs). Describe the research activities of these major users in the Project Description.

2. Project Summary

Provide a summary of the type of equipment to be purchased, the type of research for which the instrument will be used, the significance of the instrument for that research, and the overall significance of the entire activity to the institution or the field at large. A scientifically literate reader should understand the summary. If an award is made, the project summary is made available to the public as a source of information about the NSF award.

3. Table of Contents

The Table of Contents as automatically generated in the NSF FastLane system.

4. Project Description

A list of the titles and corresponding page numbers of the projects of each of the major users of the instrumentation must be the first page of the Project Description.

Provide a description of the equipment to be purchased and the research to be accomplished with the requested equipment. Multi-User Equipment proposals are classified as *Group Proposals* as defined in the *GPG*. The combined project descriptions of the user groups in *Group Proposals* submitted to the Multi-User Equipment and Instrumentation Resources for Biological Sciences (MUE) program may not exceed 26 pages. If a proposal is submitted as a group proposal, the *Group Proposal* box on the cover sheet must be checked.

To judge whether the projects are high priority and whether the requested equipment is essential for them, the MUE program considers the overall merit of the research to be accomplished using the requested equipment as well as the appropriateness of the proposed instrument configuration.

In the first part of the Project Description section describe the instrumentation that is requested. In the second part concisely describe the projects to be undertaken using the proposed instrumentation and address specifically the requirement for and impact of the requested instrumentation. Include in the Project Description adequate discussion of the points listed below.

For the proposed instrumentation:

What equipment is requested? If a specific manufacturer and model has been selected, explain why. Clearly differentiate between

competing manufacturers and models, both in terms of features and cost. If a specific item has not been selected in advance, describe those instruments that are of interest, their costs, and the methods that will be used to make the final selection. Provide a detailed breakdown of the components of any complex instrument, including an itemized price list of the individual components. List actual projected costs, not merely a nominal quote. Clearly justify each component. It is appropriate to request multiple pieces of equipment related by a common purpose, but a "shopping list" of unrelated items is not advised.

How will the continuing operation of the equipment be supported? Indicate how the instrument will be supported and managed. Identify the individual who will be responsible for the instrument and describe a mechanism for assuring access to the instrument by all investigators. Document expertise in use of the equipment. A commitment to financially support the continuing operation and maintenance of the instrument is essential. Present a replacement plan for equipment with a predictable useful life or duty cycle.

Education and Human Resources: Include a statement describing the potential contribution of the proposed instrumentation to the research training in biological sciences at the undergraduate, graduate, and postdoctoral levels. Describe special effectiveness or achievement in producing or enabling scientists from under-represented. Although an educational /training component is an important aspect of any multi-user facility, this program does not support instrumentation requests whose purpose is primarily educational.

For each of the major users:

Results from prior NSF support: For each major user of the proposed instrumentation, list the

results of their single most relevant NSF-funded project, if any.

What important research projects are proposed that will use the requested equipment? For each major user, provide a concise description of the research projects to be pursued with the use of the requested instrumentation. Specify as clearly as possible the importance of the instrumentation to the development of those projects. Provide sufficient details of the experimental procedure of the research project for reviewer consideration of the match between the instrumentation and project needs. In each description include representative literature references to work in the research field (compile in the References Cited section, see item 5 below). Clearly delineate among major and minor users. For minor users, only include a list of names, project titles, current grant support, and a very brief (one-paragraph) summary of research related to the need for the instrument.

How will the research described be affected by the requested equipment? The need for the instrumentation (such as a requirement for higher capacity, increased sensitivity, or new capabilities) should be clearly detailed and closely connected with the research projects that are described for each investigator. Quantitative analysis of the potential impact of the requested equipment on the productivity of each affected project is encouraged. For example, if increased sequencing capability is required, it is essential to characterize current capacity and estimate future needs based on the research project descriptions.

What is the likelihood of deriving benefits from the requested equipment? It must be demonstrated that the proposed equipment is appropriate for the applicant's particular samples or procedures. Present preliminary data when possible. Manufacturers' applications laboratories, regional instrumentation facilities,

and colleagues are potential sources of assistance in obtaining preliminary data. It is essential to convince reviewers that Principal Investigators (PIs) have characterized and understand the improvements to be gained from the requested instrumentation.

How essential is the equipment? The applicant must differentiate between an instrument that is essential versus one that is merely more convenient for the proposed research. It is important to document heavy usage of existing equipment or the cost of alternate strategies for obtaining the needed information or services. If the research has been conducted adequately without the proposed instrument, it must be explained what features are needed in the future and what aspect of the research will be enhanced as a result of obtaining the proposed instrumentation. (See also item 9, below.)

If the requested instrumentation would provide a service (e.g., DNA synthesis) that is commonly available on a fee-for-service basis, there must be careful justification of why existing commercial services are inadequate or inappropriate for the scientific requirements of the proposers.

5. References Cited:

Provide references as described in the *Grant Proposal Guide (GPG)*, Chapter 2, NSF 98-2, and item 4 above.

6. Biographical sketches

Provide biographical sketches as specified in the *Grant Proposal Guide (GPG)*, Chapter 2, NSF 98-2, for the PI, the Co-PIs (no more than four) and the major users (no more than seven including PI and Co-PIs). Provide an additional biographical sketch of the person responsible for the operation and upkeep of the proposed instrumentation if that person is not among the major users. Biographical sketches should conform to the format specified in the GPG and

not exceed two pages per person. *The biographical sketches are not part of the Project Description page limit.*

7. Budget

Provide a budget as specified in the the *Grant Proposal Guide (GPG)*, NSF 98-2, Chapter 2, (NSF Form 1030). The Multi-User Equipment and Instrumentation Resources for Biological Sciences (MUE) program will *not* support requests for instruments purchased prior to the submission of the proposal requesting support for the instrumentation.

When an instrument has been obtained on lease or loan prior to submission of the NSF proposal, the following information must be supplied as part of the budget justification: 1) documentation to show that the instrument is not the property of the institution and that the instrument will be at the institution for a total period of no more than two years without payment in full for the instrumentation; and 2) documentation to show that the instrument has been at the institution for less than one year at the time the proposal requesting support from NSF was submitted. If the documentation is not transmitted via FastLane, it must be sent with documents required in the PROPOSAL SUBMISSION section below. The MUE Program may opt to offer support of the depreciated value of the instrument rather than the original purchase price. Applicants should only request support for the specific instrumentation that is necessary for the research projects that are justified in the proposal, without regard to the specific configuration of the instrument currently at their institution.

Cost-Sharing: Assumption of at least 30% of the total instrumentation acquisition cost by the grantee is required. Applicants must specify the amount of cost-sharing on the budget page (line M) at the time of submission. The cost-sharing may be from any private or non-Federal

public source and may be in cash or in kind, fairly evaluated (see OMB Circular A-110). Equipment items (such as accessories for a proposed new device) may be included as part of the grantee contribution if they are listed in the budget and are subjected to the same peer review criteria as the rest of the proposal. Manufacturers' discounts do *not* constitute grantee contributions. Proposals not meeting appropriate cost-sharing criteria are returned without review.

8. Current and Pending Support (NSF Form 1239):

Include current and pending support from all sources for each major user (not simply each co-PI).

9. Facilities, Equipment and Other Resources (NSF Form 1363):

Provide a facilities statement as described in the *Grant Proposal Guide (GPG)*, Section D-9. In addition, inventory instruments to which the applicants have or might have access that are comparable to the equipment proposed and provide reasons for their unavailability or unsuitability for the proposed research. It is important that this survey be complete and cover the institution as a whole.

10. Special Information and Supplementary Documentation:

Include necessary items as described in the *Grant Proposal Guide (GPG)*, Section D-10. Items typically included in equipment proposals are documentation of cost share arrangements, commitments by the institution to provision of technical or material support, collaborative arrangements, vendor quotations, and, when applicable, certifications involving research with vertebrate animals and/or endangered species. Mail relevant letters and/or documentation regarding these matters directly to the Multi-

User Equipment and Instrumentation Resources for Biological Resources (MUE) program. See mailing instructions in the PROPOSAL SUBMISSION section.

PROPOSAL SUBMISSION

The **target date** for submitting proposals to Multi-User Equipment and Instrumentation Resources for Biological Sciences program is the **first Monday in October, annually**. Proposals received by the target date are considered by the Advisory Panel that meets January following the October target date. Proposals that do not allow sufficient time for review by this Advisory Panel may be returned without review. Proposals for this solicitation require electronic submission via NSF FastLane.

To access FastLane, go to the NSF Web Site at the URL <http://www.nsf.gov>, then select “FastLane” or go directly to the FastLane Home page located at <http://www.fastlane.nsf.gov/>. For instructions to prepare and submit your proposal via FastLane, please see Instructions for Preparing and Submitting a Proposal to the NSF Directorate for Biology Sciences located at <http://www.fastlane.nsf.gov/a1/BioInstr.htm>.

Additionally, read the “PI Tipsheet for Proposal Preparation,” and the “Frequently Asked Questions About FastLane Proposal Preparation” accessible at the URL <https://www.fastlane.nsf.gov/a1/A1Prep.htm>.

Mail the following materials directly to the to Multi-User Equipment and Instrumentation Resources for Biological Sciences Program:

- a paper copy of the cover sheet signed by the PI and an institutional representative, including the certification page (page 2 of 2);
- the BIO classification form; and

- relevant information as follows, and as outlined in the “Special Information and Supplementary Documentation” of the PROPOSAL FORMAT AND CONTENT section that includes:

- Documentation of cost share arrangements
- Commitments to provision of technical or material support, collaborative arrangements, and vendor quotations
- Applicable certifications involving research with vertebrate animals and/or endangered species.

The mailed materials must be received within five (5) business days of submitting the proposal via NSF FastLane. Send the materials to:

Multi-User Equipment and Instrumentation Resources for Biological Sciences –NSF 98-137
Division of Biological Infrastructure
National Science Foundation
4201 Wilson Boulevard
Room 615
Arlington, VA 22230

Do not mail copies of the proposal. NSF will make the appropriate number of copies of the proposal.

PROPOSAL REVIEW

Proposals are reviewed both by an advisory panel and by expert mail review. Reviewers evaluate proposals on the merit review criteria described in the *Grant Proposal Guide (GPG)*, NSF 98-2, Chapter III: (1) What is the intellectual merit of the proposed activity? and (2) What are the broader impacts of the proposed activity?

In addition, reviewers also consider: (3) the adequacy of the users' current research awards to support these studies and to utilize the

instrument, (4) the degree to which the instrument and ancillary components are appropriate and essential for the research projects, (5) the institutional commitment to maintenance of the instrumentation over the long term, as well as maintenance or development of expertise in the area of the requested instrumentation, and (6) the appropriateness of the research to the mission of the NSF. As a part of the consideration of intellectual merit (item 1 above), the reviewers judge the proposer's ability to assure competent use and maintenance of the equipment in addition to competence in conducting the proposed research. As a part of the consideration of the broader impacts of the proposed research (item 2 above), the reviewers consider the number of investigators benefiting significantly from the instrument and the potential extent of instrument usage.

AWARDS

Support for the program is subject to availability of funds. In FY 1997, about \$6.5M was available and approximately 80 awards were made with a success rate of about 30%.

GRANT ADMINISTRATION

Grants awarded as a result of this announcement are administered in accordance with the terms and conditions of NSF GC-1, "Grant General Conditions," or FDP-III, "Federal Demonstration

Project General Terms and Conditions," depending on the grantee organization. Copies of these documents are available at no cost from the NSF Clearinghouse, telephone (703) 292-7827

or via e-mail to pubs@nsf.gov. More comprehensive information is contained in the NSF Grant Policy Manual, available on the NSF On Line Document System located at <http://www.nsf.gov/>, or for sale through the

Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

INQUIRIES

Make general inquiries to:

Multi-User Equipment and Instrumentation
Resources for Biological Sciences,
Program Director
Division of Biological Infrastructure, Room 615
National Science Foundation
Arlington VA 22230
Telephone: (703) 306-1472
FAX: (703) 306-0356
E-mail: dbiuid@nsf.gov

Direct NSF inquiries to the Multi-User Equipment and Instrumentation Resources for Biological Sciences address given above.

Direct inquiries related to the Joint NSF/NIH Multi-User Instrumentation Activity to:

Marjorie A. Tingle, Ph.D.
National Center for Research Resources
Biomedical Technology Area
One Rockledge Center, Room 6154
Bethesda, MD 20892-7965
Telephone: (301) 435-0772
Fax: (301) 480-3659
E-mail: sig@ncrr.nih.gov

FINAL PROJECT REPORT

Upon completion of the project a Final Project Report (NSF Form 98A), including the Part IV Summary, is required. This report is due not more than 90 days after the expiration date of the grant. Applicants should review this form prior to proposal submission so that appropriate tracking mechanisms are included in the proposal plan to ensure that complete information is available at the conclusion of the project.

OTHER PROGRAMS OF INTEREST

Information about all NSF programs including guidelines, eligibility, deadlines and contact people are listed on the NSF homepage (<http://www.nsf.gov/>) and available links. Information about programs relevant to the Directorate for Biological Sciences is available at the URL <http://www.nsf.gov/bio/>.

GENERAL INFORMATION

The Foundation provides awards for research in the sciences and engineering. The awardee is wholly responsible for the conduct of such research and preparation of the results for publication. The Foundation, therefore, does not assume responsibility for the research findings or their interpretation.

The Foundation welcomes proposals from all qualified scientists and engineers and strongly encourages women, minorities, and persons with disabilities to compete fully in any of the research related programs described here. 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 subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

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 projects. See the program announcement or contact the program coordinator at (703) 306-1636.

Privacy Act. 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 application review process; to applicant institutions/grantees to provide or obtain data regarding the application review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers 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).

Public Burden. Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of your receiving an award.

The 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 or any other aspect of this collection of information, including suggestions for reducing this burden to, Reports Clearance Officer, Information Dissemination Branch, National Science Foundation, 4201 Wilson Boulevard, Suite 245, Arlington, VA 22230.

The National Science Foundation has TDD (Telephonic Device for the Deaf) capability, which enables individuals with hearing

impairment to communicate with the Foundation about NSF programs, employment, or general information. To access NSF TDD, dial (703) 292-5090 or (800) 281-8749; for FIRS, 1-800-877-8339.

The program described in this announcement is in the category 47.074 (BIO) of the Catalog of Federal Domestic Assistance.

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