University-Industry Cooperative Research Programs in the Mathematical Sciences (UICRP)

Program Solicitation
NSF 05-504
Replaces Document **NSF 00-121**

National Science Foundation
Directorate for Mathematical and Physical Sciences
Division of Mathematical Sciences

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

June 2, annually

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

University-Industry Cooperative Research Programs in the Mathematical Sciences (UICRP)

Synopsis of Program:

Technical innovations flourish through a symbiotic relationship between academia and industry. The mathematical sciences provide the foundation for the scientific progress that generates technical innovations. It is in the national interest to provide more opportunities for mathematical scientists to have the experience of conducting research in an industrial environment and for industrial scientists to return periodically to academia, to acquire new knowledge, and to move it efficiently into technology. The Division of Mathematical Sciences (DMS) supports this relationship through the university-industry postdoctoral research fellowships, university-industry senior research fellowships, industry-based graduate research assistantships, and industry-based graduate cooperative fellowships described in this solicitation.

Cognizant Program Officer(s):

- Lloyd E. Douglas, Program Director, Directorate for Mathematical & Physical Sciences, Division of Mathematical Sciences, 1025 N, telephone: (703) 292-4862, fax: (703) 292-9032, email: ldouglas@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Eligibility Information

- **Organization Limit: Universities, colleges, other research institutions, and for-profit organizations as described in the Grant Proposal Guide (GPG) in support of individual investigators or small groups may submit proposals.**
- **PI Eligibility Limit:**

  See Section III for detailed information.

- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard Grant
- **Estimated Number of Awards:** 10
- **Anticipated Funding Amount:** $1,000,000 subject to availability of funds

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is Specialized. Please see the full text of this solicitation for further information.
- **Indirect Cost (F&A) Limitations:**

  Postdoctoral Research Fellowships-

  NSF will provide an institutional allowance of $4,500 for the 24-month award period to the sponsoring academic institution, as partial reimbursement of indirect costs.

  Senior Research Fellowships-

  NSF will provide an institutional allowance of $10,000 for the 12-month award period to the awardee institution, as partial reimbursement of indirect costs.

  Graduate Research Assistantships and Graduate Cooperative Fellowships-

  No Limit.

- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
  June 2, annually

Proposal Review Information

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

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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I. INTRODUCTION

A major objective of the National Science Foundation (NSF) is to improve the nation's capacity for intellectual and economic growth. It does this by supporting the discovery of new knowledge and the enhancement of a skilled workforce. NSF must rely on industry to help shape the research and educational agenda, to outline the technical challenges and to assist in the support of academic institutions. By serving as a catalyst for university-industry partnerships, NSF helps ensure that intellectual capital and emerging technologies are brought together in ways that promote economic growth and an improved quality of life.

Technical innovations flourish through a symbiotic relationship between academia and industry. The mathematical sciences provide the foundation for the scientific progress that generates technical innovations. It is in the national interest to provide

more opportunities for mathematical scientists to have the experience of conducting research in an industrial environment and for industrial scientists to return periodically to academia, to acquire new knowledge, and to move it efficiently into technology. The Division of Mathematical Sciences (DMS) supports this relationship through the university-industry postdoctoral research fellowships, university-industry senior research fellowships, industry-based graduate research assistantships, and industry-based graduate cooperative fellowships described in this solicitation.

The general goals of the university-industry activities are to:

- strengthen the links between industry and academia by creating conduits for exchange of researchers, forging partnerships between universities and industries;
- establish a mechanism for exchange of mathematical scientists between academia and industry at different stages of their careers and for substantial periods of time;
- identify and encourage new avenues of research in the mathematical sciences, involving relevance to technological and societal issues, and to provide new perspectives and solutions to industrial research problems;
- encourage knowledge transfer as well as technology transfer; and
- impact the academic culture and the higher education enterprise by enriching the experience and expertise of teaching faculty and the breadth of their offerings and thereby:

    1. broaden the academic experiences of students so that they better grasp the challenges of the future, and be better prepared to meet these challenges;
    2. increase awareness of universities of the opportunities and needs of the workplace; and
    3. provide a more complete experience and perspective for students aspiring to enter the industrial workforce.

Current national goals offer outstanding research challenges to the mathematical sciences. Technical innovations in these areas will more likely result from a strong interaction and collaboration between industry and academia. In expanding partnerships with the private sector through the extension of the current program, proposals that directly address Foundation emphases are strongly encouraged. In all cases, the primary focus should be on the problems of interest to the industrial sponsor and not on the expertise of the mathematical scientists.

II. PROGRAM DESCRIPTION

UNIVERSITY-INDUSTRY POSTDOCTORAL RESEARCH FELLOWSHIPS

The University-Industry Postdoctoral Research Fellowships provide opportunities for recent doctoral recipients to broaden their knowledge, experience, and perspectives by exposing them to industrial environments and for industry to interact with talented researchers who are beginning their careers. This activity encourages interaction between the academic and industrial sectors by enabling postdoctoral researchers to spend approximately half their time engaged in research in an industrial setting and half in a university environment.

UNIVERSITY-INDUSTRY SENIOR RESEARCH FELLOWSHIPS

One way to stimulate increased participation of mid-career and senior mathematical scientists in an industrial research setting is to support university faculty taking sabbaticals in industry and/or to offer them opportunities to collaborate with scientists from industry. In order to accommodate the needs of mid-career and senior scholars, the university-industry research program includes the senior research fellowships. These fellowships will provide partial sabbatical support for

university faculty to conduct research in an industrial environment and for industrial mathematical scientists to contribute to the higher education enterprise. This program will provide opportunities for:

- faculty members to broaden their experience, knowledge, expertise, and research perspectives in industrial environments, and participate in industrial research activities and projects, and
- industrial researchers to experience and participate in the full range of university research environments, particularly including interaction with and exposure to students.

It is expected that the broadening of the research efforts of mathematical sciences faculty will enable them to mentor their students more effectively, bringing new perspectives to their institutions and curricula, and to create research collaborations extending well beyond the fellowship period. The full-time presence of an industrial researcher in an academic setting would allow for new perspectives and expertise to enrich the offerings of the university and to stimulate new directions of research.

These senior fellowships are intended to support only new or enhanced interactions, associations, and collaborations. A major factor in evaluation will be the added value or impact resulting from the award.

INDUSTRY-BASED GRADUATE RESEARCH ASSISTANTSHIPS

This research opportunity will permit graduate students to move freely between university and industrial settings and to provide a conduit for strong university/industry interactions. Important features of this activity include:

- graduate research opportunities, under the joint supervision of a university faculty member and an industrial scientist and in an industrial setting, which may form the basis of Ph.D. dissertations or Masters' theses in the mathematical sciences.
- a continuing dialogue between a university-based faculty research advisor and an industry-based research supervisor, to ensure that the research meets both the level of originality required by the academic institution for the thesis or dissertation, as well as the long-range strategic needs of the industrial participant.
- having the student spend time at the industrial site on a regular basis, and the remainder in the classroom or in other campus-based activities.

INDUSTRY-BASED GRADUATE COOPERATIVE FELLOWSHIPS

This opportunity will permit graduate students to be exposed to full-time industrial research experiences. In contrast to the industry-based graduate assistantships described above, industry-based graduate cooperative fellows will work full-time as an intern in an industrial setting for a fixed period of up to one year. The research conducted during this period would not necessarily be the basis for a thesis or dissertation.

III. ELIGIBILITY INFORMATION

POSTDOCTORAL RESEARCH FELLOW ELIGIBILITY LIMITATIONS:

The postdoctoral research fellow must:

1. be a citizen, national, or permanent resident alien of the United States as of January 1 of the year of the award;
2. be eligible to be appointed as a research associate or assistant professor at the institution submitting the proposal;
3. by the start of the fellowship award, have earned a Ph.D. in one of the mathematical sciences supported by the Division of Mathematical Sciences (see Guide to Programs, http://www.nsf.gov/cgi-bin/getpub?gp) or have had

research training and experience equivalent to that represented by such a Ph.D.;

4. have held the Ph.D. for no more than seven years as of January 1 of the year of the award;

5. not hold a tenured position at any academic institution as of the date of the award; and

6. have not previously held any NSF postdoctoral fellowship.

SENIOR RESEARCH FELLOW ELIGIBILITY LIMITATIONS:

To be eligible for this sabbatical research support, the faculty members or industrial scientists must:

1. be citizens, nationals, or permanent resident aliens of the United States as of January 1 of the year of the award;

2. if a faculty member, hold a tenured position at the academic institution submitting the proposal;

3. by the start of fellowship tenure, have earned a Ph.D. in one of the mathematical sciences supported by the Division of Mathematical Sciences (see Guide to Programs, http://www.nsf.gov/cgi-bin/getpub?gp) or have had research training and experience equivalent to that represented by such a Ph.D.; and

4. make a commitment to return to the home institution (for both university and industrial scientists) for a minimum of one year following the fellowship tenure, should an award be made.

GRADUATE RESEARCH ASSISTANTS and **COOPERATIVE FELLOWS ELIGIBILITY LIMITATIONS:**

To be eligible for support, the students must be citizens, nationals, or permanent resident aliens as of the date of the award.

IV. AWARD INFORMATION

NSF estimates making 10 standard grants for an anticipated total amount of $1,000,000 subject to the availability of funds.

University-Industry Postdoctoral Research Fellowships

Normally, the award from the National Science Foundation will total $71,000 and the contribution of the industrial sponsor will total $40,000 for a 24-month award period. The contribution of the industrial sponsor cannot come from Federal funds.

The combined funding of $111,000 includes:

a. A stipend plus fringe benefit allowance for the postdoctoral fellow of $96,000 for the 24-month award period ($40,000 per year for the stipend and an allowance of $8,000 per year for fringe benefits),

b. An allowance of $4,500 for the award period to the sponsoring academic institution as partial reimbursement for indirect costs and expenses incurred in support of the research,

c. A $4,500 research allowance for the award period for the postdoctoral fellow that may be used for travel, publication costs, and other research-related expenses, and

d. A $6,000 allowance for the award period for the faculty mentor for research expenses related to the same industrial partnership (this allowance may be used for release time when consistent with institutional policies).

The cost sharing obligation of $40,000 will be a condition of the award.

The term of the postdoctoral fellowship must begin by October 1 of the year after which the award is made.

University-Industry Senior Research Fellowships

Senior research fellowship awards will normally be for a 12-month period. Awards of shorter or longer (up to a maximum of two years) duration will also be considered, but the rationale for such terms must be fully justified. The fellowship activity must be initiated within 10 months of the award start date. The award start date will be no later than September 15 of the year after which the award is made.

Typically, awards will be based on the following:

- The equivalent of a six-month full-time salary, as set by the home institution or company, up to a maximum of $50,000 (up to $60,000 including fringe benefits as noted below) for a one-year award. For awards of shorter duration, these amounts will be adjusted accordingly.
- A research allowance of $10,000
- Institutional allowance of $10,000 as partial reimbursement for fringe benefits and (other) indirect costs.
- The awardee institution must cost share salary over and above the NSF funded six-month salary amount.

Industry-Based Graduate Research Assistantships and Cooperative Fellowships

NSF will provide 50% (with an upper limit of $20,000 per student per year) of the total support for each student for up to one year. The awardee institution must cost share any student support over and above the NSF-funded support. Requests for summer cooperative fellowships are appropriate. Modest allowances may be requested for student travel costs. The university faculty member involved in the joint supervision of such students may request a faculty research allowance in an amount up to $6,000, provided that this individual is playing a significant role in the university-industry interaction; this request must be fully justified. For both research assistantships and cooperative fellowships, the Principal Investigator will normally be the supervisor of the student.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

The following instructions supplement the GPG guidelines.

Proposers are reminded to identify the program solicitation number in the program announcement/solicitation block on the

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.

1. University-Industry Postdoctoral Research Fellowships

The maximum page limit for the Project Description section is 12 pages with Option 1 and 13 pages with Option 2.

Project Description is to consist of the following items:

- Statement of results from prior NSF support of the Principal Investigator related to the proposed research, limited to five pages.
- Training and research plan, not to exceed five pages. This plan should describe the research with both the faculty mentor and the industrial sponsor that will be carried out by the postdoctoral fellow during the award period.
- One of the following sets of materials must be included:

Option 1: Proposals in which the postdoctoral fellow is identified should include:

1. Statement from the faculty mentor nominating the postdoctoral fellow, limited to one page.
2. Personal professional goals statement, not to exceed one page, written by the proposed postdoctoral fellow. This should describe the career goals of the postdoctoral fellow and the roles that the chosen research, faculty mentor, industrial sponsor, and sponsoring academic institution will play in enhancing the realization of these career goals.

In the FastLane supplementary documents section submit the following:

Three letters of recommendation, including one from the dissertation advisor. Training and research plans should be provided to the references to assist their recommendations. These letters should address the potential of the postdoctoral fellow to participate in the proposed interaction with industry. These letters should be sent to the principal investigator for inclusion in the proposal submission. The signed letters of recommendation should be scanned, converted to PDF files and inserted into the supplementary documents FastLane section.

Option 2: Proposals in which the postdoctoral fellow will be recruited should include:

A clearly defined plan for the recruitment of the postdoctoral fellow, not to exceed three pages. This plan must provide complete details regarding the selection and recruitment process, including selection criteria. In particular, the process should include strategies for seeking to identify highly qualified individuals who are members of under-represented groups, including women, minorities, and persons with disabilities. The plan should also include a description of the roles that the faculty mentor, industrial sponsor, and sponsoring academic institution will play in enhancing the professional development of the fellow. The postdoctoral fellow ultimately chosen must be acceptable to the university, the industrial sponsor, and the National Science Foundation. It will be the responsibility of the principal investigator to notify the NSF of the identity of the chosen individual in advance of the start of the postdoctoral fellow's tenure.

In the FastLane supplementary documents section submit the following:

a. A statement from the appropriate industry representative, describing the industry policy on intellectual property rights.
b. Statement from the faculty mentor describing (1) the nature of the postdoctoral supervision to be given and (2) the facilities and resources that will be available to support the proposed research at the academic institution, not to exceed two pages. The signed statement should be scanned, converted to PDF files and inserted into the supplementary documents FastLane section.

c. Signed statement from the industrial sponsor describing the facilities and environment that will be available to the postdoctoral fellow and committing the required matching funds, not to exceed two pages. The signed statement should be scanned, converted to PDF files and inserted into the supplementary documents FastLane section.

2. University-Industry Senior Research Fellowships

a. Project Description is to consist of the following items:

- Statement of results from prior NSF support of the Principal Investigator related to the proposed research, limited to five pages.
- Activity plan, not to exceed five pages. This plan should describe the activities that will be undertaken during the award period. In the case of a faculty member applicant, the proposed industrial interaction should be completely described. In the case of an industrial researcher applicant, the proposed interaction with the university environment should be completely described.
- A description of the anticipated research activity by the industrial partner, not to exceed two pages.
- Personal professional goals statement, not to exceed one page, that describes the expected impact of the fellowship on the total career potential of the applicant.
- Institutional impact statement, not to exceed two pages, that describes the likely impact on the academic institution at the end of the Fellowship tenure, including expected benefits to and impact on students, colleagues, and curricula. This statement should include plans for follow-up activities after the end of Fellowship tenure; these plans should include provisions for continuing academic-industrial research collaboration and activities that will affect colleagues and/or students and curricula.

b. The biographical sketch of the proposed Fellow is to be included in addition to the PI (if they are different people).

c. In the case of an industrial researcher applicant, a statement from the academic department head (or equivalent) describing the facilities and resources that will be available to support the proposed research at the academic institution, not to exceed two pages. The statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

d. In the case of a faculty applicant, a signed statement from the industrial sponsor describing the facilities and resources that will be available to support the proposed research at the industrial site, not to exceed two pages. The signed statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

e. A statement detailing the nature of the cost-sharing from all sources. The statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

f. A statement from the appropriate industry representative, describing the industry policy on intellectual property rights. The statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

3. Industry-Based Graduate Research Assistantships and Cooperative Fellowships

a. Project Description is to consist of the following items:

- Statement of results from prior NSF support of the Principal Investigator related to the proposed research, limited to five pages.

- Training plan, not to exceed five pages. This plan should describe the activities in which the graduate student will engage during the award period. This section should clearly describe the nature of the supervision and the involvement of the faculty member in this activity. It should also include a description of the anticipated activity from the industrial partner.

- A clearly defined recruitment and selection plan for the graduate student(s), not to exceed three pages. This plan must include selection criteria. In particular, the process should include strategies for seeking to include highly qualified individuals who are members of under-represented groups, including women, minorities, and persons with disabilities.

b. Signed statement from the industrial sponsor describing the facilities and environment that will be available to the graduate assistant or graduate fellow, not to exceed two pages. The signed statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

c. A statement detailing the nature of the cost sharing from all sources. The statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

d. A statement, from the appropriate industry representative, describing the industry policy on intellectual property rights, as they pertain to the assistantship or fellowship. The statement should be scanned, saved as a PDF file and inserted into the supplementary documents FastLane form.

e. Biographical sketches of the proposed Assistant or Fellow and the Principal Investigator (if different).

Proposers are reminded to identify the program announcement/solicitation number (05-504) in the program announcement/ solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

- Cost sharing requirements for Postdoctoral Research Fellowships:

A $40,000 contribution by the industrial sponsor is required.

- Cost sharing requirements for Senior Research Fellowships:

NSF will provide support for the equivalent of six months of full-time salary, up to a maximum of $50,000 (up to $60,000 including fringe benefits) for a one-year award. The awardee institution must cost share salary over and above the NSF funded salary amount for the balance of the one-year award.

- Cost sharing requirements for Graduate Research Assistantships and Cooperative Fellowships:

NSF will provide 50% (with an upper limit of $20,000 per student per year) of the total support for each student for up to one year. The awardee institution must cost share any student support over and above the NSF-funded support.

The proposed cost sharing must be shown on Line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal. Only items which would be allowable under the applicable cost principles, if charged to the project, may be included as the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in-kind (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 award. All cost-sharing amounts are subject to audit. Failure to provide the level of cost-sharing reflected in the approved award budget may result in termination of the NSF

award, disallowance of award costs and/or refund of award funds to NSF.

Indirect Cost (F&A) Limitations:

Postdoctoral Research Fellowships-

NSF will provide an institutional allowance of $4,500 for the 24-month award period to the sponsoring academic institution, as partial reimbursement of indirect costs.

Senior Research Fellowships-

NSF will provide an institutional allowance of $10,000 for the 12-month award period to the awardee institution, as partial reimbursement of indirect costs.

Graduate Research Assistantships and Graduate Cooperative Fellowships-

No Limit.

C. Due Dates

Proposals must be submitted by the following date(s):

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

June 2, annually

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: https://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from 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.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which 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 the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

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

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

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

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented

minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

1. University-Industry Postdoctoral Research Fellowships

a. In the case of postdoctoral fellows who have been identified in the proposal, the fellow's ability, accomplishments, potential, and long-range career goals

   or

   In the case of proposals containing recruitment plans, the anticipated effectiveness of the proposed recruitment process to identify and select a highly qualified postdoctoral fellow;

b. the quality of the proposed research to be conducted at both the academic and industrial sites;
c. the qualifications of and commitment by both the faculty mentor and the industrial sponsor;
d. the appropriateness of the academic/industrial interaction; and
e. the impact of the proposed training on the professional development of the postdoctoral fellow.

2. University-Industry Senior Research Fellowships

1. the scientific record of the Fellow and the potential and likelihood of a significant impact;
2. the activity plan, including the appropriateness of the match of the Fellow and proposed activity site, and likelihood of productivity;
3. the effect of the fellowship on the growth and expansion of the total career potential of the Fellow, including future collaborations;
4. the likely impact on the academic institution after the end of the Fellowship tenure, including expected impact on colleagues, students, and curricula. This will be based on the explicit institutional impact statement in the proposal that describes the expected follow-up activities of the Fellow; and
5. the commitment of the university and industrial partners, provision of facilities, research plan, etc.

3. Industry-Based Graduate Research Assistantships and Cooperative Fellowships

1. the impact of the proposed training on the professional development of the graduate assistant/fellow;
2. the quality of the proposed activity at the industrial site;
3. the qualifications of both the supervising faculty member and the industrial mentor;
4. the commitment of the university and industrial partners, provision of facilities, etc.
5. the appropriateness of the academic/industrial interaction; and
6. the anticipated effectiveness of the proposed recruitment process to identify and select highly qualified graduate assistants/fellows.

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. Proposals submitted in response to this announcement/ solicitation will be reviewed by Ad Hoc and/or panel review.

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

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all

cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. 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 and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards 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 Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

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

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 the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system 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. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Lloyd E. Douglas, Program Director, Directorate for Mathematical & Physical Sciences, Division of Mathematical Sciences, 1025 N, telephone: (703) 292-4862, fax: (703) 292-9032, email: ldouglas@nsf.gov

For questions related to the use of FastLane, contact:

- Florence Rabanal, Electronic Business Coordinator, Directorate for Mathematical & Physical Sciences, 1005 N, telephone: (703) 292-8808, fax: (703) 292-9151, email: frabanal@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees 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, although some programs may have special requirements that limit eligibility.

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 GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at http://www.nsf.gov

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230
- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

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

  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to 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.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

OMB control number: 3145-0058.