

Fundamental Research Program for Industry/University Cooperative Research Centers (FRP)

PROGRAM SOLICITATION

NSF 11-570

REPLACES DOCUMENT(S):

NSF 10-601



National Science Foundation

Directorate for Engineering
Industrial Innovation and Partnerships

Directorate for Computer & Information Science & Engineering

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

February 01, 2012

First Wednesday in February, Annually Thereafter

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the **NSF Proposal & Award Policies & Procedures Guide** (PAPPG), [NSF 13-1](#), was issued on October 4, 2012 and is effective for proposals submitted, or due, on or after January 14, 2013. Please be advised that the guidelines contained in [NSF 13-1](#) apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 14, 2013, must also follow the guidelines contained in [NSF 13-1](#).

Please be aware that significant changes have been made to the PAPPG to implement revised merit review criteria based on the National Science Board (NSB) report, [National Science Foundation's Merit Review Criteria: Review and Revisions](#). While the two merit review criteria remain unchanged (Intellectual Merit and Broader Impacts), guidance has been provided to clarify and improve the function of the criteria. Changes will affect the project summary and project description sections of proposals. Annual and final reports also will be affected.

A by-chapter summary of this and other significant changes is provided at the beginning of both the [Grant Proposal Guide](#) and the [Award & Administration Guide](#).

Please note that this program solicitation may contain supplemental proposal preparation guidance and/or guidance that deviates from the guidelines established in the [Grant Proposal Guide](#).

Revision Summary

Minor changes have been made to the text for the Synopsis and Project Description.

Changes made to the list of Cognizant Program Directors; added Larry Hornak as an agency contact.

No other changes were made from the previous release of NSF 10-601.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Fundamental Research Program for Industry/University Cooperative Research Centers (FRP)

Synopsis of Program:

The National Science Foundation encourages the submission of industry-defined fundamental research proposals from NSF Industry/University Cooperative Research Centers (I/UCRC) in areas of shared value to both centers and their members. Industry-defined fundamental research broadens the scientific and engineering understanding beyond the more specific applied research interests of the industries traditionally served by the I/UCRC. Industry participation extends the scope and horizon of center research projects so as to drive innovation with industrially relevant fundamental research projects.

Cognizant Program Officer(s):

Please note that the following information is current at the time of publishing. See program website for any updates to the points of contact.

- Rathindra DasGupta, I/UCRC Program Director, ENG/IIP, telephone: (703) 292-8353, email: rdasgupt@nsf.gov
- Larry Hornak, I/UCRC Program Director, telephone: 703-292-2678, fax: (703)-292-9057, email: lhornak@nsf.gov
- Rita V. Rodriguez, I/UCRC Program Director, CISE, telephone: (703) 292-8950, email: rrodrigu@nsf.gov

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

- 47.041 --- Engineering
- 47.070 --- Computer and Information Science and Engineering

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 10 subject to the availability of funds.

Anticipated Funding Amount: \$1,600,000 subject to the availability of funds. The average award size is expected to range from \$50,000 up to \$200,000.

Industry-defined fundamental research: Industry-defined fundamental research projects must demonstrate measurable industry collaboration and involvement that accelerates fundamental research. Evidence of industry-defined fundamental research must show that the proposed industry participation extends the centers capabilities into areas or projects that might not otherwise be researched.

Eligibility Information

Organization Limit:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

PI Limit:

The PI must be the center director of an NSF Industry/University Cooperative Research Center. Other center participants may be co-PIs. The lead institution's center director may request a waiver to this requirement.

Limit on Number of Proposals per Organization:

One proposal per center. All sites must submit a collaborative proposal that is part of the same integrated research experimental plan of the center. The total budget for all site submissions from a center cannot exceed the maximum award.

Limit on Number of Proposals per PI:

One proposal per PI per center.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- Letters of Intent: Not Applicable
- Preliminary Proposal Submission: Not Applicable
- Full Proposals:
 - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
 - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide)

B. Budgetary Information

- Cost Sharing Requirements: Inclusion of voluntary committed cost sharing is prohibited.
- Indirect Cost (F&A) Limitations: Not Applicable
- Other Budgetary Limitations: Not Applicable

C. Due Dates

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

February 01, 2012

First Wednesday in February, Annually Thereafter

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria apply.

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

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

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I. INTRODUCTION

The Industry/University Cooperative Research Centers (I/UCRCs) program develops long-term partnerships among industry, academe, and government. The centers are catalyzed by a small investment from the National Science Foundation (NSF) and are primarily supported by center members, with NSF taking a supporting role in their development and evolution. I/UCRCs stimulate highly leveraged industry/university cooperation by focusing on research recommended by their Industrial Advisory Boards (IAB) whose members are companies and other organizations that help support a center's research activities.

The Fundamental Research Program for I/UCRCs provides the opportunity for centers to conduct fundamental research to better position themselves as leaders in emerging areas that could benefit the industries that they serve. Proposals must discuss how the proposed fundamental research will benefit potential and current industry members while charting a path for potentially new and emerging research directions.

II. PROGRAM DESCRIPTION

NSF supported Industry/University Cooperative Research Centers serve many industry research needs in areas such as:

- Advanced electronics
- Advanced manufacturing
- Advanced Materials
- Biotechnology
- Civil Infrastructure Systems
- Information, communication, and computing
- Energy and environment
- Fabrication and process technology

Health and Safety

These investments contribute to advances that are important for the environment, energy, transportation, information technologies, health-related industries, the economy, and other areas that impact our daily lives and quality of life.

The I/UCRCs contribute to the knowledge base of a large number of industrial processes that involve a wide range of technological pursuits and are found in areas such as aerospace, electronics, chemicals, computers, recovery of natural resources, the environment, petroleum, biochemicals, materials, food, power generation, and allied activities. To better enable these processes, the I/UCRC fundamental research program supports research that involves the development of fundamental engineering and science principles, process control and optimization strategies, mathematical models, and experimental techniques, with an emphasis on projects that have the potential for innovation and broad application across one or more industry sectors.

This fundamental research is leading to applications that include sensors, materials, pharmaceuticals, imaging, visualization, embedded systems, next generation computers, medical devices and instrumentation, alternative energy, ecological engineering, water and waste treatment, and robotics.

Fundamental research proposals must be well planned with professional project management principles applied to help assure success. The proposal must include a project plan, schedule, milestones, budget, and other factors similar to the Project Proposal Form that the center should be using in its IAB meetings (Gray and Walters, *Managing the Industry/University Cooperative Research Center: A guide for Directors and Other Stakeholders*, p. 181, 1998). As such, the second page of the proposal must use the I/UCRC Project Proposal Form shown below to be considered as responsive to this solicitation.

I/UCRC Project Proposal Form (Snapshot)
Center:
Proposal No.: Project head (PI):
Total NSF Request:\$ Industry Investment:\$
Project Description:
Experimental plan:
Related work elsewhere:
How this project is different:
Milestones:
Deliverables:
How the project may be transformative and/or benefit society:
Research areas of expertise needed for project success:
Potential Member Company Benefits:
Estimated Start Date: Estimated Completion Date:

Other pages of the proposal should be used to provide details on the information provided in the I/UCRC Project Proposal Form.

Industry-defined Fundamental Research

Industry-defined fundamental research projects must demonstrate measurable industry collaboration and involvement that accelerates fundamental research. Evidence of industry-defined fundamental research must show that the proposed industry participation extends the centers capabilities into areas or projects that might not otherwise be researched.

Students and Under-represented Groups in Industry

Should the fundamental research proposals be awarded, there may be opportunities for additional funding for opportunities such as those listed below:

- GOALI ([NSF-10-580](#)) - *Graduate and Undergraduate Student Industrial Fellowship*
- Research Experienced for Undergraduates ([NSF 09-598](#)) - REU

III. AWARD INFORMATION

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 10, subject to the availability of funds.

Anticipated Funding Amount: \$1,600,000, subject to the availability of funds. The average award size is expected to range from \$50,000 up to \$200,000.

IV. ELIGIBILITY INFORMATION

Organization Limit:

The categories of proposers eligible to submit proposals to the National Science Foundation are identified in the Grant Proposal Guide, Chapter I, Section E.

PI Limit:

The PI must be the center director of an NSF Industry/University Cooperative Research Center. Other center participants may be co-PIs. The lead institution's center director may request a waiver to this requirement.

Limit on Number of Proposals per Organization:

One proposal per center. All sites must submit a collaborative proposal that is part of the same integrated research experimental plan of the center. The total budget for all site submissions from a center cannot exceed the maximum award.

Limit on Number of Proposals per PI:

One proposal per PI per center.

Additional Eligibility Info:

Eligibility is based on center performance: Fundamental research opportunities under this solicitation are available for I/UCRCs that meet the criteria as outlined in the current [Industry/University Cooperative Research Centers Program \(I/UCRC\)](#) solicitation. This opportunity requires that centers submitting fundamental research proposals meet the following conditions for eligibility:

- Maintain sufficient industrial memberships to meet minimum program requirements,
- Engage graduate students in center research projects,
- Actively engage industry with a minimum of two Industry Advisory Board meetings annually, and
- Disseminate current and accurate information to the public about their center via the NSF web site. NSF directory listings must be current and accurate by the supplement deadline date. Updates can be sent to the I/UCRC program director if needed.

Eligibility for industry-defined fundamental research option: Centers seeking to apply for additional funding as permitted under the industry-defined fundamental research option must meet the following conditions for eligibility:

- A letter from the Industry Advisory Board (IAB) must accompany the proposal.
- The IAB letter must confirm that the IAB was actively engaged in defining the fundamental research project.
- Only members of the I/UCRC may participate in an industry-defined research project.
- Industry-participation must enable the center to extend its fundamental research project portfolio into areas that might not otherwise be researched.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Preparation Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.
- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=grantsgovguide). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

Refer to Section II, Program Description, for specific proposal preparation information and instructions.

Essential: Each proposal must include a letter(s) from the participating member partner(s) detailing measurable industry collaboration (degree and extent to which the industry will be involved with the proposed research). Proposals not meeting this requirement will be returned without review as being non-responsive.

B. Budgetary Information

Cost Sharing:

Inclusion of voluntary committed cost sharing is prohibited.

C. Due Dates

- Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):
February 01, 2012
First Wednesday in February, Annually Thereafter

D. FastLane/Grants.gov Requirements

- For Proposals Submitted Via FastLane:

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

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Further instructions regarding this process are available on the FastLane Website at: <https://www.fastlane.nsf.gov/fastlane.jsp>.

- For Proposals Submitted Via Grants.gov:

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. Comprehensive information about using Grants.gov is available on the Grants.gov Applicant Resources webpage: http://www07.grants.gov/applicants/app_help_reso.jsp. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to Grants.gov. The completed application will be transferred to the NSF FastLane system for further processing.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as [Exhibit III-1](#).

A comprehensive description of the Foundation's merit review process is available on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/meritreview/>.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in [Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years \(FY\) 2011-2016](#). These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the core strategies in support of NSF's mission 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 variety of learning perspectives.

Another core strategy in support of NSF's mission is broadening opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed

project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. Both criteria are to be given full consideration during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. ([GPG Chapter II.C.2.d.i.](#) contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including [GPG Chapter II.C.2.d.i.](#), prior to the review of a proposal.

When evaluating NSF proposals, reviewers will be asked to consider what the proposers want to do, why they want to do it, how they plan to do it, how they will know if they succeed, and what benefits could accrue if the project is successful. These issues apply both to the technical aspects of the proposal and the way in which the project may make broader contributions. To that end, reviewers will be asked to evaluate all proposals against two criteria:

- Intellectual Merit: The Intellectual Merit criterion encompasses the potential to advance knowledge; and
- Broader Impacts: The Broader Impacts criterion encompasses the potential to benefit society and contribute to the achievement of specific, desired societal outcomes.

The following elements should be considered in the review for both criteria:

1. What is the potential for the proposed activity to
 - a. Advance knowledge and understanding within its own field or across different fields (Intellectual Merit); and
 - b. Benefit society or advance desired societal outcomes (Broader Impacts)?
2. To what extent do the proposed activities suggest and explore creative, original, or potentially transformative concepts?
3. Is the plan for carrying out the proposed activities well-reasoned, well-organized, and based on a sound rationale? Does the plan incorporate a mechanism to assess success?
4. How well qualified is the individual, team, or organization to conduct the proposed activities?
5. Are there adequate resources available to the PI (either at the home organization or through collaborations) to carry out the proposed activities?

Broader impacts may be accomplished through the research itself, through the activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. NSF values the advancement of scientific knowledge and activities that contribute to achievement of societally relevant outcomes. Such outcomes include, but are not limited to: full participation of women, persons with disabilities, and underrepresented minorities in science, technology, engineering, and mathematics (STEM); improved STEM education and educator development at any level; increased public scientific literacy and public engagement with science and technology; improved well-being of individuals in society; development of a diverse, globally competitive STEM workforce; increased partnerships between academia, industry, and others; improved national security; increased economic competitiveness of the United States; and enhanced infrastructure for research and education.

Proposers are reminded that reviewers will also be asked to review the Data Management Plan and the Postdoctoral Researcher Mentoring Plan, as appropriate.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Ad hoc Review and/or Panel Review.

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

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the deadline or target date, or receipt date, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (GC-1); * or Research Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from nsfpubs@nsf.gov.

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

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational), publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide* (AAG) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

The final report must discuss these sections for the report to be accepted:

Research highlights (limit 300 words):
--

In terms of <i>intellectual merit</i> , why was this outcome notable and/or important?
--

In terms of broader impacts , why was this outcome notable and/or important?	
If applicable, tell us how this research is or may be transformational.	
If applicable, tell us how this research represents broadening participation.	
If applicable, tell us how the research may have societal benefits, e.g. the economy.	
Implications of Results Possible Applications: Impact on Industry:	
Future of Project Short term plans & ideas (1-3 years): Long range plans & ideas (more than 3 years):	
Images are important. Please include one as a separate file with your highlight submission. Files must be GIFs or JPEGs. Maximum width and height are 240 pixels. Please submit the NSF Form 1515 with your image.	
Image file name: 25 characters or less:	Can NSF use the image?
Image credit line:	
Image caption:	

VIII. AGENCY CONTACTS

Please note that the program contact information is current at the time of publishing. See program website for any updates to the points of contact.

General inquiries regarding this program should be made to:

- Rathindra DasGupta, I/UCRC Program Director, ENG/IIP, telephone: (703) 292-8353, email: rdasgupt@nsf.gov
- Larry Hornak, I/UCRC Program Director, telephone: 703-292-2678, fax: (703)-292-9057, email: lhornak@nsf.gov
- Rita V. Rodriguez, I/UCRC Program Director, CISE, telephone: (703) 292-8950, email: rrodrigu@nsf.gov

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation

message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, National Science Foundation Update is a free e-mail subscription service designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail when new publications are issued that match their identified interests. Users can subscribe to this service by clicking the "Get NSF Updates by Email" link on the [NSF web site](#).

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

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