CHE-DMR-DMS Solar Energy Initiative (SOLAR)

PROGRAM SOLICITATION
NSF 10-613

REPLACES DOCUMENT(S):
NSF 09-604

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Chemistry
Division of Materials Research
Division of Mathematical Sciences

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

January 25, 2011

IMPORTANT INFORMATION AND REVISION NOTES

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG), NSF 11-1, was issued on October 1, 2010 and is effective for proposals submitted, or due, on or after January 18, 2011. Please be advised that the guidelines contained in NSF 11-1 apply to proposals submitted in response to this funding opportunity. Proposers who opt to submit prior to January 18, 2011, must also follow the guidelines contained in NSF 11-1.

Cost Sharing: The PAPPG has been revised to implement the National Science Board's recommendations regarding cost sharing. Inclusion of voluntary committed cost sharing is prohibited. In order to assess the scope of the project, all organizational resources necessary for the project must be described in the Facilities, Equipment and Other Resources section of the proposal. The description should be narrative in nature and must not include any quantifiable financial information. Mandatory cost sharing will only be required when explicitly authorized by the NSF Director. See the PAPP Guide Part I: *Grant Proposal Guide (GPG)* Chapter II.C.2.g(xi) for further information about the implementation of these recommendations.

Data Management Plan: The PAPPG contains a clarification of NSF's long standing data policy. All proposals must describe plans for data management and sharing of the products of research, or assert the absence of the need for such plans. FastLane will not permit submission of a proposal that is missing a Data Management Plan. The Data Management Plan will be reviewed as part of the intellectual merit or broader impacts of the proposal, or both, as appropriate. Links to data management requirements and plans relevant to specific Directorates, Offices, Divisions, Programs, or other NSF units are available on the NSF website at: http://www.nsf.gov/bfa/dias/policy/dmp.jsp. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Postdoctoral Researcher Mentoring Plan: As a reminder, each proposal that requests funding to support postdoctoral researchers must include, as a supplementary document, a description of the mentoring activities that will be provided for such individuals. Please be advised that if required, FastLane will not permit submission of a proposal that is missing a Postdoctoral Researcher Mentoring Plan. See Chapter II.C.2.j of the GPG for further information about the implementation of this requirement.

Revision Notes

Preliminary proposals are no longer required.

This is the third year of the CHE-DMR-DMS Solar Energy Initiative. In response to the previous versions of this solicitation in fiscal years 2009 and 2010, valid preliminary proposals were submitted by 122 and 102 research groups respectively, of which 31 and 30 were encouraged to submit full proposals, respectively. Following review of the full proposals, 8 and 9 received funding, resulting in overall funding rates of 7% and 9%, respectively. It is anticipated that the fiscal year 2011 funding rate will be similar.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

CHE-DMR-DMS Solar Energy Initiative (SOLAR)

Synopsis of Program:

The purpose of the CHE-DMR-DMS Solar Energy Initiative is to support interdisciplinary efforts by groups of researchers to address the scientific challenges of highly efficient harvesting, conversion, and storage of solar energy. Groups must include three or more co-Principal Investigators, of whom one must be a researcher in chemistry, a second in materials, and a third in mathematical sciences, in areas supported by the Divisions of

Chemistry, Materials Research, and Mathematical Sciences, respectively. The intent is to encourage new collaborations in which the mathematical sciences are linked in a synergistic way with the chemical and materials sciences to develop novel, potentially transformative approaches in an area of much activity but largely incremental advances. Successful proposals will offer potentially transformative projects, new concepts, and interdisciplinary education through research involvement based on the integrated expertise and synergy from the three disciplinary communities.

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.

- Charles Ying, (DMR), telephone: (703) 292-8428, email: cying@nsf.gov
- Henry A. Warchall, (DMS), telephone: (703) 292-4861, email: hwarchal@nsf.gov
- Suk-Wah Tam-Chang, (CHE), telephone: (703) 292-8684, email: stamchan@nsf.gov
- Michael J. Scott, (CHE), telephone: (703) 292-4771, email: mjscott@nsf.gov
- Linda S. Sapochak, (DMR), telephone: (703) 292-4932, email: lsapocha@nsf.gov
- Charles D. Pibel, (CHE), telephone: (703) 292-4971, email: cpibel@nsf.gov
- George Maracas, (ECCS), telephone: (703) 292-8339, email: gmaracas@nsf.gov
- Andrew J. Lovinger, (DMR), telephone: (703) 292-4933, email: alovinge@nsf.gov
- Kevin F. Clancey, (DMS), telephone: (703) 292-4876, email: kclancey@nsf.gov
- James Alexander, (DMS), telephone: (703) 292-8104, email: jaalexan@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 5 to 10
Under this solicitation proposals may be submitted for funding durations up to three years. The budget must be commensurate with the project and thoroughly justified in the proposal. The NSF expects to fund 5 to 10 awards in fiscal year 2011 depending on the quality of submissions and the availability of funds. The anticipated start date of awards is September 2011.

Anticipated Funding Amount: $12,000,000 Typical award size is expected to be approximately $500,000 per year and may vary depending on the scope of the proposal.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Universities and Colleges - Universities and four-year colleges accredited in and having a campus located in the US, acting on behalf of their faculty members.

PI Limit:

Proposals must include three or more co-Principal Investigators (co-PIs), of whom one must be a researcher in chemistry, a second in materials, and a third in mathematical sciences, in areas supported by the NSF Divisions of Chemistry, Materials Research, and Mathematical Sciences, respectively. Any potential fourth or fifth co-Principal Investigator can be a researcher in any relevant area of science, including specifically those supported by the NSF Divisions of Engineering.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An investigator may participate as a PI, co-PI, or other senior research associate on only one proposal submitted per year in response to this solicitation.

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

  January 25, 2011

Proposal Review Information Criteria

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

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

Reporting Requirements: Standard NSF reporting requirements apply.

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I. INTRODUCTION

One of the most important scientific challenges of this age is to discover new methods to secure abundant, low-cost sources of energy to meet humankind's need for sustainable energy and growth. Current global demand for energy is approximately in the 15-terawatt range and is expected to double or triple by mid-century. While increased energy production via traditional methods together with increased efficiency and conservation may alleviate some of the needs, such measures by themselves cannot meet the expected demand in the long run.

Arguably, the most abundant, sustainable source of energy is the Sun, which provides over 150,000 terawatts of power to the Earth,

a small fraction of which is sufficient to supply foreseeable energy needs. Thus, one of the greatest scientific opportunities of our time is to learn to efficiently harvest, convert, store, and utilize solar energy.

The National Science Foundation Divisions of Chemistry (CHE), Materials Research (DMR), and Mathematical Sciences (DMS) believe that a new and truly transformative approach to solar energy research may result from an integrally collaborative effort among their three disciplinary communities. As a first step toward encouraging and enabling such research, the Divisions will support a small number of interdisciplinary group projects that address in a potentially transformative way the scientific challenges of efficient harvesting, conversion, and storage of solar energy. Proposed projects must bring together scientists from all three disciplines in an integrally collaborative and synergistic research effort. Only projects of mutual interest to all three Divisions will be supported by this initiative.

II. PROGRAM DESCRIPTION

The purpose of the CHE-DMR-DMS Solar Energy Initiative is to support catalytic interdisciplinary work by groups of researchers to address the scientific challenges of efficient harvesting, conversion, and storage of solar energy. The intent is to encourage new collaborations in which the mathematical sciences are linked in a synergistic way with the chemical and materials sciences to develop novel, potentially transformative approaches in an area of much activity but largely incremental advances. Since the chemistry and materials communities have already been working jointly, this initiative aims to bring novel mathematical concepts and approaches as a new and central component to this area. This is a way for the MPS chemistry, materials, and mathematics communities to contribute to the broad national energy research effort in a unique approach. In pursuit of this goal, each group must include three or more principal investigators, of whom one must be a researcher in chemistry, a second in materials, and a third in mathematical sciences, in areas supported by the NSF Divisions of Chemistry, Materials Research, and Mathematical Sciences, respectively. Proposals not complying with this requirement will be returned without review. Any potential fourth or fifth co-Principal Investigator can be a researcher in any relevant area of science, including those supported by the NSF Divisions of Engineering.

Projects supported under this activity must be closely collaborative throughout their course and depend for their advancement on the continuous interaction of scientists from all three research communities. The initiative seeks to catalyze transformative breakthroughs in solar energy research from the activities of groups of researchers working jointly at the frontiers of the three disciplines to address fundamental, first-principles questions with fresh perspectives and innovative approaches. A successful proposal should advance the frontiers of the three disciplines and lead to new concepts. It should also encourage the integration of interdisciplinary education with the research, e.g. by offering opportunities for interdisciplinary training to the students/postdoctoral fellows involved.

Research funded under this initiative will investigate novel methods for solar energy harvesting and conversion with potential efficiency substantially beyond that of current technology. Proposed work may include the investigation of energy storage mechanisms as integral parts of new techniques for solar energy harvesting and/or conversion.

Consistent with the NSF mission and the priorities of the Directorate for Mathematical and Physical Sciences (MPS), the focus of this solicitation is on basic research. It is not the intent of this initiative to support work on incremental advances in current technology, on applied engineering approaches, or on variations of PI projects already supported by other sources. This initiative aims to catalyze breakthroughs in the fundamental science underlying solar energy use; therefore any potential engineering involvement should be at the basic-research level. Distinct sources of support for related engineering challenges are available from other NSF programs.

Principal Investigators should ensure that their proposed project does not substantially overlap with ongoing federally-funded research. Proposals submitted in response to this solicitation may be shared by the National Science Foundation with other federal agencies, including (but not limited to) the Department of Energy, National Institutes of Health, Air Force Office of Scientific Research, Office of Naval Research, and the Intelligence Community. Reviews, including panel summaries, if applicable, may also be shared. The reasons for sharing these proposals and reviews include potential co-funding as well as avoiding duplication of federal funding for a particular research project. A PI or awardee organization wishing the proposal not to be shared with a particular federal agency or agencies should provide a Single Copy Document with the proposal, stating which federal funding agencies should be excluded. No explanations for exclusion are required.

III. AWARD INFORMATION

Under this solicitation proposals may be submitted for funding durations up to three years. The budget must be commensurate with the project and thoroughly justified in the proposal. Typical award size is expected to be approximately $500,000 per year and may vary depending on the scope of the proposal. Awards will be funded as standard grants or continuing grants. The NSF expects to fund 5 to 10 awards in fiscal year 2011, depending on the quality of submissions and the availability of funds. The anticipated start date of awards is September 2011. Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

This is the third year of the CHE-DMR-DMS Solar Energy Initiative. In response to the previous versions of this solicitation in fiscal years 2009 and 2010, valid preliminary proposals were submitted by totals of 122 and 102 research groups, of which 31 and 30 were encouraged to submit full proposals, respectively. Following review of the full proposals, 8 and 9 received funding, resulting in overall funding rates of 7% and 9%, respectively. It is anticipated that the fiscal year 2011 funding rate will be similar.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

Universities and Colleges - Universities and four-year colleges accredited in and having a campus located in the US, acting on behalf of their faculty members.

PI Limit:

Proposals must include three or more co-Principal Investigators (co-PIs), of whom one must be a researcher in chemistry, a second in materials, and a third in mathematical sciences, in areas supported by the NSF Divisions of Chemistry, Materials Research, and Mathematical Sciences, respectively. Any potential fourth or fifth co-Principal Investigator can be a researcher in any relevant area of science, including specifically those supported by the NSF Divisions of Engineering.

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI: 1

An investigator may participate as a PI, co-PI, or other senior research associate on only one proposal submitted per year in response to this solicitation.

Additional Eligibility Info:

Not applicable.

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.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.4 of the Grant Proposal Guide provides additional information on collaborative proposals.

Additional Instructions for Full Proposal Preparation

The standard Grant Proposal Guide or NSF Grants.gov Application Guide instructions for proposal preparation apply, with the following additions.

a. Cover Sheet: Select "DMS - MPS SUST ENERGY SCI" as the "Organization Unit for Consideration of This Proposal." (Grants.gov users should refer to Section VI.1.2. of the NSF Grants.gov Application Guide for specific instructions on how to designate the NSF Unit of Consideration.) To facilitate timely processing, the title of the proposal must begin with the designation "SOLAR:" If any proposals are submitted by different institutions as a collaborative group, they all should have the same title and begin with the designation "SOLAR Collaborative:".

b. Single Copy Documents: Single Copy Documents are used by NSF staff, but are not available to the reviewers. Single Copy Documents may include:

- Suggested Reviewers and Reviewers Not to Include (optional).
- If applicable, a statement excluding other federal agencies from seeing your proposal and reviews.

c. Project Description: In addition to the requirements of the NSF Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide, including results from prior NSF support, the narrative must also include the following within the standard 15-page limit:

- A justification for why a group effort is necessary to carry out the proposed project, together with a description of why each of the three areas of research expertise (chemistry, materials research, and mathematical sciences) is essential to the project.
- A management plan, describing how the group effort will be coordinated.
- A description of how each researcher will contribute to the project. For senior personnel and other professionals, provide an estimate of the amount of time to be committed to this project. For investigators with other supported research, explain how

the investigator will allocate time and effort among the projects.

d. Budget: The solar energy research community is global in character, and proposed activities may include international collaborative partnerships when appropriate. For those projects with international participation, NSF funds may be used to cover travel expenses for US-based researchers participating in exchange visits integral to the research project.

e. Supplementary Documentation: If any letters confirming collaboration are included, they must be very brief and contain no statements of support or reference, nor details about work to be done under this project that should have been included within the 15 pages of the Project Description.

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):

  January 25, 2011

Principal Investigators and Sponsored Research Offices are advised to submit well before the deadline to avoid any unexpected submission problems.

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 where they will be reviewed if they meet NSF proposal preparation requirements. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?
How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative, original, or potentially transformative 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?

Examples illustrating activities likely to demonstrate broader impacts are available electronically on the NSF website at: http://www.nsf.gov/pubs/gpg/broaderimpacts.pdf.

Mentoring activities provided to postdoctoral researchers supported on the project, as described in a one-page supplementary document, will be evaluated under the Broader Impacts criterion.

Additional Solicitation Specific Review Criteria

Submitted proposals will be screened by Program Officers from each of the NSF Divisions of Chemistry, Materials Research, and Mathematical Sciences to assess the adherence of the proposal to the requirement that the project involve in a central way a researcher in chemistry, a researcher in materials, and a researcher in mathematical sciences, in areas supported by the NSF Divisions of Chemistry, Materials Research, and Mathematical Sciences, respectively. Proposals not complying with this requirement will be returned without review.

In addition to the National Science Board merit review criteria, reviewers will be asked to assess

- the potential of a transformative breakthrough that addresses in a novel way a major fundamental scientific challenge for efficient harvesting, conversion, or storage of solar energy; and
- the group synergy, role of the mathematical component within the project, and potential for a team effort that will be greater than the sum of its parts.

NSF staff also 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.

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.

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:

- Charles Ying, (DMR), telephone: (703) 292-8428, email: cying@nsf.gov
- Henry A. Warchall, (DMS), telephone: (703) 292-4861, email: hwarchal@nsf.gov
- Suk-Wah Tam-Chang, (CHE), telephone: (703) 292-8684, email: stamchan@nsf.gov
- Michael J. Scott, (CHE), telephone: (703) 292-4771, email: mjscott@nsf.gov
- Linda S. Sapochak, (DMR), telephone: (703) 292-4932, email: lsapocha@nsf.gov
- Charles D. Pibel, (CHE), telephone: (703) 292-4971, email: cpibel@nsf.gov
- George Maracas, (ECCS), telephone: (703) 292-8339, email: gmaracas@nsf.gov
- Andrew J. Lovinger, (DMR), telephone: (703) 292-4933, email: alovinge@nsf.gov
- Kevin F. Clancey, (DMS), telephone: (703) 292-4876, email: kclancey@nsf.gov
- James Alexander, (DMS), telephone: (703) 292-8104, email: jaalexan@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.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Arctic and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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

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

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

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

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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