

Chemical Bonding Centers Phase II (CBC-II)

Chemistry as the Driver for Transformative Research and Innovation

Program Solicitation

NSF 07-575

Replaces Document(s):

NSF 06-558



National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Chemistry

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

October 16, 2007

REVISION NOTES

In furtherance of the President's Management Agenda, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the [NSF FastLane](#) system.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Chemical Bonding Centers Phase II (CBC-II)
Chemistry as the Driver for Transformative Research and Innovation

Synopsis of Program:

The Chemical Bonding Centers (CBC) Program is designed to support the formation of centers that can address major, long-term basic chemical research problems that have a high probability of producing both transformative research and will lead to innovation. Appropriate research problems are high-risk but potentially high-impact and will attract broad scientific and public interest. Centers are expected to be agile structures that can respond rapidly to emerging opportunities and make full use of cyberinfrastructure to enhance collaborations. Center teams may include researchers from disciplines other than Chemistry and from academia, industry, government laboratories and international organizations. CBCs are expected to integrate research, education, and outreach and to include a plan to broaden participation to under-represented groups. Proposals should contain a compelling strategy for achieving demonstrable impact in all

of these areas.

The CBC program is a two-phase program. In the first phase, Columbia University, California Institute of Technology and University of California-Irvine were lead institutions funded by NSF in FY 2005 to explore the development of CBCs. The second phase is to provide funding for implementation of full-scale centers in FY 2008. Only these development teams are eligible to participate in Phase II of the competition by submitting a proposal for the establishment of a full CBC.

Cognizant Program Officer(s):

- Katharine Covert, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, telephone: (703) 292-4950, fax: (703) 292-9037, email: kcovert@nsf.gov
- Raima Larter, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, telephone: (703) 292-5344, fax: (703)292-9037, email: rlarter@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 1 to 2 Cooperative Agreement(s) with an initial commitment of five years and a potential duration of ten years

Anticipated Funding Amount: \$4,000,000 to \$8,000,000 pending availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- The eligible institutions are those funded in the CBC Phase I program under proposals submitted by Columbia University, California Institute of Technology and University of California Irvine. Linked collaborative proposals will not be accepted.

PI Limit:

An investigator may participate (as a PI, co-PI or senior personnel) in only one CBC proposal submitted to this competition. The PI must be affiliated with a U.S. academic institution or non-profit research organization. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, national laboratories and international organizations. Unaffiliated scientists are also eligible for support under a proposal submitted by an eligible organization. CBC award funds may not go directly to industry, government laboratories or international organizations. The PI listed on the cover sheet must be affiliated with the proposing institution. While these proposals will reflect the research of many investigators, only the name of the PI, and no names of Co-PIs, should appear on the cover sheet.

Limit on Number of Proposals per Organization:

Only one proposal may be submitted per eligible institution.

Limit on Number of Proposals per PI:

Only one proposal per eligible PI.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**
 - Full Proposals submitted via FastLane: 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/bfa/dias/policy/docs/grantsgovguide.pdf/>)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

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

October 16, 2007

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

The Division of Chemistry is initiating a Phase II competition for Chemical Bonding Centers (CBCs) to capitalize on advances in addressing major intellectual challenges in basic chemical research that were achieved in CBC Phase I projects. These Phase II CBCs will continue to provide the opportunity for especially able and imaginative groups of investigators to share a commitment toward solving a "big problem" in an atmosphere having a high tolerance for risk and within a structure permitting considerable agility. A workshop at NSF, "New Mechanisms for Support of High-Risk and Unconventional Research in Chemistry," explored mechanisms for encouraging and supporting such initiatives. A report of the workshop can be obtained at <http://www.mrl.uiuc.edu/docs/nsfgmwfinal.pdf>. Successful Phase II proposals will emphasize work that has a high probability of producing transformative research and will lead to innovation. In this context a recent NSF Workshop addressed the role of basic research and innovation in relationship to the American Competitiveness Initiative see <http://enhancinginnovation.wustl.edu/>.

The Division of Chemistry expects to make one or more awards in Fiscal Year (FY) 2008 to support Phase II of the Chemical Bonding Centers (CBC) Program. Each Phase II award is expected to have a duration of five years, at \$4 million per year.

II. PROGRAM DESCRIPTION

Background. The CBC Program is based on a staged competition. Three developmental proposals outlining center's goals were funded in FY 2005 with three-year awards at a level of \$500,000 per year. Each of the teams receiving these awards is eligible to participate in Phase II of the competition by submitting a proposal for the establishment of a full CBC.

The CBC Program is designed to support the formation of centers that can address major, long-term basic chemical research problems. Appropriate research problems are high-risk but potentially high-impact because they will attract broad scientific and public interest. Centers are expected to be agile structures that can respond rapidly to emerging opportunities and make full use of cyberinfrastructure to enhance collaborations. Center teams may include researchers from different disciplines and from academia, industry, national laboratories and international organizations. Team size should reflect the needs of the problem to be studied, but a minimum of three investigators is required. Team size and composition may be different from those in the corresponding CBC Phase I project.

Successful centers will be focused on novel research centered in the chemical sciences and aimed at solving high-risk, long-term problems of large scope and impact. They will have a high probability of producing transformative research likely to lead to innovations, i.e. research results that can lead to new processes, materials or devices that will enhance economic competitiveness. It is expected that these CBC Phase II projects will continue the development of new areas of research and new communities of scientists and engineers that were initiated in Phase I. These communities will bring common and complementary interests into productive contact to nurture a culture of risk-taking and innovation around structures that are agile and take full advantage of cyberinfrastructure for fostering collaborations. The awards made under the CBC Program are expected to continue to include creative public outreach plans to make chemistry and chemists more visible to the

broader scientific community and to the public.

CBCs are expected to integrate research and education throughout the course of the project. CBCs should provide novel opportunities for participants to engage in joint efforts that combine education with the excitement of discovery at the frontiers of modern chemical research. CBCs should contain strong diversity and outreach components. There must be a commitment to broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities - in the solution of these "big problems". A vigorous outreach program should be designed to achieve the CBC goal of increasing public appreciation for the contributions of chemistry to progress in modern science.

Examples of possible CBC outcomes are:

- Progress in addressing grand challenges for which the scientific opportunities are now ripe;
- The solution of problems in basic chemical research beyond the scope of individual investigators;
- The emergence of creative, high-risk, cyber-enabled science;
- An increased connection between basic research and innovation; and
- A highly visible project which communicates the excitement of this research to the public.
- The participation of under-represented minority groups will be included.

During preparation of a CBC Phase II proposal, investigators are strongly urged to discuss details with a cognizant Program Officer listed in Section VIII of this solicitation. Investigators seeking the involvement of industrial, government and/or international team members will need to provide an institutional letter of collaboration from the partner organization that confirms the participation of a co-investigator. This letter should be included in the Supplementary Documents Section of the Full Proposal. (See Section V.A., below). The letter should describe the plan of interaction with the U.S. academic institution, the time commitment of the researcher(s), and the nature of the collaborative research activities. Letters of general support or recommendation are inappropriate and may cause a proposal to be returned without review. Cost sharing is not required for Phase II proposals.

Support for collaborations with international scientists is provided through the NSF grant to the submitting U.S. institution. No CBC award funds may go directly to foreign institutions. The proposal may include up to \$500,000 in participant support costs, over the duration of the grant, for international collaborative research activities. Travel and incidental research costs may be included; salaries may not. These international collaborations must feature a joint scientific work plan and should be clearly described in the Project Description. If, after review, a proposal is recommended for funding, the cognizant Program Officer will work with Program Officers from the NSF Office of International Science and Engineering and the key project personnel to develop a detailed plan consistent with prevailing international practices and policies.

Co-investigators associated with entities such as industry, state agencies and national laboratories (Federally Funded Research and Development Centers (FFRDCs)) must be supported by their own organization. However, it is appropriate for students supported through universities to work at a partner industrial laboratory, FFRDC or comparable site, or for universities to fund research expenses incurred when scientists from such entities work at university sites. Federal employees may not receive salaries or in other ways augment their agency's appropriation through grants made by this program, and no funds for major equipment at FFRDC's are allowed.

Principal Investigators should ensure that their proposed project does not substantially overlap with ongoing Federally funded research. NSF reserves the right to return without review proposals that are not responsive to this solicitation.

III. AWARD INFORMATION

Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

- **Anticipated Type of Award:** Cooperative Agreement.
- **Estimated Number of Awards:** 1 to 2 - Cooperative Agreement(s) with an initial commitment of five years and a potential duration of ten years.
- **Anticipated Funding Amount:** \$4,000,000-\$8,000,000 pending availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- The eligible institutions are those funded in the CBC Phase I program under proposals submitted by Columbia University, California Institute of Technology and University of California Irvine. Linked collaborative proposals will not be accepted.

PI Limit:

An investigator may participate (as a PI, co-PI or senior personnel) in only one CBC proposal submitted to this competition. The PI must be affiliated with a U.S. academic institution or non-profit research organization. Other investigators may be affiliated with U.S. academic institutions, non-profit research organizations, industry, national laboratories and international organizations. Unaffiliated scientists are also eligible for support under a proposal submitted by an eligible organization. CBC award funds may not go directly to industry, government laboratories or international organizations. The PI listed on the cover sheet must be affiliated with the proposing institution. While these proposals will reflect the research of many investigators, only the name of the PI, and no names of Co-PIs, should appear on the cover sheet.

Limit on Number of Proposals per Organization:

Only one proposal may be submitted per eligible institution.

Limit on Number of Proposals per PI:

Only one proposal per eligible PI.

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 pubs@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/bfa/dias/policy/docs/grantsgovguide.pdf>). 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 pubs@nsf.gov.

Proposals submitted in response to this program solicitation must originate from teams whose projects were successful in the CBC Phase I competition in FY 2005 and be based on those projects. The lead institutions funded in that competition were Columbia University, California Institute of Technology and University of California Irvine. Proposals not meeting this

requirement will be returned without review.

Proposal authors are strongly encouraged to consult the proposal submission checklist included in the Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide as they prepare their proposal. Proposals not compliant with the proposal preparation guidelines, as supplemented by the following instructions, will be returned without review.

The items outlined below pertain to the corresponding sections in the GPG or NSF Grants.gov Application Guide.

- Project Summary. One page limit, including the names and affiliations of all senior personnel. The project summary must address both the intellectual merit and broader impacts of the proposed CBC-II project.
- Project Description. A total of up to thirty (30), pages: a) Results from CBC PHase I Support (up to 5 pages), b) Proposed Research (up to 15 pages), c) Education Plan (up to 2 pages), d) A Plan to Broaden Participation by Under-Represented Groups (up to 2 pages), e) Public Outreach Plan (up to 2 pages), f) Dissemination and Innovation Plan (up to 2 pages) and g) Center Management Plan (up to 2 pages).
 - a. Prior Support. Report on the results from the CBC Phase I program, up to a total of five (5) pages. No results from other prior support should be included.
 - b. Proposed Research Narrative, not to exceed (15) pages, consisting of the following items:
 - An explanation of the scientific context, intellectual merit, relevance to chemistry and timeliness of the proposed project;
 - A description of the proposed research;
 - A discussion of why a transition from a Phase I to a Phase II Center is justified; and
 - A description of the contribution to be made by each senior investigator.
 - c. Education Plan. Narrative, not to exceed two (2) pages, describing:
 - The training plan for undergraduate students, graduate students, and postdoctoral researchers, including co-mentorship or other collaborative training; and
 - Plans for other education activities.
 - d. A Plan for Broadening Participation by Under-Represented groups, not to exceed two (2) pages, describing:
 - The broadening participation goals to be addressed;
 - Plans for achieving those goals; and
 - A discussion of how progress toward diversity will be measured.
 - e. Public Outreach Plan not to exceed two(2) pages, describing:
 - Plans to capture the imagination of the public;
 - Plans to increase the visibility and public appreciation of chemistry; and
 - A discussion of ways to assess the impact of outreach efforts.
 - f. Dissemination and Innovation Plan, not to exceed two (2) pages:
 - Plans for dissemination of research results; and
 - Plans for engaging industry or by other means connecting research products to new innovations.
 - g. Center Management Plan. Narrative, not to exceed two (2) pages, describing:
 - How the collaborative effort will be coordinated, including any use of cyberinfrastructure;
 - How decisions will be made regarding the conduct of the project, including plans for advisory groups;
 - A discussion of how agility will be addressed in terms of the incorporation of new ideas, tools, and partners, and;
 - How the center will be evaluated.
- References Cited. References should include full titles of articles and book chapters cited. This section should include bibliographic citations only and must not be used to provide parenthetical information outside of the Project Description. Indicate with an asterisk (*) references from work on the CBC Phase I project.
- Biographical Sketches. For PI/Co-PIs and all senior personnel, provide brief biological sketches using the format described in the GPG or NSF Grants.gov Application Guide. Note that recent collaborators and other affiliates should also be collected into the combined list given in the Supplementary Documents section (below).
- Budget. Include five annual budgets, one for each year of the duration of the award; a cumulative budget will be automatically generated by FastLane or Grants.gov. A detailed budget justification (up to three pages) should document proposed expenses. Multi-institutional proposals should use the award-sub award proposal mechanisms (see GPG guidelines, chapter II.D.3).
- Current and Pending Support. A full description of the total level of current and pending support from all sources for the key personnel. Any intellectual overlap between federally funded and/or proposed projects and the proposed research must be clarified.
- Facilities. A description of the facilities (including laboratories, computational facilities, and cyberinfrastructure) that will be made available to the project. Separate facilities descriptions should be included for multi-institutional projects or those involving non-academic partners.
- Supplementary Documents. Required letters of collaborations from national laboratories, international organizations, and industry should be included in this section. Instrument quotes are appropriate to include. Letters of collaboration from senior personnel not supported on the grant are also appropriate. Letters of recommendation or general support are not permitted.
- A combined, alphabetized list of all scientists, with current affiliations, who have collaborated with the PI, co-PIs and other senior personnel in the last 48 months or are otherwise affiliated with these individuals should be included as a single copy document.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

Other Budgetary Limitations:

Proposals should include funds in the budget for CBC personnel to participate in site visits or reverse site visits in the second and fourth years of the project.

The proposal may include up to \$500,000 in participant support costs, over the duration of the award, for international collaborative research activities. Travel and incidental research costs may be included; salaries may not.

Budget Preparation Instructions:

Multi-institutional proposals should use the award-subaward mechanism discussed in the GPG, Chapter II.D.3. A single proposal and budget should be submitted, with subawards administered by the lead institution.

C. Due Dates

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

October 16, 2007

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. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. 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 and, if they meet NSF proposal preparation 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 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 with the proposer.

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 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:

In addition to the National Science Board merit review criteria, reviewers will be asked to apply the following criteria when reviewing CBC Phase II proposals:

- o Are the scientific goals appropriate for a full-scale CBC?
- o Is the need for a collaborative effort and a center mechanism well-justified in the proposal?
- o Does the proposal have the potential to lead to transformative research in chemistry and related fields?
- o Is the project likely to enhance the nation's capacity for innovation?

- o Does the project build upon novel and significant results achieved in Phase I?
- o Does the proposal present a convincing argument that transition from Phase I to Phase II will lead to significant new progress in addressing a grand challenge problem?
- o Is there capacity for agility and evolution as the center develops and matures?
- o Will the plans for education, dissemination, broadening participation, outreach, management and use of cyberinfrastructure be effective?
- o Does the project have the potential to attract broad scientific and public interest and support?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by 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 date of receipt. 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 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 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/general_conditions.jsp?org=NSF. 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 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.

Failure to provide the required annual or final project reports 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.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Katharine Covert, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, telephone: (703) 292-4950, fax: (703) 292-9037, email: kcovert@nsf.gov
- Raima Larter, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, telephone: (703) 292-5344, fax: (703)292-9037, email: rlarter@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, MyNSF (formerly the Custom News Service) is an information-delivery system 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 or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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://>

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 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.

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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.

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- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center): (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

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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.

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