Chemical Bonding Centers (CBC), Phase I

Chemistry as the Driver for Highly Innovative Research

Program Solicitation
NSF 04-612
***Replaces Document* NSF 03-606**

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

Preliminary Proposal Due Date(s) *(required):*

December 17, 2004

(due by 5 p.m. proposer's local time)

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

April 15, 2005

(by invitation only)

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Chemical Bonding Centers (CBC), Phase I /
Chemistry as the Driver for Highly Innovative Research

Synopsis of Program:

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 cyber infrastructure to enhance collaborations. Center teams may include researchers from other disciplines and from academia, industry, government laboratories and international organizations. Centers will be selected through a multi-phase peer-review process. Phase I consists of a preliminary proposal that will be peer reviewed, followed by an invited full proposal to explore development of a center. Success at both steps of Phase I is an eligibility criterion for participation in Phase II. Phase II consists of proposals seeking full-scale implementation of a

CBC in FY 2008.

Cognizant Program Officer(s):

- Linda (Lee) Magid, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, 1055 S, telephone: (703) 292-4930, email: LMAGID@nsf.gov

- Philip B. Shevlin, Program Officer, Directorate for Mathematical & Physical Sciences, Division of Chemistry, 1055 S, telephone: (703) 292-4966, email: pshevlin@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Eligibility Information

- **Organization Limit:** Only U.S. academic institutions and non-profit research organizations may submit proposals as lead institution. Multi-institutional proposals should use the award-sub award proposal mechanisms (see GPG guidelines, chapter II.D.3).
- **PI Eligibility Limit:** An investigator may participate (as a PI, co-PI or senior personnel) in only one CBC proposal submitted to this competition at each step of the process. 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, government laboratories and international organizations. Unaffiliated scientists may also be 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.
- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 6
- **Anticipated Funding Amount:** $3,000,000 in FY 2005

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

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

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **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

- **Preliminary Proposals *(required)* :**

December 17, 2004
(due by 5 p.m. proposer's local time)

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
  April 15, 2005
  (by invitation only)

Proposal Review Information

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

Award Administration Information

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

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I. INTRODUCTION

The Division of Chemistry is initiating a second round of phase I competition for Chemical Bonding Centers (CBCs) to

nurture innovative approaches to addressing major intellectual challenges in basic chemical research and education with the potential for broad societal impact. As the name implies, CBCs will leverage a deeper understanding of the most fundamental of chemical concepts – the chemical bond – through research partnerships that benefit the scientific enterprise and society. CBCs will provide the opportunity for especially able and ambitious 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 recent 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

The Division of Chemistry expects to make awards in Fiscal Year (FY) 2005 to support activities in the Chemical Bonding Centers (CBC) Program. The CBC Program competition comprises three peer-reviewed steps and requires success in all three steps before funding for a center is awarded. The first two steps will occur in Phase I. The first step consists of a Preliminary Proposal that describes a center concept, a schematic model for the research to be carried out, and a group of initiating participants (PI and other senior personnel who may or may not be co-PIs but have agreed to participate on the project); there is no funding associated with this step. Those proposals judged meritorious by peer review will be invited to compete for funding in the second step of Phase I, which requires submission of a Full Proposal to explore development of a center. Full Proposals outline center goals, the plan for forming and mobilizing the center's team, and benchmarks for producing key proofs of concept within an award duration of three years at a level of $500,000 per year pending availability of funds. These development teams successful in both steps of Phase I will be eligible to participate in the third step of the competition, by submitting a proposal for the establishment of a CBC in Phase II. It is anticipated that, assuming availability of funds and appropriate quality of proposals, there will be two CBC awards in Phase II. Each Phase II award is expected to have a duration of five years, at a level averaging $3 million per year, with possible renewal for a second five-year period at the same average level of $3 million per year pending availability of funds. The specific program solicitation for the CBC proposals in Phase II for this second round of phase I competition will be available approximately October 2008 for funding in FY 2009. After this year, the CBC competition for Phase I is anticipated to take place quadrennially, with the next solicitation for Phase I Preliminary Proposals to occur approximately September 2008.

II. PROGRAM DESCRIPTION

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 cyber infrastructure to enhance collaborations. Center teams may include researchers from other disciplines and from academia, industry, government laboratories and international organizations. Centers will be selected through a process comprising three peer-reviewed steps spanning three years and requiring success in all three steps. Team sizes will reflect the needs of the problem to be studied, but a minimum of three investigators is required.

Phase I of the program involves the submission of a peer reviewed Preliminary Proposal followed by an invited peer reviewed Full Proposal. The Full Proposal will provide resources, for three years at $500,000 per year, for preliminary organization of the center and implementation of proof-of-concept activities pending availability of funds. In Phase II, those successful in Phase I, are eligible to submit a CBC proposal in FY 2008 for establishment of a full-scale CBC. All steps of the competition will involve comprehensive peer review and require success at each prior step of the process to be eligible to compete in the next step.

Although basic chemical research and education is the focus of the Program, it is anticipated that successful centers will involve unconventional multidisciplinary research centered in the chemical sciences and aimed at solving high-risk, long-term problems of large scope and impact. Because it is often not possible to provide compelling preliminary results in such circumstances, a major goal of the CBC Program is to afford a framework that still allows rigorous and constructive use of peer review to select appropriate CBC projects. It is anticipated that this framework will foster the establishment of new areas of research and new communities of scientists and engineers. These communities will bring common and complementary interests into productive contact to develop a culture of risk-taking and innovation around structures that are agile and take full advantage of cyber infrastructure for fostering collaborations. Further, the awards made under the CBC Program will be expected to put in place innovative plans to make chemistry and chemists more visible to the broader scientific community and to the public.

Examples of possible CBC outcomes are:

- The emergence of new areas of chemical inquiry;
- The solution of problems in basic chemical research beyond the scope of individual investigators and/or single disciplines that have broad scientific impact;
- The development of a model for innovative, high-risk, cyber-enabled science;
- An enhanced favorable perception of chemistry and chemists by the broader scientific community and by the public.

Prior to submission of a Preliminary Proposal, investigators are strongly urged to discuss ideas with a cognizant Program Officer listed at the end of this document. In Full Proposals, investigators contemplating 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, 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 I proposals. Any commitments detailed in this section will not be auditable.

For Full Proposals, support for collaborations with international scientists is provided through the NSF grant to the submitting U.S. institution. No Full Proposal award funds may go directly to foreign institutions. The proposal may include up to $100,000 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 interactions 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 applicable international arrangements.

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 overlap with ongoing Federally funded research. Proposals in topical areas covered by FY 2005 competitions in Nanoscale Science and Engineering (NSE), Biocomplexity in the Environment (BE), or Collaborative Research in Chemistry (CRC) will not be considered in the CBC Program. Additional information is available through the NSF Guide to Programs (http://www.nsf.gov/pubsys/ods/getpub.cfm?gpg). NSF reserves the right to return without review proposals that are not appropriate for the CBC Program.

III. ELIGIBILITY INFORMATION

Only U.S. academic institutions and non-profit research organizations may submit proposals as lead institution. Multi-institutional proposals should use the award-sub award proposal mechanisms (see GPG guidelines, chapter II.D.3).

An investigator may participate (as a PI, co-PI or senior personnel) in only one CBC proposal submitted at each stage of 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, government laboratories or international institutions. Unaffiliated scientists may also be eligible for support under a proposal submitted by an eligible organization. No CBC award funds may go directly to industry, government laboratories or international organizations.

IV. AWARD INFORMATION

Under this program, Phase I Full Proposals should be submitted for support for three years. It is anticipated that the award size will average $500,000 per year. NSF expects to award up to six continuing grants during FY2005. Estimated program budget, number of awards and average award size/duration are subject to the availability of funds and quality of proposals received.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals *(required):*

Preliminary Proposals must be submitted via FastLane by December 17, 2004, 5:00 p.m. proposer's local time. On the Cover Sheet, the PI must select the "preliminary proposal" check box in the Proposal Preparation module in FastLane and complete only the sections below appropriate to the preliminary proposal.

The following information is required for all Preliminary Proposals:

- **Information About Principal Investigators/Project Directors and co-Principal Investigators/co-Project Directors** - Use standard GPG guidelines.
- **Cover Sheet for Proposal to the National Science Foundation** - A cover sheet must be submitted and electronically signed by an Authorized Organizational Representative for all preliminary proposals. The NSF Cover Sheet also will identify the amount of funding for three years requested from NSF. No additional budgetary information will be required at the preliminary proposal stage.
- **Project Summary** - in one page describe scientific merit and broader impacts of the project.
- **Project Description** - limited to 5 pages.
- **Reference Section** - up to 10 key references.
- **Biographical Sketches for PI/co-PIs and other senior personnel** - Use standard GPG guidelines.
- **Current and Pending Support** - list for PI and co-PIs.

The following points should be covered in the Project Description:

- description of the "big problem" that is to be solved and why it is appropriate for the structure of a CBC;
- description of how the research would lead to major advances in chemistry and impact the broader scientific community and the public;
- schematic model for the work to be carried out;
- proposed group of initiating researchers who have consented to participate at this stage.

The Preliminary Proposal must conform to the print restrictions noted in the NSF Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (301) 947-2722 or by e-mail from pubs@nsf.gov.

These Preliminary Proposals will be peer-reviewed by ad hoc and/or panel review, and the principal investigators of proposals judged to be meritorious by peer review will be invited to submit Phase I Full Proposals (below).

Full Proposal Instructions:

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

Full Proposals submitted, by invitation only, in response to this program must originate from principal investigators whose projects are successful in the Preliminary Proposal competition described above and be based on those projects. All proposals not meeting this requirement will be returned without review.

Proposers are strongly encouraged to consult the proposal submission checklist included in the Grant Proposal Guide as they prepare their proposal. Proposals not compliant with the proposal preparation guidelines, as supplemented by the following instructions, may be returned without review.

The items outlined below pertain to the corresponding sections in the Grant Proposal 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 project.

- **Project Description.** A total of up to twenty-two (22) pages: i) Results from Prior Support (up to 5 pages), ii) Proposed Research (up to 15 pages), iii) Modes of Dissemination and Education (up to 1 page), and iv) Management Plan (up to 1 page).

i) Prior Support. List NSF awards held in the last five years by any investigator (PI and any other senior personnel who may or may not be a Co-PI). Following the Grant Proposal Guide, each PI, co-PI or senior associate must report on the award most closely related to the proposal. The proposal may contain up to a total of five (5) pages to describe the results.

ii) Proposed Research. Narrative, not to exceed fifteen (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 workshops, conferences and/or travel appropriate for developing the research project and team that would comprise the CBC;
- A description of the proposed research;
- A discussion of the broader impacts of the proposed work;
- A justification for why a collaborative effort involving at least three investigators is necessary to carry out the proposed project;
- A discussion of the mode of collaboration with description of any use of cyber infrastructure;
- A description of the contribution to be made by each senior investigator;
- A timeline for the planned work;
- A discussion of how agility will be addressed in terms of the incorporation of new ideas, tools and partners;
- Plans for disseminating the results.

iii) Modes of Dissemination and Education. Narrative, not to exceed one (1) page, describing

- The mode of training undergraduate students, graduate students, and postdoctoral researchers, including co-mentorship or other collaborative training;
- Plans for dissemination and education/outreach, including any pilot activities.

iv) Management Plan. Narrative, not to exceed one (1) page, describing

- How the group effort will be coordinated, including any use of cyber infrastructure;
- How decisions will be made regarding the conduct of the project;
- How the collaboration will be evaluated;

- How the collaboration will evolve.

- **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 co-authored by two or more proposal investigators.

- **Biographical sketches**. For PI/Co-PIs and all senior personnel, provide brief biographical sketches using the format described in the Grant Proposal Guide. Note that recent collaborators and other affiliates should also be collected into the combined list given in the Supplementary Documentation (see below).

- **Budget**. Include three annual budgets, one for each year of the duration of the award; a cumulative budget will be automatically generated by the Fast Lane system. 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 overlap between federally funded projects and the proposed research must be clarified.

- **Facilities**. A description of the facilities (including laboratories, computational facilities and cyber infrastructure) 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**. Provide 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 them. Required letters of collaboration from national laboratories, international organizations, and industry should be included in this section. Letters of collaboration from senior personnel not supported on the grant are also appropriate. Letters of recommendation or general support are not permitted.

- **Suggested Reviewers/Reviewers Not to Include (Optional).** Include potential reviewers who span the range of disciplines represented by the CBC proposal.

CBC proposals are likely to be read by non-specialists at some stage of the review process. It is therefore particularly important that they be written to emphasize the impact of the projects on the chemical sciences in a broad context.

Proposers are reminded to identify the program announcement/solicitation number (04-612) in the program announcement/ solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

Other Budgetary Limitations:

Full proposals should include funds in the budget for a site visit or reverse site visit in the second year of the project.

The proposal may include up to $100,000 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.

Budget Preparation Instructions:

Multi-institutional proposals should use the award-sub award mechanism discussed in the GPG, Chapter II.D.3.

Full proposals should include funds in the budget for a site visit or reverse site visit in the second year of the project.

The proposal may include up to $100,000 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.

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.

C. Due Dates

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

Preliminary Proposals *(required):*

December 17, 2004
(due by 5 p.m. proposer's local time)

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

April 15, 2005
(by invitation only)

D. FastLane Requirements

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

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

VI. PROPOSAL REVIEW INFORMATION

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

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

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

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

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

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which he/she is qualified to make judgments.

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

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

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

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

research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities
Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

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

Preliminary Proposals (Phase I, Step One)

- Does the proposal describe research focused on a "big problem" in basic chemical research that involves innovation, high risk, and requires a long timeline?
- Does the proposal present evidence that chemistry will be the driver in addressing the problem?
- Does the proposal make a compelling case that the project will engage the broader scientific community and the public?
- Does the proposal have the potential for building a research team with the appropriate agility, skills, and tools, including cyber infrastructure, to attack the problem successfully?
- Does the proposal suggest a reasonable scientific goal for a Phase I Full Proposal and a cogent preliminary plan to begin work on it (Step Two of the competition)?

Full Proposals (Phase I, Step Two)

- Does the proposal describe how the project will lead to progress in addressing a "big problem"?
- Does the project have the potential for a major advance in chemistry or at the interface of chemistry and other sciences?
- Are the scientific goals of Step Two appropriate for the development of a CBC?
- Is the schematic model for the work to be carried out in Step Two sound?
- Is there capacity for agility and creativity in the context of an evolving center?
- Does the project have the potential to attract broad scientific and public interest and support?
- Are there plans to develop the groundwork for an effective educational, dissemination, and management plan in Phase II (Step Three) and effective use of cyber infrastructure?
- Does the proposal have the potential to lead to a competitive CBC proposal in Phase II (Step Three)?

A site visit or reverse site visit during Phase I (Step Two) may be part of the Phase II (Step Three) CBC review process.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Ad Hoc and/or panel review.

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

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

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

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

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project reporting system, available through FastLane, for preparation and submission of annual and final project reports. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, publications, and other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Linda (Lee) Magid, Program Director, Directorate for Mathematical & Physical Sciences, Division of Chemistry, 1055 S, telephone: (703) 292-4930, email: LMAGID@nsf.gov
- Philip B. Shevlin, Program Officer, Directorate for Mathematical & Physical Sciences, Division of Chemistry, 1055 S, telephone: (703) 292-4966, email: pshevlin@nsf.gov

For questions related to the use of FastLane, contact:

- Paul G. Spyropoulos, Computer Specialist, Directorate for Mathematical & Physical Sciences, Division of Chemistry, 1055 S, telephone: (703) 292-4968, fax: (703) 292-9037, email: pspyropo@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

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

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

Related Programs:

- Collaborative Research in Chemistry (NSF 04-601)
- Science and Technology Centers: Integrative Partnerships (NSF 03-550)
- Environmental Molecular Science Institutes (NSF 04-509)
- Materials Research Science and Engineering Centers (NSF 04-580)
- Nanoscale Science and Engineering (NSF 04-43)

- Frontiers in Integrative Biological Research (NSF 04-596)

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The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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

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

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

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

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of

qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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

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