

Materials Research Centers and Teams

PROGRAM SOLICITATION

NSF 10-568

REPLACES DOCUMENT(S):

NSF 07-563



National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Materials Research

Preliminary Proposal Due Date(s) (required) (due by 5 p.m. proposer's local time):

September 01, 2010

Center Preliminary Proposals

September 03, 2010

Team Preliminary Proposals

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

January 11, 2011

Center Full Proposals

January 13, 2011

Team Full Proposals

IMPORTANT INFORMATION AND REVISION NOTES

The major difference between this solicitation and the previous one ([NSF 07-563](#)) is the elimination of single-IRG (interdisciplinary research group) centers and the establishment of Materials Interdisciplinary Research Teams (MIRTs) in this competition. In addition, Materials Research Science and Engineering Centers will be called Centers of Excellence for Materials Research and Innovation (CEMRIs). These changes were made, in part, as a response to recommendations of a 2007 assessment of the NSF MRSEC Program by the National Research Council (*The National Science Foundation's Materials Research Science and Engineering Program, Looking Back, Moving Forward*).

Also prompted by the NRC Report, each CEMRI is strongly encouraged to select a limited number of education activities that are consistent with the center size, are effective, leverage participant expertise and interest, and address local and national needs. CEMRIs are expected to take greater roles in maintaining the long-term health of the materials research infrastructure in the United States and contribute to a national network of materials research facilities. International collaboration, which was optional in previous MRSEC competitions, becomes a CEMRI requirement in this competition in response to changing global nature of the science and engineering enterprise.

Please be advised that the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) includes revised guidelines to implement the mentoring provisions of the America COMPETES Act (ACA) (Pub. L. No. 110-69, Aug. 9, 2007.) As specified in the ACA, each proposal that requests funding to support postdoctoral researchers must include a description of the mentoring activities that will be provided for such individuals. Proposals that do not comply with this requirement will be returned without review (see the PAPP Guide Part I: *Grant Proposal Guide* Chapter II for further information about the implementation of this new requirement).

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Materials Research Centers and Teams (MRCT)

Synopsis of Program:

Centers of Excellence for Materials Research and Innovation (CEMRIs) provide sustained support of interdisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. CEMRIs address research of a scope and complexity requiring the advantages of scale and interdisciplinarity provided by a campus-based research center. They support materials research infrastructure in the United States, promote active collaboration between universities and other sectors, including industry and international institutions, and contribute to the development of a national network of university-based centers in materials research, education, and facilities. A CEMRI may be located at a single institution, or may involve multiple institutions in partnership.

Materials Interdisciplinary Research Teams (MIRTs) represent a new award mechanism. These teams share with CEMRIs the same emphasis on the support of world class interdisciplinary materials research and the integration of research with education. Each MIRT addresses a major materials research problem requiring an interdisciplinary team of researchers. In addition, experimental and computational instrumentation needed for the proposed research activities is also supported. A MIRT may be located at a single institution, or may involve multiple institutions.

Cognizant Program Officer(s):

- Thomas P. Rieker, Program Director, 1065 N, telephone: (703) 292-4914, email: trieker@nsf.gov
- Charles Ying, Program Director, 1065 N, telephone: (703) 292-8428, email: cying@nsf.gov
- Sean L. Jones, Program Director, 1065 N, telephone: (703) 292-2986, email: sljones@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Continuing Grant or Cooperative Agreement

Estimated Number of Awards: 16 to 22

Anticipated Funding Amount:

\$36,000,000

The number of CEMRI and MIRT awards will depend on the quality of the proposals and available funds. Based on the FY 2011 budget request, an estimate of \$36M will be available for the FY 2011 competition. Approximately \$20M to \$24M and \$10M to \$12M will be available for funding approximately 8-10 CEMRI awards and approximately 8-12 MIRT awards, respectively.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Proposals may be submitted by academic institutions in the US with broad programs in materials research and education. Academic institutions, as defined by the GPG, are universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 1

Only one CEMRI or MIRT preliminary proposal may be submitted by any one organization as the lead organization in this competition. An organization considering to propose research in several groups should submit a single CEMRI proposal of multiple IRGs. A CEMRI proposal must contain a minimum of 2 IRGs and a maximum of 5 IRGs. The IRGs in a center may be topically related, or they may address different topical aspects of materials research. A single center at an organization allows efficient usage of resources, including common infrastructure, and better coordination of education and other activities of the center.

Institutions that were awarded a MRSEC in the FY2008 competition as the lead institutions are not eligible to submit a CEMRI or MIRT proposal as a lead institution in this competition. Existing MRSECs should have the ability to re-prioritize resources and add new participants through, for example, their seed program.

Full CEMRI and MIRT proposals may be submitted by invitation only. A full CEMRI proposal is limited to a minimum of 2 IRGs and a maximum of 5 IRGs.

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator (PI) or co-PI for only one preliminary proposal.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for

further information.

- **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:** Cost Sharing is not required under this solicitation.
- **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 Proposal Due Date(s) (required)** (due by 5 p.m. proposer's local time):

September 01, 2010

Center Preliminary Proposals

September 03, 2010

Team Preliminary Proposals

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

January 11, 2011

Center Full Proposals

January 13, 2011

Team Full Proposals

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: Additional award conditions apply. Please see the full text of this solicitation for further information.

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

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I. INTRODUCTION

The nature of materials research demands mechanisms to support interdisciplinary collaboration for the conception and execution of ideas, and for developing the capabilities to sustain our nation's competitiveness in the production of new technology and products based on advances in materials research.

In response to the 2007 assessment of the NSF MRSEC Program by the National Research Council (*The National Science Foundation's Materials Research Science and Engineering Program, Looking Back, Moving Forward*) this solicitation also includes the competition for Materials Interdisciplinary Research Teams. Although CEMRIs and MIRTs differ in scope and complexity, MIRTs share with CEMRIs the same emphasis on the support of world class interdisciplinary materials research and the integration of the research with education. CEMRIs and MIRTs will contribute to the development of a diverse and globally competitive scientific workforce for increased economic competitiveness of the United States.

II. PROGRAM DESCRIPTION

1. CEMRI

Centers of Excellence for Materials Research and Innovation are supported by the National Science Foundation to undertake materials research of a scope and complexity that would not be feasible under traditional funding of individual research projects. The CEMRI program demonstrates NSF's commitment to excellence in interdisciplinary research and education; it is national in scope, encouraging coordination of the overall effort among centers; and it complements, but does not substitute for, NSF support for individual investigators, small groups, national user facilities, and instrumentation in materials research.

A CEMRI may encompass two to five interdisciplinary research groups (IRGs). Each IRG involves several faculty members and associated researchers, addressing a major topic or area, in which sustained support for interactive effort by several participants with complementary backgrounds, skills, and knowledge is critical to progress. The IRGs in a center may be topically related, or they may address different topical aspects of materials research. The center as a whole is expected to be more than the sum of its IRGs; the synergy arises from its common infrastructure, shared facilities, education and outreach activities, etc.

CEMRIs incorporate the following activities to an extent consistent with the size and vision of the center:

- Academic institution based interdisciplinary materials research of the highest quality: each IRG must have a well-integrated, interdisciplinary research program distinguished by intellectual excellence and driven by a clear vision that could lead to fundamental advances, new discoveries, and/or technological developments that could have national and international significance. Each IRG must show clear benefits of an interdisciplinary and collaborative approach to address a major materials topic or area and the linkages between them
- Seed funding: NSF intends to provide flexibility for the center to respond quickly and effectively to new opportunities, and pursue high risk / high impact and transformative research. These may include (but are not limited to): seed support for junior faculty and for investigators changing fields; emerging areas of interdisciplinary research; programs to link the university effort in materials with industry, national laboratories, and other sectors; the development of tools and cyber infrastructure for remote access to instrumentation; and innovative interdisciplinary educational ventures. Seed funding through the center is not intended to provide a substitute for NSF individual investigator funding.
- Promotion of the integration of research and education, and development of effective education/outreach activities that are consistent with the center size, leverage participant expertise and interest, and address local and national needs. Research Experiences for Undergraduates (REU) are required. A center should pursue activities with proven impacts in improving scientific education. It may also experiment with novel approaches as appropriate.
- Fostering increased participation in materials research and education of members of underrepresented groups in science and engineering (e.g., women, underrepresented minorities, and persons with disabilities) at all academic levels. A center is strongly encouraged to develop cooperative programs with organization(s) serving predominantly underrepresented groups in science and engineering and/or predominantly undergraduate institutions.
- Development of shared experimental and computational facilities, properly staffed, equipped and maintained, and accessible to users from the center, the broader university community, and other institutions (e.g., scientists at other centers and groups, such as those at STCs, MIRTs, and PREMs; and in industry). A goal is to maintain the long-term health of the materials research infrastructure in the United States and contribute to a national network of materials research facilities.
- Promotion of partnerships by supporting a center's active cooperation with industry and international institutions, and other sectors, such as national laboratories, non-profit organizations, and state and local governments, in order to stimulate and facilitate knowledge transfer among the participants and strengthen the links between university-based research and its application.

Each CEMRI has the responsibility to manage and evaluate its own operation with respect to program administration, planning, content and direction. NSF support is intended to promote optimal use of university resources and capabilities, and to provide maximum flexibility in setting research directions, developing cooperative activities with other organizations, and responding quickly and effectively to new opportunities in materials research and education that are important to the nation's needs and technology base.

A center may address any area of research supported by the NSF Division of Materials Research. In addition to research excellence, these centers provide the infrastructure of equipment, education and outreach needed to ensure that the program as a whole meets its objectives and provides for effective coordination within and beyond the center community. Centers are required to contribute to the network addressing common problems and applications. Center shared experimental and computational facilities constitute a network of facilities that help to maintain and advance materials research infrastructure in the United States.

Existing single-IRG MRSECs funded in 2008 will remain as centers until the next competition scheduled for 2014.

2. **MIRT**

Materials Interdisciplinary Research Teams (MIRTs) are supported by the National Science Foundation to undertake materials research and education that requires collaborative efforts of an interdisciplinary team of researchers. They are encouraged to pursue emerging areas of interdisciplinary science that are designed to advance frontiers of materials research. Experimental and computational instrumentation needed for the proposed research activities, including cyber infrastructure, are also supported through MIRT funding so that there is a close coupling between research and instrumentation support.

MIRTs pursue the following activities:

- Academic institution based interdisciplinary materials research of the highest quality. Each team must have a well-integrated, interdisciplinary research program distinguished by intellectual excellence and driven by a clear vision that could lead to fundamental advances, new discoveries, and/or technological developments that could have national and international significance. Each MIRT proposal must show clear benefits of an interdisciplinary and collaborative approach to address a major materials topic or area; a MIRT should be more than a collection of projects. NSF encourages MIRTs to focus on potentially transformative projects, and emerging areas of interdisciplinary materials research. It is expected that the MIRT consists of at least five faculty level participants.
- Promotion of the integration of research and education to stimulate the development of a competitive scientific workforce, including support for under-represented groups (e.g., women, minorities, and persons with disabilities), within the host institution(s).
- Research Experiences for Undergraduates (REU) activities, which involve multiple faculty participants but are of a scope smaller than an REU site.
- Operation and maintenance of experimental and computational instrumentation needed for the materials research effort of the MIRT.

III. AWARD INFORMATION

1. CEMRI:

Individual CEMRI awards are expected to range in size from about \$2 million/year to a maximum of \$5 million/year. Awards will be made for an initial duration of up to six years, but the level of funding is contingent on successful progress and upon the outcome of external review. The number of awards will depend on the availability of funds and the quality of proposals received. Any funding provided to existing centers after the initial duration will be based on the submission of a re-competing proposal as described below.

Proposals from existing (re-competing) MRSECs will be evaluated in open competition with new proposals and prior accomplishments will be an important review criterion. If a proposal from an existing center is not successful, phase-out support may be provided at a reduced level for up to two additional years under the current award. If a proposal from an existing center is successful, a new cooperative agreement will be awarded for the center.

Awards are based on comprehensive, competitive merit review. Re-competing centers must demonstrate excellence, significant achievements, and organizational and national impact in materials research; substantive accomplishments in the integration of research and education; active and effective collaboration with industry and other sectors, as appropriate; effective development and operation of shared facilities; and measurable success in broadening participation for under-represented groups. Achievements under prior NSF support are a critical factor when re-competing proposals are considered. The commitment of each center to introducing substantially new research topics and undertaking innovative research will also be important in considering re-competing proposals. The anticipated effective date of new CEMRI awards is September 1, 2011.

2. MIRT:

MIRT awards are expected to range in size from about \$0.7 million to a maximum of \$1.5 million each year. An equipment budget is allowed/encouraged.

Awards will be made for an initial duration of three years. They may be renewed for another three years after a rigorous review process, or alternately the team may choose to expand and compete for a CEMRI. In the review process of the MIRT, the team's accomplishments and achievements including publications, integration of research and education, and its impact in materials research and other related disciplines will be evaluated.

It is anticipated that approximately 8-12 MIRT awards will be made in FY 2011, depending on the quality of submissions and the availability of funds. The anticipated start date of awards is August 1, 2011.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Proposals may be submitted by academic institutions in the US with broad programs in materials research and education. Academic institutions, as defined by the GPG, are universities and two- and four-year colleges (including community colleges) accredited in, and having a campus located in the US, acting on behalf of their faculty members.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 1

Only one CEMRI or MIRT preliminary proposal may be submitted by any one organization as the lead organization in this competition. An organization considering to propose research in several groups should submit a single CEMRI proposal of multiple IRGs. A CEMRI proposal must contain a minimum of 2 IRGs and a maximum of 5 IRGs. The IRGs in a center may be topically related, or they may address different topical aspects of materials research. A single center at an organization allows efficient usage of resources, including common infrastructure, and better coordination of education and other activities of the center.

Institutions that were awarded a MRSEC in the FY2008 competition as the lead institutions are not eligible to submit a CEMRI or MIRT proposal as a lead institution in this competition. Existing MRSECs should have the ability to re-prioritize resources and add new participants through, for example, their seed program.

Full CEMRI and MIRT proposals may be submitted by invitation only. A full CEMRI proposal is limited to a minimum of 2 IRGs and a maximum of 5 IRGs.

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator (PI) or co-PI for only one preliminary proposal.

Additional Eligibility Info:

Academic institutions in the US with broad research and education programs in the area of condensed matter physics, solid state and materials chemistry, materials science and engineering, and related areas of science and engineering may submit **preliminary proposals**.

In order to reduce the burden of proposal writing for the materials research community and the burden of subsequent proposal review and evaluation for reviewers and NSF staff, NSF will accept **full proposals** for CEMRIs and MIRTs **by invitation only**, based on the results of the preliminary proposal evaluation.

While more than one organization may participate in a single proposal or preliminary proposal, one organization must accept overall management responsibility for the proposal. A single organization may not be the lead organization in more than one preliminary proposal. An individual may be the Principal Investigator (PI) or co-PI for only one preliminary proposal.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (required): Preliminary proposals are required and must be submitted via the NSF FastLane system, even if full proposals will be submitted via Grants.gov.

It is important that preliminary proposals conform to the instructions provided in this solicitation and the *Grant Proposal Guide*. Conformance with all preparation and submission instructions is required. NSF may return without review proposals that are not consistent with these instructions.

I. CEMRI Preliminary Proposals (required):

1. NSF Cover Sheet

Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet, and to select "Materials Rsch Sci and Eng Cent" from the FastLane organization unit pull-down list. Make sure to select the "Preliminary Proposal" checkbox. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

2. Project Summary: A brief overview of the center as a whole, including a concise rationale for establishing the center and the proposed interdisciplinary research groups and other activities such as education/outreach and shared facilities. The Project Summary must clearly address (a) the intellectual merit, (b) broader impacts of the proposed activities, and (c) the added value of having the center. **Limit: 2 pages.**

3. Table of Contents. Will be generated automatically by FastLane

4. Project Description:

Include ONLY the following:

- A list of participating senior investigators (faculty level and equivalent) by full name, organizational and departmental affiliation, and major role in the proposed center (e.g., IRG 1, IRG 2, education). **Limit: 1 page.**
- Achievements under recent NSF support. Collaborative research and education activities

funded by NSF should be an emphasis in this section. Current NSF MRSECs must describe research and other achievements under MRSEC support. Collaborative research activities funded by other agencies may be included here as well. In addition, if any PI or co-PI listed on the proposal cover sheet has received NSF funding in the past five years, information on the awards is required; each PI and co-PI who has received more than one award must report on the award most closely related to the proposal. There is no need to list awards of all senior investigators of the proposed center. **Limit: 2 pages.**

- c. *Introduction.* State rationale and the vision of the CEMRI. In separate paragraphs identify the research, education, and diversity goals of the CEMRI. **Limit: 1 page.**
- d. *A description of each proposed area of multi-investigator, interdisciplinary group research (a minimum of 2 IRGs and a maximum of 5 IRGs).* List names of faculty-level participants, as well as numbers of undergraduate students, graduate students and postdoctoral associates in each group. Provide a concise description of the long-term research goals and intellectual focus, and outline the planned research activities. The need for an interactive, interdisciplinary approach involving several investigators, and the means of achieving this, should be clearly established. **Limit: 3 pages for each IRG.**
- e. *Other significant activities* include:
 - 1. *Seed funding and emerging areas.* Describe the criteria and mechanisms for selecting and evaluating seed projects. Initial seed projects and faculty level participants may be listed. **Limit: 1 page.**
 - 2. *Education and human resource development.* Describe a limited number of well-chosen education and outreach activities, including a brief description of how the education goals integrate strategically with the research and organizational/partnership opportunities of the center. A Research Experiences for Undergraduates (REU) program is required. **Limit: 2 pages.**
 - 3. *Diversity strategic plan.* CEMRIs are expected to demonstrate a significant commitment to the involvement of underrepresented groups (e.g., women, minorities, and persons with disabilities) as center participants (CEMRI leaders, faculty participants, undergraduate and graduate students, and postdoctoral associates). Describe the center's strategic plan to broaden participation at all levels, the metrics that will be established to measure progress made, and the desired outcome for the 6 year award period. **Limit: 1 page.**
 - 4. *Shared facilities.* Briefly describe the existing shared experimental and computational facilities and those that need to be established, and plans for the development of instrumentation. Outline plans for maintaining and operating the facilities, including staffing, provision for user fees, and plans for ensuring access to outside users. Distinguish clearly between existing facilities and those that are still to be developed. Briefly describe proposed contribution to a network of materials research facilities in the United States. **Limit: 1 page.**
 - 5. *Collaborations with industry, national laboratories, and other sectors.* Describe plans for significant intellectual and resource exchange, cooperation, and partnership with other organizations that may involve academic organizations, industry, national laboratories, non-profit organization, federal, state, and local governments and others. **Limit: 1 page.**
 - 6. *International activities.* Describe the nature of the international activities to be pursued by the CEMRI and the expected scientific benefits to the research and education program. Include a brief description of the expertise of the international collaborators and the added value/benefit of the international collaboration. **Limit: 1 page.**
 - 7. *Leadership, administration and management* of the center. Describe the center management team and provide an outline of the proposed arrangements for the integrated center management structure. **Limit: 1 page.**
- f. *A synopsis of organizational and other support* of the proposed center. Describe resources available to the center, such as space, access to existing facilities, and collaborations. **Limit: 1 page.**
- g. *Tables of Requested NSF Support.*

For each entry in the table include indirect costs. Column totals must equal the total budget requested from NSF for the period shown. Include major capital equipment under shared facilities. Support for graduate students should normally be included under research, not under education and human resources.

SUMMARY TABLE OF REQUESTED NSF SUPPORT (\$k)				
ACTIVITY	YEAR 1	%	6-YEAR TOTAL	%
IRG 1 (Title)				
IRG 2 (Title) (repeat for each IRG)				
Seed Funding and Emerging Areas				
Total Research (IRGs + Seeds)				
Shared Facilities				
Education and Human Resources				
Collaboration with Industry and Other Sectors				
International Activities				
Administration				

Total		100		100
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Participant number table:

PROPOSED NUMBER OF PARTICIPANTS (First 3 Years)			
Number	YEAR 1	YEAR 2	YEAR 3
Faculty-Level Participants			
Faculty Participants Requesting Salary Support			
Postdocs			
Graduate Students			
REU Students			
Technical Support Staff			
Administrative Support Staff			

Complete the following subaward table only if any subaward is proposed:

SUBAWARD	YEAR 1 (\$K)	6-YEAR TOTAL (\$K)
Subaward Institution 1		
Subaward Institution 2 (repeat as needed)		
TOTAL		

5. **References Cited.** List only references cited in the Project Description.

6. **Biographical Sketches.** Include a biographical sketch for each faculty level participant according to GPG guidelines. List full names of collaborators/coauthors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students. **Limit: 2 pages for each senior investigator.**

Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function of FastLane. Include their names, affiliations, phone numbers, e-mail addresses, and areas of expertise. PIs can also include a list of reviewers to be avoided.

Immediately after submission of the preliminary proposal, please send via e-mail to mrsec@nsf.gov the following:

1. An Adobe Acrobat or Microsoft Word file with the filename: preproposal #_institution_COI (replacing institution by university name). A combined list of full names of: collaborators/co-authors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students, for all senior participants in the proposed CEMRI, and (optional) a short list of reviewers to avoid.
2. A Microsoft Excel file with the filename: preproposal #_institution_reviewers. A spreadsheet of suggested reviewers with the following 8 columns: last name, first name, middle initial, institution, department, phone number, email address, expertise.

No additional material is required or accepted with the preliminary proposal submission. Budget, Current and Pending Support, and Facilities, Equipment and Other Resources sections are not required/accepted.

II. MIRT Preliminary Proposals (required):

1. NSF Cover Sheet

Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet. The proposal title must begin with "MIRT:" Make sure to select the "Preliminary Proposal" checkbox. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

2. **Project Summary:** A brief overview of the team as a whole, including a concise rationale for establishing the team and the proposed interdisciplinary research, education and other activities. The Project Summary must clearly address the intellectual merit and broader impacts of the proposed activities. **Limit: 1 page.**

3. **Table of Contents.** Will be generated automatically by FastLane

4. Project Description:

Include ONLY the following:

- a. *A list of participating senior investigators* (faculty level and equivalent) by full name, organizational and departmental affiliation. **Limit: 1 page.**
- b. *Achievements under recent NSF support.* Collaborative research and education activities funded by NSF should be an emphasis in this section. Collaborative research activities funded by other agencies may be included here as well. In addition, if any PI or co-PI listed on the proposal cover sheet has received NSF funding in the past five years, information on the awards is required; each PI and co-PI who has received more than one award must report on the award

most closely related to the proposal. **Limit: 2 pages.**

- c. *Introduction.* State rationale and the vision of the MIRT. In separate paragraphs identify the research and education goals of the MIRT. **Limit: 1 page.**
- d. *A description of the proposed area of multi-investigator, interdisciplinary research.* List names of faculty-level participants, as well as numbers of students and, if any, postdoctoral associates. Provide a concise description of the long-term research goals and intellectual focus, and outline the planned research activities. The need for an interactive, interdisciplinary approach involving several investigators, and the means of achieving this, should be clearly established. **Limit: 3 pages.**
- e. *Other significant activities* include:
 - 1. *Education and human resource development.* Describe Research Experiences for Undergraduates (REU) activities plus additional education activities that the team may propose, including a brief description how the education goals integrate strategically with the research and expertise/opportunities of the team. **Limit: 1 page.**
 - 2. *Instrumentation.* Briefly describe the existing experimental and/or computational equipment and those to be purchased or developed. Outline benefits of the equipment to be purchased or developed in the context of the proposed research. **Limit: 1 page.**
 - 3. *Describe one or two other activities, which may enhance intellectual merit and/or broader impacts of the proposal.* One may consider, for example, collaboration with industry, national laboratories, or international institutions; instrumentation development; etc. **Limit: 1 page.**
 - 4. Describe mechanisms designed for enhancing team collaboration, self evaluation, and resource prioritization. **Limit: 1 page.**
- f. *A synopsis of organizational and other support.* Describe resources available to the team, such as space, access to existing facilities, and collaborations. **Limit: 1 page.**
- g. *Tables of Requested NSF Support.*

In tabular form as follows, summarize the overall support levels planned for each of the major activities of the MIRT. For each entry in the table include indirect costs. Column totals must equal the total budget requested from NSF for the period shown.

SUMMARY TABLE OF REQUESTED NSF SUPPORT (\$k)				
ACTIVITY	YEAR 1	%	3-YEAR TOTAL	%
Research				
Instrumentation, if any				
Others, if any (Please specify)				
Total		100		100

Participant number table:

PROPOSED NUMBER OF PARTICIPANTS	
Faculty-Level Participants	
Postdocs (if any)	
Graduate Students	
REU Students	

Complete the following subaward table only if any subaward is proposed:

SUBAWARD (\$k)	YEAR 1 (\$k)	3-YEAR TOTAL (\$k)
Subaward Institution 1		
Subaward Institution 2 (repeated as needed)		
TOTAL		

- 5. **References Cited.** List only references cited in the Project Description.
- 6. **Biographical Sketches.** Include a biographical sketch for each faculty level participant according to GPG guidelines. List full names of collaborators/coauthors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students. **Limit: 2 pages for each senior investigator.**

Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function of FastLane. Include their names, affiliations, phone numbers, e-mail addresses, and areas of expertise. PIs can also include a list of reviewers to be avoided.

Immediately after submission of the preliminary proposal, please send via e-mail to mrsec@nsf.gov the following:

- 1. An Adobe Acrobat or Microsoft Word file with the filename: preproposal #_institution_COI

- (replacing institution by university name). A combined list of full names of: collaborators/co-authors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students, for all senior participants in the proposed MIRT, and (optional) a short list of reviewers to avoid.
2. A Microsoft Excel file with the filename: preproposal #_institution_ reviewers. A spreadsheet of suggested reviewers with the following 8 columns: last name, first name, middle initial, institution, department, phone number, email address, expertise.

No additional material is required or accepted with the preliminary proposal submission. Budget, Current and Pending Support, and Facilities, Equipment and Other Resources sections are not required/accepted.

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/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 nsfpubs@nsf.gov.

It is important that proposals conform to the instructions provided in this solicitation and the *Grant Proposal Guide*. Conformance with all preparation and submission instructions is required. NSF may return without review proposals that are not consistent with these instructions.

III. CEMRI Full Proposal Preparation Instructions: A full proposal may be submitted only by invitation.

1. **NSF Cover Sheet.** Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet, and to select "Materials Rsch Sci and Eng Cent" from the FastLane organization unit pull-down list. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. 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. Make sure that the button asking "If This Is A Preliminary Proposal ..." is UNCHECKED; also make sure to enter your preliminary proposal number in the box asking "Show Related Preliminary Proposal Number If Applicable."
2. **Project Summary.** Provide a clear vision for and description of the proposed CEMRI and its potential scientific, technological, and societal impacts. Briefly describe the organizational setting of the center, its proposed scope and organization, activities in research and education and their integration, development of human resources, shared research facilities, collaborative activities with industry, national laboratories, international institutions, and others. The Project Summary must clearly address (a) the intellectual merit, (b) the broader impacts of the proposed activities, and (c) the added value of having the center. **Limit: 3 pages.**
3. **Table of Contents.** Generated automatically by the system.
4. **Project Description.** Include the following:
 - a. *A list of participating senior investigators* (faculty level and equivalent) by full name, organizational and departmental affiliation, and major role in the proposed center (e.g., IRG 1, IRG 2, education). **Limit: 1 page.**
 - b. *Achievements under recent NSF support.* Collaborative research and education activities funded by NSF should be an emphasis in this section. (Current NSF MRSECs must describe research and other achievements under MRSEC support.) Collaborative research activities funded by other agencies may be included here as well. In addition, if any PI or co-PI listed on the proposal cover sheet has received NSF funding in the past five years, information on the awards is required; each PI and co-PI who has received more than one award must report on the award most closely related to the proposal. There is no need to list awards of all senior investigators of the proposed center. **Limit: 5 pages.**
 - c. *Introduction and strategic plan.* State rationale and the vision of the CEMRI. In separate paragraphs identify the research, education, and diversity goals of the CEMRI. Outline how the CEMRI plans to achieve the goals, the process and matrices used to monitor progress, and the mechanisms of assessment. **Limit: 2 pages.**
 - d. *Interdisciplinary research groups* (a minimum of 2 IRGs and a maximum of 5 IRGs). For each IRG proposed, provide a concise description of the long-term research goals and

intellectual focus, and describe the planned research activities in sufficient detail to enable their scientific merit and significance to be assessed. Describe the role and intellectual contribution of each senior participant in the IRG, and briefly outline the resources available or planned to accomplish the research goals (it will be helpful to underline the name of each senior investigator wherever it occurs). **The need for an interactive, interdisciplinary approach involving several investigators, and the means of achieving this, should be clearly established.** Place the IRG in the context of the center as a whole, and describe interactions with other groups and organizations. At the beginning of each IRG section in the proposal, name the senior personnel who will participate, and state the proposed number of undergraduate students, graduate students and postdoctoral associates in each group. **Limit for each IRG: 10 pages.**

e. *Other significant activities* include:

1. *Seed funding and emerging areas.* Describe the criteria and mechanisms for selecting and evaluating seed projects. Describe initial seed projects, including names of faculty level participants and numbers of students and postdocs. **Limit: 3 pages.**
2. *Education and human resources development.* Describe the education and human resource goals, provide a rationale for those goals, and metrics used to measure desired outcomes for the 6 year period of the award. Describe how the education goals integrate strategically with the research and organizational/partnership opportunities of the center, and management of proposed education activities. A Research Experiences for Undergraduates program is required. **Limit: 3 pages.**
3. *Diversity strategic plan.* CEMRIs are expected to demonstrate a significant commitment to the involvement of underrepresented groups (e.g., women, minorities, persons with disabilities as center participants (CEMRI leaders, faculty participants, undergraduate and graduate students, and postdoctoral associates). Describe the center's strategic plan to broaden participation at all levels, the metrics that will be used to measure progress, and the desired outcome for the 6 year award period. **Limit: 2 Pages.**
4. *Shared facilities.* Describe the existing shared experimental and computational facilities and those to be established, including specific major instrumentation, and plans for the development of instrumentation. Describe plans for maintaining and operating the facilities, including staffing, provision for user fees, and plans for ensuring access to outside users. Distinguish clearly between existing facilities and those still to be developed. Describe proposed contribution to a network of materials research facilities in the United States. **Limit: 3 pages.**
5. *Collaboration with industry, national laboratories, and other sectors.* Describe plans for significant intellectual and resource exchange, cooperation, and partnership with other organizations that may involve academic organizations, industry, national laboratories, non-profit organizations, federal, state, and local governments and others. Define the goals of the collaboration, describe the planned activities, and expected outcomes. Describe the roles of the senior participants, the mechanisms planned to stimulate and facilitate knowledge transfer, and the potential long-term impact of the collaborations. **Limit: 3 pages.**
6. *International activities.* Describe the nature of the international activities and the expected international and scientific or engineering benefits to the research and education program. Include a description of the research facilities at the foreign site, as appropriate, and of the division of effort and expertise among the collaborators. **Limit: 2 pages.**
7. *Management.* Describe the plans for administration of the center, including the functions of key personnel and the role of any advisory committee, executive committee, and/or program committee or their equivalent. Describe the procedures and criteria used to select, administer, and evaluate the Interdisciplinary Research Groups and other research programs of the center, including collaborative programs with other groups and organizations. Plans for administering the seed funding, education activity, and shared experimental facilities should be described under items (e.1), (e.2), and (e.4), respectively. **Limit: 2 pages.**

f. *Organizational and other sector support.* Outline existing resources available to the center, including but not limited to space, faculty and staff positions, capital equipment, access to existing facilities, collaborations, and outreach programs. **Limit: 1 page**

g. *Publications and patents under prior NSF support.* For re-competing MRSECs only, provide a table listing the total number of papers with MRSEC primary and partial support since 2005; number of these papers with two or more faculty-level participants; number of papers published in each of 10 high-impact journals of center's choice; number of awarded patents, and number of licensed patents. Then list **published** papers and awarded patents under prior NSF MRSEC support (use **bold face** to designate each author that is a center faculty participant or equivalent).

h. *Summary Table of Requested NSF Support.*

In tabular form as follows, summarize the overall support levels planned for each of the major activities of the CEMRI. For each entry in the table include indirect costs. Column totals must equal the total budget requested from NSF for the period shown. Include major capital equipment under shared facilities. Support for graduate students should normally be included under research, not under education and human resources.

SUMMARY TABLE OF REQUESTED NSF SUPPORT (\$k)				
ACTIVITY	YEAR 1	%	6-YEAR TOTAL	%

IRG 1 (Title)				
IRG 2 (Title) (repeat for each IRG)				
Seed Funding and Emerging Areas				
Total Research (IRGs + Seeds)				
Shared Facilities				
Education and Human Resources				
Collaboration with Industry and Other Sectors				
International Activities				
Administration				
Total		100		100

Participant number table:

PROPOSED NUMBER OF PARTICIPANTS (First 3 Years)			
Number	YEAR 1	YEAR 2	YEAR 3
Faculty-Level Participants			
Faculty Participants Requesting Salary Support			
Postdocs			
Graduate Students			
REU Students			
Technical Support Staff			
Administrative Support Staff			

Complete the following subaward table only if any subaward is proposed:

SUBAWARD (\$k)	YEAR 1 (\$K)	6-YEAR TOTAL (\$K)
Subaward Institution 1		
Subaward Institution 2 (repeat as needed)		
TOTAL		

- References Cited.** List only references cited in the Project Description.
- Biographical Sketches.** Include a biographical sketch for each faculty level participant according to GPG guidelines. List full names of collaborators/coauthors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students. **Limit: 2 pages for each senior investigator.**
- Budget pages and budget justification.** Complete budget pages for each year of support (1-6). A six-year cumulative budget will be automatically generated by FastLane or Grants.gov. Provide a six-year summary budget justification that may not exceed a total of 3 pages. Provide separate budget pages for the lead institution and for each organization receiving a sub-award. Provide a separate budget justification, up to three pages for each subaward.
- Current and Pending Support.** List current and pending support for each faculty level investigator.
- Postdoctoral Researcher Mentoring Plan.** Proposals that request funding for Postdoctoral researchers must include a one-page Mentoring Plan in the supplementary documents section otherwise the proposal will be returned without review. **Limit: 1 page.**
- Letters of Commitment.** Include only official letters of commitment with specific commitments of resources from participating organizations. Scan your signed letters and upload into the Supplementary Documents section of FastLane, but do not send originals. For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form. **Limit: 5 pages.**

No additional material is required or accepted with the full proposal submission. The Facilities, Equipment and Other Resources section should contain only one phrase "See Project Description."

Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function of FastLane. Include their names, affiliations, phone numbers, e-mail addresses, and areas of expertise. PIs can also include a list of reviewers to be avoided.

Immediately after submission of the preliminary proposal, please send via e-mail to mrsec@nsf.gov the following:

- An Adobe Acrobat or Microsoft Word file with the filename: proposal #_institution_COI

(replacing institution by university name). A combined list of full names of: collaborators/co-authors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students, for all senior participants in the proposed , and (optional) a short list of reviewers to avoid.

2. A Microsoft Excel file with the filename: proposal #_institution_reviewers. A spreadsheet of suggested reviewers with the following 8 columns: last name, first name, middle initial, institution, department, phone number, email address, expertise.

IV. MIRT Full Proposal Preparation Instructions: A full proposal may be submitted only by invitation.

1. **NSF Cover Sheet.** Proposers are reminded to identify this program solicitation number in the program announcement/solicitation block of the NSF Cover Sheet. Grants.gov Users: The program solicitation number will be pre-populated by Grants.gov on the NSF Grant Application Cover Page. The proposal title must begin with "MIRT." Make sure that the button asking "If This Is A Preliminary Proposal ..." is UNCHECKED; also make sure to enter your preliminary proposal number in the box asking "Show Related Preliminary Proposal Number If Applicable."
2. **Project Summary.** Provide a clear vision for and description of the proposed MIRT and its potential impacts. Describe the team, proposed activities in research and education and their integration. The Project Summary must clearly address the intellectual merit and broader impacts of the proposed activities. **Limit: 2 pages.**
3. **Table of Contents.** Generated automatically by the system.
4. **Project Description.** Include the following:
 - a. *A list of participating senior investigators* (faculty level and equivalent) by full name, organizational and departmental affiliation. **Limit: 1 page.**
 - b. *Achievements under prior NSF support.* Collaborative research and education activities funded by NSF should be an emphasis in this section. Collaborative research activities funded by other agencies may be included here as well. In addition, if any PI or co-PI listed on the proposal cover sheet has received NSF funding in the past five years, information on the awards is required; each PI and co-PI who has received more than one award must report on the award most closely related to the proposal. **Limit: 3 pages.**
 - c. *Introduction.* State rationale and the vision of the MIRT. In separate paragraphs identify the research and education goals of the MIRT. **Limit: 1 page.**
 - d. *Research.* Provide a concise description of the long-term research goals and intellectual focus, and describe the planned research activities in sufficient detail to enable their scientific merit and significance to be assessed. Describe the role and intellectual contribution of each senior participant in the team, and briefly outline the resources available or planned to accomplish the research goals (it will be helpful to underline the name of each senior investigator wherever it occurs). **The need for an interactive, interdisciplinary approach involving several investigators, and the means of achieving this, should be clearly established.** At the beginning of this section, name the senior personnel who will participate, and state the proposed number of postdoctoral and graduate student participants. **Limit 10 pages.**
 - e. Other significant activities include:
 1. *Education and human resources development.* Describe the education and human resource goals. Briefly describe how the education goals integrate strategically with the research and opportunities of the team. Research Experiences for Undergraduates activities involving multiple faculty participants (but on a scale smaller than an REU site) are required. Describe any additional education activities that the team may propose. **Limit: 2 pages.**
 2. *Instrumentation.* Describe the existing experimental and/or computational equipment and those to be purchased or developed. Describe and clearly justify benefits of the equipment to be purchased or developed in the context of the proposed research and, if applicable, other research activities on the campus. **Limit: 3 pages.**
 3. *Describe one or two other activities, which may enhance intellectual merit and/or broader impacts of the proposal.* One may consider, for example, collaboration with industry, national laboratories, or international institutions; instrumentation development; etc. **Limit: 2 pages.**
 4. Describe mechanisms designed for enhancing team collaboration, self evaluation, and resource prioritization. **Limit: 1 page.**
 - f. *Organizational and other sector support.* Describe resources available to the team, such as space, access to existing facilities, and collaborations. **Limit: 1 page.**
 - g. *Summary Table of Requested NSF Support.* In tabular form as follows, summarize the overall support levels planned for each of the major activities of the MIRT. For each entry in the table include indirect costs. Column totals must equal the total budget requested from NSF for the period shown.

SUMMARY TABLE OF REQUESTED NSF SUPPORT (\$k)				
ACTIVITY	YEAR 1	%	3-YEAR TOTAL	%
Research				
Instrumentation, if any				
Others, if any (Please specify)				
Total		100		100

Participant number table:

PROPOSED NUMBER OF PARTICIPANTS	
Faculty-Level Participants	

Postdocs (if any)	
Graduate Students	
REU Students	

Complete the following subaward table only if any subaward is proposed:

SUBAWARD (\$k)	YEAR 1 (\$K)	3-YEAR TOTAL (\$K)
Subaward Institution 1		
Subaward Institution 2 (repeated as needed)		
TOTAL		

5. **References Cited.** List only references cited in the Project Description.
6. **Biographical Sketches.** Include a biographical sketch for each faculty level participant according to GPG guidelines. List full names of collaborators/coauthors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students. **Limit: 2 pages for each senior investigator.**
7. **Budget pages and budget justification.** Complete budget pages for each year of support. A cumulative budget will be automatically generated by FastLane or Grants.gov. Provide a summary budget justification that may not exceed a total of 3 pages. Provide separate budget pages for the lead institution and for each organization receiving a sub-award. Provide a separate budget justification (up to three pages) for each subaward.
8. **Current and Pending Support.** List current and pending support for each faculty level investigator.
9. **Postdoctoral Researcher Mentoring Plan** Proposals that request funding for Postdoctoral researchers must include a one-page Mentoring Plan in the supplementary documents section otherwise the proposal will be returned without review. **Limit: 1 page.**
10. **Letters of Commitment.** Include only official letters of commitment with specific commitments of resources from participating organizations. Scan your signed letters and upload into the Supplementary Documents section of FastLane, but do not send originals. For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form. **Limit: 3 pages.**

No additional material is required or accepted with the full proposal submission. The *Facilities, Equipment and Other Resources* section should contain only one phrase "See Project Description."

Additional Information:

Suggested Reviewers. Submit a list of individuals who might be suitable to act as impartial reviewers through the Suggested Reviewers function of FastLane. Include their names, affiliations, phone numbers, e-mail addresses, and areas of expertise. PIs can also include a list of reviewers to be avoided.

Immediately after submission of the preliminary proposal, please send via e-mail to mrsec@nsf.gov the following:

1. An Adobe Acrobat or Microsoft Word file with the filename: proposal #_institution_COI (replacing institution by university name). A combined list of full names of: collaborators/co-authors within the past 4 years; co-editors within the past 2 years; graduate advisor; postdoctoral advisor; postdoctoral scholars within the past 5 years; and all prior graduate students, for all senior participants in the proposed MIRT, and (optional) a short list of reviewers to avoid.
2. A Microsoft Excel file with the filename: proposal #_institution_reviewers. A spreadsheet of suggested reviewers with the following 8 columns: last name, first name, middle initial, institution, department, phone number, email address, expertise.

B. Budgetary Information

Cost Sharing: Cost sharing is not required under this solicitation.

Other Budgetary Limitations: Awards are expected to range in size from about \$2.0 million/year to a maximum of \$5.0 million/year for a CEMRI proposal; from about \$0.7 million/year to a maximum of \$1.5 million/year for a MIRT proposal. The budget for the full proposal may not be larger than the preliminary proposal budget.

C. Due Dates

- **Preliminary Proposal Due Date(s) (required)** (due by 5 p.m. proposer's local time):

September 01, 2010

Center Preliminary Proposals

September 03, 2010

Team Preliminary Proposals

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

January 11, 2011

Center Full Proposals

January 13, 2011

Team Full Proposals

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 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.

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.

Additional Review Criteria:

In addition to the National Science Board merit review criteria, CEMRI/MIRT proposals have additional review criteria. Given competing proposals of essentially equal merit, NSF staff will be responsible for ensuring that the overall program reflects an appropriate balance among research topics and among centers of differing size and complexity. Preliminary proposals will be evaluated in terms of their potential to meet the criteria for full proposals.

CEMRI proposals will be evaluated in terms of the IRGs and of the Center as a whole, using the following additional criteria:

A. Interdisciplinary Research Groups:

- o A well integrated, interdisciplinary research program distinguished by intellectual excellence and driven by a clear vision for each interdisciplinary research group leading to fundamental advances, new discoveries, and/or technological developments that could have national and international significance.
- o Capability of the investigators, technical soundness of the proposed approach, and adequacy of the resources available or proposed, including instrumentation and facilities.
- o Clear benefits of a multi-investigator, interdisciplinary approach to address a major topic or area normally supported by the Division of Materials Research for each IRG; cooperation and interdependence of the investigators within the IRG.

B. The Center as a Whole:

- o Organizational setting and rationale for the center. Relationship to existing and planned organizational programs and capabilities in materials research and education; planned intellectual breadth of the proposed program; potential for stimulating interdisciplinary interaction and collaboration; potential for organizational, national, and international impacts.
- o Development of effective education/outreach activities that are consistent with the center size, leverage participant expertise and interest, and address local and national needs in workforce development; fostering increased participation in materials research and education of members of underrepresented groups in science and engineering at all academic levels.
- o Plans to establish and operate shared experimental and computational facilities, properly staffed, equipped and maintained, and accessible to users from the center, the broader academic community, the participating institutions, and other institutions and sectors.
- o Plans and potential to develop and maintain active cooperation with industry and other sectors, such as National Laboratories and international institutions; to stimulate and facilitate knowledge transfer among the organizational participants and between the center and other organizations and sectors; and to strengthen the links between university-based materials research and its application and implementation.
- o Effective use of seed funding for junior faculty, potentially transformative projects, and/or emerging areas of interdisciplinary materials research.
- o Organizational commitments and support. Likely effectiveness of the proposed management plan, including mechanisms for selection of topics and internal allocation of resources, plans for self-evaluation, and plans and potential for maintaining a flexible and innovative program.

MIRT proposals will be evaluated using the following criteria in addition to the two standard NSF review criteria:

- o A well integrated, interdisciplinary research team distinguished by intellectual excellence and driven by a clear vision leading to fundamental advances, new discoveries, and/or technological developments that could have national and international significance.
- o Capability of the investigators, technical soundness of the proposed approach, and adequacy of the resources available or proposed, including instrumentation.
- o Clear benefits of a multi-investigator, interdisciplinary approach to address a major topic or area normally supported by the Division of Materials Research; cooperation and interdependence of all faculty-level investigators within the team.
- o Likely effectiveness of the proposed team-work, including plans for self-evaluation and for maintaining a flexible and innovative program.
- o If a MIRT proposal requests more than \$50,000 in equipment, reviewers are asked to assess the utility, impact or potential impact that the instrument would have on the proposed research activities, as well as the ability of the applicants to operate and maintain the equipment.

B. Review and Selection Process

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

Preliminary CEMRI and MIRT proposals will be reviewed together by panel review, supplemented by *ad hoc* review as needed. Preliminary proposals will be reviewed based on the topical areas of IRGs/MIRTs.

The preliminary proposal review process pays special attention to the merit and potential impacts of each proposed IRG/MIRT, with the objective that preliminary proposals with excellent IRGs/MIRTs would be invited for full proposals. It is possible that only some of

the proposed IRGs in a CEMRI preliminary proposal would be invited for a full CEMRI proposal. It is also possible that a MIRT full proposal would be invited based on merit review of a CEMRI preliminary proposal.

A proposing organization that submits a CEMRI preliminary proposal is encouraged to submit a proposal with IRGs each with well integrated, interdisciplinary research of excellent quality; a CEMRI preliminary proposal with two or more IRGs of lower quality, as determined by the preliminary proposal review, would normally not be invited for a full CEMRI or MIRT proposal.

Full CEMRI and MIRT proposals will be accepted by invitation only, based on the pre-proposal reviews. Full proposals will be reviewed by *ad hoc* review. CEMRI finalists will be selected based on *ad hoc* reviews of the full proposals. Finalists will come to NSF to make presentations of their proposals to panels of experts (reverse site visits).

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.

Special Award Conditions:

Special award conditions for CEMRIs will be within the cooperative agreement.

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.

Center or team specific annual progress report and continuation request are required.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Thomas P. Rieker, Program Director, 1065 N, telephone: (703) 292-4914, email: trieker@nsf.gov
- Charles Ying, Program Director, 1065 N, telephone: (703) 292-8428, email: cying@nsf.gov
- Sean L. Jones, Program Director, 1065 N, telephone: (703) 292-2986, email: sjones@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 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:

Suzanne H. Plimpton
 Reports Clearance Officer
 Division of Administrative Services
 National Science Foundation
 Arlington, VA 22230

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