

Materials Research Science and Engineering Centers (MRSEC)

Program Solicitation

NSF 07-563

Replaces Document(s):

NSF 04-580



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 05, 2007

due by 5:00 PM proposer's local time

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

January 18, 2008

REVISION NOTES

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

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

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Materials Research Science and Engineering Centers (MRSEC)

Synopsis of Program:

Supports interdisciplinary materials research and education while addressing fundamental problems in science and engineering. MRSECs require outstanding research quality and intellectual breadth, provide support for research infrastructure and flexibility in responding to new opportunities, and strongly emphasize the integration of research and education. These centers foster active collaboration between universities and other sectors, including industry, and they constitute a national network of university-based centers in materials research. MRSECs address problems of a scope or complexity requiring the advantages of scale and interdisciplinary interaction provided by a center. A MRSEC may be located at a single institution, or may involve two or more institutions in partnership.

Cognizant Program Officer(s):

- Thomas P. Rieker, Program Director, 1065 N, telephone: (703) 292-4914, email: trieker@nsf.gov
- Maija Kukla, Program Director, 1065 N, telephone: (703) 292-4940, email: mkukla@nsf.gov
- Charles Ying, Program Director, 1065 N, telephone: (703) 292-8428, email: cying@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences

Award Information

Anticipated Type of Award: Cooperative Agreement

Estimated Number of Awards: 12 to 15

Anticipated Funding Amount: \$29,000,000 for FY 2008, contingent on the availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Proposals may be submitted by universities in the US with broad programs in materials research and education. Existing MRSECs that are re-competing are required to submit preliminary proposals.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 2

Only two preliminary proposals may be submitted by any one organization as the lead organization. Full proposals may be submitted by invitation only.

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator for only one preliminary proposal. Full proposals may be submitted by invitation only.

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://>

- Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required 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 05, 2007

due by 5:00 PM proposer's local time

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

January 18, 2008

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

Materials Research Science and Engineering Centers (MRSECs) support interdisciplinary and multidisciplinary materials research and education of the highest quality while addressing fundamental problems in science and engineering. MRSECs require outstanding research quality, intellectual breadth, interdisciplinarity, flexibility in responding to new research opportunities, support for research infrastructure, and they foster the integration of research and education in the materials field. They are expected to have strong links to industry and other sectors, as appropriate, and to contribute to the development of a national network of university-based centers in materials research. MRSECs address fundamental materials research topics of intellectual and technological importance, contribute to national priorities by promoting active collaboration between academia and other sectors, and enable researchers to address problems of a scope and complexity requiring the advantages of scale and interdisciplinarity provided by a campus-based research center.

The NSF's mission is to promote and facilitate the progress of science, engineering, and related education in the United States. Its role in supporting research and education is particularly important in creating physical and human resources infrastructure in both traditional and emerging areas. NSF also promotes partnerships, including collaboration with other academic organizations, agencies, industry, national and government laboratories, for projects of mutual interest. International collaborations are also strongly encouraged.

The MRSEC program reinforces NSF's commitment to excellence in interdisciplinary research and education; it is national in scope and significance, requiring coordination of the overall effort among Centers. The MRSEC program complements, but does not substitute for, NSF support for individual investigators, small groups, national user facilities, and instrumentation in materials research.

II. PROGRAM DESCRIPTION

MRSECs are supported by NSF to undertake materials research that requires the scope and complexity not feasible under traditional funding of individual research projects. NSF support is intended to reinforce the base of individual investigator and small group research by providing the flexibility to address topics requiring an approach of broad scope and duration. MRSECs are university-based, and undertake an interactive, interdisciplinary approach to materials research and education while fostering active cooperation among university-based researchers and those concerned with the application of materials research in industry and elsewhere. Centers can be co-located at multiple institutions. A MRSEC may encompass one or more interdisciplinary research groups (IRGs). Each IRG involves several faculty members and associated researchers, addressing a major topic or area, which may range from fundamental to applied research, 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; they contribute to the synergy arising from the research and education activities of the Center and its common infrastructure, shared facilities and outreach programs. Thus, the Center as a whole is expected to be more than the sum of its parts.

The scope of activities of each MRSEC is commensurate with the capabilities of the proposing organization. Smaller Centers normally consist of a single IRG addressing a particular topic in materials research. Larger Centers undertake a broader program of research and education, and may involve several IRGs. MRSECs incorporate the following activities to an extent consistent with the size and vision of the Center:

- Programs to stimulate interdisciplinary education and the development of human resources (including support for underrepresented groups) through cooperation and collaboration with other organizations and sectors, as well as within the host organization. Cooperative programs with organizations serving predominantly underrepresented groups in science and engineering are strongly encouraged.
- Active cooperation with industry and other sectors such as national laboratories to stimulate research and facilitate knowledge transfer among the participants and strengthen the links between university-based research and its application.

- Support for shared experimental and computational facilities, properly staffed, equipped and maintained, and accessible to users from the Center, the participating organizations, and other organizations and sectors.
- Active efforts to establish research collaborations and education activities at the international level are strongly encouraged. Cooperative activities may include, but are not limited to: joint research programs; affiliate programs; joint development and use of shared experimental facilities; access to user facilities; visiting scientist programs; joint educational ventures; joint seminar series, colloquia or workshops.

Each MRSEC 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 sectors, and responding quickly and effectively to new opportunities in materials research and education that are important to the nation's research and technology base. NSF encourages MRSECs to include support for junior faculty, high-risk and transformative projects, and emerging areas of interdisciplinary materials research.

The MRSECs constitute a spectrum of coordinated Centers with a range of scientific breadth and administrative complexity, which may address any areas of materials research. The MRSEC program enables specialized areas of interdisciplinary excellence to be integrated into a national network of Centers. These in turn provide, in addition to research excellence, 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 MRSEC community. MRSEC Directors are required to contribute to the network addressing common problems and applications.

III. AWARD INFORMATION

Individual MRSEC awards are expected to range in size from about \$1.0 million/year to a maximum of \$5.0 million/year. The average award of currently funded MRSECs is about \$1.9 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) Centers will be evaluated in open competition with new proposals. 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 new 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; and effective development and operation of shared facilities. 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.

Anticipated effective date of new awards: September 2008.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Proposals may be submitted by universities in the US with broad programs in materials research and education. Existing MRSECs that are re-competing are required to submit preliminary proposals.

PI Limit:

None Specified

Limit on Number of Proposals per Organization: 2

Only two preliminary proposals may be submitted by any one organization as the lead organization. Full proposals may be submitted by invitation only.

Limit on Number of Proposals per PI: 1

An individual may be the Principal Investigator for only one preliminary proposal. Full proposals may be submitted by invitation only.

Additional Eligibility Info:

Universities 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 MRSECs **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 Center. A single organization may not be the lead organization in more than two preliminary proposals. An individual may be the Principal Investigator for only one preliminary proposal. The MRSEC program will not normally provide support simultaneously for more than one Center based at any one organization.

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.

Preliminary 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/publications/pub_summ.jsp?ods_key=gpg.

Preliminary proposals that exceed the specified page limitations or do not comply with the GPG will be ineligible for consideration and will be returned without review.

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. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

2. Project Summary: include a brief overview of the Center as a whole, a concise rationale for establishing the Center, outline of the existing and planned capabilities of the participating organizations in materials research and education, and highlight the main activities, administration, infrastructure, and partnerships of the Center. It **must** indicate, in separate paragraphs, the intellectual merit of the proposed work and its broader impacts. **Limit: 2 pages.**

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

4. Project Description:

The entire Project Description section is limited to no more than twenty five pages total, including tables and illustrations, regardless of the number of IRGs. Limits are set on each Section as indicated.

Include the following:

- a. *A list of participating senior investigators* (faculty level and equivalent) by name, organizational and departmental affiliation. **Limit: 1 page.**
- b. *A description of pertinent achievements under prior NSF support*, where applicable. **Limit: 2 pages.**
- c. *A description of each proposed area of multi-investigator, interdisciplinary group research*, including names of faculty-level participants and numbers of students and postdoctoral associates in each group (**limit this section to no more than three pages for each IRG**).
- d. *A description of seed funding and emerging areas*. Through this mechanism, 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. Briefly describe proposed research plans and related activities, showing clearly how they are related to the mission of the Center. 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 and other sectors; the development of tools 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. The criteria and mechanisms for selecting and evaluating projects must be clearly addressed in the management plan. Include the names of faculty-level participants for the first year. **Limit: 2 pages.**
- e. Other significant activities include:
 - 1. *Education and human resource development*. Describe the education and human resource goals, provide a rationale for those goals, and indicate desired outcomes for the 6 year period. Briefly describe how the education goals integrate strategically with the research and organizational/partnership opportunities of the Center. Outline strategic plans for increasing the participation of women and underrepresented minorities in Center research and education activities. **Limit: 2 pages.**
 - 2. *Collaborations with industry 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, federal, state, and local governments and others. **Limit: 1 page.**
 - 3. *International Collaboration* (complete this section if appropriate). Describe the nature of the collaboration and the expected international and scientific or engineering benefits to the research and education program. Include a brief description of the research facilities at the foreign site, as appropriate, and of the division of effort and expertise among the collaborators. **Limit: 1 page.**
 - 4. *Shared Experimental 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. **Limit: 1 page.**
 - 5. *Leadership, administration and management* of the Center. Describe the Center management team and provide 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. **Limit: 1 page.**
- g. *A Summary Table of Requested NSF Support*.

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 Experimental Facilities				

Education and Human Resources				
Collaboration with Industry and Other Sectors				
Administration				
Total		100		100

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 experimental facilities. Support for graduate students should normally be included under research, not under education and human resources.

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. Include names of PhD and Postdoc advisors. **Limit: 1 page for each senior investigator.**

7. Budget pages and budget justification. Complete budget pages for each year of support (1-6). Also provide a six-year summary budget justification that may not exceed a total of 3 pages. A six-year cumulative budget summary will be automatically generated by FastLane. Provide separate budget pages for the Center as a whole and for each organization receiving a sub-award.

Concurrently with submission of the preliminary proposal, please submit via FastLane and send an e-mail to mrsec@nsf.gov the following:

1. The title of the preliminary proposal, the submitting organization(s), and the name of the PI and co-PI(s);
2. a list of individuals in alphabetical order (and their affiliations) outside the participating organizations whose participation in the review of the preliminary proposal might constitute a conflict of interest through association with the participants; and
3. a list of individuals who might be suitable to act as impartial reviewers. Please include their contact information, phone number, e-mail, affiliation, and area of expertise.

No additional material is required or accepted with the preliminary proposal submission.

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

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

A full proposal may be submitted only by invitation. **Proposals that exceed the page limitations or that contain items other than those described below will be ineligible for consideration and will be returned without review.**

1. NSF Cover Sheet.

2. Project Summary. Provide a clear vision for and description of the proposed MRSEC and its potential impact. 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 experimental facilities, collaborative activities with industry, national laboratories, and other sectors, links with related major research centers on or off campus, and management plan. Indicate in separate paragraphs, the intellectual merit and broader impacts of the proposed work. **Limit: 3 pages.**

3. Table of Contents. Generated automatically by the system.

4. Project Description. Include the following:

- a. *List of Participants.* List each senior investigator (faculty level or equivalent), by full name, and his/her organizational and departmental affiliation; also enter each name in "Add/Delete Non Co-PI Senior Personnel" FastLane form. Grants.gov users: Instructions for entering additional senior project participants are included in Section V.5. of the NSF Grants.gov Application Guide.
- b. *Achievements Under Prior NSF Support.* Currently NSF funded MRSECs must describe achievements under prior NSF support that pertain to the present proposal. Re-competing proposals should also list publications and patents from prior NSF support under section (g) below. Other proposals may use this section to describe their scientific achievements under prior NSF support. Collaborative research and related activities funded by other agencies also may be included here. **Limit: 5 pages.**
- c. *Interdisciplinary Research Groups (IRGs).* The Center may encompass one or more 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 postdoctoral and graduate student participants. **Limit for each IRG: 10 pages, including tables and figures.**
- d. *Seed Funding and Emerging Areas.* Through this mechanism, NSF intends to provide flexibility for the Center to respond quickly and effectively to new opportunities, and to pursue high risk / high impact and transformative research. Briefly describe other proposed research plans and related activities, showing clearly how they are related to the mission of the Center. These may include (but are not limited to): seed support for junior faculty and for investigators changing fields; emerging areas of interdisciplinary research; experimental programs to link the university effort in materials with industry and other sectors; the development of tools 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; the criteria and mechanisms for selecting and evaluating projects must be clearly addressed in the management plan. Include the names of faculty-level participants for the first year. **Limit: 3 pages.**
- e. Other significant activities include:
 1. *Education and Human Resources Development.* Describe the education and human resource goals, provide a rationale for those goals, and indicate desired outcomes for the 6 year period of the award. Briefly describe how the education goals integrate strategically with the research and organizational/partnership opportunities of the Center. Outline plans for seminar series, colloquial workshops, conferences, summer school and related activities, as appropriate. A Research Experience for Undergraduates program is required. Describe any additional education programs not included in other sections of the proposal. **Limit: 3 pages.**
 2. *Diversity Strategic Plan.* MRSECs are expected to demonstrate a significant commitment to the involvement of women and underrepresented racial/ethnic minorities as Center participants (MRSEC leaders, faculty participants, undergraduate and graduate students, and postdoctoral associates). Describe the Center's strategic plan to broaden participation at all levels and the desired outcome for the 6 year award period. **Limit 1 Page.**
 3. *Collaboration with Industry 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, 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.**
 4. *International Collaboration* (complete this section if appropriate). Describe the nature of the collaboration 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: 1 page.**
 5. *Shared Experimental Facilities.* Describe the shared experimental and computational facilities existing and 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. **Limit: 3 pages.**
 6. *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 seed funding and collaborative programs with other groups and organizations. Plans for administering the shared experimental facilities should be described under item (e.5). Describe plans for administering the educational programs and outreach activities of the Center. **Limit: 3 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.** Note: Letters of commitment to the project may be included in the Supplementary Documents section of FastLane. For Grants.gov users, supplementary documents should be attached in Field 11 of the R&R Other Project Information Form (**Limit: 5 pages**).
- g. *Publications and Patents under Prior NSF Support.* For re-competing proposals only, list publications and patents under prior NSF MRSEC support.
- 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 MRSEC.

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 Experimental Facilities				
Education and Human Resources				
Collaboration with Industry and Other Sectors				
Administration				
Total		100		100

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 experimental facilities. Support for graduate students should normally be included under research, not under education and human resources.

5. References Cited in the Project Description should be listed here.

6. Biographical Sketches. Include a biographical sketch for each faculty level participant according to standard NSF guidelines. Include PhD and Postdoc advisors. **Limit: 1 page for each senior investigator.**

7. Budget pages and budget justification. Complete budget pages for each year of support (1-6). Also provide a six-year summary budget justification that may not exceed a total of 3 pages. A six-year cumulative budget will be automatically generated by Fastlane or Grants.gov. Provide separate budget pages for the Center as a whole and for each organization receiving a sub-award.

8. Current and Pending Support. List current and pending support for each faculty level investigator.

9. 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.

Additional Information :

Reviewer Information: Enter the following information into the FastLane "List of Suggested Reviewers" section (Grants.gov Users: See Section VI.4. of the NSF Grants.gov Application Guide) and concurrently send an e-mail to mrsec@nsf.gov the following:

1. The title of the preliminary proposal, the submitting organization(s), and the name of the PI and co-PI(s);
2. a list of individuals organized alphabetically (and their affiliations) outside the participating organizations whose participation in the review of the preliminary proposal might constitute a conflict of interest through association with the participants; and
3. a list of individuals who might be suitable to act as impartial reviewers. Please include their contact information, phone number, e-mail, affiliation, and area of 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 \$1.0 million/year to a maximum of \$5.0 million/year. 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 05, 2007

due by 5:00 PM proposer's local time

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

January 18, 2008

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

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

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

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/Customersupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

A. NSF Merit Review Criteria

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

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

What is the intellectual merit of the proposed activity?

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

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 standard NSF review criteria, reviewers will be asked to use the following criteria. Preliminary proposals will be evaluated in terms of their potential to meet the criteria for full proposals. Achievements under prior

NSF support will be critically assessed when re-competing proposals are evaluated.

MRSEC proposals will be evaluated in terms of the IRG(s) and of the Center as a whole. 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.

A. Interdisciplinary Research Groups:

- Intrinsic merit of the research. Overall quality of the proposed research, and likelihood that the research will lead to fundamental advances, new discoveries, and/or technological developments.
- Competence to perform the research. Capability of the investigators, technical soundness of the proposed approach, and adequacy of the resources available or proposed, including instrumentation and facilities.
- Interdisciplinarity and degree of interconnection within each IRG. Benefits of a multi-investigator, interdisciplinary approach; cooperation and interdependence of the investigators.

B. The Center as a Whole:

- Organizational setting and rationale for the Center. Relationship to existing and planned organizational programs and capabilities in materials research and education; intellectual breadth of the proposed program; potential for stimulating interdisciplinary interaction and collaboration. Potential for organizational, national, and international impact.
- Achievements under prior NSF support, as appropriate.
- Potential effect on the infrastructure of science and engineering, particularly in fostering a broadly interdisciplinary, interactive approach to materials research and education, developing effective educational outreach programs, fostering a climate of interaction and effective knowledge transfer between the university and its partners in industry and other sectors (see above), effective use of seed funding, and fostering increased participation in materials research and education of members of underrepresented groups.
- Plans and potential to develop and maintain active collaboration with industry and other organizations; 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. Outreach to other organizations and sectors, including international collaboration and cooperation.
- Plans to establish, operate, and maintain shared experimental facilities and to provide appropriate access to users from the home organization, other academic organizations, industry, and other sectors.
- 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. Appropriateness of the requested budget.

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.

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

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

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

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

Special Award Conditions: See reporting requirements below. Other conditions 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.

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

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system. Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

Annual progress report and continuation request.

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
- Maija Kukla, Program Director, 1065 N, telephone: (703) 292-4940, email: mkukla@nsf.gov
- Charles Ying, Program Director, 1065 N, telephone: (703) 292-8428, email: cying@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Maxine E. Jefferson-Brown, Computer Specialist, 1065 N, telephone: (703) 292-4918, fax: (703) 292-9035, email: mjeffers@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

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