

Science Master's Program (SMP)

PROGRAM SOLICITATION

NSF 09-607



National Science Foundation

Directorate for Education & Human Resources
Division of Graduate Education

Letter of Intent Due Date(s) (required) (due by 5 p.m. proposer's local time):

October 05, 2009

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

November 20, 2009

Accepted only if a Letter of Intent was submitted.

IMPORTANT INFORMATION

The Science Masters Program (SMP) awards made in response to this solicitation will be funded under the American Recovery and Reinvestment Act of 2009 (ARRA) (Public Law 111-5). As such, awards will include special reporting requirements and other non-standard terms and conditions. Unless otherwise specified, ARRA funding should be considered one-time funding.

As announced on May 21, 2009, proposers must prepare and submit proposals to the National Science Foundation (NSF) using the NSF FastLane system at <http://www.fastlane.nsf.gov/>. This approach is being taken to support efficient Grants.gov operations during this busy workload period and in response to OMB direction guidance issued March 9, 2009. NSF will continue to post information about available funding opportunities to Grants.gov FIND and will continue to collaborate with institutions who have invested in system-to-system submission functionality as their preferred proposal submission method. NSF remains committed to the long-standing goal of streamlined grants processing and plans to provide a web services interface for those institutions that want to use their existing grants management systems to directly submit proposals to NSF.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Science Master's Program (SMP)

Synopsis of Program:

The Science Master's Program prepares graduate students for careers in business, industry, nonprofit organizations, and government agencies by providing them not only with a strong foundation in science, technology, engineering and mathematics (STEM) disciplines, but also with research experiences, internship experiences, and the skills to succeed in those careers. The program is intended to catalyze the creation of institution-based efforts that can be sustained without additional federal funding. This program is also intended to encourage diversity in student participation so as to contribute to a broadly inclusive, well-trained science and engineering workforce.

Cognizant Program Officer(s):

- Carol F. Stoel, telephone: (703) 292-8630, email: cstoel@nsf.gov
- Myles G. Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov

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

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant

Estimated Number of Awards: 21 new awards, up to \$700,000 per award, depending on the quality of awards

Anticipated Funding Amount: \$14,700,000

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- U.S. academic institutions in the United States, its territories or possessions that grant the Master's degree in one or more STEM disciplines and have the capacity to provide education in additional skill areas, for example, by creating specially tailored courses in business, management, or public administration, may submit proposals. Academic institutions are defined as 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. Projects may involve more than one institution, but a single lead institution must accept overall management responsibility. Non-graduate degree granting institutions, nonacademic, and international organizations may serve as collaborating organizations.

PI Limit:

The PI must be on the STEM faculty of the submitting institution.

Limit on Number of Proposals per Organization:

There is a limit of one proposal per institution that may be submitted by a lead institution. If a state system submits a proposal, local institutions within that system may still submit one proposal.

Limit on Number of Proposals per PI: 1

An investigator may serve as PI or Co-PI on only **one** proposal submitted in response to this solicitation.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required under this solicitation.
- **Indirect Cost (F&A) Limitations:**
Partial reimbursement of indirect costs not to exceed 8% of total direct costs, excluding equipment and cost-of-education allowances, but not excluding participant support. Please note this is in variance with Chapter II.C.2.g.v of the Grant Proposal Guide.
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):

October 05, 2009

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

November 20, 2009

Accepted only if a Letter of Intent was submitted.

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 Science Masters Program (SMP) is funded by the American Recovery and Reinvestment Act of 2009. The Foundation's other graduate education traineeship programs are IGERT (Integrative Graduate Education and Research Traineeships Program), GK-12 (NSF Graduate STEM Fellows in K-12 Education), Federal Cyber Service: Scholarship for Service (SFS), and the Robert Noyce Teacher Scholarship Program.

The Science Master's Program objectives are to prepare students for STEM careers in business, industry, government agencies, and non profit organizations. Its primary goal is to provide a well-trained U.S. STEM workforce for the changing needs of society and employers.

II. PROGRAM DESCRIPTION

Proposals submitted to the Science Master's Program should describe a STEM based Master's graduate education curriculum broadened with education that provides additional skills, such as through specially tailored courses in business and management, that prepare students to work in business, industry, government agencies, or nonprofit organizations. The fields and training activities should be in areas of science, technology, engineering, and mathematics where there is high or emerging (anticipated) need. Proposals must demonstrate that the proposed programs meet the needs of the intended workplace and that careful market research and collaboration have led to the proposed model. The proposed Science Master's Program should involve a diverse group of faculty members and other investigators with appropriate expertise in research and teaching in STEM fields, and should include instructors who have expertise specific to the workforce preparation features of the program to provide additional practical skills training. The coupling of STEM education with practical skills training provides a framework for meeting the needs of employers. Strong proposals will feature partnerships between academic institutions and potential employers to determine jointly what constitute high need areas as well as the kinds of training needed for careers in these areas.

Students should gain the breadth of skills, strengths, and understanding to succeed in business, industry, the nonprofit sector, or government work environments while being well grounded with depth of knowledge in a major scientific field. In order to ensure that students will gain an understanding of how knowledge is created through STEM research, each project must develop a hands-on research experience for each of its students. These research experiences must be at the graduate level and should reflect the STEM interests of potential employers in industry, government, or the non-profit sector.

Proposals are required to describe the STEM coursework aspects of their programs (which should constitute the majority of required courses) as well as additional courses specific to the workforce preparation features of the program, such as specially created courses in business and management. A research experience appropriate to the theme is required. Practical experiences must be included in the total curriculum. These may involve such activities as internships, project development, and mentoring in industrial, national laboratory, non-profit, or other work settings. The total graduate experience should contribute to the professional development of the students and equip them to understand and integrate scientific, technical, business, social, ethics, policy, and global issues to confront the challenging problems of the future.

As this solicitation is offered as part of the American Recovery and Reinvestment Act of 2009, timeliness is important. Proposals that demonstrate a readiness to start the new program expeditiously will be given priority. Proposals must demonstrate that the

proposed program is ready to award the new Master's degree. Letters from senior administrators will be required to justify that the program has been approved by the various internal and external approval boards and groups prior to an award. A Master's degree may currently be in place that can be extended to cover the new Science Master's Program.

An important feature of funded proposals will be the support of full-time graduate students. (Additional information about student support is provided below in Section III.) All stipend recipients supported by the Science Master's Program funds must be full-time students and citizens or permanent residents of the U.S., its territories or its possessions. It is anticipated that attractive programs will also enroll individuals, including foreign citizens, who are supported by other sources of funds (including their own funds), either part-time or full-time.

A Science Master's Program project may draw upon investigators from one or more academic departments within a single institution or from more than one institution, or be state system wide.

Successful SMP applicants must also include strategies for recruitment and retention of members of groups underrepresented in science and engineering, including women, racial and ethnic minorities, and persons with disabilities.

Features of Science Master's Program Projects

Science Master's Program proposals are expected to incorporate and integrate the following features:

- A needs assessment that describes the nature of the workforce need, data that substantiate the need at the local, national, or even global level, and a summary of conversations and other expressions of interest on the part of industry, government, and/or the non-profit sector.
- A comprehensive description of how the workforce need will be met, appropriate for master's level education, that serves as the foundation for trainee's activities and is based on labor market knowledge from industry, government, and/or the non-profit sector of what transformative education and skills are needed in STEM activities and the management of STEM activities.
- Innovative graduate education and training mechanisms, curricular enhancement, and other educational features that foster strong interactions among participating students, faculty, and workforce mentors;
- A research experience appropriate to the SMP theme;
- Career development opportunities; for example, international perspectives and instruction in ethics and the responsible conduct of research;
- Program strategy and plan for recruitment, mentoring, retention, and graduation of U.S. graduate students, including efforts aimed at members of groups underrepresented in STEM (specifically, American Indian/Alaskan Natives, Blacks, Hispanics, Pacific Islanders (natives of Hawaii, Guam, Samoa), persons with a disability, and, in some STEM disciplines, women);
- Strategy for formative assessments of the project's effectiveness and program improvements based on these assessments;
- Administrative plan and organizational structure that ensures effective management of the project resources;
- Plan for disseminating knowledge about innovative graduate education activities both within and outside the institution; and
- Institutional commitment to facilitating and furthering the plans and goals of the Science Master's Program project, to creating a supportive environment for its continued development, to creating a supportive environment for cyber-enabled learning, and to institutionalizing the successful elements of the project after NSF funding ends.

Proposals are expected to address all of the above topics.

Principal Investigator

The Principal Investigator (PI) shall be a member of the STEM faculty at the lead academic institution. If the submission is multi-institutional, the lead institution will have overall responsibility for administration of the award and the PI will have the overall responsibility for the management of the project and interactions with the NSF.

III. AWARD INFORMATION

NSF plans to make 21 awards from the Science Master's Program from this competition in the form of standard grants, depending upon the quality of the proposals. The anticipated funding amount is \$14,700,000. All projects will be three years in length. It is expected that awardees will enroll two cohorts of full-time students within the grant period.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- U.S. academic institutions in the United States, its territories or possessions that grant the Master's degree in one or more STEM disciplines and have the capacity to provide education in additional skill areas, for example, by creating specially tailored courses in business, management, or public administration, may submit proposals. Academic institutions are defined as 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. Projects may involve more than one institution, but a single lead institution must accept overall management responsibility. Non-graduate degree granting institutions, nonacademic, and international organizations may serve as collaborating organizations.

PI Limit:

The PI must be on the STEM faculty of the submitting institution.

Limit on Number of Proposals per Organization:

There is a limit of one proposal per institution that may be submitted by a lead institution. If a state system submits a proposal, local institutions within that system may still submit one proposal.

Limit on Number of Proposals per PI: 1

An investigator may serve as PI or Co-PI on only **one** proposal submitted in response to this solicitation.

Additional Eligibility Info:

From the NSF Grant Proposal Guide, [NSF 09-29](#), April 2009:

NSF does not normally support technical assistance, pilot plant efforts, research requiring security classification, the development of products for commercial marketing, or market research for a particular project or invention. Research and education programs with disease-related goals, including work on the etiology, diagnosis or treatment of physical or mental disease, abnormality, or malfunction in human beings or animals, are not supported. Research and education on animal models of such conditions, or the development or testing of drugs or other procedures for their treatment also are not eligible for support. However, research and education in bioengineering, with diagnosis- or treatment-related goals, that apply engineering principles to problems in biology and medicine are eligible for support. Bioengineering research and education to aid persons with disabilities also are eligible. For further information about the National Science Foundation, see the *Proposal & Award Policies & Procedures Guide* Introduction Section A, *About the National Science Foundation*.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (required):

Each eligible organization may submit only one Letter of Intent (LOI) in response to this solicitation. A Letter of Intent is required in order for an organization's full proposal to be eligible for review.

The purpose of the Letter of Intent is to assist NSF program staff in gauging the range of proposals that will be submitted and in planning the logistics of the review process. In addition, the information contained in a Letter of Intent is used to help avoid potential conflicts of interest in the review process. The Letter of Intent will not be externally evaluated or used to decide funding; however, submission of a Letter of Intent is mandatory for all institutions wishing to submit a full proposal.

The Letter of Intent must be submitted through FastLane by the organization's sponsored project office no later than October 5, 2009. It is expected that the letter of intent will be reviewed for eligibility and project appropriateness. The Letter of Intent must provide in bulleted form the following information:

- Name of the Principal Investigator
- Title of the proposal (to begin with "Science Master's Program:")
- A list of the disciplines, or interdisciplinary areas, providing the STEM foundations for the proposed project (see below for key word list)
- The scientific and workforce areas that will be the focus of the proposal

The title of the full proposal should match the title used in the Letter of Intent.

Letter of Intent Preparation Instructions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- Sponsored Projects Office (SPO) Submission is required when submitting Letters of Intent
- Submission of multiple Letters of Intent is not allowed

Full Proposal Instructions: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the guidelines specified 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-PUBS (7827) or by e-mail from nsfpubs@nsf.gov.

The Science Master's Program does not accept collaborative proposals as separate submissions from multiple organizations.

PROPOSAL CONTENT

A. **Cover Sheet:** Select the Science Master's Program solicitation number shown at the beginning of this solicitation from the pull down menu. A short informative title for the proposed project that begins with "Science Master's Program:" must be provided. A starting date in 2010 should be listed.

- **Project Summary** (1-page limit): Provide a summary description of the Science Master's Program project, including its STEM theme and key education and training features, in a manner that will be informative to a general technical audience. The project summary must consist of 4 parts: (1) At the top of this page include the title of the project, the name of the PI, and the lead institution. Also list any other participating institutions/organizations, and indicate whether this is a multi-institution proposal; (2) provide a succinct summary of the intellectual merit of the proposal using "Intellectual Merit" as a heading; (3) describe the broader impacts for the proposed Science Master's Program using "Broader Impacts" as a heading; and (4) at the end of the project summary provide up to 2 key words selected from the list below.
 - Biology
 - Chemistry
 - Computer Science/Information Technology
 - Engineering
 - Environmental Science
 - Geoscience
 - Materials Research
 - Mathematics/Statistics
 - Physics

- Polar Sciences
- Social Science; Behavioral and Cognitive Science

One key word of the proposer's own choosing may be included at the end of the list, followed by one key word that indicates the unique workforce theme of the proposal. No more than four key words should be listed.

- B. Table of Contents:** For all proposals submitted, a Table of Contents is generated and cannot be edited.
- C. Project Description:** The project description section contains the following items 1 through 7. These are limited to a combined total length of 15 pages, inclusive of tables, figures, or other graphical data. Proposals with Project Descriptions that exceed 15 pages may be returned without review.
- 1. List of Participants (1-page limit):** Include departmental and institutional/organizational affiliation of all faculty members and other personnel expected to have an important role in the project. No more than 10 individuals including PI and co-PIs should be listed. List the role of each participant.
 - 2. Vision, Goals, and Thematic Basis:** Discuss the vision, goals, and broader impacts of the proposed SMP project, including conversations and needs assessments with industry, government and/or non-profit sectors. Describe the thematic basis and unifying aspects of the project tying together the STEM workforce-oriented educational, research, and professional activities to be offered. Summarize the value-added aspects of the proposed project, and be specific about what is new and innovative. Proposals should clearly articulate project objectives, planned outcomes with respect to recruitment, retention, degree conferral, and career placement of students; project monitoring guidelines; and how outcomes will be measured. Include plans for evaluating the impact of the project, documenting and disseminating to the appropriate professional communities what was learned from the project, and sustaining the essential elements of the project after NSF funding ceases.
 - 3. Research Experience:** Describe how the project will meet the NSF requirement of the equivalent of a one-summer research experience in the field or fields encompassed by the project. Specify the faculty members and other principals involved (who may be from employer organizations), and provide sufficient detail to enable assessment of the merit and relevance to the overall project theme.
 - 4. Education and Training:** Describe the graduate education and professional training that are central to the SMP project, the logic and evidence to support them, and how they are to be integrated to strengthen students' scientific expertise while learning/experiencing professional skills and opportunities that will prepare them for the workforce. Novel aspects should be emphasized to enable assessment of innovative aspects of the proposed program and its potential impact. Specify faculty members and other participants with primary responsibility for these integrative efforts. Discuss plans for providing career development opportunities, developing personal and professional skills, fostering an international perspective and ability to work in diverse teams, and integrating instruction in ethics and the responsible conduct of research. For internships, fieldwork, or other opportunities, identify the potential mentors and discuss how the opportunity is intended to strengthen the student's graduate experience and the project. Discuss how trainees will develop an appreciation for and the skills required to be successful in the global context of the proposed project. Supporting letters from host organizations should document willingness to receive students and the expected roles of individual mentors. Show typical student pathways through the program and the expected time to degree.
 - 5. Organization, Management, and Institutional Commitment:** Describe plans and procedures for the organization and management of the SMP project. The plans should be specific and include use of a formal mechanism that assures the fair and effective allocation of Science Master's Program resources and enables faculty members, students, and others to interact effectively in furthering project goals. Plans should include provisions for an external advisory body. Indicate the institutional or departmental obstacles you foresee in implementing your project, and how you plan to address them. Describe the commitment of the higher education institution and related employers at all appropriate administrative levels to facilitating and furthering the plans and goals of the SMP project. Address how your institution will create a supportive environment for cyber-enabled learning. Supporting letters of commitment from the senior administration of the submitting institution and related employer organizations must accompany this proposal. Should a multi-institution project be proposed, provide a careful justification that considers the administrative complexity and the expected benefits to student experiences. Discuss the role of any other organizations such as industry, government, non-profits, non-U.S. institutions, or private foundations that are expected to participate in the project. Describe the nature and extent of any connections with existing NSF industry-related programs such as the Science and Technology Centers (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5567), Engineering Research Centers (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5502), Materials Research Science and Engineering Centers (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5295), Grant Opportunities for Academic Liaison with Industry (http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf07522&org=NSF).
 - 6. Performance Assessment / Project Evaluation:** Each project will be required to conduct its own annual assessment that will be used by the project team to evaluate success in meeting project timelines, milestones, and goals. This plan should be described in the proposal and include project goals to be evaluated for students, faculty, departments, and relations with external partners. In annual progress reports to the NSF, project PIs will be asked to report project success in fostering graduate student growth and summarize academic and professional training accomplishments, institutional impacts, and assessment and evaluation activities.
 - 7. Recruitment, Mentoring, and Retention:** Describe plans for recruitment, mentoring, and retention of U.S. graduate students, including specific provisions, beyond the norm, aimed at members of groups underrepresented in science and engineering. (A member of an under-represented group is American Indian/Alaskan native, Black, Hispanic, Pacific Islander (native of Hawaii, Guam, Samoa), a person with a disability, and/or female).
- D. References Cited (3-page limit)** in FastLane;
- E. Biographical Sketches and Current and Pending Support:** The standard NSF 2-page biographical sketches for the PI, co-PI's, and participants listed on the first page of the project description should be prepared in accordance with instructions in the Grant Proposal Guide. Current and pending support is required only for the PI and co-PI's.
- F. Budget and Allowable Costs:** Provide a budget for each year of support requested. The total must not exceed \$700,000 for three years, including stipends and cost of education allowances and inclusive of indirect costs.

A cumulative budget will automatically be generated for the proposal. Awarded funds not expended in the specific year requested may be carried over with appropriate justification provided in the annual report to NSF and with the approval of the cognizant program officer.

A limited amount of funds may be budgeted for necessary administrative support (including personnel for management/administration), and to partially defray the costs of research and publication by students. No funds for faculty salaries will be provided, except for one month per year of salary support for the Principal Investigator for management purposes. Full or partial salary for a project manager may be budgeted for three years.

The bulk of the funds must be used for graduate student stipends and educational and training activities. All funds requested for graduate student trainees should be entered under Participant Support Costs. Graduate student stipends will be \$15,000 per year per funded Science Master's Program trainee for a 12-month appointment; cost of education funds will be \$10,500 per funded SMP trainee for a 12-month appointment. Budgeting for stipends should be made on this basis for each year of the award. An individual student may be supported for one or two years. All Science Master's Program-supported students are expected to be full-time. The number of trainees anticipated, along with the durations of the appointments, should be presented and should be consistent with the requested stipend funds. Limited funds may be requested for graduate student travel, subsistence, and materials and supplies.

Faculty travel for one person for one trip to the Washington, D.C. area for the purpose of a new PI orientation meeting should be budgeted for year 1 of the project. Faculty travel for the PI to attend a national meeting highly relevant to the program once per year may be budgeted. No international travel should be budgeted for faculty or students.

Funds for facility renovation or for equipment installation or maintenance are not allowed. Awards will carry an 8% allowance for indirect costs based on modified total direct cost, excluding the cost of education. Please note this is in variance with Chapter II.C.2.g.v of the Grant Proposal Guide. For multi-institution projects, the lead institution shall submit the proposal, with other participating institutions included under subawards. Budgets shall be provided for the overall project as well as individually for the lead institution and for each participating institution/organization that receives a subaward.

Budget Justification (3-page limit): Provide a justification for the funds requested for the overall project in each budget category listed on the budget form pages. Describe the proposed allocation of funds in the major budget categories with sufficient clarity to show how resources will be utilized in carrying out the planned SMP project activities. Indicate the total number of graduate students to be supported and the phasing of their support. Provide details of anticipated resource commitments of any other organizations expected to participate in the project, such as government, industry, non-profit sector, non-U.S. institutions, or private foundations. Appropriate letters of commitment from participating organizations should be included in Supplementary Documentation (below). Cost sharing is not required under this solicitation. Any information provided here and in similar places in this solicitation will not be auditable as cost sharing.

G. **Facilities, Equipment and Other Resources** (1-page limit): Provide a description of facilities and major instruments that are available to the project for the planned research experience.

H. **Supplementary Documentation:** No cost sharing is required for Science Master's program proposals. However, because the program seeks to catalyze new approaches and programs in graduate education, indications of institutional commitments to the program and its sustainability must be included in the proposal. Up to eight letters of commitment, including one that must be from the senior administration of the submitting institution may be provided as part of the proposal, with up to four additional letters from employers involved in the design and implementation of the program. Internal letters of commitment should specify how the institution will facilitate implementation of the Science Master's Program and support its goals over the life of the award, including broadening participation; they should also specify what features are expected to be sustained after the award has ended, and how they will be sustained. The letter of commitment from the senior administrator of the submitting institution may be up to two pages in length; all of the other letters may be no longer than one page.

External letters must be included for each major key outside partner (business, non-profit or government agency) involved in the Science Master's Program, as well as from any outreach organization that may be assisting the Science Master's Program to broaden participation of under-represented groups in the science or engineering in its program. External letters should include a description of the role that the partner will play in the project implementation (i.e., provide internships, access to laboratories, industry mentors, field logistics, outreach to groups underrepresented in science and engineering, etc.). External letters should also include specific details regarding the partner's contributions to the Science Master's Program, such as tuition benefits, location and specified period for the internships, access to specific instrumentation, laboratory or computing facilities, specific plan for recruitment of diverse SMP participants, etc. Each external letter must be one page or less in length.

NO OTHER SUPPLEMENTARY DOCUMENTS ARE PERMITTED

Proposers are reminded to identify the program solicitation number (NSF 09-607) 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.

B. Budgetary Information

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

Indirect Cost (F&A) Limitations:

Partial reimbursement of indirect costs not to exceed 8% of total direct costs, excluding equipment and cost-of-education allowances, but not excluding participant support. Please note this is in variance with Chapter II.C.2.g.v of the Grant Proposal Guide.

Other Budgetary Limitations: Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Letter of Intent Due Date(s) (required)** (due by 5 p.m. proposer's local time):

October 05, 2009

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

November 20, 2009

Accepted only if a Letter of Intent was submitted.

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this program solicitation through use of the NSF FastLane system. Detailed instructions regarding the technical aspects of proposal preparation and submission via FastLane are available at: <http://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>.

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 responding to the standard NSF review criteria, reviewers will be asked to place emphasis on the following SMP objectives:

- Evidence of clear understanding of unique needs of industry, government or the non-profit sector from new master's students and involvement of these sectors in design of the Science Master's Program and partnerships in offering internships or other arrangements;
- Integration and coherence of the scientific theme and its related professional training in its effectiveness as an intellectual focus for all participating scientists, engineers, and educators;
- Quality of the proposed science research component, and its appropriateness for the master's-level research experience, that serves as the foundation for preparation in the business, non-profit or governmental sectors
- Quality and innovation in the planned graduate education and training mechanisms, and in their integration with the research
- Effectiveness of career development opportunities, provision for developing professional and personal skills, fostering an international perspective and ability to work in diverse teams, and instruction in ethics and the responsible conduct of research;
- Effectiveness of the strategy for recruitment, mentoring, retention, degree completion, and career progression of U.S. graduate students, including those from groups underrepresented in science and engineering: Plans for effective recruitment and assessment should be specific and detailed;
- Appropriateness of the plans for assessment of project performance in meeting objectives and expanding the knowledge base in STEM (Science, Technology, Engineering, and Mathematics) master's graduate education and disseminating results to appropriate professional communities
- Commitment of the institution to facilitating and furthering the plans and goals of the SMP project, to creating a supportive environment for integrative scientific research and professional education, and to sustaining the successful elements of the project after NSF funding ceases; and
- Commitment of corporate, government or non-profit sector to continuance of the partnership if it is deemed successful.

In accordance with the America Competes Act, the Program will give preferences to those applicants

- A. located in States with low percentages of citizens with graduate or professional degrees, as determined by the Bureau of the Census, that demonstrate success in meeting the unique needs of the corporate, non-profit, and government communities in the State, as evidenced by providing internships for professional science master's degree students or similar partnership arrangements; or
- B. that secure more than two-thirds of the funding for such professional science master's degree programs from sources other than the Federal Government.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

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

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

The following special award conditions apply to awards made with funds appropriated under the American Recovery and Reinvestment Act of 2009 (ARRA):

American Recovery and Reinvestment Act of 2009 Award Terms

The Recovery Act mandates a significant level of transparency and accountability. The law and implementing guidance identify specific award conditions for awards made with Recovery Act funding. As such, recipients of ARRA funds must comply with standard NSF award conditions (Research Terms and Conditions or Grant General Conditions, as applicable) as well as the requirements set forth in ARRA, including, but not limited to, the reporting requirements specified in the award term entitled, "*Reporting and Registration Requirements under Section 1512 of the American Recovery and Reinvestment Act of 2009, Public Law 111-5*", as well as the accompanying OMB guidance (available on the Recovery.gov website.) Awardees are advised that failure to submit timely reports may result in NSF taking administrative action, including disallowance of costs or suspension or termination of the award.

All ARRA-funded awards will incorporate the following language:

"This award is funded under the American Recovery and Reinvestment Act of 2009 (ARRA) (Public Law 111-5) and is subject to the ARRA Terms and Conditions, dated April 2009, available on the NSF website at: http://www.nsf.gov/awards/managing/award_conditions.jsp?org=NSF

Given the goals of the Recovery Act, awardees also are advised that they are expected to expend funds in a timely manner on allowable award costs and that NSF will be monitoring awards for expenditures. If, after 12 months, no allowable expenditures have taken place, NSF may consider reducing or terminating the award and reallocating the funds.

ARRA Award-Specific

There also may be ARRA award specific terms, as necessary and appropriate.

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.

NSF will establish evaluation metrics to ensure that each project as well as the program is measured in accordance with its goals. All awardees will be required to cooperate with a contractor that will assist NSF in collecting these data.

As a part of NSF evaluation activities, trainees may be contacted during and after the completion of this award for updates on various aspects of their employment history, professional activities and accomplishments, and other information helpful in evaluating the impact of the program. Trainees, participating faculty, and affiliated institutions should be prepared to cooperate in program-level evaluations conducted by the NSF and/or contracted evaluators.

Special reporting requirements apply to awards funded under the American Recovery and Reinvestment Act of 2009 (ARRA). Please refer to the Special Award Conditions in Section VII.B. of this solicitation for additional information.

The National Science Foundation claims no rights to any inventions or writings that might result from its fellowship or traineeship grants. However, fellows and trainees should be aware that the NSF, another Federal agency, or some private party may acquire such rights through other support for particular research. Also, fellows and trainees should note their obligation to include an Acknowledgment and Disclaimer in any publication.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Carol F. Stoel, telephone: (703) 292-8630, email: cstoel@nsf.gov

- Myles G. Boylan, telephone: (703) 292-4617, email: mboylan@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.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>.

New GI Bill: In recruiting students, particularly persons with disabilities, attention is called to the new Federal Post-9/11 GI bill for veterans of the Armed Forces. Under law, the federal government will pay public institutions the amount of in-state tuition and fees for each veteran they enroll who is eligible for full benefits. For each veteran they enroll, private institutions will receive the equivalent of the highest public-college tuition and mandatory fees in their state. The institutions that participate in the "Yellow Ribbon Program" (under chapter 33 of title 38, United States Code) can waive up to half of the remaining charges and receive the same amount from the federal government.

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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