

# Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21)

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## Program Solicitation

05-595

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Replaces Document(s):  
NSF 04-600

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**National Science Foundation**

Directorate for Mathematical & Physical Sciences  
Division of Mathematical Sciences

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

October 12, 2005

then June 6, 2006 and the first Tuesday in June in the following years

June 02, 2009

## REVISION NOTES

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No proposals requesting support under the VIGRE component of the EMSW21 solicitation will be accepted for the June 2009 submission date (i.e., for the FY2010 competition). For further information please see the "Dear Colleague" letter NSF 08-75.

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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**Program Title:**

Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21)

**Synopsis of Program:**

The long-range goal of the EMSW21 program is to increase the number of well-prepared U.S. citizens, nationals, and permanent residents who pursue careers in the mathematical sciences and in other NSF-supported disciplines. EMSW21 tries to do this with three separate components: The Vertical Integration of Research and Education (VIGRE) program supports activities that involve the entire department and span the entire spectrum of educational levels from undergraduates through postdoctoral associates; Research Training Groups (RTG) support the training activities of a group of faculty who have a common research interest; Mentoring through Critical Transition Points (MCTP) involves a larger group of faculty but focuses on specified stages in the professional development of the trainees.

**Cognizant Program Officer(s):**

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

- 47.049 --- Mathematical and Physical Sciences

**Award Information**

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**Anticipated Type of Award:** Other Grant Standard and Continuing Awards for 3 to 5 years

**Estimated Number of Awards:** 9 to 15 Varies with type and size of award

**Anticipated Funding Amount:** \$20,500,000 in FY 2006 subject to the availability of funds. See Section IV for detailed information.

**Eligibility Information**

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**Organization Limit:**

None Specified

**PI Limit:**

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

Eligible Participants: **Participating undergraduates, graduate students and postdoctoral associates supported with NSF funds in EMSW21 must be citizens, nationals or permanent residents of the United States and its territories and possessions.** For purposes of this solicitation, a postdoctoral associate is defined as a mathematical scientist who begins a postdoctoral fellowship within 18 months of having received the Ph.D. degree, regardless of the title of the position held. Exceptions to the 18 month restriction require approval of the cognizant program officer.

No citizenship requirement applies to Principal Investigators.

**Limit on Number of Proposals per Organization:**

None Specified

**Limit on Number of Proposals per PI:**

None Specified

**Proposal Preparation and Submission Instructions**

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**A. Proposal Preparation Instructions**

- **Letters of Intent:** Not Applicable
- **Preliminary Proposal Submission:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: NSF Proposal and Award Policies and Procedures Guide, Part I: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg).
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/pubs/policydocs/grantsgovguide607.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

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

October 12, 2005

then June 6, 2006 and the first Tuesday in June in the following years

June 02, 2009

## Proposal Review Information Criteria

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**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

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

**Reporting Requirements:** Standard NSF reporting requirements apply.

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## I. INTRODUCTION

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**No proposals requesting support under the VIGRE component of the EMSW21 solicitation will be accepted for the June 2009 submission date (i.e., for the FY2010 competition). For further information please see the “Dear Colleague” letter NSF 08-75.**

EMSW21 provides funds for the training of U.S. students and postdoctoral researchers in the mathematical sciences. EMSW21 is an expansion of the VIGRE program and has three different components: Vertical Integration of Research and Education (VIGRE), Research Training Groups (RTG), and Mentoring Through Critical Transition Points (MCTP). All three components are committed to enhancing diversity in the mathematical workforce.

The VIGRE program continues to support projects that involve entire departments in the training process, from the start of the undergraduate career through the completion of a postdoctoral fellowship. The Research Training Groups (RTG) program involves a group of researchers based in a sub-area of the mathematical sciences or linked by a multidisciplinary theme and supports training at educational levels from undergraduate to postdoctoral within that focus. The Mentoring through Critical Transition Points (MCTP) program supports projects, either departmentally based or conducted by a large group of faculty members, that are aimed at critical transition points in the educational careers of students and junior researchers. All these formats are intended to support training programs that have strong potential to increase the number of well-prepared U.S. citizens, nationals, and permanent residents who pursue careers in the mathematical sciences and in other NSF-supported disciplines.

Those institutions applying to more than one component of this program must include a section in the program description on how the various components will interact if more than one proposal is successful. Similarly those institutions already holding an EMSW21 grant must explain how the proposed projects will interact with the existing one. DMS program officers will consider these issues and related reviewer comments, in the context of overall management of the portfolio of EMSW21 awards.

Applicants must identify goals for their project, specify plans for measuring and reporting progress, and supply data about past achievements and the improvements expected. This information will be an integral part of the review process and is more fully discussed in the Proposal Preparation section below. It should be kept in mind that EMSW21 grants are for training and not the support of research activities. Funding requested for non-training activities necessary for EMSW21 projects should be kept to a minimum, thoroughly justified in the Project Description, and fully explained in the Budget Justification.

For purposes of this solicitation, a postdoctoral associate is defined as a mathematical scientist who begins a postdoctoral fellowship within 18 months of having received the Ph.D. degree, regardless of the title of the position held. Exceptions to the 18 month restriction require approval of the cognizant program officer.

## II. PROGRAM DESCRIPTION

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The long-range goal of the EMSW21 activity is to increase the number of well-prepared U.S. citizens, nationals, and permanent residents who pursue careers in the mathematical sciences and in other NSF-supported disciplines, while broadening trainees' background and perspective. A significant part of this goal is to directly increase the proportion and the absolute number of U.S. students at the EMSW21 sites who pursue graduate studies and complete advanced degrees in the mathematical sciences. A related goal of EMSW21 is based on the fact that the direct impact of EMSW21 funds cannot yield a substantial proportional increase in national workforce production; the funds are simply not of the order of magnitude to create such an infrastructure. Therefore, indirect impacts, in which EMSW21 can serve as a catalyst beyond the directly-supported students in its home departments and beyond the institutions receiving EMSW21 funds, are crucial as well. Practices and cultural changes that support direct and indirect impacts of this nature will be key strengths in an EMSW21 proposal. Such aspects include, but are not limited to, ideas for attracting strong U.S. students to careers in the mathematical sciences and seeing them through to completion of their studies, and/or evidence of success in doing so; and effective dissemination of best practices that can serve as a national model.

**Graduate Traineeships.** Graduate trainees form a pivotal component of the integration of activities in VIGRE and RTG grants and can be part of an MCTP grant. Their participation should result in:

(1) involvement with research activities that include undergraduates, other graduate students, postdoctoral associates, and/or faculty members;

(2) graduate education that is both broad and deep;

(3) significant teaching experience; and

(4) communication skills appropriate for both expert and non-expert audiences.

Mentoring, that is, guidance in professional development, is a critical strategy for preparing graduate trainees to become successful researchers, communicators, and mentors. Opportunities such as international collaboration and internship experiences in industry, business, government laboratories, or other science and engineering departments can contribute to broadening the education program. Graduate trainees are expected to have a minimum of one year of supervised teaching, with at least one term in which the student has substantial responsibility for a class. Some element of their activities should help students develop proficiency in the presentation of mathematical research in both written and oral formats and in the ability to place their research in context.

The EMSW21 activity is meant to allow graduate students significant time for research, course work, and related activities. A graduate trainee can receive up to 33 months of non-teaching support from an EMSW21 activity. EMSW21 stipends cannot be used to pay students to fulfill teaching duties; the institution is expected to bear the cost of a graduate trainee's required teaching. Departments should demonstrate how the traineeships will improve the quality of the education their graduate students receive. The traineeships are not meant to replace existing institutional funding of research fellowships or scholarships.

**Undergraduate Experience.** In this program solicitation, the term "research experiences" for undergraduates includes all activities that involve undergraduates in discovery and generate within them appreciation and excitement for the mathematical sciences. A research experience does not have to result in the publication of a paper. Examples of research experiences include: faculty directed projects, whether involving one or many undergraduates, either during part of the academic year or the summer; internships in industry, business, or government laboratories; and participation in interdisciplinary research teams. Such experiences are intended to involve students in the creative aspects of mathematics in a non-classroom setting. They are also expected to enhance the development of students' communication skills, with particular emphasis on the presentation of mathematical concepts in both written and oral contexts. In all cases, it is expected that these undergraduates receive mentoring to stimulate their further interest in the mathematical sciences.

**Postdoctoral Associates.** Effective EMSW21 activities better prepare postdoctoral associates for their future careers, whether in academia, industry, or government. It is expected that at the end of the postdoctoral experience, each associate will have a well-defined independent research program, well-developed communication skills, a broad perspective of his or her field, and the ability to mentor.

The postdoctoral program can provide opportunities not traditionally found in mathematical sciences education and training, including interdisciplinary research experiences in connection with other departments and programs; participation in international research programs; internships in business, industry, or government laboratories; or participation in research institute programs suitably aligned with the associate's research interests. Postdoctoral associates are expected to teach, on average, one course per term while in residence at the sponsoring university. Over the duration of the postdoctoral appointment, this teaching should encompass a diverse set of instructional experiences at different levels of the curriculum. Likewise, it is expected that each EMSW21 postdoctoral associate will submit a research proposal to a funding agency at some time during the course of the postdoctoral appointment. Mentoring to ensure that all postdoctoral associates become successful researchers, communicators, and mentors is a critical element of an EMSW21 postdoctoral program, as is interaction of postdoctoral associates with undergraduate and/or graduate students.

The typical EMSW21 postdoctoral appointment is for three years, beginning within 18 months of completion of the Ph.D. Exceptions to the 18 month restriction require approval of the cognizant program officer.

**Budget.** Proposals may include support requests for graduate and advanced undergraduate students, postdoctoral investigators, visitors, consultant services, travel, conferences, and workshops. Other budget items that are deemed to be essential to the success of the proposed activities may be proposed. No money may be requested to support the research efforts of the faculty, though grants will provide limited faculty salary for the purpose of organizing and managing the program.

**Data.** All EMSW21 proposals require supporting data about the department's programs. An extensive discussion of the required data appears in the Supplementary Documentation section (V.A.8).

**A successful EMSW21 proposal must convince reviewers that the project:**

- integrates research with educational activities;
- broadens the educational experiences of its students and postdoctoral associates to prepare them for a wide range of career opportunities;
- provides for developing professional and personal skills, such as communication, teamwork, teaching, mentoring, and leadership;
- includes an administrative plan and organizational structure that ensures effective management of the project resources;
- has an institutional commitment to furthering the plans and goals of the EMSW21 project and to create a supportive environment for integrative research and education;
- has a plan for recruitment, selection, and retention of participants, including members of underrepresented groups, so as to increase the number and diversity of U.S. citizens, nationals, and permanent residents in the graduate and

- postdoctoral programs;
- serves as a national model by effectively disseminating best practices for attraction, retention, and high-quality preparation of students and postdoctoral associates in the mathematical sciences; and
- has a post-EMSW21 plan. The EMSW21 program is intended to help stimulate and implement permanent positive changes in education and training within the mathematical sciences in the U.S. Thus it is critical that an EMSW21 site adequately plan how to continue the pursuit of EMSW21 goals when funding terminates.

### GRANTS FOR VERTICAL INTEGRATION OF RESEARCH AND EDUCATION (VIGRE)

The focus of this component is enhancing the educational experience of all students and postdoctoral associates in a U.S. academic department (or departments) that grants the Ph.D. in the mathematical sciences. Broad faculty commitment and a team approach to enhancing learning are necessary. A principal element of VIGRE activity is increasing the interaction among undergraduates, graduate students, postdoctoral associates, and faculty members. Integrating research and education for graduate students and postdoctoral associates, involving undergraduates in research experiences, and developing a team approach are keys to successful VIGRE projects. These goals can be accomplished in many ways, and proposers should develop creative approaches that suit their circumstances.

The enhancement of educational experiences of all students should stem from an understanding of current patterns of student participation in the life of the department(s). All VIGRE proposals are required to include the outcome of a curriculum review and at least five years of data on past performance in attracting and retaining well-qualified U.S. citizens, nationals, and permanent residents as graduate students and postdoctoral associates in the mathematical sciences, including members of underrepresented minorities, women, and persons with disabilities. Those departments who have had previous VIGRE awards should present data starting five years before the grant started and continuing through the period of the award. A department can use this information to describe its capacity to host a VIGRE project that will create a significant improvement in the educational experiences of its students and postdoctoral associates. These data may also inform recruitment and retention plans and mechanisms for assessment of the project. The form of the data is described more fully in Section V.A.8, Supplementary Documentation.

**Organization and Management:** VIGRE provides funds to support postdoctoral associate positions in order to provide enhanced opportunities for research and advanced training; graduate research traineeships; and undergraduate research experiences. VIGRE expects extended participation in the VIGRE program from the entire departmental faculty, particularly in mentoring participating students and postdoctoral associates. Thus, the numbers of participating students and postdoctoral associates should reflect the capability of the department to provide them with appropriate resources for their education and training and participation in research.

A successful VIGRE project will help attain the program goal of motivating more students to pursue advanced education in the mathematical sciences. It will also:

- be based in a U.S. academic institution that grants the Ph.D. in the mathematical sciences;
- involve the entire department in its efforts; and
- increase interaction among undergraduates, graduate students, postdoctoral associates, and faculty members.

### RESEARCH TRAINING GROUPS IN THE MATHEMATICAL SCIENCES (RTG)

This component provides groups of researchers having related research goals in the mathematical sciences with funds to foster research-based training and education. The groups may include researchers and students from different departments and institutions, but the research-based training and education activities must be based in the mathematical sciences. The RTG projects are expected to vary in size, scope, and proposed activities and in their plans for organization, participation, and operation.

Addressing all stages (from undergraduate through postdoctoral) of student involvement in RTG proposals is extremely important. Proposals that focus on only one stage will be viewed as less competitive unless a compelling argument is made justifying such a course.

Increasing the number of U.S. citizens, nationals, or permanent residents entering the scientific workplace is the goal of RTG; therefore a substantial plan for involving undergraduates in a research training program will increase the probability of obtaining funding. When used in reference to undergraduates, the word “research” should be given its broadest interpretation.

The group of a successful proposal will have collaborating faculty with a history of research accomplishments. This group should have a history of working with students and/or postdoctoral investigators, and they should present a good plan for recruiting students who are U.S. citizens, nationals, or permanent residents into their program. The RTG program is not meant to establish a group, but to enhance the training activities of a well established one.

A successful RTG proposal will:

- be based in a U.S. academic institution that grants the Ph.D. in the mathematical sciences (faculty and students from a predominately undergraduate institution may participate);
- be focused on a major research theme in the mathematical sciences;

- have a realistic plan showing how the proposed activity would create new or enhanced research-based training and education experiences in the mathematical sciences for the students and postdoctoral investigators;
- be directed by a principal investigator, with at least two other faculty members, who will assist in management and participate fully in the educational and research plans of the RTG.

### MENTORING THROUGH CRITICAL TRANSITION POINTS IN THE MATHEMATICAL SCIENCES (MCTP)

This component provides a system of mentoring devoted to points of transition in a mathematical sciences career path that are critical for success, from undergraduate studies to the early years in a tenure track position. MCTP emphasizes activities aimed at specific stages in the education of trainees. Department-wide programs that include components for undergraduates, graduates, and postdocs are more appropriately submitted under the VIGRE component. Unlike the other two components of EMSW21, MCTP is open to departments in the mathematical sciences at U.S.-based institutions that do not grant the Ph.D. However Ph.D. granting departments at U.S.-based institutions are urged to consider submitting an MCTP proposal as this is an effective way to address the goals of EMSW21.

Proposals must address the likely number of trainees who will be affected by the project and provide demographic information from the past to demonstrate the point. **The number of trainees affected will be a major criterion in the review and evaluation process.** For this reason four-year institutions with small enrollments may be at a distinct disadvantage in this competition. Therefore they are encouraged to form consortia or alliances with larger universities. Indeed, it is believed that such a partnership could be mutually beneficial and possibly present a strong case for funding. Of course the logistics for such a partnership are complex and must receive close attention when the proposal is written.

The goal is to encourage the participation of research-oriented mathematicians in the nurturing of students and those new to research as they change the intensity of their involvement in mathematics. The range of activities can vary from preparing postdocs for an academic or industrial career to preparing talented high school students so they can begin the study of serious mathematics at a university.

While any transition point is worthy of exploration, proposals that address the undergraduate to graduate transition are encouraged. Such a proposal will require a plan for recruiting and retaining undergraduate majors in the mathematical sciences and involving more undergraduates in research activities and in a curriculum that will allow them to enter strong graduate programs in mathematics and science.

Successful proposals will be those that provide ways to increase the number of U.S. citizens, nationals, or permanent residents entering the scientific workforce with strong mathematical training. Examples of critical transition points and some associated activities are given below. The list is not meant to be exhaustive.

- *The transition from talented and dedicated high school student to the study of advanced mathematics at a university.*
- *The transition from undergraduate to graduate studies:* A program designed for strong undergraduate students who are motivated to pursue advanced mathematical studies or to engage students who might not otherwise be aware of opportunities for such studies. Such a program might navigate the student through an accelerated curriculum that would allow one to complete both the B.S. and M.S. degrees in four to five years or provide a bridge between predominantly undergraduate and minority serving institutions and research universities. Work with faculty mentors could lead to a wide exposure to various fields of mathematical interest and mathematical research experiences. Interdisciplinary programs are encouraged, e.g., one degree (B.S. or M.S.) might be in the mathematical sciences and the other in a related science or engineering field. Programs could be proposed for upper division undergraduate students or beginning graduate students that provide preparation for the first year of graduate school.
- *The transition from course work to original research:* Choosing a Ph.D. advisor; how to identify good research topics; reading research papers, etc.
- *The transition from graduate work to a postdoctoral position:* Good practices in preparing research papers, research proposals, and oral presentations; development of independent research activity.
- *The transition from postdoctoral studies to a tenure-track position in a research university:* Development of independent research activity.
- *The transition from Ph.D. work to a position in an undergraduate institution:* Programs to help new faculty at undergraduate institutions to remain active scholars.
- *The transition from Ph.D. work to work in industry:* Graduate student summer internships with industry could be included. Support may be requested for travel, conferences or workshops related to these activities.

MCTP awards will vary in size, scope, and proposed activities, and in plans for organization, participation, and operation, but will all have the following characteristics:

- a convincing plan describing the critical transition point(s) to be addressed and showing how the proposed activity would address the transition;
- a demonstration that addressing the chosen transition points will help achieve the goals of EMSW21.

### III. AWARD INFORMATION

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In determining the number and size of awards, NSF considers the advice of reviewers and availability of funds. It is projected that award recommendations will be made in May 2006 and in January of subsequent years. Estimated program budget, number of awards and average award size/duration are as follows but are subject to the availability of funds:

**VIGRE component**

Budget: \$10,000,000

Number of Awards: 3 to 5

Award size: \$400,000 to \$1,000,000 per year

Duration: 3 to 5 years

Each proposal for the VIGRE component should describe a five-year program. Awards will initially fund the first three years of the project. Funding for the remaining two years is not guaranteed, and is contingent upon a satisfactory outcome of a comprehensive third-year assessment by NSF.

**RTG component**

Budget: \$6,000,000

Number of Awards: 3 to 5

Award size: up to \$500,000 per year

Duration: 3 to 5 years

**MCTP component**

Budget: \$4,500,000

Number of Awards: 3 to 5

Award size: up to \$500,000 per year

Duration: 3 to 5 years

**IV. ELIGIBILITY INFORMATION**

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**Organization Limit:**

None Specified

**PI Limit:**

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

Eligible Participants: **Participating undergraduates, graduate students and postdoctoral associates supported with NSF funds in EMSW21 must be citizens, nationals or permanent residents of the United States and its territories and possessions.** For purposes of this solicitation, a postdoctoral associate is defined as a mathematical scientist who begins a postdoctoral fellowship within 18 months of having received the Ph.D. degree, regardless of the title of the position held. Exceptions to the 18 month restriction require approval of the cognizant program officer.

No citizenship requirement applies to Principal Investigators.

**Limit on Number of Proposals per Organization:**



None Specified

**Limit on Number of Proposals per PI:**

None Specified

**Additional Eligibility Info:**

The categories of proposers identified in the [Grant Proposal Guide](#) are eligible to submit proposals under this program announcement/solicitation.

Eligible Participants: **Participating undergraduates, graduate students and postdoctoral associates supported with NSF funds in EMSW21 must be citizens, nationals or permanent residents of the United States and its territories and possessions.** For purposes of this solicitation, a postdoctoral associate is defined as a mathematical scientist who begins a postdoctoral fellowship within 18 months of having received the Ph.D. degree, regardless of the title of the position held. Exceptions to the 18 month restriction require approval of the cognizant program officer.

No citizenship requirement applies to Principal Investigators.

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**V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS**

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**A. Proposal Preparation Instructions**

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

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=gpg](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](mailto: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/pubs/policydocs/grantsgovguide607.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](mailto:pubs@nsf.gov).

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

**No proposals requesting support under the VIGRE component of the EMSW21 solicitation will be accepted for the June 2009 submission date (i.e., for the FY2010 competition). For further information please see the “Dear Colleague” letter NSF 08-75.**

(1) **Cover Sheet.** So that your proposal is properly identified, select the number for the EMSW21 program solicitation from the pull-down list. From the ensuing screen, select the Division of Mathematical Sciences and the Workforce program. In the title of the project, include the label "EMSW21-VIGRE", "EMSW21-RTG" or "EMSW21-MCTP" depending on which component the proposal addresses.

(2) **Project Summary** (1-page limit). Provide a description of the activities that would result if the project is funded, including comments on its objectives, people to be supported, and intended impact. The project summary should include the following information: name of the host institution/organization and of any other institutions/organizations involved; the group(s) of people to be affected; number of people involved; number of summer weeks or academic year activity. The EMSW21 component (VIGRE, RTG, or MCTP) should be identified at the top of the summary page. The project summary must clearly address in separate statements (within the one-page summary): (1) the **intellectual merit** of the proposed activity; and (2) the **broader impacts** resulting from the proposed activity. Having sections with these two explicit titles would be helpful.

(3) **Project Description**. All EMSW21 proposals must include an assessment plan and management plan as described below. In the assessment plan section, the proposal's goals must be clearly stated. This is necessary so that the National Science Foundation can verify, at the conclusion of the grant or another specified time, that the goals have been reached. This can be done if the goals are numerical, but other types of goals are acceptable as long as verification is not to be based on anecdotal evidence. The proposal's reviewers should have a clear picture of the present status of your program and where you intend to be should an award be made. This will be an important part of the review process.

Recall the long-range goal of the EMSW21 program as stated at the beginning of this solicitation. Goals set for any proposal submitted to this program must be consistent with the overall program goal and help NSF achieve it.

For example, one goal might be to increase the number of U.S. citizens, nationals, and permanent residents earning undergraduate or graduate degrees by a specifically stated percentage. Other possibilities might be to keep the number of U.S. degree recipients constant, but to increase the percentage of these who go to the next stage of a mathematical career or to improve the quality of the career paths they choose. Another possible goal might be to increase the number of U.S. students who receive doctoral degrees and accept a postdoctoral fellowship at a Group I department.

The management plan submitted in the proposal must contain a description of the actions that will be taken to achieve the goals set in the assessment plan. One basis for judging proposals will be the goals set and the likelihood that the actions described in the management plan will achieve them. This section should also contain information on the plans to recruit and retain U.S. students and members of underrepresented groups.

**All EMSW21 proposals must include the following items.**

- Introduction. Discuss the vision, scope, objectives, and anticipated impact of the program, at the local institution and beyond. (Not to exceed 2 pages)
- Proposed project. Provide a discussion of the programs envisioned for graduate trainees, undergraduate research experiences, and postdoctoral associates. Proposals should describe the proposed mechanisms for interaction among undergraduates, graduate trainees, postdoctoral associates, and faculty, and how these mechanisms will achieve the EMSW21 goals. Proposals should also describe how education will be integrated with research and ways in which the project will broaden the experience of the students and postdoctoral associates involved and enhance their career opportunities. In addition to research activities and the broadening of course work, describe activities such as industrial internships or arrangements with government laboratories, businesses, or other academic departments and how these activities contribute to meeting the EMSW21 goals. Describe teaching requirements for the graduate trainees and the postdoctoral associates. Include a discussion of adequate mentoring for each of these activities. Discuss the proposed means of improving communication skills at all levels and of enhancing the professional development of trainees. Finally, include a discussion of how the EMSW21 activities might affect students and postdoctoral associates not supported on EMSW21 funds. (Not to exceed 15 pages for a VIGRE proposal and 10 pages for RTG and MCTP)
- Recruitment and Retention. Describe plans for the recruitment and retention of students and postdoctoral associates. Plans to motivate more students to pursue an education in the mathematical sciences should also be discussed. Specific provisions for the recruitment of U.S. citizens, nationals, and permanent residents as well as members of underrepresented groups must be included. (Not to exceed 2 pages.)
- Performance Assessment Plan. Each proposal should describe a plan to assess the progress towards the achievement of the EMSW21 goals. This plan should describe the quantitative and qualitative information that will be used to monitor the EMSW21 activities and determine necessary mid-course corrections. The performance assessment of a VIGRE proposal will form part of the basis for the comprehensive third year review that will be conducted by NSF of the VIGRE sites. (Not to exceed 5 pages.)
- Organization and Management Plan. Describe the plans, procedures, and personnel for the development and monitoring of all aspects of the project. In particular, discuss plans to ensure appropriate mentoring of students and postdoctoral associates, as well as the roles of the faculty involved. Provide evidence of faculty commitment necessary for the implementation of the proposed program. If the project involves international collaborations, industrial internships or arrangements with government laboratories, businesses, or other departments, then the proposal should document existing arrangements, any plans for expanding these arrangements, and the personnel involved in managing these linkages. If the proposal describes a joint project between two or more departments at the same institution, describe organization and management plans for the necessary interactions between the departments. (Not to exceed 3 pages.)
- Dissemination. The EMSW21 program is intended to have a positive impact at the national level on the mathematical sciences community. Broad dissemination of EMSW21 site activities, experiences, and insights is critical to achieve this. Each proposal must include a plan for this dissemination. It is important to disseminate both successful activities as well as information on less successful activities and mid-course corrections. A minimum form of dissemination is a web page devoted to EMSW21 describing its activities. The department's web page should contain an easily seen

link to its EMSW21 page. (Not to exceed 2 pages)

- Post-EMSW21 plan. The EMSW21 program is intended to help stimulate and implement permanent positive changes in education and training within the mathematical sciences in the U.S. Thus, it is critical that a EMSW21 site adequately plan how to continue the pursuit of EMSW21 goals when funding terminates. (Not to exceed 2 pages)

**The project description for the VIGRE Component must also include the following items.**

The proposed project should have a five-year duration. Particular attention must be paid to the following items in preparing the description and having sections of the project description so titled would be helpful:

- Outcome of curriculum review. Describe the nature of the curriculum review and any planned or implemented changes based on it. (Not to exceed 2 pages)
- Results from Prior Support. Existing VIGRE departments should include a summary of what has been accomplished with a previous VIGRE award. This should include information on career paths of VIGRE-supported graduate students and postdocs. (Not to exceed 5 pages)

**The Project Description for the RTG Component (not to exceed a total of 15 pages) must also include:**

- a description of the group's research program;
- a description of any new activities (courses, seminars, workshops, special programs, etc.) that will result from this support;
- evidence of past success in training undergraduates, graduate students, or postdocs, identifying names, degree dates, and subsequent placement (including the flow of undergraduates into graduate programs).

**The Project Description for the MCTP component (not to exceed a total of 15 pages) must also include:**

- a description of the transition point(s) to be addressed;
- a description of any activities (courses, seminars, workshops, special programs, etc.) that will result from this support;
- plans for how the project will function to enhance the transition of the participants, and how the resources will be allocated.

(4) **Current and Pending Support.** This form should be provided for all persons listed as Senior Personnel (limited to 12 people).

(5) **Biographical Sketches.** The basic GPG guidelines for biographical material apply; however, senior personnel are encouraged to include other activities or accomplishments relevant to the proposed activities. Senior personnel include the principal investigator; the co-principal investigators, if any have been designated; and other faculty/professionals who are anticipated to serve in the project. The number of biographical sketches is limited to 12.

(6) **Project Budget.** The proposal should include a detailed project budget and budget justification, as described in the GPG. The budget justification (not to exceed 3 pages) should explain and justify major cost items and any unusual situations/inclusions and address the cost-effectiveness of the project.

Note that support of students and postdoctoral associates is in the form of stipends and, therefore, is not subject to indirect costs. The cost of students, postdoctoral associates, and any fringe benefits should be entered as Participant Costs in Section F of the budget page.

In the Budget Justification page you must include a breakdown of numbers by types of participants and stipend levels for undergraduates, graduate trainees and postdoctoral associates. Project costs may also include such items as participant stipends, housing, meals, travel, tuition, or laboratory use and modest amounts for faculty salaries who administer the activities. Since expenditures cannot be funded beyond the the last year of the project, the budget justification should also address how the project will enable the continued progress of individuals supported in the last year of the project.

Graduate Trainees: EMSW21 funds will provide \$25,000 per student for eleven months each year, with an allowance for tuition and fees of up to \$10,500 per year per student. Stipends may be supplemented during non-teaching periods with support from other sources. The institution must bear the cost of the one-year teaching requirement for EMSW21 graduate trainees.

Undergraduate Students: The stipends are expected to be at least \$1,000 per month for full-time research in the summer. Academic year stipends are limited to a maximum of \$5,000 for the year, as undergraduates normally have significant demands on their time outside mathematics. Exceptions to these rules must be justified in the proposal.

Postdoctoral Associates: The typical EMSW21 postdoctoral associate will have a 3-year appointment, but this appointment should not go beyond the expiration date of the EMSW21 award. An EMSW21 postdoctoral appointment must not exceed 3 years. The full-time rate for the university appointment should be at least \$45,000 for the academic year. Funds can be requested in the proposal to pay for half this academic year stipend up to a maximum of \$25,000 for a full-time EMSW21 postdoctoral associate. Postdoctoral associates who receive any support from EMSW21 funds must be full-time postdoctoral

associates when in residence and supported by EMSW21 funds for at least half the academic year. Each EMSW21 postdoctoral associate is expected to teach, on average, one course per term. In addition, the grant will provide summer support for two summers at the rate of \$10,000 per summer. The grant can be charged for the fringe benefits on that portion of the stipend paid by the grant. The associate is expected to apply to an appropriate external funding agency for support for the third summer. Funding for the postdoctoral appointments should include a total of \$9,000 for the three years to cover travel, equipment, and supplies.

Salaries: Faculty and staff salary may be requested only for the purpose of organization and management of the program. EMSW21 is a program for student training; as such faculty and staff salary must be limited to a small fraction of the entire budget, with the vast majority of funds directed at student and postdoctoral support. For this proposal's purpose, summer faculty teaching of courses and seminars that are exclusively targeted at EMSW21 trainees may be considered as part of the organization and management of the program. No summer teaching by postdocs who are EMSW21 supported is allowed. Graduate students can be hired in the summer and paid by EMSW21 funds to teach courses and seminars exclusively targeted at EMSW21 trainees; funds for this must be entered in line B.3, "Graduate Students," and are subject to indirect costs.

#### (7) Supplementary Documentation.

**Letters of Commitment.** Signed letters of commitment by the institution and other sources in support of the project should be included. If industrial internships are planned, letters indicating the willingness of the industrial organization and of individual industrial mentors (if known) to participate should also be included. These documents should be scanned and uploaded into the FastLane supplementary documentation section. Letters of endorsement are not permitted.

**Trainee Data.** All EMSW21 proposals must supply the following data unless such data is irrelevant to the proposed activities: (a) a list of Ph.D. recipients during the past five years (ten years for those seeking a second VIGRE award), along with each individual's citizenship status, baccalaureate institution, time-to-degree, post-Ph.D. placement, and thesis advisor; (b) the names of postdoctoral associates (including holders of named instructorships and 2- or 3-year terminal assistant professors) during the past five years (ten years for those seeking a second VIGRE award), their Ph.D. institutions, postdoctoral mentors, and post-appointment placements; (c) the dollar amount of funding by federal agencies for REUs, for graduate students, and for postdoctoral associates in each of the past five years (ten years for those seeking a second VIGRE award).

**Quantitative Data.** For each of the three components of EMSW21, additional quantitative data must be furnished. Below are listings, for each of the three components, of the row headings of a spreadsheet. Columns are to contain entries for different academic years. The PI can manufacture a spreadsheet using this information or can request by e-mail an electronic version of the spreadsheet from one of the cognizant Program Officers. Once the spreadsheet is completed, it can be pasted into a word processing document and then submitted via FastLane. (FastLane will not accept uploads in spreadsheet format.)

In these lists, "Math" means Mathematical Sciences, that is, Mathematics or Statistics. "US Citizen" means citizen, national, or permanent resident of the United States and its territories and possessions.

Inadequate data or data that is poorly presented will be negatively interpreted in the review process.

In these spreadsheets, a U.S. Citizen is a U.S. citizen, national, or permanent resident. A Minority is a U.S. Citizen from one of the following groups: Native American, Black, Hispanic, Pacific Islander (Hawaii, Guam, Samoa).

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For VIGRE proposals, submit a spreadsheet with rows that contain the following data:

- A. Undergraduate Student Population
  - o Total University Undergraduate Enrollment
  - o Total Number of Math Undergraduate Majors
  - o Total Number of Math Female Undergraduate Majors
  - o Total Number of Math Minority Undergraduate Majors
- B. BS/BA Degrees Awarded
  - o Total Number of University BS/BA Degrees
  - o Total Number of BS/BA Math Degrees
  - o Number of BA/BS Math Degrees to Women
  - o Number of BA/BS Math Degrees to Minorities
- C. Graduate Student Population
  - o Total Number of Math Grad Students
  - o Number of Female Math Grad Students
  - o Number of Minority Math Grad Students
  - o Number of US Citizen Math Grad Students
- D. Internal University Support (Non-Teaching) for Math Grad Students
  - o Total Dollar Amount for Math Grad Students
  - o Total Dollar Amount for Female Math Grad Students
  - o Total Dollar Amount for Minority Math Grad Students

- o Total Dollar Amount for US Citizen Math Grad Students
- E. PhD Degrees Awarded
  - o Total Number of Math PhDs granted
  - o Number of Math PhDs granted to Women
  - o Number of Math PhDs granted to Minorities
  - o Number of Math PhDs granted to US Citizens
- F. Math Postdoctoral Researchers
  - o Total Number of Postdoctoral Fellows supported by Dept
  - o Number of Female Postdoctoral Fellows supported by Dept
  - o Number of Minority Postdoctoral Fellows supported by Dept
  - o Number of US Citizen Postdoctoral Fellows supported by Dept
- G. VIGRE Supported Individuals (If Applicable)
  - o Total Number of Undergraduates supported by VIGRE
  - o Number of Female Undergraduates supported by VIGRE
  - o Number of Minority Undergraduates supported by VIGRE
  - o Total Number of Grad Students supported by VIGRE
  - o Number of Female Grad Students supported by VIGRE
  - o Number of Minority Grad Students supported by VIGRE
  - o Total Number of PhDs awarded to VIGRE Students
  - o Number of PhDs awarded to Female VIGRE Students
  - o Number of PhDs awarded to Minority VIGRE Students
  - o Total Number of Postdoctoral Fellows supported by VIGRE
  - o Number of Female Postdoctoral Fellows supported by VIGRE
  - o Number of Minority Postdoctoral Fellows supported by VIGRE
- H. Disbursement of VIGRE Funds
  - o Total VIGRE Funds Spent for Support of Undergraduates
  - o Total VIGRE Funds Spent for Support of Grad Students
  - o Total VIGRE Funds Spent for Support of Postdoctoral Fellows

The columns should display data for each of the last five academic years or each of the last ten academic years if the PI's institution has had a VIGRE grant.

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For RTG proposals submit a spreadsheet with the following rows.

- A. Graduate Student Population
  - o Total Number of Math Grad Students working with group
  - o Number of Female Math Grad Students working with group
  - o Number of Minority Math Grad Students working with group
  - o Number of US Citizen Math Grad Students working with group
- B. PhD Degrees Awarded
  - o Total Number of Math PhDs granted in this area
  - o Number of Math PhDs granted to Women in this area
  - o Number of Math PhDs granted to Minorities in this area
  - o Number of Math PhDs granted to US Citizens in this area
- C. Math Postdoctoral Researchers
  - o Total Number of Postdoctoral Fellows in this area
  - o Number of Female Postdoctoral Fellows in this area
  - o Number of Minority Postdoctoral Fellows in this area
  - o Number of US Citizen Postdoctoral Fellows in this area

The columns should display data for each of the last five academic years. Note that the data required is for the group submitting the proposal, not for the entire department.

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For MCTP proposals submit a spreadsheet with the following rows.

- A. Undergraduate Student Population
  - o Total University Undergraduate Enrollment
  - o Total Number of Math Undergraduate Majors
  - o Total Number of Math Female Undergraduate Majors
  - o Total Number of Math Minority Undergraduate Majors
- B. BS/BA Degrees Awarded
  - o Total Number of University BS/BA Degrees
  - o Total Number of BS/BA Math Degrees
  - o Number of BA/BS Math Degrees to Women
  - o Number of BA/BS Math Degrees to Minorities
- C. Graduate Student Population

- o Total Number of Math Grad Students
- o Number of Female Math Grad Students
- o Number of Minority Math Grad Students
- o Number of US Citizen Math Grad Students
- D. Internal University Support (Non-Teaching) For Math Grad Students
  - o Total Dollar Amount for Math Grad Students
  - o Total Dollar Amount for Female Math Grad Students
  - o Total Dollar Amount for Minority Math Grad Students
  - o Total Dollar Amount for US Citizen Math Grad Students
- E. PhD Degrees Awarded
  - o Total Number of Math PhDs granted
  - o Number of Math PhDs granted to Women
  - o Number of Math PhDs granted to Minorities
  - o Number of Math PhDs granted to US Citizens
- F. Math Postdoctoral Researchers
  - o Total Number of Post Doctoral Fellows supported by Dept
  - o Number of Female Post Doctoral Fellows supported by Dept
  - o Number of Minority Post Doctoral Fellows supported by Dept
  - o Number of US Citizen Post Doctoral Fellows supported by Dept

The columns should display data for each of the last five academic years. You must include data spanning the preceding 5 years, but only concerning classes of students to be affected should a grant be awarded. So, for example, an MCTP proposal that involves graduate students must include such data for the entire graduate student population of the department. If no undergraduates are involved, no data on undergraduates is required.

Given the likely variation in the nature of projects appearing in MCTP proposals, it is impossible for the Division of Mathematical Sciences to formulate a single spreadsheet that will solicit data appropriate for all the possible projects. If data for activities proposed in an MCTP proposal is not asked for in the standard spreadsheet, the PI should be sure to supply this independently in a spreadsheet of his/her own design. Any data involving students must be broken down by gender, minority status, and citizenship, as above.

## B. Budgetary Information

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

**Other Budgetary Limitations:**

Award sizes, contingent on the availability of funds, will be as follows:

VIGRE component- \$400,000 to \$1,000,000 per year

RTG component- up to \$500,000 per year

MCTP component- up to \$500,000 per year

## C. Due Dates

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

October 12, 2005

then June 6, 2006 and the first Tuesday in June in the following years

June 02, 2009

## 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](mailto: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](mailto: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**

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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**

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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 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:**

EMSW21 proposals will be examined by external merit review. Reviewers will be asked to interpret the two basic NSF review criteria in the context of EMSW21. In addition, they will be asked to place emphasis on the following considerations:

- The appropriateness and value of the experience for the participants and the nature of participation in these activities;
- The quality of the environment in the department and the institution, including the record of the Principal Investigator and other senior personnel in the proposed activities, the facilities, and the professional development opportunities;
- The quality and appropriateness of the goals for the proposal and the assessment plan;
- Appropriateness of the recruitment and selection plan, including plans for involving participants from underrepresented groups at all levels, including students, investigators, etc.;
- Quality of plans for participant preparation and follow-through designed to promote continuation of participant interest and involvement in the mathematical sciences;
- The plans for managing the project and evaluating outcomes; and
- The appropriateness of the budget.

## **B. Review and Selection Process**

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

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

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

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### A. Notification of the Award

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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

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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](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 [pubs@nsf.gov](mailto: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](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag).

#### Special Award Conditions:

While each VIGRE component proposal should describe a five-year program, some awards may be made for only three years. When an award is made for five years, initial funding will only cover the first three years of the project. Additional funding for the remaining two years will be contingent upon the satisfactory outcome of a comprehensive third-year assessment by NSF. Funding is always subject to availability of funds.

In addition the following special conditions will apply: the cognizant NSF program official must be notified prior to any reallocation of funds in excess of \$25,000, or any reallocation of funds granted as participant support costs.

### C. Reporting Requirements

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For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

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

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

## VIII. AGENCY CONTACTS

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General inquiries regarding this program should be made to:

- Dean M Evasius, telephone: (703) 292-8132, email: [devasius@nsf.gov](mailto:devasius@nsf.gov)
- Joe W Jenkins, telephone: (703) 292-4870, email: [jjenkins@nsf.gov](mailto:jjenkins@nsf.gov)
- Bruce Palka, telephone: (703) 292-4856, email: [bpalka@nsf.gov](mailto:bpalka@nsf.gov)
- Christopher W Stark, telephone: (703) 292-4869, email: [cstark@nsf.gov](mailto:cstark@nsf.gov)

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: [fastlane@nsf.gov](mailto:fastlane@nsf.gov).

For questions relating to Grants.gov contact:

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

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## IX. OTHER INFORMATION

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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>.

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## ABOUT THE NATIONAL SCIENCE FOUNDATION

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The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

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The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS)

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

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The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

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