Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS)

Program Solicitation

NSF 06-559

National Science Foundation

Directorate for Mathematical & Physical Sciences
Division of Mathematical Sciences
OFFICE OF MULTIDISCIPLINARY ACTIVITIES

Directorate for Education & Human Resources
Division of Undergraduate Education

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

June 27, 2006

October 17, 2006

October 17, 2007

October 17, 2008

October 17, 2009

REVISION NOTES

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

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

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS)

Synopsis of Program:

The goal of Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS) is to enhance computational aspects of the education and training of undergraduate students in the mathematical sciences -- mathematics and statistics -- and to better prepare these students to pursue careers and graduate study in fields that require integrated strengths in computation and the mathematical sciences. The core of the activity is long-term research experiences for cohorts of at least six undergraduates. Projects must focus on research topics that require interplay between computation and mathematics or statistics. They should expose students to contemporary mathematics, statistics, and computation, addressed with modern research tools and methods. That is, projects must be genuine research experiences rather than rehearsals of research methods. Interdisciplinary projects are encouraged, and appropriate mentorship from the disciplines involved is welcomed. In addition, we expect that projects will strengthen the research and education capacity, infrastructure, and culture of the participating institutions. To this end, we welcome projects that create models for education in the mathematical sciences and influence the direction of academic programs for a broad range of students. CSUMS is a joint effort of the Education and Human Resources (EHR) and the Mathematical and Physical Sciences (MPS) directorates at the National Science Foundation (NSF).

Cognizant Program Officer(s):

- Michael Steuerwalt, Program Director, MPS/DMS, telephone: (703) 292-4860, email: msteuerw@nsf.gov
- Leland Jameson, Program Director, MPS/DMS, telephone: (703) 292-4883, email: ljameson@nsf.gov
- Thomas Russell, Program Director, MPS/DMS, telephone: (703) 292-4863, email: trussell@nsf.gov
- Gabor Szekely, Program Director, MPS/DMS, 1025, telephone: (703) 292-8869, email: gszekely@nsf.gov
- Lee Zia, Program Director, EHR/DUE, telephone: (703) 292-5140, email: lzia@nsf.gov

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

- 47.049 --- Mathematical and Physical Sciences
- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Standard Grant or Continuing Grant

Estimated Number of Awards: 7 to 15 Three-year to five-year projects, as well as shorter projects, are appropriate.

Anticipated Funding Amount: $2,000,000 in FY 2006, pending availability of funds

Eligibility Information

Organization Limit:

None Specified

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Not Applicable
- **Full Proposals:**
  - Full Proposals submitted via FastLane: Grant Proposal Guide (GPG) Guidelines apply. The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg.
  - Full Proposals submitted via Grants.gov: NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/)

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** An administrative allowance, limited to 25% of the participant support stipend amount (Line F.1. on the FastLane budget and Field E.2. on the Grants.gov budget) only, is allowed for CSUMS awards as partial reimbursement of indirect costs. That amount should be entered under Total Indirect Costs (Line I on the FastLane budget and Field H on the Grants.gov budget).
- **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):

  June 27, 2006

  October 17, 2006

  October 17, 2007

  October 17, 2008

  October 17, 2009

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: Standard NSF award conditions apply

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

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I. INTRODUCTION

The goal of Computational Science Training for Undergraduates in the Mathematical Sciences (CSUMS) is to enhance computational aspects of the education and training of undergraduate students in the mathematical sciences -- mathematics and statistics -- and to better prepare these students to pursue careers and graduate study in fields that require integrated strengths in computation and the mathematical sciences. CSUMS aims to increase the number of mathematical sciences students who participate in undergraduate research experiences, to increase the number of students with skills in both computation and the mathematical sciences, to broaden undergraduate research experiences, and to enhance capacity, infrastructure, and commitment to excellence in undergraduate education. CSUMS is a joint effort of the Education and Human Resources (EHR) and the Mathematical and Physical Sciences (MPS) directorates at the National Science Foundation (NSF).

II. PROGRAM DESCRIPTION

CSUMS provides opportunities for funding of undergraduate education and training efforts that integrate the mathematical sciences with computation. Such efforts:

- Must be grounded in research activities involving both computation and the mathematical sciences;

- Should connect to regular academic studies, influencing the direction of academic programs for a broad range of students;
- Must involve groups of students in significant research experiences that involve both computation and the mathematical sciences; and
- Must show commitment of faculty to mentoring of the undergraduate students.

Proposals for durations of up to five years are invited, and we encourage projects of a five year duration. Long-term projects will be reviewed in the third year; fourth- and fifth-year funding will depend on the outcome of this review. Proposals for shorter terms of one or two years are also invited; these may be appropriate as, for example, pilot projects that could lead to longer-term efforts. In either case, research activities should focus on areas funded by the Division of Mathematical Sciences (DMS). In this regard, note that DMS funds research grants whose research spans the full range of NSF disciplines. Therefore, CSUMS proposals may appropriately incorporate interdisciplinary research experiences. We encourage such research projects in CSUMS proposals.

- CSUMS proposals that offer interdisciplinary research experiences are particularly encouraged. However, they must take care to show appropriate mentoring in the relevant disciplines for the undergraduate participants -- including, if necessary, senior mentors from the other disciplines.

A cohort is the set of students who begin their involvement in CSUMS activities in a given year. CSUMS is not intended to provide stipends for longer than a year for any individual undergraduate student. Hence a new yearly cohort of at least six undergraduate students is required each year of a CSUMS award, although previously engaged students may continue to participate in the project activities. CSUMS aims at group and team research experiences rather than individual research experiences. Hence a CSUMS project should encompass not only the central research experience, which may be designed for smaller teams or groups of students than the full cohort, but also activities that involve the full yearly cohort. Significant advantages for the students accrue from broad activities that integrate all the cohort. Any such activities (e.g., seminars, group discussions, lectures, workshops) should be discussed as well as those activities that are aimed at smaller-group experiences. A schedule of the year-round activities should be provided.

Key characteristics of CSUMS proposals include:

- Student involvement in innovative research at the forefront of the mathematical sciences;
- Six or more students involved as a cohort, working and learning together;
- Long-term involvement of each student with research activities -- more than a semester or a summer -- to provide immersion, intense involvement in research, and mutual reinforcement between the research and classroom activities;
- Extensive mentoring, with full attention to the mathematical or statistical aspects as well as the computational aspects of the research experiences and to any interdisciplinary aspects of the research;
- A diversity of students; attention to ethnic and gender diversity is essential;
- The ability to affect programs and students beyond those directly involved in the project.

CSUMS will include annual meetings of awardees to share information and encourage student/faculty exchanges among awardees. Opportunities for partnering across institutions and for developing international collaborations are welcome. Field work may be appropriate. While the core of CSUMS research projects and educational activities is the intersection of computation with the mathematical sciences, CSUMS is open to projects that include other disciplines as appropriate, such as the physical sciences, geosciences, social sciences, computer sciences, and engineering. However, **CSUMS student support from DMS can only be used for students from the mathematical sciences.**

Dissemination of information about project outcomes to a broader audience is also important. CSUMS aims to create new models for approaches to education and training in the mathematical sciences. CSUMS projects should strengthen educational capacity, infrastructure, and culture at participating institutions, as reflected in the number and inclusiveness of participating mentors and students and the quality of their research experience. Educational culture is linked to campus resource investment and to the value placed by the institution on participation by mentors in the undergraduate research enterprise. Educational culture also embraces the fostering of student learning and professional development and an appreciation for the integration of research and education. CSUMS projects should contribute substantially to an enhanced and sustainable undergraduate educational enterprise that strengthens mathematical, statistical, and computational training and education for students in the mathematical sciences.

The program encourages collaborations that bring together mathematical scientists from baccalaureate, masters, or Ph.D. granting institutions. Involvement of minority-serving institutions and of industrial or government laboratories is encouraged.

Eligible Student Participants: **Undergraduate student participants supported with NSF funds must be citizens or permanent residents of the United States or its possessions.** An undergraduate student is a student who is enrolled in a degree program (part-time or full-time) leading to a baccalaureate or associate degree. Students who are transferring from one institution to another and are enrolled at neither institution during the intervening summer may participate. High school

graduates who have not yet enrolled and students who have received their bachelor's degrees generally are not eligible. While undergraduates at all stages are eligible, students will be involved in genuine mathematical sciences research and must be accordingly capable. The heart of the CSUMS project must be a research experience, not simply a classroom experience. Thus, the proposal should outline the process that will be used to select student participants, including ensuring that the students have the proper prerequisites. Collaborations between universities, four-year colleges, and two-year colleges are encouraged.

III. AWARD INFORMATION

We anticipate awarding 7 to 15 standard or continuing grants each year. This may include both short-term projects of one or two years duration as well as projects of longer duration.

The duration of projects may be up to five years, and we encourage projects of a five-year duration. **Projects longer than three years will be reviewed in the third year, and continued funding for these projects will depend on the outcome of this review.**

Total award sizes should not exceed an average of $250,000 per year. For example, an award for a project of five years duration is limited to a maximum of $1.25 million.

Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds.

IV. ELIGIBILITY INFORMATION

Organization Limit:

None Specified

PI Limit:

None Specified

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. In CSUMS awards, only those undergraduate students who are citizens or permanent residents of the United States or its possessions can be supported with NSF funds.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

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.

This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) or NSF Grants.gov Application Guide proposal preparation guidelines. Investigators are directed to pay particular attention to the additional information below. Proposals that do not provide required information will be returned without review. Proposals to this solicitation should begin their titles with the phrase "CSUMS:" in order to expedite the orderly review of these proposals.

The following instructions supplement the GPG or NSF Grants.gov Application Guide guidelines.

1. **Cover Sheet.** The title of the project should begin "CSUMS: ...."

2. **Project Description.** The project description is not to exceed 15 pages in length and should contain the following items:

    a. Results from Prior NSF Support (if applicable).

    b. Overview. Provide a brief description of the objectives of the proposed CSUMS project (including the central theme(s) of the research projects), the targeted student participants, the intellectual focus and innovative strategies, the organizational structure and timetable, and organizational endorsement of the CSUMS activity. *Endorsement letters from appropriate institutional administrators can be included as supplementary documents.*

    c. Nature of Student Activities. Proposals should address the approach to undergraduate research training, including description of current or planned courses that will expose student participants to both the mathematical sciences and the computational methods and skills important for their research immersion experience, detailed descriptions or examples of the interdisciplinary research projects that teams of students will pursue, and plans for presentation and dissemination of research results, including any travel to scientific meetings. CSUMS is not intended to provide stipends for longer than a year for any individual undergraduate student. Hence a new yearly cohort of at least six undergraduate students is required each year of a CSUMS award, although previously engaged students may continue to participate in the project activities. Cohorts may be divided into smaller teams as appropriate for specific research activities. But significant advantages for the students accrue from broad activities that integrate all the cohort. Any other such activities (e.g., seminars, group discussions, lectures, workshops, cohort-wide research projects) should be discussed as well as those activities that are aimed at smaller-group experiences. A schedule of the year-round activities should be provided.

    d. Connection to Regular Academic Studies. Proposals should describe the ways in which the CSUMS activity will influence academic programs for a broader range of students, including possible curriculum

development and changes to strengthen computational training for mathematical sciences students.

e. Research Environment and Mentoring Activities. Proposals should describe the structure for mentoring of student teams by mathematical sciences faculty. If joint mentoring with faculty from other disciplines is appropriate, the proposal should describe the collaborative structure for that as well. For senior personnel who will serve as research mentors, proposals **must** describe the mentoring activities planned and the past experience and record of involvement with undergraduate research.

f. Student Recruitment and Selection. The recruitment plan should be described with as much specificity as possible. NSF is particularly interested in increasing the participation in research of women, underrepresented minorities, and persons with disabilities. Underrepresented minorities are African-Americans, Hispanics, Native Americans, and Native Pacific Islanders. In CSUMS awards, only those undergraduate students who are citizens or permanent residents of the United States or its possessions can be supported with NSF funds.

g. Project Management. A clear management plan should be described, including mechanisms for dealing with possible changes in faculty participation over the course of the project.

h. Project Evaluation and Reporting. A plan for qualitative and quantitative evaluation of the proposed project **must** be provided. The objective of the evaluation process is to measure qualitatively and quantitatively the success of the project in achieving its goals, particularly the degree to which students have strengthened their capacity to do research at the intersection of computation and the mathematical sciences. The evaluation plan should include metrics on such key issues as the number of mathematical sciences majors supported, the research fields served, and the impact on the programs at the organizations involved. Demographic data of the students supported **must** also be reported. Although not required, the principal investigator may wish to engage educational research specialists in planning and implementing the project evaluation. Additionally, it is highly desirable to have a structured means of tracking participating students beyond graduation with the aim of gauging the degree to which the research experience has been a lasting influence as they follow their career paths.

Evaluation may involve periodic measures throughout the project to ensure that it is progressing satisfactorily according to the project plan, and may involve pre- and post-project measures aimed at determining the degree of student learning that has been achieved as a result of the project. Mid-term assessment (at the end of the third year) is deemed critical. For guidance, proposers may wish to consult the NSF on-line document, "User-Friendly Handbook for Project Evaluation" (NSF 02-57), http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf02057 .

3. **Biographical Sketches.** The standard guidelines for biographical material apply; however, senior personnel are encouraged to include publications with undergraduate co-authors (with the student labeled by an asterisk) and other activities or accomplishments relevant to a successful CSUMS activity. Senior personnel are the principal investigator, any co-principal investigators, and any other faculty/professionals who are anticipated to serve as research mentors. Postdoctoral scholars and graduate students are not senior personnel.

4. **Project Budget.** Project costs should include undergraduate student stipends -- note here that these are long-term research experiences and stipends may reflect this -- and may include laboratory use fees, housing (if appropriate during the summer months) and travel for student participants. Enter those amounts on the appropriate participant support category on Line F on the FastLane budget or Field E of the Grants.gov budget. Tuition and other fees are not permitted. The budget may also include items such as faculty salaries, salaries for graduate students or post-doctoral scholars to the extent that they serve as auxiliary mentors for the undergraduates, support for coordination activities, and equipment and other direct costs (e.g., materials, publication costs). Funds should also be budgeted for travel to an annual awardees meeting. As a guide to budget development, participant support costs should be at least 50% of the total budget request, and faculty salaries should be limited to 2 weeks annual support except for the lead investigator, who may request 1 month each year.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted to the National Science Foundation.

Indirect Cost (F&A) Limitations: An administrative allowance, limited to 25% of the participant support stipend amount (Line F.1. on the FastLane budget and Field E.2. on the Grants.gov budget) only, is allowed for CSUMS awards as partial reimbursement of indirect costs. That amount should be entered under Total Indirect Costs (Line I on the FastLane budget and Field H on the Grants.gov budget).

Other Budgetary Limitations:

Other budgetary limitations apply. Please see Sections II.A and V.A *[the full text]* of this solicitation for further information. In CSUMS awards, only those undergraduate students who are citizens or permanent residents of the United States or its possessions can be supported with NSF funds.

C. Due Dates

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

  June 27, 2006

  October 17, 2006

  October 17, 2007

  October 17, 2008

  October 17, 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. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this funding opportunity.

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

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

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

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

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

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

A. NSF Merit Review Criteria

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

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

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

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

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

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

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

Additional Review Criteria:

Additional review criteria apply. Each proposal will be evaluated on the degree of interaction between computation and the mathematical sciences in the research experiences provided to undergraduates, the degree of student participation and immersion in the proposed activities, the extent of commitment to mentoring by senior faculty, and the quality and efficacy of its management and evaluation plans.

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by CSUMS proposals normally will receive ad hoc mail or panel review or both.

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

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

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

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

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

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

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

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

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.

Investigators are reminded to include in their **final reports** lists of undergraduate student participants with demographic data, along with brief descriptions of the research experiences with attention to the integration of computation with the mathematical sciences. Investigators should also describe steps taken to ensure that their CSUMS projects contribute to an enhanced and sustainable undergraduate educational enterprise. For projects of more than a year's duration, **annual reports** should include all of these items also; they are significant measures of how effectively the project is meeting CSUMS objectives and DMS and EHR priorities, and so they will weigh in the third-year reviews of longer-term CSUMS grants.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- Michael Steuerwalt, Program Director, MPS/DMS, telephone: (703) 292-4860, email: msteuerw@nsf.gov
- Leland Jameson, Program Director, MPS/DMS, telephone: (703) 292-4883, email: ljameson@nsf.gov
- Thomas Russell, Program Director, MPS/DMS, telephone: (703) 292-4863, email: trussell@nsf.gov
- Gabor Szekely, Program Director, MPS/DMS, 1025, telephone: (703) 292-8869, email: gszekely@nsf.gov
- Lee Zia, Program Director, EHR/DUE, telephone: (703) 292-5140, email: lzia@nsf.gov

For questions related to the use of FastLane, contact:

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

For questions relating to Grants.gov contact:

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

IX. OTHER INFORMATION

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

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF

funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at http://www.grants.gov.

ABOUT THE NATIONAL SCIENCE FOUNDATION

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

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

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

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

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

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

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

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

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

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

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

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

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