Grants for the Department-Level Reform of Undergraduate Engineering Education (DLR)

Program Solicitation
NSF 04-523
Replaces Document NSF 03-562

National Science Foundation
Directorate for Engineering
- Division of Bioengineering and Environmental Systems
- Division of Chemical and Transport Systems
- Division of Civil and Mechanical Systems
- Division of Design, Manufacture and Industrial Innovation
- Division of Electrical and Communications Systems
- Division of Engineering Education and Centers

Directorate for Education and Human Resources
- Division of Research, Evaluation and Communication
- Division of Undergraduate Education

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

March 12, 2004

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Grants for the Department-Level Reform of Undergraduate Engineering Education (DLR)

Synopsis of Program:

The Grants for the Department-Level Reform of Undergraduate Engineering Education solicitation provides an opportunity for institutions to compete for planning and implementation grants to assist departmental and larger units in:

- Engaging faculty in the scholarship of learning and teaching on a department wide basis,
- Developing, implementing, assessing and disseminating comprehensive plans to reformulate, streamline and update engineering degree programs,
- Developing, implementing, assessing department wide transformational change of student learning experiences,
- Incorporating Service Learning opportunities into engineering programs,
- Meeting the emerging workforce and educational needs of U.S. industry, and
- Incorporating methods for integration of research and teaching.

This solicitation is a collaborative effort between the Directorate for Engineering (ENG) and the Directorate for Education and Human Resources (EHR).

Cognizant Program Officer(s):

- Krishna Vedula, **Solicitation Coordinator**, Program Director, Division of Undergraduate Education, EHR/DUE., Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-7335, fax: (703) 292-9051, email: kvedula@nsf.gov
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- Thomas W. Chapman, Program Director, Directorate for Engineering, Division of Chemical & Transport Systems, 525 N, telephone: (703) 292-8370, fax: (703) 292-9054, email: tchapman@nsf.gov
- Cynthia J. Ekstein, Program Director, Directorate for Engineering, Division of Bioengineering & Environmental Systems, 565 S, telephone: (703) 292-7941, fax: (703) 292-9098, email: cekstein@nsf.gov
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- Bruce M. Kramer, Division Director, Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-8380, fax: (703) 292-9051, email: bkramer@nsf.gov
- Richard J. Fragaszy, Program Director, Directorate for Engineering, Division of Civil & Mechanical Systems, 545 S, telephone: (703) 292-8360, email: rfragasz@nsf.gov
- James Momoh, Program Director, Directorate for Engineering, Division of Electrical & Communications Systems, 675 S, telephone: (703) 292-8339, fax: (703) 292-9147, email: jmomoh@nsf.gov
- Roger K. Seals, Program Director, Division of Undergraduate Education, Directorate for Education and Human Resources, Directorate for Education & Human Resources, Division of Undergraduate Education, 835 N, telephone: (703) 292-4645, fax: (703) 292-9015, email: rseals@nsf.gov
- Gregg Solomon, Program Director, Directorate for Education & Human Resources, Division of Research, Evaluation & Communication, 855 S, telephone: (703) 292-8333, fax: (703) 292-9046, email: gesolomo@nsf.gov
- Glenn H. Larsen, Program Clearance Officer, Directorate for Engineering, 505 N, telephone: (703) 292-4607, fax: (703) 292-9013, email: glarsen@nsf.gov

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

- 47.076 --- Education and Human Resources
- 47.041 --- Engineering

Eligibility Information

- **Organization Limit:**

Only U.S. academic institutions that offer a baccalaureate degree in engineering are eligible.

- **PI Eligibility Limit:**

  PI must be a faculty member of the institution which is submitting the proposal.

- **Limit on Number of Proposals:** 1. Institutions can submit a maximum of one planning grant proposal and one implementation grant proposal.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 26 - An extimated 20 planning and 6 implementation awards are expected to be made.
- **Anticipated Funding Amount:** $8,000,000 per year for an estimated 20 planning grants of up to $100,000 each, and 6 implementation grants of up to $1,000,000 each, subject to the availability of funds and the quality of proposals received.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required.
- **Indirect Cost (F&A) Limitations:** Not Applicable.
- **Other Budgetary Limitations:** Not Applicable.

C. Due Dates

- **Full Proposal Deadline Date(s)** (due by 5 p.m. proposer's local time):
  March 12, 2004

Proposal Review Information

- **Merit Review Criteria:** National Science Board approved criteria apply.

Award Administration Information

- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Standard NSF reporting requirements apply.

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Summary of Program Requirements

I. INTRODUCTION

This is an opportunity to compete for grants to enable departmental and larger units to reformulate, streamline, and update engineering degree programs, develop new curricula for emerging engineering disciplines, and meet the emerging workforce and educational needs of U.S. industry. Grants will be available for both planning and implementation efforts.

These efforts should increase both the relevance of undergraduate engineering curricula to modern engineering practice and induce an increased proportion of students who enroll to complete engineering degree programs. This can be accomplished by introducing modern learning strategies, expanding both the disciplinary breadth and the range of problems and problem-solving techniques to which engineering students are exposed, incorporating new laboratories and research experiences, and effectively integrating the powerful software tools used in engineering practice.

Significant reform on a departmental wide basis can only be built on a solid foundation of understanding of how students learn engineering, how faculty teach engineering and how we can best assess learning. Integration of teaching and research as well continuous faculty development are key to the success of departmental level reform. Cultural change requires active faculty participation and department head leadership.

A unique feature of the solicitation this year is the emphasis on service learning as an important means to enhance student learning outcomes. Industry partners have offered their in-kind support for proposals which include a significant service learning component. See Section IV B.

II. PROGRAM DESCRIPTION

Overview

The NSF *Grants for the Department-Level Reform of Undergraduate Engineering Education* solicitation encourages proposals that build on the pioneering efforts of the NSF Engineering Education Coalitions, supports the goals of the Accreditation Board for Engineering and Technology (ABET) *Criteria for Accrediting Engineering Programs*, (http://www.abet.org) and reflects advances in the science of learning.

Departments or multiple departments may update and reconstitute elements of the curricula in existing engineering disciplines or invent elements of completely new curricula for emerging engineering disciplines or cross-disciplines. The proposed efforts should define the interfaces between the new elements and existing programs, and streamline and update course offerings to make the curriculum both more attractive and effective by:

- Introducing emerging knowledge related to information technology, bioengineering, microelectronics, microelectromechanical systems (MEMS), nanotechnology, product design and realization, advanced materials, manufacturing, etc.
- Using cognitive theory and latest pedagogical concepts to improve learning outcomes.
- Replacing legacy materials with improved content emphasizing the fundamental, underlying behavior of physical and biological systems and the social systems in which they are employed.
- Exposing students to the computational methods and design practices employed by practicing engineers to solve engineering problems, preferably in collaboration with industry leaders in developing tools implementing such methods.
- Emphasizing critical thinking skills as well as communication and interpersonal skills.
- Ensuring that the course content as well as pedagogy are sensitive to the needs of a diverse student body.
- Making full use of modern teaching methods, including mentoring, team-based and experience-based learning, computer simulation, and distance learning.
- Incorporating service learning as a means to broaden students' professional skills and enhance their learning outcomes and academic performance, while providing sustained support for community service organizations.

Proposals should reflect:

- An understanding of the research on how students learn engineering and how the practice of teaching must build on this understanding.
- An understanding of the research and practice of the assessment of learning outcomes.
- The benefits of integrating teaching and research.
- The appreciation that faculty participation, faculty development and faculty appreciation for the scholarship of learning are critical to the success of departmental reform.
- The realization that collaboration with experts in the field of learning, pedagogy and assessment is critical to departmental reform.
- The importance of stimulating students, particularly underrepresented minorities, to pursue graduate studies.

Proposals which incorporate **service learning projects** must ensure that these projects:

- Count for engineering course credit (for example, not be in addition to requirements but replacements for them).
- Align with ABET requirements, especially those for teamwork, communication skills, and project based experiences.
- Be multidisciplinary.
- Include a strong assessment and evaluation plans, and research on the impact of service learning on teaching and learning.

An international dimension to the **service learning projects** is also encouraged.

Prior receipt of a Planning Grant for the Departmental-Level Reform of Undergraduate Engineering Education is not a requirement for participation in the implementation component of this solicitation.

Frequently Asked Questions (FAQs)

Why is a department-level involvement required?
In most universities, fundamental change occurs at the departmental level. We're looking for a few departments that have been asking themselves the question "starting from a clean page in 2004, what is the best possible learning experience we can provide for our students, that will prepare them for professional practice or for the career they choose?"

Can the target be a single degree program (as in a department) or does it have to include a group of programs (as in a college)?
Either approach is acceptable. We encourage multidepartmental and interdisciplinary experiments.

Will ABET let us do this?
EC 2000 encourages experimentation, as long as a clear rationale is presented for change and appropriate methods are instituted for evaluating outcomes. Since NSF requires similar characteristics in a successful proposal, we anticipate that the receipt of NSF funding is likely to enhance the case for accreditation.

How should we incorporate the in-kind support into the proposal ? Proposals interested in being eligible for in-kind support from HP and Microsoft, should ensure that their proposals for departmental level reform contain service learning themes. However, the proposal implementation should not depend on the availability of this in-kind support. Such proposals should clearly explain how the in-kind support will add value to the implementation of their proposal.

Departmental reform is a huge undertaking. If we receive a planning grant, what assurance do we have that future opportunities will provide the resources required to complete these efforts, assuming that our planning grant results in successful proposals to follow-on programs?
Any future program commitments depend on the availability of funds. We, nevertheless, expect to fund some implementation efforts in the future. However, it is obvious that we cannot fund all fundable implementation efforts. We expect that departments will use the outcomes from their planning grants to solicit institutional support for implementation as an integral part of catalyzing change.

III. ELIGIBILITY INFORMATION

Only U.S. institutions that offer a baccalaureate degree in engineering are eligible to submit proposals under this program solicitation. Institutions can submit a maximum of one planning grant proposal and one implementation grant proposal.

IV. AWARD INFORMATION

A: NSF Award:

About 20 planning grants, each in an amount up to $100,000 total with a duration of 12 months, and about 6 implementation grants, each in an amount up to $1,000,000 total with a duration of up to 36 months, will be awarded. Estimated program budget, number of awards, and average award size/duration are subject to the availability of funds and the quality of proposals received.

B: In-Kind Support:

Industry support from the Hwelett-Packard Company and Microsoft Corporation in the form of in-kind contributions will be available for successful planning grant proposals that incorporate **service learning** as a significant element of departmental level reform. Such proposals will be eligible for equipment and software support, such as wireless enabled HP Tablet PCs (up to 10) or iPAQ Pocket PCs (up to 20) and licenses for Microsoft Office, Studio, .Net and Project for each tablet PC donated and an MSDN Academic Alliance License for 2 years.

Delivery of in-kind support may be timed to coincide with planning grant needs. The number, timing and composition of the in-kind awards may be dependent on product availability, sponsors' funding levels and the total number of eligible proposals. For more information on Microsoft and HP products offered, see www.microsoft.com and www.hp.com.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Full Proposal Instructions:

Proposals submitted in response to this program announcement/solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF *Grant Proposal Guide* (GPG). The complete text of the GPG is available electronically on the NSF Website at: http://www.nsf.gov/cgi-bin/getpub?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.

The following information supplements the GPG guidelines:

Two letters must be submitted in the Supplementary Documentation section of the FastLane proposal. Both of the letters should endorse the proposal. One letter should be signed by the Department Chair and one letter signed by the Dean of the College of Engineering or equivalent position(s).

Proposers are reminded to identify the program announcement/solicitation number (04-523) in the program announcement/ solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

B. Budgetary Information

Cost Sharing:

Cost sharing is not required in proposals submitted under this Program Solicitation.

C. Due Dates

Proposals must be submitted by the following date(s):

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

March 12, 2004

D. FastLane Requirements

Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed instructions for proposal preparation and submission via FastLane are available at: http://www.fastlane.nsf.gov/a1/newstan.htm. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/solicitation.

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. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: http://www.fastlane.nsf.gov

VI. PROPOSAL REVIEW INFORMATION

A. NSF Proposal Review Process

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 (NSB 97-72). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued Important Notice 127, Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the Grant Proposal Guide Chapter III.A for further information). 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 he/she is qualified to make judgments.

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.

B. Review Protocol and Associated Customer Service Standard

All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/solicitation will be reviewed by Panel Review.

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

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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

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.

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 Division 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.A. 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 (NSF-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 agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. 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 is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at http://www.nsf.gov/cgi-bin/getpub?gpm. The GPM is also for sale through the Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at http://www.gpo.gov.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

VIII. CONTACTS FOR ADDITIONAL INFORMATION

General inquiries regarding this program should be made to:

- Krishna Vedula, **Solicitation Coordinator**, Program Director, Division of Undergraduate Education, EHR/DUE., Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-7335, fax: (703) 292-9051, email: kvedula@nsf.gov

- Jian Cao, Program Director, Directorate for Engineering, Division of Design, Manufacture, & Industrial Innovation, 531, telephone: (703) 292-7088, fax: (703) 292-9056, email: jcao@nsf.gov

- Thomas W. Chapman, Program Director, Directorate for Engineering, Division of Chemical & Transport Systems, 525 N, telephone: (703) 292-8370, fax: (703) 292-9054, email: tchapman@nsf.gov

- Cynthia J. Ekstein, Program Director, Directorate for Engineering, Division of Bioengineering & Environmental Systems, 565 S, telephone: (703) 292-7941, fax: (703) 292-9098, email: cekstein@nsf.gov

- Susan C. Kemnitzer, Deputy Division Director (Education), Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-8383, fax: (703) 292-9051, email: skemnitz@nsf.gov

- Bruce M. Kramer, Division Director, Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-8380, fax: (703) 292-9051, email: bkramer@nsf.gov

- Richard J. Fragaszy, Program Director, Directorate for Engineering, Division of Civil & Mechanical Systems, 545 S, telephone: (703) 292-8360, email: rfragasz@nsf.gov

- James Momoh, Program Director, Directorate for Engineering, Division of Electrical & Communications Systems, 675 S, telephone: (703) 292-8339, fax: (703) 292-9147, email: jmomoh@nsf.gov

- Roger K. Seals, Program Director, Division of Undergraduate Education, Directorate for Education and Human Resources, Directorate for Education & Human Resources, Division of Undergraduate Education, 835 N, telephone: (703) 292-4645, fax: (703) 292-9015, email: rseals@nsf.gov

- Gregg Solomon, Program Director, Directorate for Education & Human Resources, Division of Research, Evaluation & Communication, 855 S, telephone: (703) 292-8333, fax: (703) 292-9046, email: gesolomo@nsf.gov

- Glenn H. Larsen, Program Clearance Officer, Directorate for Engineering, 505 N, telephone: (703) 292-4607, fax: (703) 292-9013, email: glarsen@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk FastLane hours: 8 AM to 8 PM (Mon-Fri), telephone: 800-673-6188, email: fastlane@nsf.gov

- Esther M. Bolding, Management Analyst, Directorate for Engineering, Division of Engineering Education & Centers, 585 N, telephone: (703) 292-8380, fax: (703) 292-9051, email: ebolding@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at http://www.nsf.gov/cgi-bin/getpub?gp. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF E-Bulletin, which is updated daily on the NSF Website at http://www.nsf.gov/home/ebulletin, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's Custom News Service (http://www.nsf.gov/home/cns/start.htm) to be notified of new funding opportunities that become available.

The Science, Technology, Engineering, and Mathematics Talent Expansion (STEP) Program, seeks to increase the number of students (U.S. citizens or permanent residents) pursuing and receiving associates or baccalaureate degrees in established or emerging fields within science, technology, engineering, and mathematics (STEM). The goals of the STEP program are particularly relevant to the curriculum reform efforts encouraged by this solicitation. All proposers are encouraged to consider the submission of complementary proposals to STEP, which has an anticipated deadline of deadline of May 1, 2004. The 2003 solicitation NSF (03-548) will provide useful guidelines.

NSF continues to make major investments in K-12 school systems and we encourage proposers to make contact to see if mutually beneficial relationships can be developed. General information about the Math Science Partnerships can be obtained at https://www.ehr.nsf.gov/msp/ and for the Teacher Professional Continuum can be obtained at http://www.ehr.nsf.gov/ehr/DUE/programs/tpc/.

We strongly urge that all applicants for planning grants continue to prepare for future opportunities during the evaluation process, and in the event of non-award.

Related Programs of Interest:

- Centers for Learning and Teaching (CLT) (http://www.ehr.nsf.gov/esie/programs/clt/clt.asp)
- Course, Curriculum and Laboratory Improvement (CCLI) (http://www.ehr.nsf.gov/ehr/DUE/programs/ccli/)
- Engineering Education Centers (http://www.eng.nsf.gov/eec/)
- Evaluative Research and Evaluative Capacity Building (http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf03542)
- Faculty Early Career Development (CAREER) Program (http://www.nsf.gov/home/crssprgm/career/start.htm)
- Integrative Graduate Education and Research Traineeship (IGERT) Program (http://www.nsf.gov/home/crssprgm/igert/start.htm)
- Research Experiences for Undergraduates (REU) (http://www.nsf.gov/home/crssprgm/reu/start.htm)
- Research on Learning and Education (ROLE) (http://www.nsf.gov/pubsys/ods/getpub.cfm?nsf03542)
- Science, Technology, Engineering, and Mathematics Talent Expansion Program (STEP) (http://www.ehr.nsf.gov/ehr/DUE/programs/step/)

- Corporation for National and Community Service (http://www.nationalservice.org/)

Suggested References

- *How People Learn: Brain, Mind, Experience and School*, National Academy Press, Washington, DC, 2000. (http://www.nap.edu/catalog/9853.html)
- *Knowing What Students Know: The Science and Design of Educational Assessments*, National Academy Press, Washington, DC, 2001. (http://www.nap.edu/catalog/10019.html)
- *Recommendations for Action in Support of Undergraduate Science, Technology*, Engineering and Mathematics, Project Kaleidoscope Report on Reports 2002. (http://www.pkal.org/template2.cfm?c_id=387)
- *Taking the Lead: A Deans Summit on Education for a Technological World*. This 2001 IEEE meeting brought together 36 pairs of Deans of Engineering and Deans of Education to discuss avenues for collaboration. (http://www.ieee.org/organizations/eab/precollege/deansummit/index.htm)
- *Transforming Undergraduate Education in Science, Mathematics, Engineering and Technology*, National Research Council, National Academy Press, Washington, DC, 1999 (http://www.pkal.org/template2.cfm?c_id=387)
- *Women and Men of the Engineering Path: A Model for Analyses of Undergraduate Careers*, Clifford Adelman, U.S. Department of Education (PLLI 98-8055), 1998. This excellent study of the progress, retention and satisfaction of students in undergraduate engineering programs is out of print. We are working to make it available on the website of the Division of Engineering Education and Centers. Please check for availability at: (http://www.erc-assoc.org/nsf/engrg_paths/)
- *Science and Technology and the National Science Education Standards: A Guide for Teaching and Learning (in press),* National Academy Press, Washington, DC, 2002. (http://www.nap.edu/catalog/9833.html)
- The 2002 User Friendly Handbook for Project Evaluation, Directorate of Education and Human Resources, NSF. http://www.nsf.gov/pubs/2002/nsf02057/start.htm
- Scientific Research in Education, Committee on Scientific Principles for Education Research, Richard J. Shavelson and Lisa Towne, Editors, National Research Council , 2002. http://www.nap.edu/catalog/10236.html
- Strategic Education Research Partnership, M.S. Donovan, A.K. Wigdor, and C.E. Snow, Editors, Committee on a Strategic Education Research Partnership, National Research Council, 2003. http://books.nap.edu/catalog/10670.html
- Digital Resources for Evaluators. http://www.resources4evaluators.info/CommunitiesOfEvaluators.html
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