

Advanced Technological Education (ATE)

Program Solicitation

NSF 04-541

Replaces Document NSF 03-523



National Science Foundation

Directorate for Education and Human Resources

Division of Undergraduate Education

Division of Elementary, Secondary and Informal Education

Preliminary Proposal Due Date(s) (required):

April 21, 2004

Required only for Large Scale Materials Development (LSMD) and Large Scale Teacher Preparation (LSTP) proposals. Preliminary proposals are recommended but not required for all other proposals.

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

October 08, 2004

REVISIONS AND UPDATES

Changes in the ATE program solicitation for FY2005 include:

1. The cost-sharing requirement has been eliminated.
2. A new funding opportunity has been added within Program Improvement: "Institution-Wide Reform of Technician Education."
3. Formatting requirements have been changed to mirror those in the [Grant Proposal Guide](#) (GPG). In particular, in all full proposals, the page limit for the Project Description is now 15 pages, single-spaced. However, a preliminary proposal's Project Description may be no longer than 6 pages, single-spaced.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Advanced Technological Education (ATE)

Synopsis of Program:

This program promotes improvement in technological education at the undergraduate and secondary school levels by supporting curriculum development; the preparation and professional development of college faculty and secondary school teachers; internships and field experiences for faculty, teachers, and students; and other activities. With an emphasis on two-year colleges, the program focuses on the education of technicians for the high-technology fields that drive our nation's economy. The program also promotes articulation between programs at two-year colleges and four-year colleges and universities--in particular, articulation between two-year and four-year programs for prospective teachers (with a focus on activities and disciplines that have a strong technological foundation) and between two-year and four-year programs in science, technology, engineering, and mathematics (also with a focus on disciplines that have a strong technological foundation). Additionally, the program invites proposals focusing on research relating to technician education.

Cognizant Program Officer(s):

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

- 47.076 --- Education and Human Resources

Eligibility Information

- **Organization Limit:** None Specified.
- **PI Eligibility Limit:**

An individual may serve as the Principal Investigator (PI) on no more than one proposal submitted, but may serve as a co-PI on multiple proposals.

- **Limit on Number of Proposals:** None Specified.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 65
- **Anticipated Funding Amount:** \$38 million in FY2005, subject to the availability of funds

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **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:**

In *planning grants* for ATE centers and *planning grants* for Institution-Wide Reform of Technical Education, indirect costs may not exceed 10 percent of modified total direct costs.

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

C. Due Dates

- **Preliminary Proposals (required) :**

April 21, 2004

Required only for Large Scale Materials Development (LSMD) and Large Scale Teacher Preparation (LSTP) proposals. Preliminary proposals are recommended but not required for all other proposals.

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

October 08, 2004

Proposal Review Information

- **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 Advanced Technological Education (ATE) program promotes improvement in the education of science and engineering technicians at the undergraduate and the secondary school levels. Proposals to the program may aim to affect either specialized technology courses or core science, mathematics, and technology courses that serve as prerequisites or corequisites for specialized technology courses. The curricular focus and the activities of all projects should demonstrably contribute to the ATE program's central goals: producing more science and engineering technicians to meet workforce demands, and improving the technical skills and the general science, technology, engineering, and mathematics (STEM) preparation of these technicians and the educators who prepare them.

The ATE program focuses on two-year colleges and expects two-year colleges to have a leadership role in all projects. Effective technological education programs should involve partnerships between two-year colleges, four-year colleges and universities, secondary schools, business, industry, and government, and should respond to industry's need for well-prepared workers having adaptable skills.

Fields of technology supported by the ATE program include, but are not limited to, agricultural technology, biotechnology, chemical technology, civil and construction technology, computer and information technology, electronics, environmental technology, geographic information systems, manufacturing and engineering technology, marine technology, multimedia technology, telecommunications, and transportation technology. The ATE program generally does not support projects that focus primarily on students who will become health or medical technicians.

The nation's economic prosperity hinges on the fields served by the ATE program. Many of these fields also play a vital role in national security. For example, information technology specialists and telecommunications technicians confront threats to computer, information, and Internet security and contribute to intelligence gathering; environmental technicians measure air, water, and soil quality for adulteration by chemical and biological agents; biotechnicians, agricultural technicians, and chemical technicians monitor and thwart biological and chemical threats and threats to the nation's food supply; and process technicians develop, enforce, and improve the security of manufacturing processes, including safeguarding materials and data.

Activities undertaken in ATE projects may include:

- the adaptation of exemplary educational materials, courses, and curricula in new educational settings;
- the preparation and professional development of college faculty and secondary school teachers;
- the design and implementation of new educational materials, courses, laboratories, and curricula;
- internships and field experiences for students, faculty, and teachers;
- the evaluation and broad dissemination of exemplary educational materials and pedagogical strategies that have been developed through ATE awards; and

- research on the effectiveness of various approaches or practices in technician education.

Activities may have either a national or a regional focus, but not a purely local one. All projects must be guided by a coherent vision of technological education--a vision that recognizes the needs of the modern workplace, of students as lifelong learners, and for articulation of educational programs at different levels. The program especially encourages efforts that give prospective technicians insight into real-world work environments; serve the needs of not only first-time students but also returning students and workers wishing to acquire new skills; implement the national science, mathematics, technology, and industry standards in education; use information technology and other educational technologies to improve learning and teaching; and link educators and educational programs in two-year colleges, four-year colleges and universities, secondary schools, business and industry.

The ATE program specifically welcomes proposals for developing comprehensive articulation agreements between two-year and four-year institutions either to strengthen the technological knowledge and skills and the science and mathematics preparation of future K-12 teachers or to facilitate the transition of students from STEM associate's degree programs to related bachelor's degree programs, especially those having a strong technological basis.

The ATE program also invites proposals for National Centers of Excellence in all technological fields supported by the program, as well as Regional Centers in information technology and manufacturing education, two areas of technology that have been identified for special emphasis.

This is the 11th year of the ATE program. Nearly 550 ATE projects have been supported to date and provide a base upon which future ATE projects should build. Information about these projects can be found on the ATE web site (<http://www.nsf.gov/ATE>). In addition, a large-scale evaluation of the ATE program has been performed by the Evaluation Center at Western Michigan University and includes several research studies on best practices in technician education. Proposers should visit <http://ate.wmich.edu> for information on evaluation and best practices and build proposals on this evaluation and research base. The ATE program invites proposals that focus on research relating to the education and career pathways of students served by these programs, how career choices are made, and the impact of programs on business and industry. The program also invites proposals to investigate the effects of advanced technological education on increasing the diversity of K-12 students prepared to study in these fields and on changes in teaching and learning in technical and academic courses.

II. PROGRAM DESCRIPTION

A. PROGRAM TRACKS

The ATE program supports proposals in three major tracks: *ATE Projects*, *ATE Centers*, and *Articulation Partnerships*. Although these tracks are expected to encompass most of the activities supported by the program, people who have ideas for other activities are invited to contact an ATE program officer to explore whether those ideas might be appropriate for funding by the program. Proposals in all tracks should demonstrate a thorough awareness of previous relevant ATE grants as well as research in the field. Whenever feasible, projects should utilize and innovatively build from successful educational materials, courses, curricula, strategies, and methods that have been developed through other ATE grants, as well as other exemplary resources (including those not supported by NSF) that can be adapted to technological education. Proposers should contact the Principal Investigators (PIs) of previously funded projects to explore the possibilities for adapting materials, evaluating materials, receiving guidance, or collaborating in other ways, such as conducting research projects which focus on the effectiveness of technician education.

1. ATE Projects

While ATE Centers are comprehensive in scope, ATE Projects focus more narrowly on one or more of the six activities described below. Multifaceted projects that cut across these activity categories are especially encouraged. For all activities, proposers should thoroughly explore possibilities for adapting and implementing proven materials and methods. Grants for

ATE Projects range from \$25,000 to \$300,000 per year and have a duration of up to three years, except as noted below for Large Scale Materials Development (LSMD) and for conferences, workshops and special activities.

The ATE program also supports a small number of conferences, workshops, and special similar activities that lead to a better understanding of issues in advanced technological education. Typically, these are short-duration events and are national or international in scope.

Program Improvement: These efforts should increase the relevance of technician education to modern practices and assure an increased number of students entering the high performance workplace with enhanced competencies.

Proposed activities for program and department projects should enhance a curriculum in multiple ways, producing a coherent sequence of classes, laboratories, and work-based educational experiences that revitalize the learning environment, course content, and experience of instruction for students preparing to be science and engineering technicians. Employers must be involved, and the resulting program should constitute a model that will be disseminated broadly. The improved program should lead students to an appropriate associate degree, or specific occupational competency or certification embedded in an associate degree program, provide business and industry with a larger pool of skilled technicians, and induce an increased proportion of students who enroll to complete programs. Components of the program improvement process might include, for example, integrating industry standards and workplace competencies into the curriculum; adapting educational materials or courses developed elsewhere; adding rigorous STEM content to courses; adding work-based experiences; modernizing equipment; incorporating appropriate pedagogical approaches; providing professional development for educators; improving articulation between programs at secondary schools and two-year college programs, and providing pathways to four-year college or university programs; and improving the recruitment and retention of students. Innovative programs that provide faster tracks to demonstrated competencies are encouraged--for example, programs that restructure courses and curricula into modules, tracks, or blocks to provide students a step-wise approach to a two-year degree, with multiple exit and reentry points defined by certifications or competency assessments.

The ATE program also offers grants for *planning efforts* leading to *Institution Level Reform of Technician Education (ILRTE)*. Many institutions need to undertake substantial reorganization to meet contemporary challenges. These planning grants (up to \$150,000 for 24 months) enable institutions to reformulate, streamline, and update technician degree programs at their institutions to meet the emerging educational needs of U. S. industry. ILRTE proposals should be designed to plan to transform the institutional mission, organizational structure, policies and procedures, and curricula; strengthen faculty; and enhance connections with industry.

Proposals may pursue a range of activities related to contemporary issues and changes facing technician education:

- addressing evolving, converging, and emerging technical fields;
- providing educational opportunities for an increasingly diverse student body;
- strengthening the academic potential of under-prepared students coming to the college;
- developing life-long career and educational pathways for technicians;
- adapting to educational forces outside the college such as e-learning and changing workplace expectations;
- building leadership faculty leadership potential;
- dealing with fiscal constraints; and
- incorporating global issues and international technological and business practices into technical programs.

ILRTE proposals require a letter of commitment from the Chief Academic Officer at the institution. Participation by academic administrators and significant faculty involvement on the leadership team are essential and expected. Institutions should be prepared to participate in separately funded studies of ILRTE projects.

For these planning grants, indirect costs are limited to no more than 10%.

Professional Development for Educators: The ATE program supports projects that provide current secondary school teachers and college faculty with opportunities for continued professional growth in areas that directly impact advanced technological education. These projects should be designed to enhance the educators' disciplinary capabilities, teaching

skills (including skills in using information technology and other educational technologies to enhance instruction), vitality, and understanding of current technologies and practices. Activities typically include workshops, intensive seminars, industrial internships, or a combination of these. Such activities typically last from a few days to several weeks and are usually conducted in the summer, with follow-up activities during the academic year. To effect long-term change, these projects should normally span at least two academic years. The program particularly encourages activities that involve secondary school teachers and two-year college faculty working together. Evaluation should demonstrate changes in practice of participating faculty and teachers.

Curriculum and Educational Materials Development (for National Dissemination): Proposed activities should affect the learning environment, course content, and experience of instruction for students preparing to be science and engineering technicians and for their teachers. Projects result in new print, electronic, and multimedia materials, including simulations, scenarios, web-based collections, etc. as well as laboratory experiments and manuals. It is expected that products will be developed with input from industry, validated by industry experts, field tested in diverse locations, and validated in terms of their effectiveness in meeting learning goals. Educational materials and curricula that offer students innovative high-quality learning experiences through distance education are encouraged. A project's focus may range from the revision or adaptation of existing educational materials to the creation of entirely new ones; from the a few modules at a single educational level to a comprehensive curriculum for multiple years; from a single subject to integration of several disciplines.

The ATE program also anticipates funding a few *Large Scale Materials Development (LSMD)* projects that could exceed the financial limits noted above. These projects may target course sequences or multiple courses that are integrated and taken concurrently, or major changes in teaching strategy. They should be research-based, build upon cognitive science, leverage existing resources, and respond to documented national needs. The materials may be pilot tested locally, but field tests should be done in diverse locations. The evaluation must include measures of increased student learning of content and processes and have input from business and industry. A realistic national dissemination strategy must be described. The size of the budget and the duration of the work plan should be in proportion to the importance and scope of the proposed work. Preliminary proposals should clearly identify that they are for LSMD, and full proposals should be submitted to this category only if a preliminary proposals was submitted to LSMD.

Technical Experiences: Well-designed technical experiences typically allow educators or students to get hands-on exposure to applications of science, technology, engineering and mathematics; interact closely with working scientists, mathematicians, engineers, and technicians; engage in the actual practice and thought processes of science, engineering, and technology (formulating problems and questions, designing appropriate models, troubleshooting, and using technological tools); and become acquainted with the environments of two-year colleges and other academic institutions, businesses and industries, government laboratories, and other research organizations. Projects ideally should provide a balance of classroom, laboratory, and field experiences and should foster collaboration among peers. Student-faculty teams are particularly encouraged to participate in technical experiences and to translate those experiences into meaningful classroom activities that introduce other students to the role of technicians in the workplace.

Laboratory Development: The ATE program supports the development of innovative methods for using laboratory and field exercises and technical experiences to improve students' understanding of basic principles and for using modern instrumentation, new technologies, or applications of instruments that extend their instructional capability. The program also encourages the establishment of equipment-sharing arrangements through consortia or ATE centers. For some proposals, instrumentation-only requests might be appropriate; however, innovative laboratory development usually entails the concurrent adaptation or development of educational materials, courses, or programs. Proposals whose primary rationale is financial need or the replacement of equipment at the same level of capability are not appropriate.

Research: The ATE program is committed to applied research that assesses the effectiveness and impact of funded efforts in enhancing technician education. The purpose of these applied research projects is to ensure that the ATE program itself and its projects are informed by, and grounded in, educational research. The feedback helps all ATE projects benefit from this knowledge, strengthens the portfolio and identifies new programmatic directions. Research studies are separate efforts that grow out of a group of completed projects or from questions that arise through analysis of an issue of priority to ATE. Proposals should be based on a research design that incorporates appropriate and proven methodologies and strategies to (1) identify the research questions, (2) implement the collection and analysis of data, (3) interpret the resulting measures and findings generated by the study, and (4) address the impact on business and industry. These studies should address the unique challenges and opportunities posed by the broad variety of technician education programs, the diversity of two-year

colleges that offer them, and the diversity of students in them. Studies could also determine the effects of the ATE program on student recruitment and retention; changes in the way faculty teach; or changes in college structures. Researchers with interests in adult learning for technical careers are especially encouraged. People who have experience and expertise in designing and implementing such studies should be in the project leadership. Teams of STEM specialists and social scientists or others well-versed in research design are also encouraged. The intent of the proposed research should be to identify factors (including departmental/institutional) that lead to programs and/or instructional materials that prepare technicians for the high performance workplace. Outcomes should inform the education and business and industry community, including faculty, administrators, business and industry partners, policymakers, and parents, enabling them to guide better the future development of learning experiences for technician education. They should also foster the retention and academic success of diverse students in technician programs.

2. ATE Centers

ATE centers are comprehensive national or regional resources that provide models and leadership for other projects and act as clearinghouses for educational materials and methods. They are typically cooperative efforts involving two-year colleges, four-year colleges and universities, secondary schools, business, industry, and government. Proposals for centers must clearly articulate a vision of technological education for the future and must describe a workable plan for achieving that vision during the period of NSF funding and for sustaining it afterwards. Proposals for ATE centers should be based on a three-pronged alliance of support from (1) NSF, (2) the proposing educational institution or consortium, and (3) businesses, industries, and/or other government agencies or laboratories. Depending on the quality of proposals received and the availability of funds, the ATE program anticipates making awards of the following sizes and durations:

- *National Centers of Excellence*: up to two new awards for up to \$5 million (each) spread over four years, with the possibility of renewal (at a lower level of funding) for an additional three years.
- *Regional Centers* for manufacturing or information technology education: up to four new awards for up to \$3 million (each) spread over four years, with the possibility of renewal (at a lower level of funding) for an additional three years.
- *Resource Centers*: up to four new awards for up to \$1.5 million (each) spread over four years.

(Within the total proposed budget for a center, experience suggests that the annual budgets should increase during the first three years as the center's activities increase.)

In addition, the ATE program anticipates making up to 10 new *planning grants* to fund the development of well-formulated plans for future national centers in any technological field supported by ATE or regional centers in manufacturing or information technology education. Planning grants are made for up to \$70,000 and have a duration of one to two years. A proposal for a planning grant should clearly describe the activities that will take place during the planning period. It should also provide details about the workforce demands that the prospective center will address, the organizations that will be (or will likely be) partners in the center, the core faculty members or administrators who will manage the center, and the criteria that will be used to judge the proposer's readiness to form an ATE center at the end of the planning period. The proposal should also outline plans for identifying and enlisting faculty and representatives from business or industry to provide intellectual leadership for the center's various activities. Planning-grant proposals need not present elaborate plans for evaluation and dissemination.

National Centers of Excellence: National Centers of Excellence may vary in size and disciplinary coverage but must have a national impact. In particular, a National Center should bring together a broad array of institutions that offer programs in the area of technology on which the center focuses. National Centers typically engage in the full range of activities associated with ATE Projects (see Section A.1 above). They are expected to develop high-quality curricula for the high-performance workplace; to provide professional development for educators to support the utilization of these resources; and to disseminate their products through commercial publishers, journals, conferences, workshops, electronic networks, and other means. Centers must also have well-developed strategies for recruiting, retaining, and placing students preparing to be science and engineering technicians. Proposals should present a detailed plan for advancing the ATE program's mission and emphases; proposals for Centers must articulate a vision for sustainability and describe a realistic process for attaining it. In particular, the proposals should lay out significant plans for:

- broad outreach to institutions offering programs in the area of technology on which the Center will focus;
- professional development of secondary school teachers and college faculty (especially two-year college faculty);
- strong collaboration of educational institutions with business, industry, and government (especially with regard to identifying needed technical skills, planning curricula, and establishing internships and evaluative activities for students and faculty);
- utilization, creation or enhancement of skill standards;
- curriculum development (including the improvement of core STEM courses that would allow students to transition to an associate or a baccalaureate program as well as specialized courses in various technologies);
- articulation of courses and programs between secondary schools, two-year colleges, and four-year colleges and universities;
- recruitment, retention, and placement of students, especially students from groups underrepresented in STEM fields;
- institutionalization of Center activities;
- dissemination of educational materials and practices; and
- evaluation of products and student learning and impact of Center activities on business and industry and on the institution housing the Center.

Regional Centers for Manufacturing or Information Technology Education: Manufacturing and information technology (IT) are central to maintaining the economic competitiveness of the United States in the 21st century. ATE Regional Centers for manufacturing or IT education are designed to impact the nation's economy and workplace through the comprehensive reform of technician education in these critical areas.

These centers are expected to focus mainly on reforming academic programs, departments, and systems to produce highly qualified workers who meet industry's needs within a particular geographic region and who also meet national industry and academic skill standards appropriate for the region's employers.

A Regional Center must involve multiple academic institutions. Each center should lead systemic reform in the manufacturing or IT programs at all or most of the academic institutions in a region, engaging a majority of the region's college faculty and secondary school teachers in the relevant discipline(s). Each center's activities must be designed to have a clear, measurable impact on the region's workforce needs in manufacturing or IT; and the center must have mechanisms for measuring the number and quality of students who are recruited, achieve competencies in relevant areas, receive industry certifications (when relevant), participate in internships, graduate, and find appropriate employment. The Centers should also have a measurable impact on the educational institution involved. Center leaders should also be prepared to contribute to longitudinal studies that examine students' performance in the workplace and measure employers' satisfaction with graduates.

In conjunction with business and industry partners, each center should undertake activities that address:

- *academic program reform*, such as using industry and skill standards and other input from industry in program development, adapting and implementing exemplary educational materials and practices developed elsewhere, improving laboratories or equipment, improving core STEM courses integral to the technical program, and using distance-learning technologies to connect workplaces and two-year colleges;
- *professional development for college faculty (including adjunct faculty) and secondary school teachers*, such as cooperative activities between faculty and teachers in technology departments and those in mathematics and science departments, exchanges of faculty and teachers among educational institutions, internships in industry, and opportunities to obtain certifications in emerging technologies; and
- *capacity building (recruitment, retention, and placement of students)*, such as mentoring and tutoring prospective and current students, collaborating with secondary schools to ensure that students are prepared for technical programs, ensuring articulation between two-year technology programs and four-year programs, providing internships for students in industry or national laboratories, and utilizing parents, teachers, counselors, and industry representatives to recruit students into careers in manufacturing and IT.

Resource Centers: A Resource Center should constitute a highly visible source of materials, ideas, contacts, and mentoring in a particular field of technological education, and the proposers should have already made substantial, high-quality contributions in an area of technological education. These centers (1) serve as clearinghouses for, and broadly distribute, the exemplary educational materials, curricula, and pedagogical practices adapted or designed by previously funded ATE

centers and projects and (2) provide support and mentoring for institutions that wish to start or improve educational programs in a particular field of technology. Generally, only ATE national or regional centers and exemplary ATE projects that have already completed their original grants are well-positioned to become Resource Centers.

3. Articulation Partnerships

This track promotes initiatives at two-year colleges, in partnership with four-year colleges and universities, to expand two important educational pathways. One type of articulation partnership aims to impact two-year college programs for prospective K-12 teachers (with a focus on activities and disciplines that have a strong technological foundation), and the other type of partnership targets two-year college programs for students who continue their education in four-year STEM degree programs, especially programs that have a strong technological basis. With leadership based at two-year colleges, these articulation partnerships should enhance the ability of two-year college students to transfer to four-year programs and should improve the quality of these students' preparation in STEM. Grants for Articulation Partnerships range from \$50,000 to \$100,000 per year and have a duration of three years, except as noted below for Large Scale Teacher Preparation (LSTP) projects.

Teacher Preparation: Because many of the nation's teachers begin their professional education and complete a significant portion of their required science and mathematics course work in two-year colleges, the resources of these institutions must be utilized fully if the national need for a teaching force well-prepared in science, mathematics, and technology is to be met. (See the report *Investing in Tomorrow's Teachers: The Integral Role of Two-Year Colleges in the Science and Mathematics Preparation of Prospective Teachers* [NSF 99-49].) Moreover, the nation's technological future depends not only on highly qualified technicians, engineers, and scientists, but also on K-12 teachers who are technologically literate and have been exposed to the range of advanced technologies used in the modern workplace and supported by the ATE program.

Projects must involve both two-year and four-year institutions and should aim to increase the number, quality, and diversity of prospective K-12 science, mathematics, or technology teachers in preprofessional or paraprofessional programs at two-year colleges; improve the prospective teachers' technological literacy; improve their understanding of advanced technologies used in the modern workplace; and strengthen their preparation in science and mathematics (since science and mathematics provide critical underpinnings for advanced technological education). Paraprofessional programs should provide pathways to a four-year degree. The ATE program particularly encourages efforts that target prospective middle school and high school technology teachers.

Projects should focus on activities such as recruiting students, improving systems for advising and mentoring, developing high-quality STEM educational materials, engaging pre-service and in-service teachers in joint activities, and connecting two-year college programs for prospective teachers with other organizations (such as businesses, laboratories, professional societies, and museums) that have a stake in STEM education. Each project's evaluation plan must include metrics for the recruitment of prospective K-12 teachers, the transfer of those students into four-year teacher preparation programs, and the improvement in those students' preparation in science, mathematics, and technology. Project leaders should also be prepared to contribute to longitudinal studies that track students beyond the grant period, in order to measure the number who graduate with teaching credentials, find positions in K-12 schools, and demonstrate successful performance in the classroom.

The ATE program also anticipates funding a few *Large Scale Teacher Preparation (LSTP)* projects that could exceed the limits above. These could focus on state systems of two- and four-year colleges or multiple two- and four-year institutions working together on teacher preparation activities as described above. The size and duration should be in proportion to the importance of the proposed work. Preliminary proposals should clearly identify that they are LSTP, and full proposals should only be submitted in this category if a preliminary proposal for LSTP was submitted.

Articulation Between Associate's Degree and Bachelor's Degree Programs: The ATE program supports partnerships in which two-year colleges work with four-year colleges or universities to develop, implement, and evaluate model programs that enable students to make a successful transition from a STEM associate's degree program to a related bachelor's degree program. Like other ATE projects, these partnerships should involve industry. The partnerships should aim to produce highly skilled technicians with bachelor's degrees and/or highly qualified bachelor's degree graduates in science, mathematics, or engineering who are well-prepared for employment in the technical workplace. Projects that involve curricula central to

technician education are strongly encouraged. Such projects might involve, for example, joint activities between students in programs with different educational requirements (e.g., engineering and engineering technology); "reverse transfer" arrangements in which students in a four-year degree program take technical courses in a two-year college; or students' transition from a two-year degree program to a four-year program from which graduates enter the workforce as technicians or technologists. Project activities must constitute an innovative approach to articulation that can be disseminated and implemented broadly. For example, activities might focus on designing and implementing "bridge" programs, creating or reengineering curricula to respond to emerging workforce needs, attracting students into programs, or bringing together two-year and four-year college faculty in the design and implementation of new courses and programs. Proposals should explain the rationale for the particular partnership that is proposed, describe existing barriers to effective articulation, detail a plan for overcoming those barriers, demonstrate strong institutional commitments to the new curricular arrangements that would come out of the project, estimate the project's impact on the number of students (or workers) going on to complete STEM bachelor's degrees, and describe the evidence that will be used to evaluate the project's impact on student transfers, degree production, workforce enrichment, and student learning.

B. INFORMATION ABOUT PREVIOUS AWARDS

- ATE's Web site provides an online guide to abstracts for and other information about previous ATE awards (<http://www.nsf.gov/ate>).
- DUE's Web-based Project Information Resource System (http://www.ehr.nsf.gov/pirs_prs_web/search/) contains award abstracts and a variety of additional information provided directly by Principal Investigators.
- EHR's Web site contains a variety of information about the different divisions and programs (<http://www.ehr.nsf.gov>).
- NSF's Web site provides an Awards Search feature (<http://www.fastlane.nsf.gov/a6/A6Start.htm>) that allows customized searches of NSF's award database.

III. ELIGIBILITY INFORMATION

The categories of proposers identified in the *Grant Proposal Guide* ([Chapter 1, Section C](#)) are eligible to submit proposals under this program solicitation. Two-year colleges and other associate degree-granting institutions are especially encouraged to submit proposals, and all proposals are expected to include one or more two-year colleges in a leadership role. A proposal from an informal consortium of institutions should be submitted by one member of the consortium; a proposal from a formal consortium--such as a community college system or school district--should be submitted by the consortium.

An individual may serve as the Principal Investigator (PI) on no more than one proposal submitted for each deadline date, but may serve as a co-PI on multiple proposals.

IV. AWARD INFORMATION

NSF anticipates that approximately \$38 million will be available for this program in FY2005. The program expects to make approximately 65 awards, depending on the quality of proposals received. Grants may be awarded in a wide variety of sizes and durations, as specified in Section II ("Program Description") above. The estimated program budget, number of awards, and average award size and duration are subject to the availability of funds.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals (*required*):

Preliminary Proposal Deadline Date: April 21, 2004 (optional except for LSMD and LSTP)

The submission of a preliminary proposal is *required* for LSMD and LSTP proposals, and *recommended* but not required for all other proposals. Preliminary proposals are read by experienced reviewers and NSF staff. On the basis of these readers' judgment of the likelihood that a full proposal based on the preliminary proposal could be successful in the formal peer review process, NSF will either "encourage" or "discourage" the submission of a full proposal. This is an advisory opinion only; a proposer may submit a formal proposal even if NSF recommends against it. The ATE program anticipates being able to return reviews of preliminary proposals within approximately ten weeks after the deadline date. These reviews will provide comments to help proposers strengthen their ideas and project plans before submitting a full proposal.

Preliminary proposals must be submitted through FastLane. A preliminary proposal must include the following sections/forms:

- Cover Sheet: See description under *Full Proposal Instructions* below.
- Project Data Form: See description under *Full Proposal Instructions* below.
- Project Summary: See description under *Full Proposal Instructions* below.
- Project Description: See description under *Full Proposal Instructions* below. In preliminary proposals, the length of the Project Description is limited to **6 pages** (single-spaced).
- References Cited: See description under *Full Proposal Instructions* below.
- Biographical Sketches: See description under *Full Proposal Instructions* below.
- Budget: See description under *Full Proposal Instructions* below. In preliminary proposals, budgets for subawards are not required.

A preliminary proposal should *not* include the following sections/forms:

- Current and Pending Support
- Facilities, Equipment, and Other Resources
- Special Information and Supplementary Documentation
- Appendices

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.

When preparing proposals (both preliminary and full), proposers should follow the GPG's guidelines for format and content except where the instructions below specifically allow a departure from the GPG. The following guidance on particular sections of the proposal supplements the guidance found in [GPG, Chapter II, Section C](#).

- **Cover Sheet:** In FastLane, take special care to select the correct "Program Announcement/Solicitation No."; this number can be found at the beginning of this document. If the proposal is for a *planning grant*, begin the project title with the words "Planning Grant for...."
- **Project Data Form:** The information on this form is used to direct the proposal to appropriate reviewers and to determine the characteristics of NSF-supported projects. Take special care to identify the proper track for your proposal in Item 1 on the form. For any audience code(s) marked in Item F (e.g., women, minorities, persons with disabilities), include in the Project Description a substantive discussion of the strategies that the project will employ to affect the audience(s). *Note:* In FastLane, the Project Data Form will show up in the list of forms for your proposal only after you have (1) selected the correct Program Announcement/Solicitation No. on the Cover Sheet and (2) saved the Cover Sheet.

- **Project Summary:** The one-page Project Summary should clearly indicate, in the first few sentences, the disciplinary focus (or foci) of the proposed project, the kinds of activities to be undertaken (e.g., educational materials development, adaptation and implementation, professional development for educators), and the primary audience to be affected by those activities (e.g., two-year college students, high school students, two-year college faculty members). This information is used to assign the proposal to a panel for review.

Proposers are reminded that the Project Summary *must* explicitly address, in separate statements, both NSB-approved merit review criteria; the statements should contain the phrases "intellectual merit" and "broader impacts." Proposals that do not separately address both merit review criteria within the one-page Project Summary will be returned without review.

- **Project Description (including Results from Prior NSF Support):** While the minimum font size allowed is 10 point, the ATE program strongly recommends that proposers use a 12-point, standard font (e.g., Times New Roman, Times, Arial, or Helvetica) to ensure readability. In *preliminary proposals*, the length of the Project Description is limited to 6 pages (single-spaced). In *full proposals*, the length is limited to 15 pages (single-spaced). The Project Description should explain the project's motivating rationale, goals, objectives, deliverables, and activities; the timetable; the management plan; the roles and responsibilities of the PI, co-PI(s), and other senior personnel; the plan for sustainability after the period of NSF funding; the evaluation plan; the dissemination plan; and results evaluating prior NSF support. The subsection on *Results from Prior NSF Support* should only cover awards pertaining to education; describe research awards only if they have a direct bearing on the new proposal. If the proposed project is based on previously funded work, the proposal must thoroughly describe the results of the prior project, demonstrate that the project achieved its objectives, and provide evidence of the quality and effectiveness of the project's deliverables. (Appendices may also be used, subject to the constraints indicated below, to illustrate prior work.) For information about effective approaches to evaluation, see the following resources:
 - *The 2002 User-Friendly Handbook for Project Evaluation (NSF 02-057)*
 - *User-Friendly Handbook for Mixed Method Evaluations (NSF 97-153)*
 - Online Evaluation Resource Library for NSF's Directorate for Education and Human Resources (<http://oerl.sri.com>)
 - Field-Tested Learning Assessment Guide (FLAG) for Science, Math, Engineering, and Technology Instructors (<http://www.flaguide.org>)
- **References Cited:** Any literature cited should be specifically related to the proposed project, and the Project Description should make clear how each reference has played a role in the motivation for or design of the project. Any relevant literature on research in teaching and learning should be cited.
- **Budget:** A Budget Justification of up to three pages *must* accompany the budget forms and provide details about budget line items. This includes justification for the subawards. Except for preliminary proposals, proposals that involve subawards should include subaward budgets. *Note:* Because this program solicitation does not require cost-sharing, proposers are advised not to include any cost-sharing on Line M of the proposal budget.
- **Special Information and Supplementary Documentation and Appendices:** In *preliminary proposals*, these sections may *not* be included. In *formal proposals*, they are optional. If included, these sections must be concise and relevant. *Reviewers will be strongly encouraged to disregard any supplementary documentation or appendix material in excess of 30 pages.* These sections might include, for example, letters of commitment, a sample of previously developed (relevant) educational materials, a published review of such materials, or a draft of a proposed unit or module. *Letters of commitment should document collaborative arrangements or pledge resources of significance to the proposal. Letters that merely endorse the proposal or offer nonspecific support for project activities should not be included.* FastLane's Supplementary Documents function should be used to upload these sections as one or more PDF files. Note that any letters must be obtained in or converted to electronic format; if necessary, electronically scan paper documents and convert them to PDF. (Proposers should not send videotapes, computer diskettes, CD-ROMs, slides, books, etc., as appendices or supplements to a proposal.)

Because proposals submitted in response to this solicitation will be reviewed by panel review instead of mail review, there is no need for proposers to submit a list of suggested reviewers unless an NSF program officer specifically requests it.

Certain special types of proposals described in the GPG--i.e., Small Grants for Exploratory Research (SGER) proposals

(see [GPG, Chapter II, Section D.1](#)), Equipment Proposals (see [GPG, Chapter II, Section D.4](#)), and Accomplishment-Based Renewal (ABR) proposals (see [GPG, Chapter V, Section B.2](#))--are not appropriate for the ATE program. Collaborative Proposals (see [GPG, Chapter II, Section D.3](#)) should in most cases be submitted as a single proposal. Under unusual circumstances, Collaborative Proposals involving the simultaneous submission of proposals from different organizations will be accepted in the formal proposal cycle. The lead proposer must obtain advance written approval from an ATE program officer to submit such a proposal, and the collaborating organizations must exactly follow the instructions for electronic submission specified in [GPG, Chapter II, Section D.3.b](#). The project titles of the related proposals must be identical and must begin with the words "Collaborative Project," and the *combined* budgets of the related proposals should conform to the typical award sizes specified in this solicitation. These simultaneous Collaborative Proposals will be treated as a single proposal (with a single Project Summary, Project Description, and References Cited) during the review process.

Proposers are reminded to identify the program announcement/solicitation number (04-541) 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.

Indirect Cost (F&A) Limitations:

In *planning grants* for ATE centers and *planning grants* for Institution-Wide Reform of Technical Education, indirect costs may not exceed 10 percent of modified total direct costs.

Other Budgetary Limitations:

Funds requested for equipment (computers, computer-related hardware, software, laboratory or field instrumentation, and scientific or industrial machinery) must not exceed \$100,000 or 10 percent of the total NSF funding request, whichever is larger. NSF funds may not be used to support expenditures that would normally be made in the absence of an award, such as costs for routine teaching activities (including curriculum development) and laboratory upgrades.

NSF project funds may not be used for:

- equipment or instrumentation that is not mainly for use in the project;
- replacement equipment or instrumentation that does not significantly improve instructional capability;
- teaching aids (e.g., films, slides, projectors, "drill and practice" software);
- vehicles, laboratory furnishings, or general utility items such as office equipment (including word-processing equipment), benches, tables, desks, chairs, storage cases, and routine supplies;
- maintenance equipment and maintenance or service contracts;
- the modification or construction of laboratories or other buildings;
- the installation of equipment or instrumentation (as distinct from the on-site assembly of multicomponent instruments--which is an allowable charge);
- a flat percentage inflation allowance.

Workshops: In proposals that involve professional development workshops, it is generally expected that the home institutions of the participants will bear the cost of travel to and from the workshop. However, some travel costs may be included in project budgets. Costs for subsistence (lodging and meals) during the workshop may be included. In addition, funds may be requested for a stipend of up to \$100 per workshop day for participants; requests for such stipends must be specific to the target audience and must be fully justified--for example, to assure participation by faculty with few professional development opportunities or from resource-poor institutions.

The use of NSF funds to hire substitute teachers is allowed under the following conditions: (1) it is necessary to meet the goals and objectives of the project; and (2) it can be documented that the substitute teachers are directly replacing teachers participating in the NSF-funded project. Substitute teachers should be paid in accordance with established school district policies, and in lieu of paying the teachers participating in the project. Records must be maintained on the hiring and use of substitutes.

Note that indirect costs may not be charged on participant support costs.

National Visiting Committee: For large projects (generally those requesting a total of \$750,000 or more), the budget should include provisions for a National Visiting Committee (NVC) to visit the project on an annual basis. An NVC is a group of experts who provide advice to the project staff, assess the plans and progress of the project (and make reports both to the project leadership and to NSF), and enhance the dissemination of the project's products. Typically, ATE Projects enlist four to six members for an NVC, and ATE Centers enlist eight to ten. After an award is made, an NSF program officer will work with the grantee to finalize NVC membership. But the proposal should address how the NVC will be used in the project. (Additional information describing the role of NVCs can be found at http://www.wmich.edu/evalctr/ate/NVC%20Handbook%20Final%20ceh%2010_09_03.pdf; information describing ATE Centers advisory boards can be found at <http://www.wmich.edu/evalctr/ate/adv-comm.html>.)

C. Due Dates

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

Preliminary Proposals (required):

April 21, 2004

Required only for Large Scale Materials Development (LSMD) and Large Scale Teacher Preparation (LSTP) proposals. Preliminary proposals are recommended but not required for all other proposals.

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

October 08, 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.

Additional Review Criteria:

For the ATE program, questions such as the following are often relevant to evaluating proposals in terms of NSF's merit review criteria

Intellectual Merit

- Does the proposed project address a major challenge facing technician education?
- Does the project have potential for improving student learning of important science, technology, engineering, or mathematics (STEM) principles?
- Are the goals and objectives, and the plans and procedures for achieving them, worthwhile, well-developed, and realistic?
- Are the proposed outcomes and evaluation of those outcomes clearly tied to goals and objectives?
- Is the rationale for selecting particular activities or components for development or adaptation clearly articulated?
- Does the project design consider the background, preparation, and experience of the target audience?
- Is the project informed by research in teaching and learning, current pedagogical issues, the efforts of others (particularly other NSF-funded projects), and relevant literature?
- Does the project provide for effective assessment of student learning, which reflects the proposed educational objectives and practices?
- Are plans for evaluation of the project appropriate and adequate for the project's size and scope, and will the evaluation appropriately inform project development?
- Does the project have the potential to provide fundamental improvements in teaching and learning through effective uses of instructional technologies?
- Is the project led by, and supported by the involvement of, capable faculty (and where appropriate, practicing scientists, mathematicians, engineers, and technicians), who have recent and relevant experience in education, in research, or in the workplace?
- Is the project supported by adequate facilities, resources, and departmental commitment?
- Is the evidence of institutional support clear and compelling, and have plans for long term institutionalization been addressed?

Broader Impacts

- Does the project address the current and future needs of business and industry for technicians?
- Does the project enhance the status of technician education?
- Are the proposed activities integrated into the academic program(s) of the participating institution(s)?
- To what extent will the results of the project contribute to the knowledge base of activities that enhance student learning?
- Will the project evaluation inform others through the communication of results?
- Are the results of the project likely to be useful at other institutions?
- What is the potential for the project to produce widely used products that can be disseminated through

commercial or other channels? Are plans for producing, marketing, and distributing these products appropriate and adequate?

- Will the project result in significantly improved content and pedagogical preparation of STEM faculty and teachers?
- Does the project effectively address one or more of the following objectives: ensuring the highest quality education for those students planning to pursue STEM careers; increasing the participation of women, underrepresented minorities, and persons with disabilities; providing a foundation for scientific, technological, and workplace literacy; developing multi- and interdisciplinary courses and curricula; developing courses and curricula that are aligned with national standards, as appropriate?

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.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual 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.

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.

To assist NSF in evaluating the ATE program and meeting the reporting requirements of the Government Performance and Results Act of 1993, the PI must also respond annually to a survey that requests information about the number and characteristics of students and educators that have been affected by the project; the retention, graduation, and placement rates for students; the project's impact on workforce needs; awards and other measures of the quality of the project's products and activities; and other indicators of the project's effect on the quality and quantity of technicians being educated for the high-tech workplace. NSF will provide guidelines for the collection and reporting of data. (NSF may use an external evaluator to gather and analyze the data.)

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:

- Dr. Elizabeth J Teles, Program Director, Division of Undergraduate Education, telephone: (703) 292-4643, email: ejteles@nsf.gov

- Dr. Gerhard L Salinger, Program Director, Division of Elementary, Secondary, and Informal Education, telephone: (703) 292-5116, email: gsalinge@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: (800) 673-6188, email: fastlane@nsf.gov
- Ms. Antoinette Allen, Computer Specialist, Division of Undergraduate Education, telephone: (703) 292-4646, email: duefl@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 Division of Undergraduate Education has compiled a short list of other funding opportunities for undergraduate STEM education, which can be found on the Web at http://www.ehr.nsf.gov/ehr/ue/links/other_programs.asp.

Funding opportunities in the Division of Elementary, Secondary, and Informal Education can be found at <http://www.ehr.nsf.gov/esie/>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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 or (800) 281-8749
- **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; 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 applicant 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 needing information as part of the review process or in order to coordinate programs; 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," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). 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 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 this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.



The National Science Foundation
4201 Wilson Boulevard, Arlington, Virginia 22230, USA
Tel: 703-292-5111, FIRS: 800-877-8339 | TDD: 703-292-5090 or (800) 281-8749

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