

Advanced Technological Education (ATE)

PROGRAM SOLICITATION NSF 14-577

REPLACES DOCUMENT(S): NSF 11-692



National Science Foundation

Directorate for Education & Human Resources
Division of Undergraduate Education
Research on Learning in Formal and Informal Settings

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

October 09, 2014

October 08, 2015

October 06, 2016

IMPORTANT INFORMATION AND REVISION NOTES

Changes in the ATE program solicitation for FY 2015, FY 2016, and FY 2017 include:

A new focus area for ATE projects called "ATE-Coordination Networks" is described.

The Targeted Research on Technician Education track has been expanded. This track now supports planning, exploratory research and development, and full scale research and development proposals. All projects must demonstrate substantive faculty partnerships between 2-year and 4-year colleges and universities.

Proposals submitted for a Center renewal may submit up to five pages on Results of Prior Support in the supplementary documents section of the proposal, and refer the reader to that section in the Project Description section.

The funding duration and size of award for the Centers track has been changed, and resource centers renamed to support centers.

Large Scale Material Development projects are no longer supported.

An additional requirement is described under "Reporting Requirements". This is a requirement to work with ATE Central to archive resources developed with grant funds.

For proposals describing the development of new learning materials and computer software source code developers are encouraged to license these materials (See text under "Reporting Requirements").

Any proposal submitted in response to this solicitation should be submitted in accordance with the revised *NSF Proposal & Award Policies & Procedures Guide (PAPPG)* (NSF 16-1), which is effective for proposals submitted, or due, on or after January 25, 2016.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Advanced Technological Education (ATE)

Synopsis of Program:

With an emphasis on two-year colleges, the Advanced Technological Education (ATE) program focuses on the education of technicians for the high-technology fields that drive our nation's economy. The program involves partnerships between academic institutions and industry to promote improvement in the education of science and engineering technicians at the undergraduate and secondary school levels. The ATE program supports curriculum development; professional development of college faculty and secondary school teachers; career pathways to two-year colleges from secondary schools and from two-year colleges to four-year institutions; and other activities. Another goal is articulation between two-year and four-year programs for K-12 prospective STEM teachers that focus on technological education. The program invites research proposals that advance the knowledge base related to technician education.

The ATE program encourages partnerships with other entities that may impact technician education. For example, with

- the National Institute of Standards and Technology (NIST) Manufacturing Extension Partnerships (MEPs)

- **Cost Sharing Requirements:** Inclusion of voluntary committed cost sharing is prohibited.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this solicitation for further information.

C. Due Dates

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):
 - October 09, 2014
 - October 08, 2015
 - October 06, 2016

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this solicitation for further information.

Award Administration Information

Award Conditions: Standard NSF award conditions apply.

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

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I. INTRODUCTION

The Advanced Technological Education (ATE) program promotes improvement in the education of science and engineering technicians at the undergraduate and the secondary school levels (grades 7 through 12). Proposals to the program may aim to affect specialized technology courses or core science, mathematics, and technology courses that serve as immediate prerequisites or co-requisites 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 qualified 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 colleges that award 2-yr degrees in advanced technology fields and expects these colleges to have a leadership role on all projects. Effective technological education programs should involve partnerships in which two-year colleges work with four-year colleges and universities, secondary schools, business, industry, and government, and should respond to employers' needs for well-prepared technicians with the ability to learn and embrace change.

The ATE program prepares well-qualified science and engineering technicians for existing and emerging advanced technological

Curriculum and Educational Materials Development: A project may also focus on curriculum and materials development with the intent of nationally disseminating the developed products. Proposed project 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 develop new print, electronic, and multimedia materials, including simulations, scenarios, and web-based collections as well as laboratory experiments and manuals. It is expected that products will be developed with input from business, industry, and government, validated by experts from these organizations, field tested in diverse locations, and validated in terms of their effectiveness in meeting learning goals.

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 technician education. These projects should be designed to enhance the educators' disciplinary capabilities, teaching skills, and understanding of current technologies and practices, and employability skills. 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-on activities conducted during the academic year. To effect long-term change, workshop participants should demonstrate institutional support. The program particularly encourages activities that involve secondary (grades 7 through 12) school teachers and two-year college faculty working together. Additionally, the program encourages activities that provide pedagogical skills to industry scientists and tradespeople who wish to teach. Evaluation should demonstrate use in the classrooms and sustainable changes in practice of participating faculty and teachers. Changes in student learning outcomes as well as students' perceptions of technical careers should be measured.

Leadership Capacity Building for Faculty: The vitality and growth of the ATE community is closely linked to industry trends and needs as well as the acumen of the PIs and their institutions who educate technicians. As such, faculty must: 1) work with their institutional administration, 2) effectively manage both programs and project/center activities, 3) maintain industry connections that include local, statewide, and national economic development efforts, and 4) maintain and cultivate networks with other grantees across funding agencies. Activities that foster these skills might include:

- Mentoring programs that link experienced ATE PIs with new grantees. Activities are expected to lead to new PIs acquiring skills needed to successfully manage, complete, evaluate, disseminate and sustain their projects as well as fostering leadership skills such that they may become mentors at a future time;
- Identifying and mentoring faculty and their administrators for the purpose of developing and implementing a new curriculum in an advanced technological area to educate technicians for local industry needs; and
- Outreach activities that reach faculty and their institutions to educate them about the value and potential impact of working with the ATE Program and its community. These efforts could include providing information on funding opportunities, developing effective proposal writing skills, providing guidance on ways of surveying area industry to determine industry needs as well as finding and working with local workforce investment boards and other entities.

Teacher Preparation: The foundation for advanced technological education is grounded in strong mathematics, science, and technology education in K-12 schools. The preparation of future teachers who will facilitate student learning in mathematics and science and cultivate an interest in technological careers is an important component of the ATE program. ATE teacher preparation projects help prepare a future K-12 teaching workforce that is skilled in teaching science and mathematics, understands the technological workplace, and can prepare students to use a variety of approaches to solving real world technology related problems using design processes and principles (See Standards for Technological Literacy, ITEA, <http://www.iteaconnect.org>)

Teacher Preparation 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 pre-service or paraprofessional programs. These projects are expected to improve the prospective teachers' technological understanding; provide them with experiences to use in engaging students in real world technological problems; improve their understanding of the modern workplace; and strengthen their preparation in science and mathematics. These projects are expected to build on the extensive research literature on teacher preparation. Two-year colleges have the unique advantage of having technology faculty, connected with the high performance workplace, who can work with mathematics and science faculty in developing and teaching these programs.

The project's evaluation plan must measure the effectiveness of efforts to recruit prospective K-12 teachers, transfer those students into four-year teacher preparation programs, enhance their understanding of advanced technologies used in the workplace, and enhance their ability to improve the technological literacy of their students. 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.

Business and Entrepreneurial Skills Development for Students: In addition to technical skills and disciplinary content, students entering the industry environment need skills that allow them to understand and work effectively in a business environment. Many companies have a global presence, and students need to understand that the global economy affects them as employees. Another sector of the industry is comprised of small start-up companies, and these have different attributes than large established firms. Students need to understand these attributes and differences to be effective employees.

Employers often expect employees to possess knowledge, skills and competencies in a specific technical area and to demonstrate professional, industry related, and entrepreneurship acumen. Entrepreneurship skills can be developed in students in technician education programs by having them take selected business courses, by engaging students in problem-based learning using projects of interest to local industry, working with local economic investment organizations and by developing incubator programs that provide experiences for students to interact with entrepreneurs. Projects are encouraged that:

- Educate traditional students and returning learners to develop and apply technical, professional, industry-related, and entrepreneurship knowledge, skills, and competencies within the context of a technician education program;
- Incorporate global issues and international technological and business practices into technical programs; and
- Introduce technical program students to business plans, marketing strategies, networking and interviewing skills, and characteristics of successful entrepreneurs within the context of the program.

Small Grants for Institutions New to the ATE Program: This category seeks to increase the incentive and opportunity for community colleges that have little or no previous experience with the ATE program to undertake projects to improve science and engineering technician education programs or teacher preparation programs that focus on technological education. This small grants opportunity is designed to stimulate implementation, adaptation, and innovation in all areas supported by the ATE program and to broaden the base of community colleges participating in the program. Proposers are strongly encouraged to utilize resources developed by other ATE or other NSF awardees and to consult with people from these projects and centers. Prospective PIs are encouraged to provide sufficient detail on what is being proposed to clearly inform both reviewers and NSF staff.

It is expected that some of the funded projects in this category will serve as a prototype or pilot for an idea that may be expanded in a future proposal for an ATE project. The ATE program is particularly interested in projects addressing issues in rural technician education.

Only community college campuses that have not had an ATE award within the past 10 years may be the "performing organization"

National Centers: National Centers must have a major national impact and visibility in the technological fields they address catalyzing a broad national network of academic institutions and industry partners. Partnerships may be national and/or regional, and all partners are expected to collaborate to improve technological education. The evaluation plan for a national center should provide evidence of impacts on institutions, faculty, students, and industry.

A new national center proposal must make a compelling case that there is a national need for a center in the particular technology and that the proposed center does not duplicate in any substantial way an existing national center or nationally-coordinated activities in the same technology. Groups of institutions contemplating a proposal for a new ATE national center should make early contact with one of the ATE Lead Program Directors to discuss whether a new center is appropriate. If so, a proposal for a national center will be reviewed on its merits, and ATE staff judgment that a proposal is appropriate in no way commits NSF to eventual funding of the proposed center.

National centers are funded for five years, after which they are eligible for a competitive grant renewal for another five years. At the end of the second round of funding a center may transition to a Support Center. This funding model applies to new centers and centers renewed after 2015.

Regional Centers: Regional centers focus on a particular field of technology and have a clear, measurable impact on the workforce and economy in a logically defined geographic region. The center's activities should be coordinated with local, regional, and statewide economic development strategic plans, and, if appropriate, any other ATE funded center that is in a related technological field. Although a regional center may have national impacts, the mission, structure, activities, and products of a regional center should be carefully designed to fit the region's particular characteristics and needs in the relevant field of technology.

Regional centers are funded for four years, after which they are eligible for a competitive grant renewal for another three years. In the second year of the renewal, the progress of the center will be reviewed to determine whether the center should be terminated or possibly transition to a support center.

Support Centers: A support center, within a technological area or combination of areas, constitutes a highly visible source of educational materials, ideas, and contacts, research and evaluation, and provides mentoring to increase leadership capacity on a national level. Support centers may focus on a particular field of technological education or cut across several technology fields to promote best practices in areas such as recruitment, retention, curriculum development, teaching practices, and industry partnerships. Leaders of these centers must demonstrate that they have already made substantial, high-quality contributions to technological education. As such it is common for support centers to take a greater leadership role in:

- Providing support and mentoring for prospective PIs that wish to start or improve educational programs in a particular field of technology;
- Establishing and supporting additional industry, business and academic partnerships;
- Promoting technician careers and visibility and the public image in the field(s) on which the Center is focused;
- Addressing technician knowledge, skills, and competencies needed for the evolving, converging, and emerging technical workplace; and
- Screening, validating, updating, and broadly distributing exemplary materials, curricula, and pedagogical practices adapted or designed by ATE centers and projects and other appropriate sources. This role also involves working with ATE Central to ensure that exemplary materials and curricula are appropriately archived and supported.

3. Targeted Research on Technician Education The goals of this track are: 1) to simulate and support research on technician education in established and emerging advanced technology fields in STEM, and 2) to build the partnership capacity between 2-year and 4-year institutions and universities to design and conduct research and development projects. Projects must clearly demonstrate partnerships between faculty at 2-yr and 4-yr colleges and universities, and the 2-yr faculty must have leadership roles on all projects. All projects must include a literature review that establishes the basis for the proposed study; a clear description of the alignment of research questions with methodologies; and be informed by the Common Guidelines for Education Research and Development https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13126.

This track supports 3 levels of research efforts (these include applied research and research and development).

- Planning: \$150,000 with a duration up to 2 years.
 - Conducting Design Research
 - Pilot Study
- Exploratory Research and Development: \$300,000 total with a duration up to 2 years. These research projects may be built on results from a pilot study or design research study.
- Full Scale Research and Development: \$800,000 total with a duration up to 3 years. These projects are expected to include research on and implementation with other types of participants, at other locations, under different conditions to test development efforts or innovations.

Examples of funded targeted research projects may be found on the NSF website using the awards search tool.

Investigators who are interested in conducting a targeted research project are strongly encouraged to discuss their plans with a program officer prior to submission.

B. INFORMATION ABOUT PREVIOUS AWARDS

- NSF's web site (<https://www.nsf.gov>) provides an Awards Search feature that allows customized searches of NSF's award database. Proposers are also encouraged to search <http://atecentral.net/> and contact PIs of previous awards.

III. AWARD INFORMATION

NSF anticipates that approximately \$64.0 million will be available for new and continuing awards in this program in FY2015. Funding in all years is subject to the availability of funds. The program expects to make 40-55 new awards per year. Grants may be awarded in a wide variety of sizes and durations, as summarized below. The categories below are expected to encompass most of the activities supported through the ATE program; however, additional activities and mechanisms may be proposed after consultation with an NSF program officer. The actual number of awards and the award sizes are subject to the availability of funds and the quality of proposals received.

Anticipated number, size, and duration of new awards:

- ATE Projects: approximately 20-35 new awards, ranging from \$25,000 to \$300,000 per year and having a duration of up to

NSF Grants.gov Application Guide.

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 specific 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. Grants.gov users should refer to Section VI.5. of the NSF Grants.gov Application Guide for specific instructions on how to submit the DUE Project Data Form.

Project Summary: The Project Summary should clearly indicate, in the overview textbox, 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, secondary school students, two-year college faculty members, secondary school teachers). This information is used to assign the proposal to a panel for review. Full proposals that do not address both merit review criteria in the separate textboxes will not be accepted or will be returned without review.

Project Description: The length of the Project Description is limited to 15 pages. The Project Description must begin with the subsection on Results from Prior NSF Support, and this subsection should only cover awards pertaining to the new proposal. This subsection must contain specific outcomes and results including metrics to demonstrate the impact of the project activities.

Center renewal proposals **only** may submit up to 5 pages of Results of Prior Support in the supplementary documents section of the proposal. The first section of the Project Description of Center renewal proposals should state that the results of prior support are in the supplementary documents.

The Project Description must 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; and the dissemination plan. For information about effective approaches to evaluation, see the following resources:

The 2010 User-Friendly Handbook for Project Evaluation

Online Evaluation Resource Library for NSF's Directorate for Education and Human Resources

Field-Tested Learning Assessment Guide (FLAG) for Science, Math, Engineering, and Technology Instructors

References Cited: A references cited page must be included in the proposal. Literature cited should specifically relate 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. Relevant literature on research in teaching and learning as well as relevant literature on technical education efforts should be cited. If no references are cited the page should state that no references were cited.

Facilities, Equipment and Other Resources: Proposers should include an aggregated description of the internal and external resources (both physical and personnel) that the organization and its collaborators will provide to the project, should it be funded. Such information must be provided in this section, in lieu of other parts of the proposal (e.g., budget justification, project description). The description should be narrative in nature and must not include any quantifiable financial information. See GPG Chapter II.C.i for additional information

Special Information and Supplementary Documentation:

These are optional except for: 1) a listing of all of the known people (aside from participants and students) who will receive compensation from the project and their affiliation, 2) a postdoctoral researcher mentoring plan, if funding is requested to support postdoctoral researchers, 3) a data management plan, and 4) a letter from the president or chief academic officer of the host institution documenting the institution's commitment to the center and describing the infrastructure that the institution has to fully support a center (applies only to center proposals).

If included, these sections must be concise and relevant. Reviewers will be strongly encouraged to disregard any supplementary documentation material in excess of 30 pages. These sections might include, for example, letters of commitment, a sample of previously developed (relevant) 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.

Additional Guidance for Planning Grant Proposals: On the Cover Sheet of the proposal, the project title should begin with the words "Planning Grant for..." Planning grants are reserved for planning for a center. 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 planning grant will address, the organizations and departments that will be (or will likely be) partners in the project, the core faculty members or administrators who will manage the project, 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 from two- and four-year institutions and representatives from business, industry and public sector agencies to provide leadership for the various activities of the project or center.

Planning-grant proposals need not present elaborate plans for evaluation and dissemination.

Additional Information: Certain special types of proposals described in the GPG--i.e., Grants for Rapid Research Response (RAPID) proposals and EARLY Grants for Exploratory Research (EAGER) proposals (see GPG, Chapter II, Section D.1 and 2), Equipment Proposals (see GPG, Chapter II, Section D.5), and Accomplishment-Based Renewal (ABR) proposals (see GPG, Chapter V, Section B)--are not appropriate for the ATE program and should not be submitted in response to this solicitation.

B. Budgetary Information

Cost Sharing: Inclusion of voluntary committed cost sharing is prohibited.

Other Budgetary Limitations:

Funds requested for equipment and instrumentation (computers, computer-related hardware, software, laboratory or field instrumentation, and scientific or industrial machinery) normally may not exceed \$200,000 for the duration of a full project grant. Exceptions for this limit will be considered when a single piece of equipment costs in excess of the maximum allowable request, and the need for the equipment is justified in terms of student use and learning outcomes. Equipment requests for small, new to ATE

Representative may check the status of an application on Grants.gov. After proposers have received an e-mail notification from NSF, Research.gov should be used to check the status of an application.

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program for acknowledgement and, if they meet NSF requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF either as *ad hoc* reviewers, panelists, or both, who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts of interest with the proposal. In addition, Program Officers may obtain comments from site visits before recommending final action on proposals. Senior NSF staff further review recommendations for awards. A flowchart that depicts the entire NSF proposal and award process (and associated timeline) is included in the GPG as Exhibit III-1.

A comprehensive description of the Foundation's merit review process is available on the NSF website at: https://nsf.gov/bfa/dias/policy/merit_review/.

Proposers should also be aware of core strategies that are essential to the fulfillment of NSF's mission, as articulated in *Investing in Science, Engineering, and Education for the Nation's Future: NSF Strategic Plan for 2014-2018*. These strategies are integrated in the program planning and implementation process, of which proposal review is one part. NSF's mission is particularly well-implemented through the integration of research and education and broadening participation in NSF programs, projects, and activities.

One of the strategic objectives in support of NSF's mission is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions must recruit, train, and prepare a diverse STEM workforce to advance the frontiers of science and participate in the U.S. technology-based economy. NSF's contribution to the national innovation ecosystem is to provide cutting-edge research under the guidance of the Nation's most creative scientists and engineers. NSF also supports development of a strong science, technology, engineering, and mathematics (STEM) workforce by investing in building the knowledge that informs improvements in STEM teaching and learning.

NSF's mission calls for the broadening of opportunities and expanding participation of groups, institutions, and geographic regions that are underrepresented in STEM disciplines, which 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.

A. Merit Review Principles and Criteria

The National Science Foundation strives to invest in a robust and diverse portfolio of projects that creates new knowledge and enables breakthroughs in understanding across all areas of science and engineering research and education. To identify which projects to support, NSF relies on a merit review process that incorporates consideration of both the technical aspects of a proposed project and its potential to contribute more broadly to advancing NSF's mission "to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes." NSF makes every effort to conduct a fair, competitive, transparent merit review process for the selection of projects.

1. Merit Review Principles

These principles are to be given due diligence by PIs and organizations when preparing proposals and managing projects, by reviewers when reading and evaluating proposals, and by NSF program staff when determining whether or not to recommend proposals for funding and while overseeing awards. Given that NSF is the primary federal agency charged with nurturing and supporting excellence in basic research and education, the following three principles apply:

- All NSF projects should be of the highest quality and have the potential to advance, if not transform, the frontiers of knowledge.
- NSF projects, in the aggregate, should contribute more broadly to achieving societal goals. These "Broader Impacts" may be accomplished through the research itself, through activities that are directly related to specific research projects, or through activities that are supported by, but are complementary to, the project. The project activities may be based on previously established and/or innovative methods and approaches, but in either case must be well justified.
- Meaningful assessment and evaluation of NSF funded projects should be based on appropriate metrics, keeping in mind the likely correlation between the effect of broader impacts and the resources provided to implement projects. If the size of the activity is limited, evaluation of that activity in isolation is not likely to be meaningful. Thus, assessing the effectiveness of these activities may best be done at a higher, more aggregated, level than the individual project.

With respect to the third principle, even if assessment of Broader Impacts outcomes for particular projects is done at an aggregated level, PIs are expected to be accountable for carrying out the activities described in the funded project. Thus, individual projects should include clearly stated goals, specific descriptions of the activities that the PI intends to do, and a plan in place to document the outputs of those activities.

These three merit review principles provide the basis for the merit review criteria, as well as a context within which the users of the criteria can better understand their intent.

2. Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board approved merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two merit review criteria are listed below. **Both** criteria are to be given **full consideration** during the review and decision-making processes; each criterion is necessary but neither, by itself, is sufficient. Therefore, proposers must fully address both criteria. (GPG Chapter II.C.2.d.i. contains additional information for use by proposers in development of the Project Description section of the proposal.) Reviewers are strongly encouraged to review the criteria, including GPG Chapter II.C.2.d.i., prior to the

Once an award or declination decision has been made, Principal Investigators are provided feedback about their proposals. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers or any reviewer-identifying information, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

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

B. Award Conditions

An NSF award consists of: (1) the award notice, 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 notice; (4) the applicable award conditions, such as Grant General Conditions (GC-1)*; or Research Terms and Conditions* and (5) any announcement or other NSF issuance that may be incorporated by reference in the award notice. Cooperative agreements also are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC) and the applicable Programmatic Terms and Conditions. NSF awards are electronically signed by an NSF Grants and Agreements Officer and transmitted electronically to the organization via e-mail.

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

More comprehensive information on NSF Award Conditions and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide (AAG)* Chapter II, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer no later than 90 days prior to the end of the current budget period. (Some programs or awards require submission of more frequent project reports). No later than 120 days following expiration of a grant, the PI also is required to submit a final project report, and a project outcomes report for the general public.

Failure to provide the required annual or final project reports, or the project outcomes report, will delay NSF review and processing of any future funding increments as well as any pending proposals for all identified PIs and co-PIs on a given award. 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 Research.gov, for preparation and submission of annual and final project reports. Such reports provide information on accomplishments, project participants (individual and organizational), publications, and other specific products and impacts of the project. Submission of the report via Research.gov constitutes certification by the PI that the contents of the report are accurate and complete. The project outcomes report also must be prepared and submitted using Research.gov. This report serves as a brief summary, prepared specifically for the public, of the nature and outcomes of the project. This report will be posted on the NSF website exactly as it is submitted by the PI.

More comprehensive information on NSF Reporting Requirements and other important information on the administration of NSF awards is contained in the *NSF Award & Administration Guide (AAG)* Chapter II, available electronically on the NSF Website at https://www.nsf.gov/publications/pub_summ.jsp?ods_key=aag.

There are two special ATE requirements. The EvaluATE National Resource Center at Western Michigan University (DUE-1204683) assists NSF in evaluating the ATE program by conducting the ATE Annual Survey. All PIs must respond annually to this 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 works with the EvaluATE Center to set guidelines for the collection and reporting of data.

For the second requirement, to support project and center sustainability and data management planning and help ensure that the valuable deliverables created through ATE funding remain available after funding ends, ATE projects and centers are required to work with ATE Central to ensure those resources are archived. Specifically, projects and centers that create resources that exist at all in digital form (e.g. curriculum, professional development, and recruitment materials) must provide copies of those resources to ATE Central for archiving purposes, in an archivable format and with clear intellectual property information. Details on archiving can be found on the ATE Central website (<http://atecentral.net/archiving>). Projects and centers are encouraged to work with ATE Central early in their funding period to develop a plan for preparing and migrating copies of their materials for archiving.

Additionally, it is suggested that the developer of new materials license all work (except for computer software source code, discussed below) created with the support of the grant under either the 3.0 Unported or 3.0 United States version of the Creative Commons Attribution (CC BY), Attribution-ShareAlike (CC BY-SA), or Attribution-NonCommercial-ShareAlike (CC BY-NC-SA) license.

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

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

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