

# Writing More Effective ATE Proposals

V. Celeste Carter, [vcarter@nsf.gov](mailto:vcarter@nsf.gov)

## Background

The Advanced Technological Education (ATE) Program at the National Science Foundation funds projects and centers that promote improvement in the education (not exclusively training) of science and engineering technicians for the high-technology workplace that drives the nation's economy. In ATE centers and projects, two-year colleges have leadership roles and work in partnership with universities, secondary schools, business and industry, and government agencies to design and carry out model workforce development initiatives. ATE supports faculty and usually supports credit-bearing courses.

The ~forty national and regional ATE centers serve as the Program's flagships and develop strong relationships with regional and national industry in a given field to provide leadership to ATE projects. The projects focus on particular technician education challenges. The strategies used by both centers and projects include creating educational resources, professional development of teachers and faculty, recruitment and retention of students, industry involvement and partnerships, and research. The outcome is more, better qualified science and engineering technicians, and model programs that benefit all levels of education.

The ATE program is focused on preparing technicians for "middle skill" occupations that comprises about 45% of all occupations. These occupations require more than a secondary education, but not necessarily a four-year degree. They require the 21<sup>st</sup> Century Skills (Employability Skills) of team work, non-routine problem solving, complex communications, and inter- and intra-personnel skills. More and more they require an ability to be entre- or intra-preneurial. Even in this time of high employment there are many unfilled jobs because the applicants lack these skills. The jobs can be both a destination and a stepping stone.

The ATE program was created in response to the Science and Advanced Technology Act passed by Congress in 1992. The budget has grown to \$66 million dollars per year and funds about 200 active projects and about 40 centers mostly at two-year colleges in every state, Guam and Puerto Rico.

There are three tracks in ATE with different levels of funding – Projects (including small, new to ATE), Centers (National, Regional, Support), and Targeted Research on Technician Education.

**The ATE solicitation currently is being revised. You can sign up for updates on the NSF website for any programs or opportunities related to STEM education. Proposals will be due in early October 2017.**

## ATE Proposal Template

### Recommendation

Complete each box in the template below as thoroughly as possible. Be specific about your ideas, how it is informed by prior work of yours/other investigators, student learning outcomes, implementation plan, and how you know your project is progressing according to your timeline and benchmarks (formative evaluation), and the overall impact of your project (summative evaluation). A competitive NSF DUE proposal should include most, if not all, the information summarized in each box.

**Note:** This template initially was developed for the TUES Type 1 program and modified to reflect the ATE solicitation.

Select the primary focus of your proposal. (Note: more than one box can be checked):

- Development of learning resources, effective pedagogies, instrumentation, integration of undergraduate research into the curriculum
- Improve students' STEM learning outcomes
- Recruiting and retaining students in STEM technician education programs and preparing them to enter workforce and/or baccalaureate programs (main emphasis, entering workforce)
- Broaden participation in STEM fields and advance preparation of a globally-competitive workforce, including teachers
- Generate knowledge on how students learn and on effective practices in undergraduate classrooms
- Other (describe)

**Your first step should be reading both the program solicitation and the Proposal and Award Policies and Procedures Guide (PAPPG).**

1. Target Audience (e.g., students entering or continuing in technician education programs, **or faculty**)

--All about Undergraduates, and the "formal" education curriculum --Describe the undergraduate course(s) you want to impact or program you want to develop --Describe the industry need that will be met through your proposed changes --Educational level of the primary student audience --Educational focus of the student audience (technician education programs or immediate pre-reqs/co-reqs) --A secondary audience that will be impacted is a Broader Impact (such as 7-12, graduates) --Faculty professional development - in your department, at your institution, at other institutions (or some combination)
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2. **If applicable**, describe how the project provides students the opportunity to conduct research (either integrated into a course or as a separate/independent research course, or industry internship, and how these competencies and skills relate to those identified by your industry partners.)

--This can be learning the tools of research while conducting research, or research that follows onto the classroom interventions  
-- Can be research integrated directly into a course or research through independent studies  
-- Research can be used as a recruitment/retention strategy early in major or conducted later in UG program  
-- There is a wealth of information about UGR as a recruitment and retention strategy and if this is a strategy you are proposing to use, best to review that literature and demonstrate your awareness of existing models in your proposal. Related to this, there is substantial information about UGR from Council on Undergraduate Research and SERC website for UGR developed by geoscientists  
--This might also include industry supported internships for students in the program

3. Identify collaborators (e.g., on-campus within department and/or on-campus in another department, or at other institution(s)). Identify the lead institution (usually is a two-year institution) and what each partner will contribute to the project. Identify industry partners and describe what they will contribute to the project.

--Your collaborators should include the person(s) involved with your project evaluation -they should be involved from the start.  
--Collaborators (and you) should be supported in the budget commensurate with their contribution to the project.

4. Provide a short description of proposed project.

-Describe the educational problem or challenge you're trying to address  
-Describe the context and significance of this problem within education in your sub-discipline, based on the educational literature and information resources.  
-Outline your plans for addressing this problem; include support from the literature and, as appropriate, the results of past ATE/other related funded educational efforts (e.g. TAACCCT).  
-Describe the changes in student learning you want to see  
-Describe other important changes you want to see  
-Describe how you will engage with the science educational community as your project proceeds, how you'll spread the word about your findings, and how you will encourage and support adoption/adaptation of successful practices or resources from your project.

5. Provide additional detail about your project considering such things as: course or courses to be revised or developed; background of students to be enrolled in course(s); part of major requirements or elective courses taken by students; connection of course(s) to existing courses offered by department; support for proposed project by department (e.g., how does the proposed project support other curriculum development activities going on within department/division/institution); and any special equipment/other resources necessary to support proposed project.

-Provide a detailed enough description of the course/course sequence/curriculum that a reviewer will understand what these do and where they fit in the overall program.  
-Detail the demographics of your department's student audience, and as appropriate the kinds of backgrounds they have coming into the course(s).  
--Provide a letter from your Chair indicating his/her support for the changes you're seeking to institute.  
--Document equipment and related resources necessary for the project (in Facilities section, or if seeking equipment, in the project description and via supplemental documents (price quotes, including educational discounts if available)  
--Document institutional support for equipment to be used (NSF doesn't support service agreements...)

6. Explain how the proposed project builds upon and takes advantage of existing resources and what the literature tells us about educational research, including how students learn?

--Need to document how the effort is built on recognized, published best practices in education, and based in current understanding of learning and cognition as demonstrated in the literature (evidence-based).  
--Need to be familiar with the literature in science education as relevant to your project.  
--Project needs to have as an objective documenting positive changes in student learning (evidence generating).

7. If applicable, identify equipment requested to support the project and provide a justification for selecting the particular piece(s) of equipment. Identify where the equipment will be housed and how the equipment will be maintained and repaired (a letter from an administrator should confirm that the institution will be responsible for costs associated with housing and maintaining the equipment). Describe the need for training in the use of the equipment (for the PI and/or other users). If technician time is needed to maintain the equipment or to assist in sample preparation and analysis, give specific details.

**Note:** It is appropriate to request equipment in NSF DUE programs such as ATE. This is specified in the program solicitation with budget limitations for equipment.

--Clear demonstration of the planned educational benefits of the equipment, supported by literature.  
--Plan for course-related equipment use.  
--Students will use the instrument!  
--Plan to obtain research-grade equipment that can support research data collection.  
--Demonstration of necessary infrastructure (physical and technical/human) to support and maintain the equipment.  
--Letters of support from College officials for equipment acquisition.

8. Explain how the project will build or expand a community of users/adapters?

- Demonstrate and include funds for engagement with community (meetings/workshops).
- Demonstrate partnership with other ATE faculty development initiatives (letters and plans)
- Demonstrate relationships with publishers or professional disseminators (letters and plans)

9. Describe how project findings will be proactively shared within and beyond your specific disciplinary community.

- Funds for meeting presentations, publications
- Participation in PI meetings
- Funds/arrangements for dissemination via informatics portals (ATE Central, teachingtechnicians.org,..)
- Proactive engagement via workshops, etc.

10. Identify the ways the project activities would be sustained beyond the NSF funding period. If the proposed project is a pilot effort, describe how the project would be scaled up to involve a larger audience of users (this could be the basis for a larger ATE proposal).

- Documentation of continued support of activities via lab fees, or the like
- Commitment of institution to maintenance of curricular change (letters of commitment)
- Expansion of intervention across a curriculum.

11. Explain how the project will be evaluated, including the identification of an evaluator (from your campus or from another institution/consultant), the specific outcomes to be measured, and the metrics/methodology used to obtain measurements that will inform you about your project while it is taking place (formative evaluation) and the overall impact of your project (summative evaluation).

**Note:** Formative evaluation data generally are used by the project team to make adjustments to the project while it is still ongoing; summative evaluation findings are shared with the community as a way to demonstrate impact and success of the project.

- Name and vita for chosen evaluator
- Listing of evaluator as co-PI/senior personnel
- Funds for evaluation ~5% of budget at least (list evaluator daily rate and number of days he/she will work on the project)
- Indication in Project description of early contact and cooperation with evaluator; detailed plan, example instruments (questions, or surveys; check with program officer regarding inclusion of Supplemental Documents)
- Plans for use of evaluation data

12. Describe the expertise of each member of the project team and the role and responsibility of each member of project team (biographical sketches should be included for all individuals identified in the proposal.

- Does team have background to do the proposed work?
- Can you run/maintain the instrument requested?
- Do you have a qualified evaluator?

13. Provide a timeline and measurable outcome(s) for each activity identified in the project. Specific details about the implementation of the project are useful and based on evaluation findings, can be adjusted as needed.

- Timeline must be sufficient to prepare, pilot, and refine activities (generally 3 course offerings may be necessary)
- Should include a period for formative project adjustment based on data
- Should include outreach and dissemination activities from Year 1 forward
- Should include implementation of sustainability plans described.

14. Identify all budget needs (e.g., salary, equipment, evaluation consultant, travel, other) and a budget justification for all requested budget categories.

- You need to pay for all project needs, including you!
- Maximum budget requests are usually specified in the solicitation. The PAPPG doesn't give guidance on this issue.
- Funds for student participants acceptable
- Funds for evaluator required!
- Dissemination costs money!
- Budget justification should align with the Project Description in terms of the activities being supported. There should be no surprises in the budget justification that are not mentioned in the Project Description!

15. Describe results from prior NSF support, including specific student learning outcomes, evaluation results, and any publications/presentations. Note: Only describe projects that supported educational activities.

- ONLY include if you have had previous NSF education support - not regular research grants
- Or any support that led to the development of the proposal you are writing (e.g. TAACCCT award)