

the benefit of an informed discussion upon which to base a decision. Following these discussions, panelists complete their individual reviews and one panel member writes a summary of the discussion for each proposal. Reviews are used by NSF Program Directors to inform funding decisions; and anonymous copies are made available to all proposers.

Reviewers are charged with safeguarding the confidentiality of proposals and are asked not to copy, quote, or otherwise use material from any proposal. Reviews are not disclosed to persons outside NSF except to the principal investigator. At the end of the review process, the principal investigator can access via FastLane the written verbatim reviews with the reviewers' names and affiliations omitted. Reviews are provided whether the proposal is funded or not. All reviews are confidential. NSF releases abstracts and other information about funded proposals only.

## Criteria for Evaluation

Proposals to NSF are evaluated for merit on the basis of two general criteria: intellectual merit and broader impacts. These criteria are described in Chapter III, Section A, of the *Grant Proposal Guide*. These criteria, as they relate to education, are defined below. In addition to the suggestions listed in the "Advice to Proposal Writers" section, special attention should be paid to the criteria and questions specified below. Reviewers are asked to comment on the quality of the proposal with respect to each of these two criteria. Some programs include additional criteria. See the applicable *Program Solicitation* for this information.

### I. Intellectual Merit

**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? Typical questions raised in the review process of proposals submitted to DUE programs include:

- Does the project address a major challenge facing STEM undergraduate education?
- Are the goals and objectives, and the plans and procedures for achieving them, innovative, well-developed, worthwhile, and realistic?
- Does the project have potential for improving student learning of important principles of science, technology, engineering, or mathematics?
- Is the project informed by research in teaching and learning, current pedagogical issues, what others have done, and relevant literature?

- Does the project provide for effective assessment of student learning, which reflects the proposed educational objectives and practices?
- Does the project design consider the background, preparation, and experience of the target audience?
- Does the project have the potential to provide fundamental improvements in teaching and learning through effective uses of technology?
- Is the project led by and supported by the involvement of capable faculty (and where appropriate, practicing scientists, mathematicians, engineers, technicians, teachers, and student assistants), who have recent and relevant experience in education, in research, or in the workplace?
- Is the project supported by adequate facilities and resources, and by an institutional and departmental commitment?

## II. Broader Impacts

**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? Typical questions raised in the review process of proposals submitted to DUE programs include:

- To what extent will the results of the project contribute to the knowledge base of activities that enhance student learning?
- Are the proposed course, curriculum, faculty or teacher professional development, experiential learning, or laboratory activities integrated into the institution's academic program?
- Are plans for evaluation of the project appropriate and adequate for the project's size and scope?
- Are the results of the project likely to be useful at similar 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 and communication of results appropriate and adequate?

- For Advanced Technological Education (ATE) projects, does the project address the current and future needs of industry for technicians? Does the project enhance the current status of technician education?
- Will the project result in solid content and pedagogical preparation of faculty and teachers of science, technology, engineering, and mathematics?
- Does the project effectively address one or more of the following objectives:
  - Ensure the highest quality education for those students planning to pursue STEM careers?
  - Increase the participation of women, underrepresented minorities, and persons with disabilities?
  - Provide a foundation for scientific, technological, and workplace literacy?
  - Develop multi- and interdisciplinary courses and curricula that are aligned with national standards, as appropriate?