

Staff Response
To the Committee of Visitors (COV) Report
NSF Scholarships in Science, Technology, and Mathematics (S-STEM) Program

COV Meeting of July 17-18, 2007

The program staff appreciates the hard work and good judgment of the Committee of visitors, and we thank each member for useful contributions.

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Reviewers' use of merit review criteria

A 2.4 COV Comment:

The review analyses and individual reviews have a consistent emphasis on the "intellectual merit" and "broader impacts" criteria. It is apparent that these questions are specifically asked on the form itself, and/or the instructions to reviewers include the requirement to respond to these questions directly.

There is not a consistent emphasis on the "intellectual merit" and "broader impacts" criteria in the *panel summaries*. Most often, panel summaries cover strengths and weaknesses of the proposal to varying detail and extent. Inherent in the discussion of strengths and weaknesses is the concept of "intellectual merit", but "broader impacts" are rarely included. A requirement and/or change in form that stipulates that the panel summary address and cite strengths and weaknesses within the topics of "intellectual merit" and "broader impact" can easily solve this concern.

Response:

Numbers are improving as the program emphasizes addressing both criteria in the panel summary. In addition, in 2008 the program began conducting webinars for panelists about a week before the panel meeting, and we emphasized the two criteria there. Text boxes would help.

Reviewer pool

A 3.3 COV Comment

In response to the last COV recommendation, the program has developed 'Selection of Reviewer' procedures that resulted in what appears to be a much larger, more diverse reviewer pool. A spot check of reviewer demographics against proposals they reviewed indicates the program is making reasonable attempts to ensure balance. Summary reviewer demographics for all three cohorts indicate a reasonable balance in terms of the characteristics cited in this question, including underrepresented groups. Desired program efforts to expand

the pool of reviewers to include student services and financial aid professionals are commendable. However, it would be helpful if, in addition to education degree, the panel reviewers' current job title is also collected. The program should continue to refine these procedures and document as appropriate, the extent to which selected reviewers are meeting established selection procedures objectives.

Response:

The program agrees and will collect additional information in subsequent panels.

A 3.5 COV Comment

The last COV recommended inclusion of more industry and information technology reviewers as panel members. The program continues to be challenged with that goal and expressed difficulty in finding and convincing these professionals to serve on review panels. The current COV suggests linkage to or soliciting suggestions from university-industry partnerships and professional organizations may help. Targeted groups may include university cooperative education programs, the national Conference on Industry and Education Collaboration, university programs and academic departments' industrial advisory boards, and university career service officers' recruiting networks. Other sources for potential industry reviewers could be scholarship selection committees of technical and diversity-based organizations such as SWE, GEM, AWIS, IEEE, ASME, AIChE, ACM, etc. If the NSF supported Corporate Foundation Alliance were revived, this would be another excellent source of potential reviewers from the STEM workforce.

Response:

The program agrees that these are useful sources of information and thanks the panel for the suggestions. The program will consider a range of strategies to increase the number of industry and information technology experts on the review panel.

A 5.1 COV Comment

We recommend that the staff focus on continued development of the reviewer pool with particular attention to increasing the representation of scientists and engineers employed in the scientific and technical workforce.

Response:

The program agrees.

PI Diversity

A 4.8 COV Comment:

As with both the experience of the PI's and their geographic distribution, the institutional types are closer to a balance that reflects the distribution of students in the US. There are several awards that have been made to community colleges and comprehensive institutions. Relatively few seem to have been made to liberal arts colleges and to research universities. This is appropriate given the importance of community college and comprehensive institutions as entry points for STEM majors. Data on the whole program shows an approximately equal distribution among associates, bachelors, masters, and doctoral institutions. This matches the data on the applications received. However, doctoral institutions have become dominant, a trend which should be monitored.

Response :

Doctoral-degree-granting universities have always been a large part of the program. They educate many STEM students. In addition, in the CSEMS version of the program they dominated the program because almost all engineering students are in doctoral-degree-granting universities. The program continues to monitor this and other indications of balance.

Award Portfolio

A 4.10 COV Comment:

In the case of these grants, we interpret balance as a question of disciplinary focus. There is a good balance of the original CSEMS disciplines—computer science, engineering, and mathematics. The revision of the program to include natural science has resulted in only a few programs that include that area, either in conjunction with CSEM or as standalone. We expect this to change as the natural science undergraduate education community becomes more aware of the S-STEM program. The data on disciplines served from the NSF Form 1295, however, seem to be skewed in terms of “NEC” programs, suggesting that the form is not capturing well the specific departments affected.

Response:

The current classification lumps multidisciplinary proposals into the “Other Disciplines NEC” category. In assigning proposals to panels, the program staff read the Project Summary and, if necessary, scan the proposal to ensure these proposals are being considered along with proposals from similar disciplines.

A 4.13 COV Comment

The quality of the proposals, as noted, is clearly seen to be high, usually because of one or more clear elements of strength in terms of recruiting and retaining students in STEM majors. However, the lack of a linkage to other strategies for improving the experience of STEM undergraduates—for example, research-

based reformed pedagogy or induction into research or design projects—is problematic.

Response:

Research experiences are an important part of undergraduate education, and a necessary part of graduate education. The program encourages optional undergraduate student research as part of the student support structures. However, a research project (as well as some other activities) must be optional and not a condition of the scholarship, because a requirement can impose unusual demands on students and can make the scholarship appear to be compensation for services. Projects may strongly encourage student research and can do things like reserving research positions for scholarship students.

A 4.13 COV Comment (continued)

A comparison of the S-STEM awards and those who received CCLI grants in the four year period 1999-2002 (as a sample period) showed more than half of the institutions that had an S-STEM award had a CCLI in that time period. There were more than 20 S-STEM grants given to a PI who had a CCLI award. Examining these overlap cases to see what, if any, benefit accrued to an S-STEM proposal that was able to make use of CCLI-supported innovations, would be a way to test if “cross-fertilization” between the programs could and should be encouraged.

Response:

The program agrees. We can encourage PIs to take advantage of other educational projects on their campuses, and the new I³ activity in EHR may help in coordinating projects on a campus.

A 4.13 COV Comment (continued)

In the same vein, the lack of references in the proposals to current research and optimal practice in pedagogy and students services is a concern, suggesting that innovation may be ad hoc and not based in the literature.

Response:

The Committee has good suggestions for literature, especially on student recruitment and retention, although many faculty do not know of this literature. We are collecting references to make available to PIs.

A 5.2 COV Comment

The program could be more effective by suggesting in the solicitation that P.I.s investigate CCLI, ASA or STEP innovation that might exist at their institution, or others, and integrate the knowledge into their proposal. After awarding S-STEM grants, the program could help P.I.s learn about emerging educational research and best practices through an annual or biannual P.I. meeting. Two important benefits would result from such conferences – P.I.s who are faculty members focused on research and teaching in STEM disciplines would gain knowledge on

research and best practices related to student support services; and P.I.s from institutions that do not have cutting edge innovations in curriculum and pedagogy would gain an understanding of practices that might improve the education of STEM students, particularly the scholarship recipients on their campus.

Response:

The program is discussing a PI meeting operated by an external organization through a grant. The I³ activity recently begun by EHR may help in coordinating projects on a campus.

Monitoring and Evaluation

A 5.1 COV Comment

The COV believes that further development of a system for student recipient tracking is necessary for effective S-STEM program management. NSF staff or external contractors need to develop a consistent tracking system that is appropriate across institutions and time. The COV could find very little outcome assessment information to ascertain if the S-STEM program is achieving goals set forth in the program solicitations and management plans.

(See response below)

A 5.4 COV Comment

Several NSF programs have separate, fairly extensive databases for participant data collection. For example, LS-AMP uses QRC developed/hosted WebAmp/AmpMars report for annual collection and data reporting. S-STEM could benefit from having similar data collection procedures. That data would have benefitted the COV as we attempted to assess participant diversity and overall program success.

Response:

The program has been working with staff in OAD/EHR to establish an S-STEM student data tracking system, as well as a contract evaluation. Contracting expertise and personnel have left the foundation, and progress has been slow in preparing for a new system. After a hiatus due to lack of support, the previous system for CSEMS is being used in the interim.

PART C. OTHER TOPICS

Monitoring and Evaluation

C 1.1 COV Comment

A consistent, reliable program for tracking student recipients through job placement is needed.

Response:

See A.5.4 for a response.

C 1.2 COV Comment

The S-STEM program needs to provide guidelines to P.I.s for program-specific information that should be included in the Annual Report. In addition the COV recommends that program officers be more pro-active in encouraging the submission of annual reports. A review of jackets for 2003 & 2004 revealed that 69% of the jackets had no annual report (31%) or annual reports that were too brief (38%) to provide worthwhile information to assess progress.

Response:

Since the period reviewed by this COV, NSF has strengthened its system for obtaining annual and final reports, and more are being submitted. The program does provide instructions to PIs about what is needed in the reports as part of biannual requests for student data and reports, and we will strengthen them.

Proposal Requirements

C 1.3 COV Comment

The program has not integrated itself well within the scope of work in DUE. Although keeping it as a standalone, scholarship-focused program makes sense, we noted that few proposals sought to show that students would experience supportive pedagogy in their STEM learning, perhaps diminishing the impact of the S-STEM scholarships. Of course, the scope of the S-STEM project means that there are little or no funds for new educational innovations or for new student support services. Still, reference to prior or ongoing reform of teaching and learning for STEM majors or to significant innovation in student support systems does much to show that a campus was amenable to student progress in STEM degree tracks. Similarly, requiring more systematic exposition of the rationale for particular ideas (e.g., by citing relevant literature or previously funded projects) would help investigators (and the NSF) be more confident that changes in student experience were linked to research-based innovations.

Response:

The program is a Congressionally-initiated program to provide scholarships. While it also provides small amounts of student-support funds, it cannot directly support more educational innovations. The idea of encouraging projects to take advantage of innovations that exist in the literature and on their campuses is a good one, and the program will pursue it.

Outreach

C 1.4 COV Comment

Program management should give more attention to disseminating information to the natural sciences communities for the next few years, until they become familiar with the S-STEM program.

Response:

The program is exploring outreach seminars for prospective PIs. Program staff already present numerous informational sessions at meetings of institutions and professional societies, and S-STEM is one of the programs that is included.

Use of Merit Review Criteria

C 1.5 COV Comment

Effectiveness of individual and panel reviews could be improved by more specific guidelines for Panel Summaries and a reminder to reviewers of the program-specific interpretation of intellectual merit and broader impact as stated in the Program Solicitation.

Response:

The program is emphasizing panel summaries in the instructions to reviewers. In 2008 the program offered 3 webinars a week before the panel to discuss the review process with reviewers.

Evaluation

C 2. COV Comment

A full evaluation with rigorous methodology is needed to be able to tell if the program is meeting the program solicitation goals. An initial effort of this has been done prior to the period studied by the COV, but that did not have the depth required. This evaluation would be independent of, but should link with a data based study of student tracking within and beyond the S-STEM scholarship period.

Response:

The program will work with OAD to contract an independent evaluation of sufficient scope to assess outcomes and the impact of the program.

Award Portfolio

C 4 COV Comment

The question of part time students remains a pressing one for promoting undergraduate STEM majors by non-traditional students. We recognize that many institutions may not be able to work effectively with part-time students. But we recommend that the program consider inviting a limited number of proposals that focus on part-time students specifically, so to investigate how part-time students can be supported by S-STEM scholarships, for example when students are advanced in their STEM major but need to finish college part-time.

Response:

The program continues to be concerned about the logistical difficulties of handling scholarships for part-time students, and we know of no other program that does so. However, the committee's suggestion that we try a limited, pilot project that explores this is interesting. We will consider it seriously either as a small number of special project proposals or at the time the next Program Solicitation is issued in the winter of 2008.