Response to the FY 2006 Committee of Visitors (COV)
For
The Course, Curriculum, and Laboratory Improvement (CCLI) Program

The Report from the Committee of Visitors (COV) for the Course, Curriculum, and Laboratory (CCLI) program noted several positive aspects of the design and implementation of the program and these are listed in the first section of this report. The Committee also raised several issues and made several suggestions, and these are addressed in the second section. The parenthetical notes refer to the sections of the COV report where the comment, issue, or suggestion appeared.

Positive Aspects

The Committee noted the following positive aspects of the program:

1. The Committee applauded the change in CCLI panel practice of sending out proposals prior to the panel meeting, and it noted increased details and more attention to broader impacts in the reviews handled that way. (A.1.2, A.1.3, and A.1.4, A1.7)

2. The Committee noted that the management of the program on the whole appears to be excellent given the limited staff and the heavier workload that has come with increases in the number of proposals. (A.5.1) It noted that the "triage process" allowed the program officers to provide exemplary guidance to the PIs and explain outlying ratings satisfactorily. (A.1.5) The Committee commented that the program officers are nimble and thoughtful in guiding the program. (B-4)

3. The Committee noted that the CCLI program, as the main source of funding for all institutions focused on improving undergraduate education, has made important contributions and has had positive impacts, has stimulated work across disciplines, and has helped build new communities. (B.4, C.1.A, and C.3)

4. The Committee was impressed with the number of new investigators receiving awards, with the number of proposals from EPSCoR states, and with the mix of individual and collaborative awards. (A.4.5, A.4.6, and A.4.7)

5. The Committee was impressed with the diversity of the reviewers. (A.3.3)

6. The Committee was impressed with the organization of COV materials and with the meeting agenda. (C.5)

Issues and Suggestions

The Committee also raised several issues and made several suggestions. These are summarized below with our response, which includes actions already taken, and intended new action for each comment.

1. **Dwell-Time Goal**

   COV Comment: The Committee noted that although the proposal processing rate for the EMD and ND tracks combined did meet the goal of processing 70 % of the proposals in six months, it was not met in the ND track when its rate of processing was considered alone. (A.1.6)

   Response: In FY 2005, the CCLI program was redesigned, eliminating the EMD, A&I, ND, and ASA tracks. The new solicitation requests that proposals be submitted to one of three phases based on the developmental phase of the proposal. The dwell times for all three phases of CCLI are independently monitored.

   Action: Continue to monitor dwell time independently for each of the CCLI phases.

2. **Broader Impacts in Panel Summary and Review Analysis**

   COV Comment: The Committee noted that both the Panel Summaries and Review Analyses would benefit from more attention to broader impacts. (A.2.2 and A.2.4)

   Response: Both in the written instruction sent to reviewers and in the orientation presentation at the start of the panel meeting, we emphasize the importance of addressing the broader impacts criterion. We will begin requiring that reviewers include the headings "Intellectual Merit" and "Broader Impacts" in their written panel summaries. The Review Analysis templates for both awards and declines include sections dealing with both criteria. We will encourage the Program Officers to be more thorough in addressing both criteria in their Review Analyses

   Action: Require separate heading for the two criteria in the panel summaries and continue to remind Program Officers to address broader impacts specifically in their Review Analyses.

3. **Broader Impacts Statement in Solicitation**

   COV Comment: The Committee noted that language prefacing the two criteria in the solicitation could place unintended limits on broader impacts. (A.2.4)

   Response: This section is part of the standard language included in every NSF solicitation and not subject to change on an individual program basis. We will share the Committee's comments with the NSF policy group.

   Action: Share the Committee's comments about the solicitation language with the NSF policy group.

4. **Reviewer Diversity**

COV Comment: The Committee encouraged recruitment of a larger portion of reviewers from underrepresented minority groups, from baccalaureate and community colleges, and from individuals experienced in education technology. While commending the program for the number of women and minority reviewers on the panels, they urged efforts to increase the involvement of minorities in the process because they best understand the importance of targeting underrepresented students. (A.3.2 and A.3.3)

Response: We try to have the reviewers on each sub-panel represent a diversity of institutions and populations. In addition, in order to broaden our reviewer base and to provide panel experience to a wider population of STEM faculty members, we try to involve a substantial number (roughly one–third of the total) of new reviewers in each panel. Finally, it is critical to get the right mix of expertise so that the reviews are informative. With this many objectives, the program occasionally has difficulty satisfying all of them on some panels. We will continue our efforts to expand the involvement of minorities in the review process and to balance the involvement of all institution types. As noted below in discussing Proposal Diversity, we conduct special outreach activities for targeted populations and we try to enlist, as reviewers, as many participants at these sessions as possible.

Action: Continue and expand efforts to involve minorities in the review process and to balance the involvement of all institution types.

5. **Proposal Diversity**

    COV Comment: The Committee encouraged the program to seek more proposals, from institutions serving under-represented groups and from baccalaureate and community colleges. (A.4.11, C.1.A, and C.1.B)

    Response: We continue our outreach efforts to all institutions, particularly those efforts aimed at minority serving institutions and non-research colleges and universities. This is and will be done through special workshops organized for targeted audiences and through organizations that serve these communities.

    Action: Continue and expand outreach efforts for targeted audiences.

6. **Multidisciplinary and Collaborative Proposals**

    COV Comment: The Committee encouraged the program to give increased attention to courses bridging multiple disciplines and heralding the disciplines of the future. (A.5.4, and B.4) It also encouraged the program to seek more proposals from collaborating institutions. (A.4.4, A.4.5, A.4.8)

    Response: We treat the interdisciplinary area as a "discipline" with its own allocation. We allocate a minimum of 10 % of the Phase 1 and 2 funds for interdisciplinary projects and increase the allocation as needed in response to

proposal pressure. Both interdisciplinary and collaborative proposals are encouraged in our outreach efforts.

Action: Continue these activities.

7. **Innovation and Evidence-Based Emphasis**

COV Comment: The Committee encouraged the program to seek more innovative evidence-based proposals that give attention to pedagogy and research and are based on the literature. They also urged that the program consider scaling-up successful projects, even as the funding rate decreases. (A.4.3, A.4.9, and A.5.2)

Response: We agree with these suggestions and, since FY 2005, the CCLI solicitation requires that projects build on and contribute to the STEM education knowledge base. We hope that this change addresses this problem and have seen evidence that it does. The new solicitation also encourages research proposals, and provides a phased path for prototyping or piloting an idea (Phase 1), building an effort up to a full project (Phase 2), and then scaling it to a national level (Phase 3).

Action: Continue to emphasize the importance of building on and contributing to the knowledge base in STEM undergraduate education in program solicitations, in the proposal review process, and in the award decision making process.

8. **Emerging Areas Emphasis**

COV Comment: The Committee encouraged the program to respond to new and emerging areas in the disciplines and in undergraduate education. It also encouraged a budget increase to enable the program to target high payoff areas. (A.5.3)

Response: We agree that it is important for the CCLI program to encourage new and emerging areas. We feel that Program Officers in each discipline are in the best position to identify these needs and all disciplines make the support of new and emerging areas an important consideration in making funding decisions. We are limited by the mix of the proposals that we receive but we believe that we are meeting the needs of emerging areas as reflected by the interests of the community. Certainly, with additional funds, the program could take a more active role in stimulating new developments.

Action: Consider adding language to the solicitation that addresses the needs in new and emerging areas and reexamines the method for allocating CCLI funds among the disciplines.

9. **Selected Fields Emphasis**

COV Comment: The Committee encouraged the program to gear the portfolio to support fields and disciplines that intersect with student interest and undergraduate

STEM requirements, particularly lower-division biology and mathematics courses, to entice students to persist. They also suggested that we consider course enrollment as a factor in defining the portfolio, which we assume to mean that we should consider course enrollment in a disciplines as a factor when allocating funding to that discipline. (A4.10 and A.4.13)

Response: We acknowledge that lower-division biology and mathematics courses impact persistence in STEM fields but we also believe that every discipline teaches introductory courses that impact student persistence. It is difficult to single out those that would have the most impact across all disciplines. Each discipline decides the fraction of its funds to allocate to introductory courses and more than one-half of the CCLI awards deal with introductory courses. We also feel more research is necessary to determine factors affecting student persistence in STEM majors and courses. Since NSF has education research programs, including the research component in the CCLI program, we will encourage proposals that investigate factors effecting persistence to explore this issue. In the past we used course enrollment to adjust the distribution of funds among the disciplines, but we abandoned this as the numbers became outdated and too unreliable to use as a basis for this adjustment. We have considered using the number of majors or the number of BS degrees as a measure of student load but neither account for the distribution of students in the introductory course. We will continue to look for reliable measures of student load and we will reexamine the method for allocating CCLI funds among the disciplines.

Action: Encourage research that investigates factors effecting student persistence in STEM majors and courses and reexamine the method for allocating CCLI funds among the disciplines.

10. Program Officers' Feedback on Declines

COV Comment: The Committee approved of the triage system for declining proposals but encouraged the program to strengthen the quality of information provided to the proposers of highly rated proposals that are declined in order to prevent these proposers from becoming overly discouraged. The Committee also encouraged better continuity between Program Officers on resubmitted proposals, which we interpret to mean better communication between Program Officers to ensure continuity. (A.5.1)

Response: We use a template for the Program Officer comments for highly rated proposals that are declined and this template requires that the Program Officers describe key weaknesses of proposals and suggestions for improvements. If a Program Officer decides to encourage the proposer to revise and resubmit a proposal, the template contains language that the Program Officer can select to indicate this. We feel that this approach is adequate given the number of proposals that each Program Officer must process. Although the use of temporary Program Officers, the large number of proposals, and the lack of any official indication that a proposal is a

resubmittal make any continuity policy difficult; the assignment of proposals to specific disciplines and communication among Program Officers within that discipline when making award decisions provide some continuity of treatment for resubmitted high decline proposals.

Action: Renew our efforts to remind Program Officers to provide adequate feedback for highly rated proposals being declined.

11. PI Meetings and Special Conference Sessions

COV Comment: To facilitate sharing of information among funded projects, the COV encouraged the program to hold annual PI meetings, perhaps organized by discipline. In a similar vein, to increase visibility of the program's innovations, the COV encouraged the program to seek proposals for conferences that build expertise and community for new technologies, important educational innovations, emerging fields or methodologies, and to emphasize publications of special issues and symposia at professional meetings. (B.4, Q.1, Q.2, and Q.3)

Response: We agree that all of these activities would facilitate the dissemination of the results of CCLI projects and the building of a community. We have hesitated to organize annual PI meetings because the number of projects supported by the CCLI program would result in a very large and difficult to manage meeting, should we get one or two attendees from all active projects. Organizing discipline specific meetings might lead to more manageable meetings, but interactions among the disciplines, a strength of the CCLI program, would be lost. The CCLI team has decided to hold a general PI meeting and we are planning for one in the next year or so. We are also exploring how we might hold these on a regular basis so PIs will be aware of the schedule and can plan to attend accordingly. The program, primarily through the efforts of individual disciplines, does support workshops and conferences dealing with innovative and emerging areas and these efforts will continue.

Action: Plan a general PI meeting and continue to fund disciplinary conference and workshop efforts to disseminate results.

12. Increased Program Budget

COV Comment: The COV encouraged the Foundation to provide more funds for the program because the declining budget limits the program's impact and, with success rates in the 10-20 percent range, it is very difficult to encourage new directions or to take risks with leading edge proposals. (A.5., B.4, and C.3)

Response: We agree that an increased budget would allow the program to encourage and support more direction-setting and risky projects than we do now. This feedback will be helpful in making the case for additional funding in this area.

Action: No direct action possible by the CCLI team.

13. Travel Budget

COV Comment: The Committee noted that the current travel budgets limit the staff's efforts to monitor programs. (C.1.A)

Response: We agree that the travel budget does limit project monitoring. This feedback will be helpful in making the case for additional funding in this area.

Action: No direct action possible by the CCLI team.

14. Evaluation

COV Comment: The Committee indicated that funding should be provided for individuals or groups to study the impact of the program on undergraduate STEM education over the years. In addition, they indicated support for developing an effective survey tool to monitor project progress and to aid projects in their evaluation efforts. (C.1.A and Q4)

Response: We agree that the program needs a through evaluation by an outside organization and we have begun to plan such an effort. In addition, the revised CCLI solicitation has given increased emphasis to the importance of project evaluation and we plan to investigate the use of evaluation information in the projects' reports to identify impacts of the CCLI program.

Action: Award contracts or grants to conduct an evaluation and to investigate the use of project reports in determining the program's impact.