CORE QUESTIONS and REPORT TEMPLATE
for
FY 2011 NSF COMMITTEE OF VISITOR (COV) REVIEWS

Guidance to NSF Staff: This document includes the FY 2011 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2011. Specific guidance for NSF staff describing the COV review process is described in Subchapter 300-Committee of Visitors Reviews (NSF Manual 1, Section VIII) that can be obtained at <www.inside.nsf.gov/od/oia/cov>.

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. Committee of Visitor (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and (2) managerial matters pertaining to proposal decisions.

The program(s) under review may include several sub-activities as well as NSF-wide activities. The directorate or division may instruct the COV to provide answers addressing a cluster or group of programs – a portfolio of activities integrated as a whole – or to provide answers specific to the sub-activities of the program, with the latter requiring more time but providing more detailed information.

The Division or Directorate may choose to add questions relevant to the activities under review. NSF staff should work with the COV members in advance of the meeting to provide them with the report template, organized background materials, and to identify questions/goals that apply to the program(s) under review.

Suggested sources of information for COVs to consider are provided for each item. As indicated, a resource for NSF staff preparing data for COVs is the Enterprise Information System (EIS) –Web COV module, which can be accessed by NSF staff only at http://budg-eis-01/eisportal/default.aspx. In addition, NSF staff preparing for the COV should consider other sources of information, as appropriate for the programs under review.

For section IV addressing portfolio balance the program should provide the COV with a statement of the program's portfolio goals and ask specific questions about the program under review. Some suggestions regarding portfolio dimensions are given on the template. These suggestions will not be appropriate for all programs.

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in the integrity and efficiency of the ***processes*** related to proposal review. Discussions leading to answers for Part A of the Core Questions will require study of confidential material such as declined proposals and reviewer comments. ***COV reports should not contain confidential material or specific information about declined proposals.*** The reports generated by COVs are made available to the public.

We encourage COV members to provide comments to NSF on how to improve in all areas, as well as suggestions for the COV process, format, and questions. For past COV reports, please see http://www.nsf.gov/od/oia/activities/cov/covs.jsp.

FY 2011 REPORT TEMPLATE FOR
NSF COMMITTEES OF VISITORS (COVs)

The table below should be completed by program staff.

Date of COV: May 2, 2011 – May 3, 2011
Program/Cluster/Section: NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) Program
Division: Division of Undergraduate Education (DUE)
Directorate: Education and Human Resources (EHR)
Number of actions reviewed: **Awards: 34** **Declinations: 74** **Other: 8 exemplary awards**
Total number of actions within Program/Cluster/Division during period under review: **Awards: 389** **Declinations: 764** **Other: 12 return without review**
Manner in which reviewed actions were selected: The NSF staff randomly selected award jackets and declinations for the S-STEM COV review by sorting proposals according to the last digit of each proposal ID number. Each proposal ending in the number "5" was selected for COV review. This resulted in a list that comprised approximately 10% of all proposals submitted to S-STEM during FY2007, 2008, 2009, and 2010. These proposals consisted of 34 awards and 74 declines. The staff also chose eight "exemplary" jackets, defined as projects that were rated highly by the review panel and whose annual reports have demonstrated success. The selection process chosen for S-STEM was pre-approved by the Chair of the COV.

INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

Briefly discuss and provide comments for *each* relevant aspect of the program's review process and management. Comments should be based on a review of proposal actions (awards, declinations, and withdrawals) that were *completed within the past three fiscal years*. Provide comments for *each* program being reviewed and for those questions that are relevant to the program under review. Quantitative information may be required for some questions. Constructive comments noting areas in need of improvement are encouraged.

I. Questions about the quality and effectiveness of the program's use of merit review process. Please answer the following questions about the effectiveness of the merit review process and provide comments or concerns in the space below the question**.**

QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS	YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE
1. Are the review methods (for example, panel, ad hoc, site visits) appropriate? Comments: The review method (panel) appears appropriate and informative for the S-STEM program. Most proposals reviewed had at least five panel members and some had six. Judging from a review of the individual panel members' comments, a significant cross-section of useful observations was made. The panel summary consistently captured the essence of the individual reviews. The proposals tend to be organized according to the NSF proposal criteria (intellectual merit and broader impacts). However, the reviewers often include broader impact topics in the intellectual merit section of the review. Examples include comments about impact on underrepresented populations or assessment/evaluation plans within the intellectual merit section. Perhaps the uncertain nature of "intellectual merit" for an S-STEM proposal explains in part the confusion. In some instances, none of the reviewers were from institutions similar to that of the proposal writer. The COV recommends that greater effort be placed in securing reviewers from a multitude of institution types.	YES
2. Are both merit review criteria addressed a) In individual reviews? In most individual reviews surveyed, both intellectual merit and broader impacts were addressed. In almost all cases, those criteria were specifically addressed in sections labeled as	YES

such. b) In panel summaries? Most panel summaries reviewed contained specific sections labeled intellectual merit and broader impacts, respectively. c) In Program Officer review analyses? All of the Program Officer (PO) review analyses surveyed contained specific sections labeled intellectual merit and broader impacts, respectively. However, review analyses tend to be much more comprehensive for funded proposals. Comments: The COV would like to note that the PO review analyses were thorough and comprehensive. In a few cases, both the peer reviews and the PO review analyses of declined proposals lacked detail and sufficient feedback for the PI.	
3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals? Comments: While the quality and depth of individual reviews varied, the overwhelming percentage of those individual reviews had specific comments, whether positive or expressed as a concern, which provided useful feedback to the proposal writer. However, in some cases, one could conclude that a reviewer's rating was either higher or lower than what might be expected based on the reviewer's narrative. Substantive comments appear in a little more than half of the reviews. The COV suspects that the best indicators for substantive reviews include PO and proposal rating (higher rating, more substantive review). As noted in Question I.2 above, there may be a link between proposal rating and the degree of details given in the review. Specifically, negatively reviewed proposals did appear to have less detail in reviews. The trend did not appear to be statistically significant, and may simply be reflective of the style that the PO uses in reviewing the peer review submissions.	YES
4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)? Comments: For proposals that tended to be more highly rated and that were eventually funded, the panel summaries in general consistently captured the essence of the individual reviews. Helpful comments that discuss the rationales for consensus or the lack thereof are present. However, for proposals with more mixed ratings and that were not subsequently funded, some of the panel summaries tended to be	YES

less informative.	
5. Does the documentation in the jacket provide the rationale for the award/decline decision? (Note: Documentation in jacket usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), program officer review analysis, and staff diary notes.) Comments: In general, the jackets contained all of the above cited documentation. In almost all cases, the PO review analyses surveyed were outstanding. Those analyses were detailed, thorough, and comprehensive. They adequately summarized the panels' reviews, highlighted the strengths and weaknesses, and provided a rationale for the PO's recommendation regarding funding. In particular, when the PO recommended a funding outcome different from that of the panel, the PO took great care to explain the basis of the recommendation. In viewing the entire body of information provided by the jacket, enough information is available to understand the rationale for the proposal decision.	YES
6. Does the documentation to PI provide the rationale for the award/decline decision? (Note: Documentation to PI usually includes context statement, individual reviews, panel summary (if applicable), site visit reports (if applicable), and, if not otherwise provided in the panel summary, an explanation from the program officer (written or telephoned with diary note in jacket) of the basis for a declination.) Comments: Collectively, the documentation cited above provides sufficient information to the PI regarding the award/decline decision. In particular, the PO correspondence to the PI regarding the award/decline decision was outstanding. That correspondence provided a summary, suggested considerations for reworking a proposal when the decision was a decline, and invited further inquiry if needed. The COV notes that, post-award, written correspondence between the PO and the PI was less frequent, though correspondence was likely continued by phone.	YES
7. Additional comments on the quality and effectiveness of the program's use of merit review process:	

While intellectual merit and broader impacts are generally covered, the COV believes it worthwhile to consider that reviews specifically contain sections so labeled. The COV recommends that reviewer panels also receive specific or typical examples of intellectual merit and broader impacts.	

II. Questions concerning the selection of reviewers. Please answer the following questions about the selection of reviewers and provide comments or concerns in the space below the question**.**

SELECTION OF REVIEWERS	**YES , NO, DATA NOT AVAILABLE, or NOT APPLICABLE**
1. Did the program make use of reviewers having appropriate expertise and/or qualifications? Comments: After review of the reviewer database from 2007-2010, it appears as though the program has a wide variety of STEM expertise that has been efficiently utilized. The identification of industry and information technology experts (as mentioned in the 2007 COV report) still seems to be very low upon review of the past four panelist cohorts. However, the COV panel is unable to determine if an increase in these disciplines has been shown since the 2007 report.	YES
2. Did the program recognize and resolve conflicts of interest when appropriate? Comments: NSF has a documented process for identifying and resolving conflicts of interest, both before and during the review process. This process has been strictly followed throughout the past years. It appears as though the number of COIs remains fairly low across the board during the review process. Only two COIs were reported in this panel sample for review.	YES
Additional comments on reviewer selection: No additional comments.	

III. Questions concerning the management of the program under review. Please comment on the following:

MANAGEMENT OF THE PROGRAM UNDER REVIEW
1. Management of the program. Comments: The management plan appears to be detailed and outlines proposal and budget management, as well as the schedule of activities. The COV applauds the development of a student tracking system in response to a 2007 COV recommendation. Of interest to the COV is the possibility of a tracking system to measure outcomes that assesses where students are after the award of five years has expired. The COV recommends that merit criteria, broader impacts and intellectual merit, be addressed more specifically by review panels. Please see Question I.7 for further comments.
2. Responsiveness of the program to emerging research and education opportunities. Comments: The long-term outcome of the program reflects the need to develop a highly-skilled technical workforce in the areas of national need, as well as enhance the capacity of institutions to provide and sustain student support services. The diversity of the types of services that the awarded institutions propose often reflects innovative and creative methods of attracting and retaining STEM students. The COV notes that a PI meeting supporting best practices and emerging research techniques, recommended by the 2007 COV, does not appear to be a part of the program. The COV notes that this method of collaboration could serve to be extremely useful to awardees. A public forum to disseminate such practices (i.e., journal articles, web products, etc.) could be extremely useful for those who are considering applying for future S-STEM grants. The COV noted the increased participation from institutions, particularly from two-year institutions, that hadn't previously been funded by NSF, indicating that the S-STEM program's reach is expanding.
3. Program planning and prioritization process (internal and external) that guided the development of the portfolio. Comments: The S-STEM program has a detailed internal and external planning and prioritization process. The

Program Development Timeline, Management Plan, and the most recent solicitation serve as a guide for potential applicants.

4. Responsiveness of program to previous COV comments and recommendations.

Comments:

It was noted in the 2007 COV report that the S-STEM program did an adequate job responding to the 2002 COV recommendations. It can be seen how more detailed capturing of reviewer information has been beneficial to the program. Based on the 2007 COV recommendations, the NSF staff indicated that it has been working to establish an S-STEM student data tracking system as well as a contract evaluation. This system is a very valuable tool that enhances the assessment of the long-term effectiveness of the program. The update of the COV staff responses should reflect on all of the original responses to determine what, if any, significant level of improvement has been made. Some, but not all recommendations were updated. The COV recommends that the updated responses contain reference to all recommendations and their progress, if any.

In response to the request for references to all 2007 recommendations and updated, we note the following progress.

Sections A.1.4, A.2.4, and C.3 COV comments all addressed panel summaries, in particular the lack of emphasis of intellectual merit and broader impact through the specific labeling of those topics and the variation in panel summaries that led, in some cases, to insufficient guidance to the PI team. In response, the program has strongly emphasized its expectations of panel summaries in the pre-panel webinars and in the reviewer orientation at the panel meeting. We ask the scribe, who writes the summary after the panel discussion, to provide a detailed summary of the discussion in the panel. All panelists review the summary and indicate their approval before the summary is submitted to NSF. NSF Fastlane presents the scribe with only a single text box, leaving format and length to the scribe. We encourage scribes to include merit criteria in the summaries. If the summary is not adequate, the Program Officer writes a substantive comment that is available to the Principal Investigator along with the reviews. This is available to the PI in the form of the Program Officer Comments.

The Section A4.3 COV comments indicate that the PI teams do not have sufficient knowledge of the literature. In response, the S-STEM team has included 21 selected references about effective scholarship programs to the S-STEM solicitation. These are useful educational tools to help the PI teams familiarize themselves with the evidence-base for the activities they propose.

The Section A.4.8 COV comments note that there were no multi-institutional grants within the sample set that they examined. We have provided two examples of grants that involve both two-year and four-year schools in the “exemplary projects” list. In both cases a student receives a scholarship at the two-year college and continues to be supported after transferring to the four-year school.

Based on the 2007 COV recommendation of including more resources for potential PIs, the COV applauds the inclusion of references in the program solicitation, and notes that references were in use and included in most proposals.

IV. Questions about Portfolio. Please answer the following about the portfolio of awards made by the program/s under review.

RESULTING PORTFOLIO OF AWARDS	APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE
1. Does the program portfolio have an appropriate balance of awards across disciplines and sub disciplines of the activity? Comments: The vast majority of awards are multidisciplinary. Awards to a single discipline had an appropriate balance across disciplines. About half of the funded awards are self-categorized as “inter/multidisciplinary,” reflecting the broad disciplinary approach in many of the projects. Twenty percent of the awards are focused in engineering disciplines, perhaps a reflection of the historical focus of the program on computer science, engineering and mathematics (CSEM). Chemistry and physics appear somewhat underrepresented in awards (~3% and ~2%, respectively), although these disciplines are well represented in many interdisciplinary projects. The distribution of student majors in the program tells the same story, with about one-third of the affected students in engineering disciplines. Awareness of the program outside the original CSEM disciplines seems to be growing slowly. The COV encourages continued efforts to make these disciplines (especially chemistry and physics) aware of the program.	YES
2. Are awards appropriate in size and duration for the scope of the projects? Comments: The awards (most falling into the $400,000 – $600,000 range) are of sufficient size to impact a significant number of students. The funding period (typically five years in duration) provides sufficient time to track the first cohort to graduation and observe progress toward graduation of later cohorts, and to evaluate the effectiveness of any student support activities put into place. The COV recommends that part of the required grant evaluation at each campus include collection of data on why students left the program despite receiving scholarships in order to help craft future student support. The COV notes that the five-year duration of most awards allows for a variety of different schemes for the time period, timing, and number of scholarships, allowing institutions to tailor the program to their needs. The COV looked at several small awards and found strong rationales for the	YES

smaller award sizes in each case.	
3. Does the program portfolio include awards for projects that are innovative or potentially transformative? Comments: Funded projects demonstrate a broad variety of innovative approaches. For example, several recent awards promote transitions of students between two- and four-year institutions, a process that could substantially increase graduates in STEM fields. Other programs show creative approaches to recruiting underrepresented students into STEM disciplines, reducing the attrition during first-year “gateway” science classes, improving retention at small institutions where cohort sizes are small, promoting interactions among student peers, providing effective career mentoring, and many other areas. Many of these approaches could be easily adapted for use at other institutions and thus could contribute to transforming the national STEM graduation rates. The exemplary projects provided by the program staff include several innovative programs. One such example is a coordinated program involving three community colleges, recruitment activities by over 70 faculty, and curriculum development in the form of a capstone course for transfer readiness and a peer program. Another project engages students in faculty-led research, increasing student interest in research. It promotes student support and leadership opportunities through peer mentor teaching, and it helps to form networks and career connections between STEM students, faculty, alumni, and area industry leaders. Additional innovative programs include students building robots that are controlled by cell phones, recruiting and retaining environmental scholars with field experiences, and programs directed at Native Americans through intercollegiate mathematics competitions.	YES
4. Does the program portfolio include inter- and multi- disciplinary projects? Comments: The vast majority of program portfolios award scholarships in multiple disciplines, many following the organization at the college. For example, a school of arts and sciences may sponsor scholarships in biology, chemistry, mathematics, and physics. Accompanying student support activities are similarly multi- and interdisciplinary. The COV notes that it is less clear whether there are programs that explicitly	YES

include interdisciplinary pedagogical approaches in their programming to improve student outcomes.	
5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators? Comments: There is a fairly even and representative geographical distribution of PIs from across the country, as evidenced by data provided by the NSF: West – 19%, Midwest – 24%, South – 31%, Northeast – 26%.	YES
6. Does the program portfolio have an appropriate balance of awards to different types of institutions? Comments: During the COV period of review, 2007-2010, the program portfolio had an appropriate balance of awards to different types of institutions with two-year campuses receiving 15-22% of the awards (funding rate = 29-41%), four-year campuses receiving 19-29% of the awards (funding rate = 27-40%), master's granting institutions receiving 12-29% of the awards (funding rate = 16-50%); and doctoral institutions receiving 25-40% of the awards (funding rate = 29-40%). The COV notes that while distribution is appropriate, two trends are present in the data: 1) A decrease in the number and funding rate of master's level institutions receiving awards relative to other types. 2) An increase in the success of two-year institutions relative to other types, particularly in 2010. Overall, there is a focus on lower-division undergraduate students, an appropriate focus given the program's emphasis on retaining students in STEM majors.	YES
7. Does the program portfolio have an appropriate balance of awards to new investigators? NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant. Comments: The program portfolio has an appropriate balance of awards to new PIs. In	YES

2007-2010, the ratio of new to total PIs was 31/90, 36/93, 40/84 and 43/89, respectively. The funding rate of new PIs was 18-33% versus an overall funding rate of 26%-39%. It is reasonable that more seasoned submitters would have a higher rate of funding. The COV notes that both the number of proposals and awards to new investigators has been increasing. In 2007, about one-third of the awards were to new PIs, while almost half were to new PIs in 2010.	
8. Does the program portfolio include projects that integrate research and education? Comments: Many of the funded grants incorporate opportunities for students to conduct research or support for obtaining internships for that purpose, promoting success among scholarship recipients. A handful of the projects reviewed include educational research looking at the impact of scholarship on graduation rates, recruitment, etc. As the majority of funding — 85% — is used for scholarships, this seems to be a reasonable outcome. Formal pedagogical research is not a main focus of this program, so it would be unreasonable to expect a high output of scholarship from the program. On the other hand, it is reasonable to ask how well best practices are being shared among grantees and other institutions.	YES
9. Does the program portfolio have appropriate participation of underrepresented groups? Comments: The program portfolio has an appropriate level of participation of underrepresented groups, both in terms of student recipients and PIs. Involvement of students from underrepresented groups is a goal in many funded awards. Over 30% of scholarship recipients are from racial and ethnic groups traditionally underrepresented in S-STEM disciplines, and scholarship distribution roughly matches national demographics, suggesting reasonable success towards these objectives. Just over one-third of scholarships recipients are women. In one sense, it is discouraging that men form a much larger fraction of award recipients. However, many of the served disciplines (especially mathematics and engineering) have very low female representation, and in these disciplines the gender ratio might represent good progress. The COV believes that a breakdown of gender ratios by discipline might prove informative.	YES

Over the COV review period, the number of awards and funding rates of PIs from traditionally underrepresented groups is appropriate. However, in 2010, the funding rate of Black/African American and Hispanic/Latino PIs dropped considerably more than it did for other groups. Perhaps this is a one-year anomaly, but it merits continued attention.	
10. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports. Comments: The program is relevant to the national priority of substantially increasing the number of U.S. scientists and engineers, as it provides scholarships to U.S. citizens and permanent residents with academic ability and financial need. Many talented students are receiving financial and programming support. We see many instances of success at both the level of institutions and individual students. Overall, the nation's science and technology workforce is being enhanced both by the training of scholarship recipients and by the development of innovative strategies for recruiting, retention, and mentoring that the program encourages. The program was established by the NSF in accordance with the American Competitiveness and Workforce Improvement Act of 1998.	YES
11. Additional comments on the quality of the projects or the balance of the portfolio: The S-STEM program is an important initiative that has reduced the financial burden on students with promising academic ability that may be prevented from obtaining an education due to financial need. Additional efforts to ascertain the percentage of scholarship recipients who go on to receive a STEM degree and understand why some scholarship recipients do not graduate or return to the program may help to improve the program and make recruitment more effective.	

OTHER TOPICS

1. **The S-STEM program's aim is to increase the number of talented students in STEM fields and the quality of education they receive. Are there possible changes to the program that you would suggest that could make the program more effective?**

The COV acknowledges that an aim of many of the proposals is workforce development. The COV recommends encouraging the exploration of partnerships or other means to supplement S-STEM funding to address specific workforce development needs by both the program and the PIs.

The COV recommends longitudinal studies (perhaps by external evaluators) of student scholars 5-10 years post S-STEM scholarship awarding to assess the effectiveness of the program in workforce development. The COV acknowledges the challenge of this recommendation, but encourages its development to provide assessment of the program and alumni resources for past scholars.

2. **Please provide comments as appropriate on the program's performance in meeting program-specific goals and objectives that are not covered by the above questions.**

The COV recommends the improvement in the dissemination of outcomes. Publications and presentations should be encouraged. The COV recommends the creation of a repository/online community of resources that could be accessed by current and potential PIs that contains results, best practices, etc. The COV also recommends the development of PI meetings to facilitate interaction among PIs and the dissemination of materials, be it a traditional conference or a virtual meeting wherein PIs of exemplary proposals would be presenters or lead discussion panel members.

3. **Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.**

The COV acknowledges the occurrence of partnerships across directorates and EHR programs. The COV encourages the continuation and expansion of these partnerships. The COV acknowledges that since S-STEM is geared toward student scholarships, partnerships could enhance research opportunities for students and allow PIs greater freedom to explore the effectiveness of the S-STEM program within their institutions.

4. **Please provide comments on any other issues the COV feels are relevant.**

The direction of the S-STEM program, multi- and interdisciplinary in nature, is to be applauded and the COV encourages the continuation of this path, particularly in view of the fact that a science or technology background leads to varied opportunities in the workforce.

As state and federal agencies are cutting support to colleges and student aid, scholarships through programs such as S-STEM are helping promising students continue their education and are promoting the creation of a more highly-skilled technical workforce, a key factor in our nation's

economic health. We commend the NSF and the S-STEM program for their leadership in promoting these laudatory goals.

5. NSF would appreciate your comments on how to improve the COV review process, format and report template.

The COV recommends that the electronic binder be made available in advance of the COV meeting for review.

The COV applauds the organization of the COV process. The process was comprehensive; the materials provided were complete and well-organized. We thank the S-STEM staff — Program Officers, science assistants and contractors — for their diligence and hard work in preparation for and during the COV meeting.

SIGNATURE BLOCK:

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NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM) COV
John P. Idoux, Chair