

**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](http://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.

<b>Date of COV: June 21-22, 2011</b>
<b>Program/Cluster/Section: Graduate STEM Fellows in K-12 Education (GK-12)</b>
<b>Division: Division of Graduate Education</b>
<b>Directorate: Directorate for Education and Human Resources</b>
<b>Number of actions reviewed:</b>  <b>Awards: 2008 (8), 2009 (8), 2010 (8)</b>  <b>Declinations: 2008 (8), 2009 (8), 2010 (8)</b>  <b>Other:</b>
<b>Total number of actions within Program/Cluster/Division during period under review:</b>  <b>Awards: 2008 (26), 2009 (27), 2010 (23)</b>  <b>Declinations: 2008 (75), 2009 (82), 2010 (123)</b>  <b>Other:</b>
<b>Manner in which reviewed actions were selected:</b>

**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.

<p style="text-align: center;"><b>QUALITY AND EFFECTIVENESS OF MERIT REVIEW PROCESS</b></p>	<p style="text-align: center;"><b>YES, NO, DATA NOT AVAILABLE, or NOT APPLICABLE</b></p>
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>Overall, the review methods and panel reviews were very appropriate for the program with opportunities to seek new reviewers (if necessary). Additionally, seeking reviewers from the K-12 environment, as well as non-university scientists, is a very good step.</p> <p>The materials provided to the reviewers were impressive and very detailed. The program has responded to the prior COV and has done a very good job in orienting panelists. Also, instructions have become much more explicit for the proposers — especially with respect to the kinds of outcomes that are expected in funded GK-12 projects.</p> <p>The instructions to reviewers were thorough. Providing webinars to orient and train the panelists proved to be an excellent idea. The panel approach is particularly valuable because it helps deal with the unevenness of the reviews.</p>	<p style="text-align: center;">YES</p>

<p>2. Are both merit review criteria addressed</p> <ul style="list-style-type: none"> <li>a) In individual reviews? Not Always (see below)</li> <li>b) In panel summaries? Yes (see below)</li> <li>c) In Program Officer review analyses? Yes (see below)</li> </ul> <p>Comments:</p> <p>Despite the best attempts of the Program Officers to train the reviewers, there was still a lot of variation in the depth of analysis. In some cases the reviewer neglected to answer these questions; in other cases, there is some ambiguity with respect to what information is being elicited by the question. This issue may not be unique to the GK-12 program.</p> <p>Even when reviews and analyses addressed both merit criteria, many panelist reviews are lacking in the analysis of exactly how the proposals met the merit review criteria. Nonetheless, in most cases, substantive comments to both awarded and declined proposals were provided.</p> <p>Comments to awardees vary greatly among all cases. In some cases, declined proposals were given substantive feedback, and in others they were not. The COV concurred that, in general, the feedback to the PIs of declined proposals was appropriate, given the degree of issues a proposal might have.</p> <p>The Program Officer review analyses tended to be thorough; however, even in these one can find substantive differences in content of intellectual merit and broader impact statements. The depth of the Program Officers' summaries justified their independent assessments — some of which differed from that of the reviewers.</p>	<p>YES, NOT ALWAYS</p>
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<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>Many of the reviews lacked any substantive summary comments. In some cases, the K-12 reviewers wrote more thorough reviews than some of their higher education colleagues, but in every panel there was at least one person who wrote very thorough reviews. Taken together, however, the reviews and panel summaries provided good overall assessments — rendering the panel approach especially important (in light of the unevenness of the individual reviews themselves).</p> <p>While the Program Officers are making a strong effort to encourage more thorough reviews, ways to identify those lacking in thoroughness may be appropriate. This issue is probably not limited to this program and could be NSF-wide or present in many situations involving peer review. The Program Officers are to be commended for the steps they have taken to address this issue.</p>	<p>YES</p>
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <p>The summaries were more than the sum of the parts in the sense that the summaries took the best of the individual reviews and also reflected the conversations that must have gone on about the proposals. The panel summaries also did a good job of presenting the rationale for the funding decision and emphasized the complexity of reviewing the proposals and the importance of the panel review process.</p>	<p>YES</p>
<p>5. Does the documentation in the jacket provide the rationale for the award/decline decision?</p> <p>(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.)</p> <p>Comments:</p> <p>Program Officer review analysis was quite thorough and supported the decisions that were made — even when there were differences in recommendations for funding amongst panelists.</p>	<p>YES</p>

<p>6. Does the documentation to PI provide the rationale for the award/decline decision?</p> <p>(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.)</p> <p>Comments:</p> <p>The documentation seemed to be sufficient, provided appropriate rationale for the award/decline decision, and was responsive to the last COV recommendation.</p> <p>The Program Officers also did a nice job of trying to offer constructive comments on declined proposals.</p>	<p>YES</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>There is a great deal of evidence in the COV portfolio that the Program Officers have been very responsive to the comments of the previous COV about the merit review process.</p> <p>The unevenness of the individual reviews continues to highlight the importance of the panel review process. The expectation of making more substantive summary statements should also be considered.</p> <p>The sketchiness of some of the reviews may be a result of too heavy of a workload on reviewers. Decreasing the workload on each panelist might increase the overall quality of the reviews.</p> <p>We commend the Program Officers for providing more details to the reviewers in an attempt to elicit better reviews (including what constitutes intellectual merit versus broader impact). We found evidence of this responsiveness in the materials we reviewed. More webinar training for reviewers (including examples of good/helpful and bad/unhelpful reviews) should be considered in the ongoing effort to generate better reviews.</p>	

**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
<p>1. Did the program make use of reviewers having appropriate expertise and/or qualifications?</p> <p>Comments:</p> <p>Based on the evidence we were given, there was a breadth of expertise in the review panels. It is commendable that reviewers from the K-12 sector are involved (and their reviews often were more thorough than their University colleagues).</p> <p>More reviewers with expertise in educational program assessment and the social sciences would be valuable.</p> <p>Also, because race and ethnicity are self-reported by panelists, there was not enough information to judge the extent to which panels were racially diverse.</p>	<p>YES</p>
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments:</p> <p>The process described was well thought-out. Program protocol is designed to help the reviewer determine COIs when they occur and the explanatory material related to this concept is more than adequate. A process clearly exists to resolve these conflicts when they occur.</p>	<p>YES on recognition</p> <p>DATA NOT AVAILABLE on resolution</p>
<p>Additional comments on reviewer selection:</p> <p>Assessing a GK-12 proposal is a complicated endeavor because it involves a lot more than simply judging the scientific merits of the proposal. GK-12 proposals describe models for facilitating working relationships between participants (including graduate students, teachers, K-12 students, research advisors, school administrators, parents, interested community members, and department faculty and graduate committees). Some of the goals of these groups overlap, but others may be in conflict. A GK-12 program model and the data that describe how relationships were built and the players were brought together to agree on and achieve a common set of goals is a critical aspect of the intellectual merit of</p>	

the GK-12 project. This is often overlooked, or at least not noted, in the reviewer summaries.

The increase in the complexity of proposals necessitates a larger base of reviewers. University faculty are required to evaluate the technical nature of the proposal and K-12 faculty are now participating to evaluate the effectiveness of the K-12 interactions. Assessment is an important ingredient in these proposals and specialists are required for that component because many STEM faculty may not have expertise in evaluation.

An important part of the proposals is social interactions and networks, and social scientists are now on panels. How can these proposals be effectively evaluated with four panel reviewers? If proposals are to be effectively reviewed, how does NSF carry out the review in order to provide an effective evaluation? Is a panel review alone the best vehicle for carrying this out?

**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:**

Sites visits have become an important part of program management and should be valuable to monitor the extent to which programmatic goals are being met. Twenty-five site visits were carried out since the last COV, and we were able to see two of them — but we would need to see how site visit reports were used to track project implementation and achievement of project goals.

**2. Responsiveness of the program to emerging research and education opportunities.**

**Comments:**

GK12 projects are interdisciplinary and tend to focus on research areas that are relevant to and of interest to the public. One of the concerns of the previous COV was a much greater number of funded projects in biology-related areas compared to other STEM disciplines. The program has addressed this well with a much broader set of program areas including computer science/ IT, energy and environmental areas (including climate change, and other biology-related areas such as biomedical engineering). The move to a greater focus on interdisciplinary themes related to science and engineering grand challenges and societal needs is quite commendable.

The program also is producing a cadre of well-rounded scholars, many of whom are publishing both in their content areas and in education journals. There are very few, if any, other programs funded by the NSF that can say they have made such an impact on our universities. GK-12 fellows who establish their careers in an academic setting have deep expertise in both their disciplinary area AND in connecting teaching with learning (both through pedagogical strategies and in knowing something about classroom assessment).

Overall, we do not feel that the international program added much to the GK-12 program. While having an international research experience can be a personally catalytic experience, this seems to stray from the main mission of the GK-12 program and might best be funded elsewhere. The comments made by the previous COV in this regard are still valid and the question of whether this should be a core activity of the GK-12 program is still open.

**3. Program planning and prioritization process (internal and external) that guided the development of the portfolio.**

**Comments:**

The portfolio of the program continues to be quite impressive and reflects excellent vision and management. Nonetheless, we are aware that the decision has been made to discontinue the program in its present form.

A challenge noted by the COV is where else within NSF the work of the GK-12 program could be done in the future. Since the goals and vision of the program are still very critical and are consistent with NSF's overall strategic plan and the national interest, NSF should be seeking ways to continue the major elements of this program in other directorates and Foundation-wide programs. The needs that led to the establishment of this program remain pressing.

It is also important to note that the GK-12 program has created a unique environment for training of graduate students that is not present in any other NSF traineeship program. The concern is that this environment will be very difficult to duplicate without the organized joint university-community effort that is catalyzed by this program.

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

##### Comments:

The program was highly responsive to the previous COV comments and recommendations and has provided detailed information to the reviewers on the reviewing process.

Site Visits: There have been 25 site visits made since the last COV. This is certainly a positive development. A template for those site visits and two examples of site visit reports were provided to the COV.

It is commendable that Einstein Fellows have been integrated into the site visit team.

Two of the stated goals of the GK-12 program are diversity and transformation of graduate programs. Neither of these two goals were mentioned in the template. Given the importance of these goals, they should appear on the template (in fact, for future sites, the templates might contain the goals that are to be met for that particular program).

In the two site visit reports that were provided, one report did not mention diversity at all and the other simply had one sentence. Transformation of the graduate program was addressed in one of the reports.

**IV. Portfolio Review.** Please provide comments on whether the program's portfolio goals are appropriate and whether the program has achieved its goals for portfolio balance.

***Programs should provide materials to the COV regarding portfolio goals and can insert specific targeted questions about their portfolios.*** (Some dimensions of portfolio balance to consider include: balance across disciplines and sub-disciplines, award size and duration, awards to new investigators, geographical distribution of awards, awards to different types of institutions, innovative/potentially transformative projects, projects with elements of risk, inter- and multi-disciplinary projects, projects that integrate research and education, and projects that are relevant to agency mission or national priorities).

A primary goal of the GK-12 program is to enable STEM graduate students to “bring their leading research practice and findings into K-12 settings.” Evaluation data provided in the November 2010 Abt Associates summary report indicates that GK-12 is meeting this goal and accomplishing the key NSF objectives for this program.

Portfolio goals include:

Discipline: The previous COV noted that biology was overrepresented with math and physics underrepresented. This has now changed with the portfolio reflecting a better balance across various disciplines (e.g., biology, math, engineering) and particularly across societal challenges and needs (e.g., climate change, environmental issues, nanoscience, computer science/IT, ecology).

PI Gender and Minority: The proposals reviewed reflect a trend toward less diversity in PI gender and minorities.

Awards to new investigators: A majority of awards are made to PIs with prior NSF award experience; although given the nature of this program, this should be expected.

Geographical distribution: The portfolio of awards reflects the goal of the program having a national impact. This is seen clearly through the geographical mapping provided in the tabbed data.

Awards to different types of institutions: The portfolio shows an adequate balance between research-extensive and less research-extensive institutions.

Innovative/Transformative grants: While most of the proposals claim to potentially have a “transformative” impact, this is a result to be determined rather than proposed. While the previous COV encouraged the program to support more innovation in the proposals, it is not clear this has been achieved or at least measured in a way to establish if the program has moved more in this direction.

Projects with elements of risk: A case is made that a few proposals include elements of risk (e.g., partnering with local science centers or partnering with a school that might be closed); however, this is not characteristic of the majority of the awards funded by the program. The GK-12 program has invested in projects that have some risk — although the risk is balanced by potential high impact.

In general, the program has achieved many of its goals but there remains a question of sustainability for many of the programs accomplishments. In particular, the COV notes the difficulty of achieving widespread infusion of GK-12 program elements across all STEM disciplines on host

campuses. The application format and protocol should require information about institutional mechanisms for achieving sustainability in post-initiative phases. An absence of programmatic activity designed to achieve such aims has an impact on all STEM graduate student training.

## OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.

- There seems to be little programmatic activity to leverage GK-12 to improve training of all STEM graduate students.
- Templates for proposals, site visits, and reviews, as well as standards for summaries, should all reflect the program's specific objectives. There have been 25 site visits made since the last COV. This is certainly a positive development. A template for those site visits and two examples of site visit reports were provided to the COV. In the two site visit reports that were provided, one report did not mention diversity at all and the other had one sentence. Transformation of the graduate program was addressed in one report.
- Two of the stated goals of GK-12 are diversity and transformation of graduate programs. Neither of these two goals is mentioned in the template. Given the importance of these goals, the stated goals should appear on the template (in fact, for future sites, the templates might contain the goals that are to be met for that particular program).
- Specific professional development goals for K-12 teachers should be formulated.
- Reviewers should be expected to complete a more analytical grant proposal review, including making substantive summary comments that relate to the overall rating of the proposal.
- In reading over the reviews, the efforts to increase diversity were often mentioned and diversity efforts were viewed as an important ingredient in the review process. However, achieving diversity is quite another matter. The Abt Associates report shows only a modest percentage of minorities participate as Fellows in this program, indicating that academia still has not been able to seriously address diversity issues.
- The fact that diversity played such a prominent role in the reviews indicates that many of the panel reviewers supported the importance of increasing diversity. In making a recommendation for funding for a proposal, most panel summaries indicated some issues that needed to be addressed. The review analysis by the NSF Program Officer recognized these deficiencies and asked the PI to address these issues. In many instances the lack of diversity efforts in the proposal were pointed out and these concerns were passed along to the PIs.
- Having NSF mention the importance of diversity to university faculty is one of the few instances where university faculty are forced to develop plans to increase diversity, and to some extent held accountable for that plan. An opportunity to discuss diversity in this context should not be missed.
- In reading over the annual reports, it appeared that some PIs did not address diversity issues. Though the check list that NSF Program Officers use asks for the race/ethnicity of participants, it does not have a category for diversity issues. Perhaps the check list can be changed to reflect the importance of diversity and recruitment efforts of the project. There might be other categories that should be included, like evidence for the transformation of the graduate program.

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.

- A primary goal of the GK-12 program is to enable STEM graduate students to "bring their leading research practice and findings into K-12 settings." Evaluation data provided in the November 2010 Abt Associates summary report indicates that GK-12 is meeting this goal

and accomplishing the key NSF objectives for this program. Performance is weakest with respect to institutionalization and diversity.

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

- Given the decision that has been made to terminate the GK-12 program, an important issue for the NSF is how to either create a follow-on program or incorporate the unique benefits of the GK-12 program into other programs or Foundation-wide efforts.
- Initiatives such as IGERT and GK-12 are developed to achieve special outcomes. Before termination decisions are made, it should be clear that program goals have either been accomplished or that plans for imbedding them in Foundation-wide programs have been developed.
- Attention to the peer review process and expectations for what makes a good, helpful, and thorough review should be set.
- In traineeship programs, ensuring that the dimensions of assessment described are appropriate for the proposed program models – this may require broader expertise on the review panels.
- Reviewer fatigue might be an NSF-wide concern. When the reviewer load is large, the quality of the reviews suffers.
- The number of minorities who are successful in obtaining NSF funding continues to be a problem. Without increasing the pipeline of minorities in undergraduate STEM programs this will continue to be a major problem.

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

- The overlap of the GK-12 and IGERT COVs is commended and promises to draw out possible synergies between these two traineeship programs.

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

- A number of the comments made by the previous COV have been incorporated with positive results for this COV.
- Very little guidance on the project management aspects of this process were provided prior to this COV convening at NSF. This is in contrast to fairly extensive pre-site guidance in other recent COV's (e.g., IIP). More attention should be given to this aspect in following COV's with the idea of working from best practices.
- More information on the area of expertise of the reviewers would be helpful.
- The amount of information that the COV is to process is immense. When this information is initially sent out, some kind of plan should be sent along with it to give more details about the best way to tackle the process — including a way to prioritize material review.

## OVERARCHING QUESTIONS

- a. What program changes/enhancements, including possible synergies across the training/fellowship programs, have the potential of increasing the impact of the programs?
  - Communication skills
  - Teamwork and collaboration skills
  - Pedagogy, knowledge, and expertise
  - The translation of science for the benefit of the public
  - Better metrics
- b. How can the expertise, benefits and learning realized by GK-12 and IGERT programs be infused across NSF graduate education efforts?
  - Better identify expertise, benefits, and learning
  - Capture best practices and broadly disseminate to graduate education programs, generally
  - It's time for a scholarly analysis of these two programs to determine whether they have broadly influenced graduate education.
- c. What are realistic goals for a traineeship program, both in terms of impact on the students and the institutions? Have GK-12 and IGERT met these goals.
  - Provide new systematic and nationally systemic pathways for trainees
  - NSF provides universities with the ability to carry out experiments on how to better train graduate students and to rethink graduate education
  - The best aspects of traineeships need to be institutionalized and made sustainable
  - Greater breadth while maintaining depth; recapturing the "Renaissance person"
  - GK-12 and IGERT have not fully met expectations regarding the participation of underrepresented minorities
- d. Concerns have been raised in the community regarding the ending of GK-12. What is the reasonable lifespan for an NSF traineeship program? What factors should be considered in determining their end and what strategies should be used in implementing their sunset?
  - NSF's DGE should develop, articulate, and disseminate information about the interrelationship and complementarities of programs within its portfolio.
  - Whenever a new traineeship program is initiated, NSF should articulate benchmarks for assessing when the traineeship has met its goals.
  - Additionally, traineeship programs should not be viewed under the same light as centers which have a 10-year period of funding vs. five years for traineeship programs such as IGERTs and GK-12s. The expectations of traineeship programs' sustained results and institutionalization should be considered accordingly.
  - There should be greater transparency in the evolution and decisions about the possible termination of a program.
- e. NSF supports graduate students primarily through RAs, fellowships, and traineeships. Are there other mechanisms, or variations of these mechanisms, that should be considered?

- In advancing the goal of integrating research and education, all NSF-funded Research Assistants must have a traineeship component to promote breadth. Examples can be drawn from the experiences of the IGERT and GK-12 programs.

**SIGNATURE BLOCK:**

For the GK-12 COV

Thomas F. George (University of Missouri–St. Louis), Chair

Louis A. Martin-Vega (North Carolina State University), Co-Chair