

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

The table below should be completed by program staff.

Date of COV: June 21-22, 2011
Program/Cluster/Section: Integrative Graduate Education and Research Traineeship (IGERT)
Division: Division of Graduate Education (DGE)
Directorate: Directorate for Education and Human Resources (EHR)
Number of actions reviewed: Awards: 8 (4 per year) Declinations: 8 (4 per year) Other: Pre-proposals: 16 (4 invited/not-invited per year)
Total number of actions within Program/Cluster/Division during period under review: Awards: 2009 (25); 2010 (20) Declinations: 2009 (74); 2010 (85) Other: Pre-proposals: 2009 (412); 2010 (434)
Manner in which reviewed actions were selected: Random Sampling

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
<p>1. Are the review methods (for example, panel, ad hoc, site visits) appropriate?</p> <p>Comments:</p> <p>The eJacket offers little evidence and no documentation of site visits.</p> <p>Reviewing pre-proposals through the dual proposal process is time-consuming and may take time away from more value-added activities like site visits.</p> <p>The orientation of panels via webinars was very impressive and comprehensive.</p> <p>The COV would be interested to see data on the webinar participation by panelists.</p>	<p>YES</p>
<p>2. Are both merit review criteria addressed</p> <p style="padding-left: 20px;">a) In individual reviews?</p> <p style="padding-left: 20px;">b) In panel summaries?</p> <p style="padding-left: 20px;">c) In Program Officer review analyses?</p> <p>Comments:</p> <p>For the most part, merit review criteria were addressed; however, some individual reviews do not give full consideration to broader impacts.</p>	<p>a) YES</p> <p>b) YES</p> <p>c) YES</p>

<p>Panel summaries were very comprehensive and addressed merit review criteria in an effective manner.</p> <p>The COV supports continuing the process of communication between Program Officers and PIs to resolve issues identified by the panel during the review process. Maintenance good documentation (e-mails, etc.) is important in this process, and the COV is supportive of doing this for selected proposals and not just any proposal where there is an issue needing clarification (i.e., only those on the bubble).</p> <p>The COV supports increased emphasis on the importance and impact of innovation during the review process. Additionally, the COV supports continued emphasis on the research activities as an essential component of IGERT proposals.</p> <p><u>COV Recommendations:</u></p> <ul style="list-style-type: none"> • Provide a clear and inclusive definition of “innovation.” • The NSF should consider ways to incorporate innovation potential into the reviews and give some thought to coupling innovation in with the other criteria of intellectual merit and broader impacts. 	
<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>For the most part, individual reviewers' comments were substantive.</p> <p>As previously mentioned, the orientation of panels via webinars was very impressive and comprehensive. This is evident in the detailed comments provided by individual reviewers.</p>	YES
<p>4. Do the panel summaries provide the rationale for the panel consensus (or reasons consensus was not reached)?</p> <p>Comments:</p> <p>Panel summaries provide sufficient rationale for panel consensus.</p> <p>The review analysis also offers a second review, further analysis, and a recommendation from the Program Officer.</p>	YES

<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>The eJackets include at least three reviews for each full proposal, a panel summary, and a review analysis. The review analyses provide insight on the relative importance of elements of the reviews as discussed by the panel. The rationale for award or decline by the Program Officer is clearly stated and based on the strengths and weaknesses of the proposal as made evident in the reviews and panel summary. In cases where the decision to make an award appears questionable due to limited support from the panel, there is documentation that the Program Officer raised questions with the PI that were answered satisfactorily.</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 context statements provide an inclusive summary of the number of proposals reviewed, the panel review process, and the deliberation of the ICC following the panel meetings. The reviews and panel summaries provided to the applicant are detailed and provide a clear rationale for the decision.</p> <p>The COV notes that it is critical to provide constructive feedback (both positive and negative) to all applicants, especially for first time PIs who submit proposals that are declined.</p>	<p>YES</p>
<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>The COV concurs with the decision to eliminate the pre-proposal stage of the IGERT review process.</p> <p>In the future, a more extensive use of industry and policy reviewers will be important to capture significant opinions on the newly instituted "innovation" component.</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>In general, the reviewers appear to be representative geographically and with respect to disciplines and fields/sub-fields of the proposals begin reviewed.</p> <p>There are more panelists from hard and natural sciences as opposed to social sciences presumably reflecting the distribution of proposals received.</p> <p>The COV has provided more specific analysis on the reviewers below:</p> <p>Geography The reviewers are geographically representative. In 2009-2010, as many as 43 states were represented on panels during the pre-proposal process; as many as 30 states were represented on full proposal panels.</p> <p>Type of Institution The COV review of sample IGERT proposals from 2009-2010, determined that reviewers and panelists represented Major Research Universities as well as smaller state universities. The COV notes lower representation among reviewers and panelists from minority-serving institutions (MSI); only approximately 5% of reviewers and panelists were from MSIs.</p> <p>Underrepresented Groups Gender Between 2009-2010, females were consistently represented on pre-proposal and full proposal panels. Out of 322 pre-proposal panelists, 123 were female (38.2%). Out of 111 full proposal panelists, 41 were female (36.9%). The IGERT program goal for female representation on panels is 40%.</p> <p>Race/Ethnicity The COV was unable to fully ascertain the racial and ethnic diversity of the IGERT panelists because demographic data are self-reported and only 25% of panelists self-identified their race and/or ethnicity. The IGERT program goal for minority representation on panels is 20%. Although the COV cannot provide conclusive data regarding minority representation on panels, the low percentage of reviewers and panelists from MSIs does indicate that panel diversity is an area that calls for further review</p>	<p>YES</p>

<p>as it is unlikely that the minority representation goal is close to being reached. For example, the Hispanic representation alone, listed Hispanic surnames were scarce on the list of reviewers of past IGERT proposals.</p> <p><u>COV Recommendation:</u></p> <ul style="list-style-type: none"> IGERT program staff should explore alternative methods for attracting greater racial and ethnic diversity among panel reviewers. Similar efforts should be made to attract more panelists from MSIs of all types. 	
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p> <p>Comments:</p> <p>Potential conflicts of interest were appropriately addressed.</p>	YES
<p>Additional comments on reviewer selection:</p> <p><u>COV Recommendation:</u></p> <ul style="list-style-type: none"> Incorporate more industry or non-academic panelists in the future to capture various perspectives on the “innovation” element of IGERT proposals. <p><u>COV Recommendation:</u></p> <ul style="list-style-type: none"> Create a non-academic category within the Reviewer Information Spreadsheet to capture industry and policy panelist data. 	

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:

IGERT remains an exciting program with the potential to transform science and engineering by training young investigators in broad areas of science that are important for the future by giving them the broad set of professional skills they need to be successful in their careers.

The program is managed with efficiency and effectiveness:

- The proposal review process is designed to advance the goals of the program. Potential applicants and panelists are clearly presented information about NSF and IGERT goals.
- IGERT has adopted best practices for program review that have improved the feedback to applicants over time and made the basis for decisions clear.
- PI workshops and the annual meeting provide opportunities for faculty and trainees to shape the program and share best practices with one another and the program staff.

The previous pre-award processes continue to improve. State-of-the-art technologies (IGERT website, webinars, and other electronic media) streamline the workflow and better support proposal panel reviews.

The NSF plans to reduce the workload of the NSF and the reviewer community by eliminating pre-proposals and restricting submissions to one per institution. This decision will place an increased burden on the universities and the PI community. In addition, it is important to recognize that the overall number of full proposals to be reviewed will almost certainly increase with this change. A rough calculation by the COV led to the estimate that the number of full proposals will be close to double.

COV Recommendation:

- The NSF should carefully assess the outcome of the plan to restrict institutions to one proposal per request for proposal (RFP) cycle to insure that the quality of proposals does not slip.

As noted above, site visits are infrequent and it is unclear how they are used currently to assess any given awardee.

COV Recommendation:

- The COV encourages more site visits. Priority for such site visits should be given to:
 - Investigating partnerships between minority-serving institutions and majority serving institutions with a goal of clearly establishing the quality of the linkage.
 - Evaluating institutional impact or change on graduate education.

Post award, the COV commends the NSF's ongoing efforts to obtain input from PIs and trainees through participation in a variety of meetings and workshops along with the IGERT Annual Report Web Survey. The COV notes the importance of the annual IGERT grantee meeting as an effective mechanism for sharing common experiences and developing best practices among the PIs, senior administrators, and the NSF on issues that are critical to increasing program impact and sustainability.

The COV recommends more attention to the following post-award issues:

Measurements:

- The Abt Associates Inc. report, *Bridging Disciplinary Divides: Developing an Interdisciplinary STEM Workforce* (October 2010), "examined degree completion and short-term professional outcomes of IGERT graduates and compared their outcomes with those of other STEM doctoral students. These survey data were supplemented by two other data sources; extant data from the population of IGERT Principal Investigators and IGERT trainees; and national data."
- "This [Abt] report is organized around five themes that reflect selected study findings:
 - IGERT Addresses Calls for Graduate Education Reform
 - IGERT Helps Students Obtain Advanced Degrees in Less Time
 - IGERT Prepares Students Well for Today's STEM Workforce
 - IGERT Graduates Surpass Non-IGERT Graduates at Integrating Multiple Disciplines
 - IGERT Training is Valued."
- The COV appreciates this initial Abt Associates Inc. report in its effort to quantify student outcomes.
- COV Recommendation:
 - The Abt Associates Inc. report should be disseminated widely to NSF stakeholders to give them some understanding of the success of the IGERT Program.
- COV Recommendations:
 - As a way of disseminating the lessons of IGERT education more broadly to the larger graduate education community, members of graduate schools and graduate programs directors should be invited to attend part of the annual IGERT meeting where these lessons could be presented to schools that have not had IGERT grants but could benefit from the experiences of those who have and possibly glean best practices that might be appropriate for their institutions.
 - NSF should distribute program evaluation materials (for example, the Abt Associates Inc. *Bridging Disciplinary Divides: Developing an Interdisciplinary STEM Workforce* report) to a broader audience including deans and graduate program directors at universities.
- Continue to use measures, such as publications and presentations, as indicators of student progress.
- Closely monitor student retention, graduation, and career outcomes; completion rates; and time to degree to generally provide a richer picture of who the IGERT students are, what they are doing, and where they are going.
- COV Recommendation: Broaden the measures of success:
 - Document changes at the institutional level as well as IGERT's broad effects on graduate education to complement already existing student data.
 - Capture institutional level changes/impacts in graduate education and where/why these changes occur at certain institutions.
 - What is the evidence that IGERT-initiated programs are being

- o sustained beyond the IGERT funding period?
- o What is the impact of IGERT on new faculty hires, job announcements, tenure decisions, growth of interdisciplinary appointments, and so on?
- Capture more information, particularly in renewals about national, state, and regional impacts, as well as commercialization and application of research products.
- o COV Recommendation:
 - Future COVs should see disaggregated data to know whether underrepresented minorities are being successfully recruited and retained by IGERT programs or whether a few successful programs give the impression of overall success on this front.

Points for Clarification:

It is not clearly documented how the PI's annual review is used by the program staff and what actions are taken based on the reviews.

It is also unclear as to how well NSF IGERT categories/guidelines are communicated to universities/institutions of higher education.

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

Comments:

The proposals funded successfully integrated research in NSF's high priority areas coupled with graduate education. Some IGERT projects connected research groups with industry, government, and local communities, thereby applying science to local or regional issues and communicating the value of science and graduate education to the public.

The COV endorses future efforts to connect IGERT projects to national innovation initiatives with the goal of applying knowledge to solve broad societal issues.

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

Comments:

The IGERT Strategic Plan and goals are well aligned with the NSF Strategic Plan and goals. The NSF Strategic Plan forms the framework in which the IGERT solicitation operates. The current IGERT portfolio reflects NSF investment priorities and goals in four key areas:

1. Transformative research achievements and discoveries in cutting edge interdisciplinary science, technology, engineering, and math.
2. Innovative interdisciplinary graduate education with curricular options, courses, interactions, and partnerships, including methodologies for developing trainees with the technical, professional, and personal skills to become leaders and creative agents for change in a globally engaged science and engineering workforce.
3. Informing the general public, undergraduates, and K-12 students about the innovative science associated with IGERT programs.
4. Broadening participation in STEM graduate education and research.

The budget contributions from other directorates indicate the commitment of these NSF directorates to IGERT. Moreover, the COV would expect that clear and demonstrable successes will continue to positively influence contributions from the directorates and offices that broadly fund IGERT awards.

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

Comments:

The responses to previous COV comments and recommendations were fully adequate and in keeping with the concerns raised by the COV.

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).

Comments:

- The portfolio goals are appropriate and well-balanced with respect to most NSF categories.
- Balance across Disciplines and Sub-Disciplines: The distribution and balance of the portfolio's themes and disciplines are adequate.
- Awards to New Investigators: It was not clear to the COV that IGERT-awarded PIs were as new to the funding system as the program indicated. (For example, only seven out of 45 PIs had no previous funding in 2009-2010.)
- The COV suggests that NSF rethink its public posture regarding how the program focuses on new investigators and better align the public position with the actual distribution of awardees.
- Geographic Distribution: The distribution is adequate, with the exception of underrepresented minority (URM) PIs and Investigators.
- Geographic Distribution: The NSF should continue to monitor the distribution of proposal funding to ensure an equitable distribution.
- Awards to Different Types of Institutions: The COV suggests that NSF explore the possibility of enhancing/increasing the number of IGERT awards given to master's level programs.
- Projects with Elements of Risk: The criteria for assessing risk are unclear.
- Inter- and Multi-disciplinary Projects: IGERT is staying true to its mission, and the NSF is to be commended for this effort.
- Projects that Integrate Research and Education: Again, IGERT is fulfilling its mission to integrate research and education.
- Projects Relevant to Agency Mission: IGERT is consistent with the goals of the strategic plan.
- The awards generally seem to be appropriately distributed across the NSF-identified themes. However, it is not evident to the COV how the current themes for the IGERT program were selected, but they seem appropriate and consistent with the NSF strategic plan.
- COV Recommendation:
 - Increased attention to the areas of food, water, energy, and climate change, particularly where there is ample opportunity for innovation.

OTHER TOPICS

1. Please comment on any program areas in need of improvement or gaps (if any) within program areas.
 - There should be more emphasis on enhancing URM representation on the review panels. Additionally, there should be more emphasis on the recruitment of and completion of degree by URM students in IGERT programs.
 - Provide more full data regarding URM student participation; disaggregate the data whenever possible to indicate the actual ethnic groups (e.g., Mexican-American and Puerto Rican participants).
 - Develop improved metrics for evaluating IGERT program accomplishments, starting at the institutional level.
 - Increase the emphasis on the role of ethics in IGERT curriculum.
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 endorses the emphasis on innovation defined as providing solutions to societal needs as envisioned in the new solicitation.
 - The COV encourages ongoing efforts to examine the IGERT Program's broader effects on graduate education.
 - The COV endorses the ongoing emphasis on global awareness in IGERT education.
3. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.
 - The COV encourages ongoing collaboration and support among NSF directorates for the IGERT Program.
 - To reiterate, it is not evident to the COV how the current themes for the IGERT program were selected, or if they were simply grouped into these themes based on the proposal topics. However, they seem appropriate and consistent with the NSF strategic plan.
 - The COV commends the current focus on sustainability. However, the COV recommends increased attention to the areas of food, water, energy, and climate change, particularly where there is ample opportunity for innovation. Explore opportunities for leveraging funding and collaboration with appropriate federal agencies.
4. Please provide comments on any other issues the COV feels are relevant.

None.
5. NSF would appreciate your comments on how to improve the COV review process, format and report template.
 - The information provided by the IGERT program staff was comprehensive, well organized, and easy to follow. The reference tabs in the annotated COV as well as the previous COV report were very helpful.
 - A more detailed description of the reviewer selection process and the reviewer pool should be provided for future COVs.
 - More explicit instructions should be provided as early as possible for future COVs regarding the COV process and the expectations of their work. This will give COV members more time

to read the materials provided, prepare their initial thoughts, and highlight any questions for NSF program staff in advance of the COV meeting.

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 complementarity 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 IGERT COV

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

Dr. James Siedow (Duke University), Co-Chair