

**Graduate Research Fellowship Program**  
**CORE QUESTIONS and REPORT TEMPLATE**  
**for**  
**FY 2012 NSF COMMITTEE OF VISITOR (COV) REVIEWS**

**Guidance to NSF Staff:** This document includes the FY 2012 set of Core Questions and the COV Report Template for use by NSF staff when preparing and conducting COVs during FY 2012. 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 provides 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 2012 REPORT TEMPLATE FOR  
NSF COMMITTEES OF VISITORS (COVs)**

The table below should be completed by program staff.

<b>Date of COV:</b> September 12 – 13, 2012			
<b>Program/Cluster/Section:</b> Graduate Research Fellowship Program (GRFP)			
<b>Division:</b> Division of Graduate Education (DGE)			
<b>Directorate:</b> Education and Human Research (EHR)			
<b>Number of actions reviewed:</b>  Awards: 48 (16/yr); 3 NRO (1/yr) Declinations: 48 (16/yr); 3 NRO (1/yr) Other (Honorable Mentions): 48 (16/yr)			
<b>Total number of actions within Program/Cluster/Division during period under review:</b>			
<b>Year</b>	<b>Awards</b>	<b>Declinations</b>	<b>Other (honorable mentions)</b>
2010	2,000	7,735	2,026
2011	2,000	7,678	2,064
2012	2,000	7,598	1,835
<b>Manner in which reviewed actions were selected:</b> Random Selection			

## 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>Panel review has been utilized in the past. It has been of high quality and very effective. Due to the large number of applications the program will begin to test a combination of online review and panel review. The COV applauds this effort as online review will allow for a broader range of reviewer expertise in the initial stage and a reduction in panelist burden during the in-person stage.</p> <p>The COV is delighted by the current plan to assign each application three reviewers in the new planned asynchronous electronic review process. (In current practice, all applicants are guaranteed two reviews, but only the applicants that rise to the top in the first round are guaranteed a third).</p> <p><b>Recommendation:</b> If this expansion to partial online review proves unworkable or infeasible, the COV recommends that a third reviewer be automatically assigned to any application that is deemed meritorious by <i>either</i> of the first two reviewers. This recommendation could also be implemented during the transition years from the current process until the electronic review is fully implemented.</p>	YES
<p>1. 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>	YES

Comments:

In most applications reviewed by the COV both criteria were addressed in individual reviews and, in all cases, both criteria were addressed in panel summaries. Program officer review analyses are not applicable in the GRFP.

The COV strongly affirms the goal of having applications reviewed holistically in the context of applying the NSF merit review criteria to the GRFP and applauds the many practices, large and small, that the program has implemented to ensure this type of review actually occurs. Examples include the extensive reviewer training, the elimination of the optional inclusion of the applicant's GRE score, and the carefully crafted order in which materials are presented in each application. A holistic review process is particularly important for the identification of "diamonds in the rough." This category includes meritorious candidates who have followed non-traditional paths to graduate school, who are members of a traditionally underrepresented group, or who have triumphed over adversity. A holistic review also ensures that otherwise outstanding candidates are not rejected for minor blemishes in their record or their application and enables the recognition of applicants whose extraordinary accomplishments in one area, perhaps research, and "only" strong performance in other areas, perhaps academic record.

Nevertheless, the COV recognizes that panels are composed of individuals, each with their own views, values, and biases and that each application can only be read by a limited number of reviewers. The COV also recognizes that natural tendency of reviewers to make safe, conservative decisions and to develop internal criteria or "checklists" that enable time-effective triage of applications. These tendencies work against the identification of "diamonds in the rough."

The COV therefore makes the following specific recommendations to improve the review process:

**Recommendation:**

The program should develop a strategy to ensure that panels think twice about rejecting applications on the basis of a single real or perceived flaw. For example, while research presentations and/or publications certainly strengthen the case for a GRF award, all applicants should not be held to this standard as applicants do not have equal opportunities. Similarly, while an outstanding GPA (e.g., top 2%) is indicative of intellectual potential, a "merely" strong GPA (e.g., top 15%) might be a consequence of extraordinary devotion and dedication to research or a slow start to undergraduate studies which the applicant learned from and then excelled.

**Recommendation:**

Continue to include discussions of implicit bias in panelists' training, and develop a strategy to discourage reliance on a checklist.

<p>3. Do the individual reviewers provide substantive comments to explain their assessment of the proposals?</p> <p>Comments:</p> <p>The COV reviewed 144 randomly selected applicant jackets for the years 2010, 2011, and 2012. In a number of the applications reviewed, more than one COV member noticed that some panelists provided non-substantive comments and limited justification for their ranking evaluations. Due to the frequency of occurrence in the sample, the COV makes the following recommendations.</p> <p><b>Recommendation:</b> Provide panelists with examples of meaningful proposal assessments that reflect holistic review as part of the panelist training before they begin reviewing applications.</p> <p><b>Recommendation:</b> Emphasize to panelists that their reviews serve two functions: rationale for decision and feedback to the applicant.</p> <p>The written comments serve two functions: (1.) they provide the panel rationales for reviewer's rankings of proposals and, (2.) they offer applicants a clear statement delineating why they did or did not receive an award. For function (1.), brief evaluations can increase the panel's applicant pool winnowing efficiency. For function (2.), abbreviated commentaries do not supply the applicants with an understandable appraisal of their proposals. The volume of proposals evaluated by each panelist demands that reviewers draft truncated commentaries.</p> <p><b>Recommendation:</b> Proceed with the planned implementation of partial online review as expeditiously as possible.</p> <p>Online methods will enable more scholars to participate in the review process by allowing them to evaluate proposals at a distance and on their own time schedules. Although substantive reviews and constructive feedback are useful to all applicants, they are particularly useful for level 1 non-awardees who plan to resubmit.</p>	<p>NO</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>Not applicable.</p>	<p>NOT APPLICABLE</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>The documentation in the jacket, the Recommendation Letter, the Division Director's Context Letter, and the Working Group's report provide sufficient rationale for award/decline decisions.</p>	<p>YES</p>
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<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>In the case of the GRFP, the term "PI" refers to the "Applicant". Applicants are provided with a context statement, verbatim panelist reviews and panel summaries. This is should be sufficient rationale for the award/decline decision. However, as described above reviewer comments are very brief and often fail to provide useful feedback to applicants. These are young scholars, and feedback on applications—successful or unsuccessful—can teach them how to write successful applications. These young scientists will be writing applications throughout their careers.</p> <p><b>Recommendation:</b> Remind reviewers of the dual purposes of their comments and provide examples of comments that offer helpful feedback to applicants.</p>	<p>NO</p>
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<p>7. Additional comments on the quality and effectiveness of the program's use of merit review process:</p> <p>The COV felt the effort undertaken by the Working Group to broaden the participation of underrepresented minorities by identifying 100 QG-2 applicants for awards was an important step in a very appropriate direction. The COV felt that the effectiveness of this mechanism could be enhanced by increasing the diversity of the input to the working group. This could be accomplished by either soliciting input from NSF colleagues in the research directorates (a process which has already been established by the GRFP) or by soliciting insights from panelists as part of the review process (as the COV believes that on-line reviewing will provide time efficiencies for such reflection).</p>	<p>YES</p>
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The COV made the following recommendations on the quality and effectiveness of the merit review process.

**Recommendation:**

Continue to emphasize the importance of holistic review.

**Recommendation:**

For each applicant consider having panels develop a "*promise profile*" rather than an accomplishments profile,(e.g. how an applicant has overcome adversity, creatively addressed challenges, persisted in the face of frustration, etc.). The GRFP is endeavoring to find and fund promising young scientists.

**Recommendation:**

Emphasize the importance of broader impacts to applicants, panelists, and letter writers.

**Recommendation:**

(Editorial change) In the instructions to letter writers on p. 7 of the solicitation (NSF 12-599) rather than relegating broader impacts to "other information to enable review panels to evaluate the application...", call out broader impacts specifically in the preceding list of important required items.

**Recommendation:**

When reference writers submit their letters in Fast Lane, have the submission page include a checkbox that must be clicked prior to presenting the upload page. The text associated with the checkbox should remind letter writers to explicitly address both scientific merit and broader impacts.

**Recommendation:**

Instruct applicants to explicitly label both the scientific merit and broader impacts sections (by bolding, perhaps) in essays.

**Recommendation:**

Instruct panelists during their training to look for both criteria.

**Recommendation:**

Instruct panel chairs to remind panelists to look for both criteria during the panels.

**Electronic Review**

The COV spent some time discussing proposed plans for changing the review process to **electronic review**. There are a number of benefits of an initial electronic review process. These include equalizing the number of proposals read by each reviewer, increasing the number of reviewers from diverse institutions and locations, ensuring the multidisciplinary proposals are reviewed by panelists from different fields, and allowing each proposal to be read by three reviewers. If the initial reviews then allow for "triage" so that fewer on-site panels review the higher quality proposals, then this will have the added benefit of more discussion of applications at lower cost. There are also some possible negative outcomes of electronic review. Most importantly, it may be more difficult to ensure that reviewers all share the same values and understanding of

<p>the criteria for holistic review.</p> <p>Nevertheless, the COV was unanimous in endorsing the rapid transition to electronic review and a two-stage process of asynchronous electronic review followed by on-site panels. The initial costs of implementation will be offset by reduced travel costs.</p>	
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**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>The GRFP program officers are to be commended for the work they do to ensure a diverse, highly qualified pool of reviewers. The COV sees the proposed transition to on-line review as the initial stage of the review process as an opportunity to expand the pool of reviewers and reduce the number of applications reviewed by each panelist. The COV also believes that there is value in having each reviewer review a sufficient number of applications to see the breadth of the quality.</p> <p><b>Recommendation:</b> The COV recommends that the program continue to be proactive in the recruitment of reviewers from industry and the national labs as their perspectives are important in the review process.</p> <p>With an increasing number of undergraduate students starting their education at community colleges, it is becoming increasingly important to include a community college perspective in the review process.</p> <p><b>Recommendation:</b> The COV recommends that the program expand its recruitment of community college faculty who hold a research doctorate in a STEM field to participate as reviewers and/or faculty from universities and colleges with strong articulation partnerships with community colleges.</p>	YES
<p>2. Did the program recognize and resolve conflicts of interest when appropriate?</p>	YES

<p>Comments:</p> <p>The COV saw a number of ways in which efforts were made to recognize and resolve conflicts of interest in the panelist and panel chair training and other materials provided to the COV. The COV is concerned that avoiding conflicts of interest may be more difficult in a transition to on-line review. To avoid COIs, reviewers must be given the opportunity to flag COIs on an application-by-application basis during the electronic review.</p>	
<p>Additional comments on reviewer selection:</p> <p><b>Recommendation:</b>  Proceed with the planned implementation of partial online review as expeditiously as possible. Moving to an on-line review process will allow greater diversity in the review panels and review of the interdisciplinary proposals.</p> <p>The COV commends the GRFP on becoming a Foundation-wide program and involving all of the directorates in the entire process, from the selection of reviewers to program officer observation of the panels to the Working Group evaluation and review of recommendations. The COV also commends the GRFP on the broad composition of the Working Group and on moving the panel review dates to allow more program officers to attend.</p>	

**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:

**A. Eligibility Criteria** The long standing eligibility limit is that applicants have completed no more than 12 months of graduate study prior to August 1 of the application year. This is how the program ensures that the Fellowships are allocated to those students who are early in their graduate studies. The one exception is for students who have completed more than 12 months of graduate study, but for which there was a break of more than 2 years since they were enrolled.

In 2011 this eligibility requirement was made more restrictive by prohibiting applications from students who have had a graduate degree conferred. Many graduate programs admit students to a master's degree program as the path to doctoral studies, and some students test out their fitness for graduate studies in a master's program. These students should not be held back from timely academic progress in order to maintain eligibility. And yet, the result of the new rule is that students are delaying degree conferral in order to meet GRFP eligibility requirements. This is counterproductive.

The COV affirms the decision to drop the GRE score requirement.

**Recommendation:**

Rescind the new rule prohibiting conferral of a graduate degree to allow students who complete a master's degree during the allowed 12-months of graduate study to be eligible for the GRFP.

Currently there is a prohibition against students who are enrolled in joint degree program.

**Recommendation:**

The COV suggests looking into how joint-degree students can use NSF funding for their core science classes (as distinct from the JD, MPP, or MD portions of a joint degree program), rather than excluding well-rounded, joint-degree candidates from the program entirely as is the current case.

**Recommendation:**

In addition, the COV recommends that the Working Group review the most common problems that lead to un-reviewed applications (1,242 in 2012) with the goal of insuring that there are no issues with the solicitation or the application process. This review may also lead to the development of more effective outreach materials.

**B. Announcement and Implementation of Policy Changes**

The policies governing the program affect each student's plans for their education during the five years of the Fellowship. Program policies also affect how institutions manage the program. Program policies also help faculty members to guide and mentor students. The GRFP program is to be commended for reviewing their policies and discussing them within the Working Group. However, GRFP must be mindful that changes in policy may have unintended consequences.

It has been observed that when proposals for policy changes are shared with the GRF Community (including Coordinating Officials, Financial Officials, Fellows, and Graduate Deans) for feedback, that stronger policies are the result. The plan for the new International Research Fund is a case in point. Initial ideas for program implementation were changed in part as a result of feedback from institutional representatives.

By the same token, there needs to be sufficient time once new policies are announced, for the policies to be understood and incorporated into institutional policies and practices and for Fellows to make educationally sound plans. Policies and detailed implementation procedures must be announced with sufficient lead time. Most importantly, new policies must not penalize Fellows by changing the "rules of the game" in the middle of their graduate programs.

**Recommendation:**

Share proposed policy changes (such as changes in eligibility, changes in program rules or new educational opportunities) with the GRFP community in their formative stages so that there is ample opportunity for institutions to provide feedback and for the feedback to be incorporated.

**Recommendation:**

Develop a GRFP policy review and implementation cycle analogous to the Annual Program Cycle. Optimally, policies and implementation guidelines should be announced at least six months before they take effect. Under no circumstances should policy changes be made retroactively; doing so can cause Fellows already holding the award to be unable to fulfill their educational plans. For example, restricting outside work, teaching or outreach activities restricts the long term plans that Fellows have made. (The COV also noted that this particular restriction—which was not ultimately implemented—contradicts program goals to produce scientists whose work has broader impacts.)

**C. Student's Activity Report and Faculty Certification**

Each year, Fellows are required to complete an Annual Activities Report, and then, as of 2011-12, Faculty Advisors are required to confirm the student's progress. The COV applauds the explicit inclusion of the faculty advisor into the oversight of Fellows. This provides an opportunity for an annual review of student progress and a mentoring conversation about how the student is developing as a scientist. In some graduate programs these conversations happen as a matter of course, in others they do not. The COV desires the process of confirmation to become an annual conversation between student and advisor to discuss progress in the last year and plans for the next year. This rationale for the confirmation process should be made explicit. In addition, there should be instructions provided to the faculty member as to what actions can be taken if the faculty member is not able to certify the student's progress.

**Recommendation:**

The Faculty Advisor Confirmation Form should be revised to provide clear and explicit instructions to the Fellow and to the faculty member. Instructions to the Fellow should include: print out your Activities Report and discuss it with your faculty advisor; after the advisor signs it, upload via FastLane. Instructions to the faculty member should include: read the student's Activities Report and discuss your advisee's accomplishments in the past year and her/his plans for the coming years; once you are satisfied, sign the form. If you are not, then do not sign.

The COV recommends the following language of Confirmation:

"I am the primary academic advisor for the student. I confirm that:

- I have reviewed the Fellow's Activity Report and discussed it with the Fellow
- This Fellow is making satisfactory academic progress by the standards of the Institution and

the Department/Program

- This Fellow's plans for next year will continue to advance the Fellow towards timely degree completion and a career as a scientist."

#### **D. Management of Institutional Grants**

The finances of the GRF program are managed via five-year grants to institutions. The start and end dates of these grants do not conform to the start dates for Fellows (June 1 and September 1). In addition, there are challenges with the closing of the grants. Institutions report that they receive contradictory information from NSF as to how to handle the small amounts of money that are sometimes left at the end of a grant cycle. Ultimately, these funds must be returned. This process of "clean up" should be expedited so that the new grants can begin on time. Extensions are not appropriate for these grants.

#### **Recommendation:**

The five-year institutional grant cycle should be timed for either June 1 or September 1.

#### **Recommendation:**

At the close of the five year cycle, institutions should be clearly instructed to return unspent funds.

#### **E. Outreach**

The outreach efforts undertaken by both the GRFP and its contractor ASEE have focused on Graduate Research Fellowship Program awareness. Numerous efforts have been undertaken to ensure both students and universities are aware of the program. As a result of these efforts the program receives approximately 12,000 applications per year for approximately 2000 awards. It is important to continue to ensure awareness of the program, but it is also important that the quality of applications is as high as possible. The COV recommends that both NSF and ASEE expand their outreach efforts to include guidance on preparing quality GRFP applications.

#### **Recommendation:**

The COV recommends that ASEE take full advantage of electronic and social media to provide students with strategies for producing the highest quality applications.

#### **Recommendation:**

The COV recommends that ASEE share best practices with faculty members on writing strong reference letters.

#### **Recommendation:**

The COV recommends that ASEE share university-level best practices for developing future GRFP winners with deans and department heads, and other staff on campus (such as McNair program directors).

#### **Recommendation:**

The COV recommends that the program continue to work with other directorates and program officers to share information and best practices on visits that program officers make to conferences and/or universities. The COV recommends that the program identify opportunities for sharing university-level best practices for developing future GRFP winners.

While the GRFP Program Officers clearly endorse the candidacy of "diamonds in the rough" the COV is concerned that some reviewers need further encouragement.

#### **Recommendation:**

The GRFP should prepare brief "profiles" of successful scientists and engineers who followed non-

traditional paths to their success or who were drawn from non-traditional backgrounds. These descriptions will be useful for both reviewer training and program promotion. For example, reviewers may view applicants with two years of community college experience in a different light after learning that a highly successful (white, male) MIT professor and NSF Center Director followed a similar trajectory.

Proposal/application writing is neither an innate ability nor a part of the standard undergraduate curriculum. Some institutions have well developed training and review programs to help their students develop strong applications. Others do not. The COV is concerned that this uneven playing field disadvantages many students.

**Recommendation:**

The COV recommends that the GRFP devote an increased percentage of its outreach budget towards the preparation of effective applications. By necessity, this implies that a lower percentage will be devoted to increasing the number of applications. This shift in focus is appropriate for such a well-established program which is well-known across the country.

To be effective, this outreach must be *specific and concrete*. The advice offered on the [current FAQ](#) is unlikely to guide an application from “almost” into a “definitely.” This outreach should be directed towards three separate constituencies: students preparing an application package, scientists and engineers writing letters of recommendation, and departments/institutions seeking to improve the competitiveness of their students.

While the COV recognizes that the presentation of “good” and “bad” examples of both student materials and reference letters would be useful to many; it is also a concern that such examples would be used as templates, which would stymie the desired holistic review. This should be avoided. The COV is also mindful of the difficulty of preparing a universal set of recommendations for all GRF applicants, as different communities and different reviewers have different values.

**Applicants:**

**Recommendation:**

One possibility that might be explored would be to interview recent GRFP panelists, asking them to describe the common problems and “red flags” they saw while evaluating applications. Much like the popular website/application “Yelp,” the final document (video?) could then highlight themes that arose multiple times without explicitly endorsing any specific approach.

**Letter Writers:**

**Recommendation:**

The COV suggests that the most effective means of impacting the quality of recommendation letters would be to provide a quick checklist of the most important 3-5 points that should be included in a letter of reference that provides helpful information to the review panels (e.g., Did your letter address both the intellectual merit and the broader impacts of the proposal?).

**Institutions:**

**Recommendation:**

The message should be that it is not the number of times at bat; it is the efficacy of the batters. While the GRFP should seek to promulgate best practices to help applicants developed at highly successful institutions, they should also articulate the institutional value of individual faculty member's service on review panels.

**F. Award Announcements**

The timing of the announcement of awards is extremely important as a number of parties need to respond when a Fellowship award is made.

For those applicants who are still deciding where to attend graduate school (Level 1 applicants) early notification is very important. Receiving the award may make these applicants more attractive to institutions that have not yet offered them admission. GRF awards have a ripple effect, if an admitted student has the GRF award, institutional funds can be offered to other applicants.

It is crucial that Level 1 awardees have sufficient time to communicate with the institutions to which they applied and understand the role that the Fellowship will play in their education. The GRF award is a plum award, and many awardees and Honorable Mentions are able to negotiate for a more robust funding package to acknowledge their achievement. In any case, new students should understand that they might well be able to receive a commitment for multiple years of funding from the institutions, beyond the terms of the GRF.

Students who are already enrolled in a graduate program (Level 2 and Level 3 applicants) may wish to change their plans to act as a research or teaching assistant as a result of the award.

For awardees at all levels, institutions (centrally and at the department level) must identify and allocate institutional funds to pay any shortfall between the NSF Cost of Education and institutional tuition and fees.

The deadline for accepting the offer of admission, per the Council of Graduate Schools, is April 15. It is crucial that students in Level 1 have sufficient time to communicate with the institutions to which they applied and understand the role that the Fellowship will play in their education. The COV noted that the target date for award announcements is March 15, but typically awards are announced two weeks later. Two weeks for students to make an informed decision is simply too little time.

**Recommendation:**

Continue to strive to make initial announcements of awards no later than March 15 and earlier if at all possible. Streamlining the review process through partial online review may make this more feasible.

**Recommendation:**

New Level 1 awardees should be offered guidance on questions to ask of their prospective institutions that will help them make wise educational choices. Examples are: "Given that I have the GRF, what will my funding package for the full five or six years of my graduate studies be?" Creating a resource on the NSFGRFP.org web site is an option.

**G. Award Start Dates**

New awardees have the option of starting their award on either June 1 or September 1. Experience from institutions indicates that new awardees may not have sufficient information to make an informed choice about start date. They may inadvertently make choices that shortchange themselves by electing a June 1 start when they should not. By the same token institutions that start before September 1 may expect students to select a June 1 start. It would be helpful to institute a process that ensures communication between a student and the institution so that students receive the maximum benefit from the award. From an institutional perspective, it is crucial to receive a list of awardees that will be enrolling at their institution once students have made their tenure declarations and before June 1. When this list is not available, there may be some challenges in ensuring a smooth flow of funds.

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

Comments:

The Working Group, which includes representatives from all Directorates, sets aside a small number

of awards to be allocated on a Foundation-wide basis. This allows the program to meet strategic and emerging needs of the nation. Application pressure is another measure of emerging research areas, as the nation's students, are at the cutting edge of research questions. The COV endorsed this approach.

Moreover, the ever-increasing number of multidisciplinary proposals is an important trend that the program must be aware of. As discussed in the section on multidisciplinary (IV-4), the COV encourages the program to increase the diversity of reviewers and use other strategies to give multidisciplinary proposals a fair review.

### **Recommendation**

Request that the Working Group look at the topics that are categorized by applicants as "Other" as a potential indicator of emerging subfields, with a view towards incorporating them in a future list of fields of study. The COV also requests that the Working Group look at fields that the foundation (e.g., the Emerging Frontiers in Research and Innovation Office) and the National Academies consider as emerging for emerging subfields.

The COV commends the GRFP on recognizing the ever-growing number of multidisciplinary proposals and adjusting the review process to meet those demands. The implementation of an online review process, and the new process whereby GRFP staff assign proposals to reviewers, will allow multidisciplinary applications to be reviewed by panelists from different disciplines, regardless of the panel to which the application is assigned.

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

Comments:

The Working Group meets weekly and has been effective in meeting its charge to “build on its previous work and continue to transform GRFP to a Foundation-wide program, fully integrated with all NSF directorate and office endeavors.” Their efforts have resulted in improvements in training of panel chairs and panelists, development of a plan for transition to the on-line system review process, and revision of the fields of studies, among others. Clearly, the Working Group is an effective mechanism for continuous quality improvement of the complex GRF program.

The COV applauds the efforts of the Working Group; in particular the changes that they have made to allocate fellowship awards beyond application pressure in each disciplinary panel by reviewing Quality Group 2 applicants to seek to award a higher percentage of the fellowships in fields under-represented in the proportion of US scientists. The COV also commends the Working Group efforts and process for awarding applicants who have interdisciplinary research plans, have been identified by panelists as having a high potential, or have highly discrepant reviewer scores.

### **Recommendation**

The COV strongly encourages the Working Group to broaden its mission to include awards of quality group 2 from under-represented groups at a higher percentage than the current national percentage for that group. The reason is that this higher percentage is needed to overcome underrepresentation for the long term, not to merely just meet it in the short term. There are several actions that could be taken to facilitate this process:

- 1.) The panelists could be asked to specifically address the applicant's potential to conduct quality research, in particular those students who have taken a non-traditional path to graduate studies. This is the development of a “Promise Profile” for each applicant, also

described in section I-7.

- 2.) During the review of Quality Group 2, the Working Group could extend its membership to include a more diverse group (of possibly external reviewers) who can provide a perspective on potential of students who have taken a non-traditional path to graduate studies.

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

##### Comments:

The initial responses to the 2009 COV were often quite short and unresponsive. The current COV was pleased to have received an updated set of responses to the 2009 COV. It is clear that the NSF and the GRFP staff have been very responsive to the recommendations in the last three years.

##### **Recommendation:**

The COV recommends that the updated response document be posted to the public COV website in order to document the responses for future COVs and for the public

The COV commends the GRFP for its agility in the face of extreme external pressures, while maintaining the excellence of long tradition. The COV finds that the GRFP has not only been responsive to the previous COV Report, but has been innovative in its evolution of the program while remaining faithful to its principles.

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

<p align="center"><b>RESULTING PORTFOLIO OF AWARDS</b></p>	<p align="center"><b>APPROPRIATE, NOT APPROPRIATE, OR DATA NOT AVAILABLE</b></p>
<p>1. Does the program portfolio have an appropriate balance of awards across disciplines and sub disciplines of the activity?</p> <p>The program currently has appropriate balance of awards across disciplines and sub disciplines of the activity based on the current mechanism of using application pressure to assign proportions to disciplines. This approach may not best serve the nation as it is underrepresenting women and minorities in comparison to the overall population.</p> <p>Women have made tremendous progress in education and the workplace during the past 50 years. In scientific areas, however, women’s educational gains have been less dramatic, and their progress in the workplace still slower. There continues to be an underrepresentation of women within science and technology fields within the distribution of awards made from NSF.</p> <p><b>Recommendation:</b> Consider developing a mechanism for increasing the proportion of disciplines such as physics, engineering, and computer science where women’s participation is particularly low.</p>	<p align="center">YES</p>
<p>2. Are awards appropriate in size and duration for the scope of the projects?</p> <p><b>Comments:</b></p> <p>The COV unanimously agreed that the size of awards is currently inadequate and has been inadequate for quite a few years. The Cost of Education rose in 2012 for the first time since 1998. This 14 year interval is too long. During this time, the cost of education has risen dramatically at both private and public institutions. The gap between the COE award and the actual cost of education, at both public and private institutions, has grown too large. The current economic situation renders the burden on institutions too high. Likewise, the GRF stipends no longer keep pace with institutional awards or with other federal fellowship programs. There are plans to increase the annual stipend in 2013 for the first time since 2004 (at which time it doubled) from \$30,000 to \$32,000. In fact, the COV noted that over 50 awardees declined the award in each year between 2010 and 2012. The COV presumes that this is because they received more lucrative offers from other sources.</p>	<p align="center">NO</p>

<p>At this critical time of national need for increases in STEM workforce and specifically science and engineering researchers in order to sustain US economic competitiveness, it is imperative that NSF remain cognizant of its leadership role in this matter. This program is one of the most important opportunities for investing in the future. Graduate students are our nation's seed corn.</p> <p>Action in this realm has impacts beyond the normal reach of the GRF Program. Other university, public, private, and corporate fellowship programs follow the GRFP's lead in setting stipend and cost of education levels. Regular but modest increases will help the program keep pace and maintain its leadership status. Shocking the system with large increases at long intervals does not serve the graduate education community, NSF or the nation.</p> <p>The COV understands that increasing award sizes in the current economic climate might meet some political resistance; however, the COV feels strongly that the program should develop a long-range plan for rational, regular, and modest increases in both the stipends and Cost of Education.</p> <p>The COV also endorsed the recently implemented policy that prohibited GRF fellows from accepting any other federal fellowship.</p> <p><b>Recommendation:</b> The COV is unanimous in recommending that the COE increase on a regular basis.</p> <p><b>Recommendation:</b> The COV is unanimous in recommending that the stipend levels increase on a regular basis, in part to keep pace with other federal fellowships (e.g., NASA).</p> <p><b>Recommendation:</b> The COV recommends that NSF develop a long term plan for regular, modest and rational increases in the COE and the stipend level without significantly decreasing the number of awards.</p> <p><b>Recommendation:</b> The COV recommends that NSF fund a grant to an independent entity such as the National Academy of Sciences or the National Research Council to conduct an in-depth study of the economics of graduate STEM education and specifically GRF stipend and cost of living levels.</p>	
<p>3. Does the program portfolio include awards for projects that are innovative or potentially transformative?</p> <p>Comments:</p> <p>The COV questioned the relevance of this priority to GRFP. At the same time, it was recognized that Level 1 applicants might bring "out of the box thinking" to the work they propose, and applicants from more advanced levels of preparation have the opportunity to connect with PIs conducting</p>	<p>YES</p>

<p>transformative research. From the documents provided, the COV noted that on average 2.5% of applicants each year report inventions among their accomplishments. However, it is not clear whether these inventions are transformative. The GRFP Student Highlights for 2010, 2011, and 2012 each presented profiles of innovative projects. It seemed to the committee that these were likely accomplishments of GRFs from Level 2. These included Level 1-4 applications.</p> <p>Societal transformation is not just confined to research activities.</p> <p>The COV reviewed a level 4 applicant who had strong research experience, but the student’s potential and history of impacting society was transformative. This student’s focus on seamlessly integrating research and outreach, at multiple levels, highlighted the necessity of investing as much in “transformative individuals” as transformative research.</p> <p><b>Recommendation:</b> The COV recommends extending the conceptualization of transformative beyond research to individual scholars.</p> <p>The GRFP has had past Fellows who since engaged in transformative research or had a transformative effect on society. These are successes that the GRFP should share with the community.</p> <p><b>Recommendation:</b> Highlight the transformative nature of the research done by past Fellows.</p>	
<p>4. Does the program portfolio include inter- and multi- disciplinary projects?</p> <p>Comments:</p> <p>The portfolio has had a steady increase in applications identified by the applicants as interdisciplinary/multi-disciplinary project from 2010 (24%) to 2012 (32%). Applicants denote the percentage for each discipline represented by their work.</p> <p><b>Recommendation:</b> The COV recommends that the Working Group define procedures for how interdisciplinary applications are reviewed and how the “home” panel should be determined to prevent applications from being moved to other panels in ad hoc manner.</p> <p>The COV supports the Working Group’s decision to seek a rating from the panel of the secondary discipline(s), which will be combined with the “home” score with the appropriate weighting.</p> <p>As GRFP moves to partial online review it will become possible to seek reviewers who can address the different areas that multidisciplinary proposals contain. GRFP will then have greater flexibility in structuring the panels.</p>	<p>YES</p>

<p><b>Recommendation:</b> The move to partial online review requires that the solicitation clearly articulate proposed changes within the review process, including the manner in which proposals are assigned to initial reviews.</p>	
<p>5. Does the program portfolio have an appropriate geographical distribution of Principal Investigators?</p> <p>Comments:</p> <p>The geographic distribution algorithm is working effectively.</p>	<p>YES</p>
<p>6. Does the program portfolio have an appropriate balance of awards to different types of institutions?</p> <p>There continues to be a large proportion of awards being made to applicants planning to attend the top-tier private institutions. The COV noted a number of possible reasons. One of the major reasons is that some of the top-tier private institutions provide guidance to their own undergraduates on how to prepare a successful GRFP application. The COV would like to see higher quality of applications from a broader group of applicants and institutions.</p> <p><b>Recommendation:</b> See the extensive recommendations on outreach in the Management section 1.E. Outreach.</p>	<p>NO</p>
<p>7. Does the program portfolio have an appropriate balance of awards to new investigators?</p> <p>NOTE: A new investigator is an investigator who has not been a PI on a previously funded NSF grant.</p> <p>Comments:</p> <p>All awardees are new investigators.</p>	<p>YES</p>
<p>8. Does the program portfolio include projects that integrate research and education?</p> <p>The GRFP by its very nature uses research as a mechanism for educating the next-generation of scientists and engineers. Thus, research and education are tightly integrated in all awards.</p> <p>In addition, the COV was delighted to find that many awardees propose educational activities designed to enrich the broader community, K-12 students, or current undergraduates. Such activities play an important role in the development of supported Fellows and are to be encouraged.</p> <p><b>Recommendation:</b> The GRF program must not impede student's ability to learn how to integrate</p>	<p>YES</p>

<p>research and education by prohibiting teaching or outreach activities while on tenure. Indeed, these should be encouraged and facilitated by the GRFP funding as long as the student's development as a scientist and researcher is not slowed.</p> <p>A small, but growing, number of awards support research activities that are specifically designed to improve STEM education. This is to be applauded. Nevertheless, the COV remains concerned about the effective review of the small number of applications within the current field structure.</p> <p><b>Recommendation:</b> Provide specific guidance to reviewers concerning small but emerging fields of study. This point deserves particular attention as the new electronic application process is developed. For example, applications that propose research on effective physics education may be less well reviewed by a physics research panel.</p>	
<p>9. Does the program portfolio have appropriate participation of underrepresented groups?</p> <p>Comments:</p> <p>There has been a steady increase in minority participation over the past thirty years and particularly since the termination of the Minority Graduate Research Fellows Program. Underrepresented minorities' and women's GRFP applications are in proportion to their representation within the sub disciplines in which they applied. However, for many disciplines and sub disciplines URM and women are still severely underrepresented with respect to the general US population. GRFP outreach can only address the underrepresentation problem to the extent that there are sufficient applicants from these groups. The general underrepresentation problem in science and engineering has to be addressed more broadly.</p> <p><b>Recommendation:</b> See the extensive recommendations on outreach in the Management section 1.E. Outreach</p> <p>The COV has concerns that measures of participation by women and underrepresented groups may be distorted by overrepresentation of an underrepresented group within a sub discipline while there is severe underrepresentation at the discipline level. Since application pressure determines the proportion of awards to a discipline, it is possible that full participation by a URM group in a small sub discipline would not be sufficient to offset overall underrepresentation at the discipline level. This is an artifact of the affinity of URMs for specific sub disciplines.</p>	YES
<p>10. Is the program relevant to national priorities, agency mission, relevant fields and other constituent needs? Include citations of relevant external reports.</p> <p>Comments:</p>	YES

<p>This program makes grants to support academically talented students in graduate programs, thus enabling them to enter the STEM workforce.</p> <p>The goal of this program is to recognize and help retain America's most talented STEM students, build a community of practice among them, raise the profile of the STEM profession, and leverage excellent scientists to collaborate with their peers to strengthen STEM in America's academic, public, and private sectors.</p>	
<p>11. Additional comments on the quality of the projects or the balance of the portfolio:</p> <p>The COV felt strongly that given the very early career stage of the applicants it is inappropriate for reviewers to use transformative potential as an assessment metric. The issue is that potential is highly open to interpretation (accurate assessment of transformation is done retrospectively rather than prospectively). The COV feels that when research <i>accomplished</i> by GRF recipients is transformative it should be properly highlighted and recognized (this now seems to be done effectively by the program). It wasn't completely clear how the program identifies transformative accomplishments, but it is important that these mechanisms be as robust as possible.</p> <p>While the COV felt transformative potential of the proposed research was not an appropriate metric for assessing GRFP applicants, members felt the concept of transformative is helpful in thinking about the applicants themselves - identifying those who are, themselves, transformative.</p>	<p>YES</p>

## OTHER TOPICS

### 1. Please provide feedback on the Nordic Research Opportunity for Graduate Research Fellows.

In an era of globalization of science, it is crucial to have an opportunity to help graduate students travel to conduct science around the world and to interact with and learn from other scientists. The international travel supplement has been missed since it was cancelled, and the Nordic Research Opportunity fund represents an interesting experiment for a new form of international research support. The COV applauds this experiment and noted that several interesting research projects were supported.

The COV was delighted to learn that the new global research fund is due to be announced in fall 2012. Moreover, the COV appreciated that the plans are being formulated by incorporating feedback from institutions and from across NSF.

Partnerships with other countries, who also subsidize the student's research, are beneficial. The COV also desires to see funds made available to subsidize students' research in countries that cannot offer direct research support. The COV is mindful, however, that directing funds to support international travel could affect other parts of the program. The COV noted that in 2011-12 nearly 30% of Fellows reported international experience. Clearly, international research and travel is not unduly hampered by the absence of GRFP funds. Most importantly, the COV does not want to see the number of Fellowship awards decreased to fund this opportunity.

#### **Recommendation:**

Move quickly to expand the Nordic Research Opportunity Fund to more countries, and thus to enable more Fellows to conduct international research.

#### **Recommendation:**

Do not decrease the number of Fellowship awards in order to fund this opportunity.

### 2. Please provide feedback on the Engineering Innovation Fellowship Program.

The COV commends the collaboration between the Engineering Education Division and the Division of Graduate Education for piloting the EIF program to give engineering fellows industry experience. However, the COV is concerned that the number of students taking internships is far below the positions available and that the internship experience survey indicates that over 40% disagreed that their advisor encouraged them to apply. It was not clear whether the faculty advisors offered no guidance (perhaps from lack of knowledge of the program) or whether they actively discouraged application.

#### **Recommendation:**

Change the requirement for two years of graduate education to one year of graduate education to reduce possible conflict between an internship and a student's advisor wanting to keep the student on campus,

#### **Recommendation:**

Encourage the Engineering Directorate to reach out to universities and engineering fellows to raise the awareness of this internship program

If the results from the EIF program continue to be positive<sup>1</sup> and that there are no serious negative impacts, such as lengthening the time to degree, the COV recommends offering similar industry internships to fellows in disciplines outside engineering.

**3. Please comment on whether the goals of the GRF Program are clear, whether they are clearly expressed to the community, and whether program policies are effective in promoting the goals.**

Yes, the goals of the GRF Program are clearly expressed to the community. As stated earlier, the COV is in favor of outreach targeting potential candidates to increase the number of quality candidates in a range of diverse institutions.

**Recommendation:**

Target women and minorities to meet the goals mandated by President Obama for STEM education and outreach.

**4. Please comment on types of information about the GRF portfolio that should be provided to the community.**

The COV talked extensively on outreach to the community through the use of social media. It has been suggested that social media be used as a tool to highlight diverse candidates and to encourage a stronger application pool. The COV discussed that the goal is not to drastically raise the numbers of those applying, but the quality and diversity of the candidates.

**Recommendation:**

Highlight the success of minority, women, and community college awardees to further encourage others to apply and participate.

**5. Please comment on the award selection process.**

The COV felt increasing the use of technology is an imperative for the Program and efforts to that end are applauded and fully encouraged. The entire COV felt it was important that the Program realize the goal of accomplishing online application review of the submitted proposals prior to the panel meeting for the 2013 award selection process.

The COV also supports the Working Group's efforts to broaden participation through selection of QG-2 recommendations for awards -- both the 100 selections based on key demographics and the limited number of substitutions made by program officers in QG-2.

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

No, it is sufficient.

**7. 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 GRF Program is one of the crown jewels of the NSF portfolio. The program has an outstanding track record of producing scientists and engineers who become field leaders in academia, in industry and in government. The program officers are highly responsive to individual awardees' circumstances, such as offering short term medical leaves and maternity leaves. This meets the program-specific goals of supporting young scientists.

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<sup>1</sup> 86% of participants felt the experience would enhance their studies upon returning to school; 50% said they have changed their future career or research plans because of the EIFP experience; and 79% said they are now more open to pursuing a career in industry.

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

**Recommendation:**

As previously stated, NSF should work to improve budget issues, ways to improve program performance/management, and increasing the award amounts for the costs of education and stipends.

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

**Recommendation:**

Note factual inconsistency in panelist reviews in the panel summary before declines are sent to the applicant. Thus, the applicant can understand that the factual inconsistency was not the determining factor in the decline. Consistency will breed confidence in the fairness of the review process.

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

The composition of the COV panel was very diverse along a number of dimensions. It was important to include members with direct experience as GRFP Panel members. The two day time frame allowed sufficient time to discuss the issues and begin to draft the report.

The program provided sufficient information and was responsive to requests for additional information. Given that there were over 100 documents to review, some members of the COV felt it would have been helpful to receive access to the materials with more lead time.

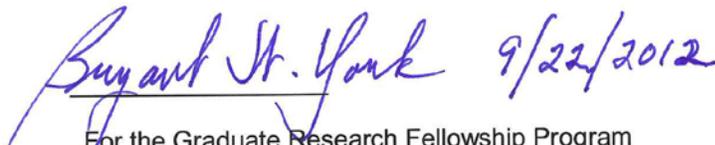
**Recommendation:**

One important document was the revised responses to the 2009 COV report. The current CCOV recommends that this document be uploaded to the public website..

**Recommendation:**

For the 2015 GRFP COV, it is recommended that one member of the 2012 COV be included, to provide continuity of discussion.

**1. SIGNATURE BLOCK:**

 9/22/2012

For the Graduate Research Fellowship Program  
Bryant W. York  
Chair