INITIAL RESPONSE TO 2006 GRFP COV REPORT

PART A. INTEGRITY AND EFFICIENCY OF THE PROGRAM'S PROCESSES AND MANAGEMENT

RECOMMENDATION: The program should select a small number of participating institutions for site visits. These should be universities/colleges that do not have the bulk of awardees. A possible outcome would be increased visibility of the GRFP on those campuses as well as additional applicants.

RESPONSE: The program office has conducted and will continue to schedule visits to individual institutions and to clusters of institutions that do not have the bulk of awardees. These visits will be coordinated with the outreach visits of the GRF Operations Center to optimize the number of institutions and students reached.

RECOMMENDATION: The GRFP should develop a web-based orientation process for panelists, ideally scheduled for one-week prior to the on-site application review.

RESPONSE: The orientation process for panelists is conducted in two phases. In the first phase, panelists are forwarded instructional materials, reviewer guidelines, and practice exercises electronically a month prior to the on-site review. The second phase consists of a one-hour briefing with questions and answers on site. The on-site briefing provides an opportunity for all reviewers to benefit from the information shared during the general session.

The program office will incorporate a web-based briefing to address issues such as intellectual merit, broader impacts, interdisciplinary applications, and conflict-of-interest prior to the on-site meeting.

RECOMMENDATION: Future COVs should receive a summary of feedback from panels regarding the review process. (We note that feedback is solicited via a form included in the Panelist Information Folder.)

RESPONSE: The program office provided reports summarizing the feedback from each panel review in the exhibits for the 2006 COV. These reports will be available in the notebooks for future COVs.

RECOMMENDATION: As NSF continues to expand electronic processing of applications, the program should develop electronic means to capture reviewers' comments.

RESPONSE: The program office will continue to explore the techniques for capturing reviewers' comments electronically. The support contractor currently performs this function external to the NSF Fastlane system.

RECOMMENDATION: An alternate review process should be considered for applications identified as "interdisciplinary." The current adaptation for interdisciplinary proposals seems to be an appropriate process to formalize as additional interdisciplinary applications are encouraged (See Section A.5.2 recommendation).

RESPONSE: The NSF Fastlane GRF applicant module identifies applicants whose graduate program of study and research cross disciplinary boundaries. The 2006 program solicitation includes a separate deadline for "interdisciplinary" applications to encourage more creativity and innovative approaches in pursuing graduate level research and education. These applications will be flagged as "interdisciplinary" and reviewed for the interdisciplinary aspect of the application. Special care will be taken to include reviewers with interdisciplinary experience on each panel.

RECOMMENDATION: When orienting panels, include some information about research on letters of recommendation, which might provide a useful framework for evaluating applications from men and women. Recent work by Virginia Valian emphasizes some specific ways in which the accomplishments and promise of equally excellent females and males are often presented and interpreted differently (e.g. Trix, F., & Psenka, C. [2003]. Exploring the color of glass: Letters of recommendation for female and male medical faculty. *Discourse and Society, 14*, 191 – 220).

RESPONSE: Specific guidance about letters of reference will be included in the briefing materials for reviewers' orientation and the 2007 Guide for Panelists based on a synthesis of research and writing about the topic. The intent is to minimize bias in the review of applications.

RECOMMENDATION: Although the overall pool of panelists may be balanced, more care should be taken to ensure that individual panels have better racial, ethnic and gender balance.

RESPONSE: The demographic profile of individual panels will be monitored to ensure a better racial, ethnic, and gender balance. Efforts are being taken to recruit more reviewers to fill the noticeable gaps. In addition, the template used to capture reviewer profile data has been revised to encourage more responses to the fields that identify individuals' race/ethnicity and gender so that the demographics will reflect more accurately the panel composition.

RECOMMENDATION: The NSF needs to begin an immediate and detailed review <of> the current funding model and implement changes to ensure the NSF Graduate Research Fellowships support research and education among more of the most capable science and engineering graduate students in the United States.

RESPONSE: The program office will develop a position paper framing the issue by describing the problem, summarizing the previous research and trends, presenting the recent changes adopted by other federal agencies and the rationale for those changes, and proposing a strategy to initiate internal discussion about this issue. The position paper will be forwarded to the division director by Spring 2007.

RECOMMENDATION: Utilize a wider range of strategies to attract applications from non-traditional STEM populations.

RESPONSE: The program office and the GRF Operations Center will continue to aggressively target institutions that produce and enroll a critical mass of non-traditional STEM populations and build closer alliances with relevant organizations such as scientific societies, professional organizations, and campus fellowship advisors. In addition to campus visits, workshops, and panel presentations, outreach strategies will be expanded to include regional briefings for clusters of institutions, wider distribution of promotional materials, and closer collaboration with other NSF programs such as Louis Stokes Alliances for Minority Participation and Research Experiences for Undergraduates sites.

RECOMMENDATION: As STEM fields become increasingly interdisciplinary, the program may want to encourage, specifically identify and track those applications that are truly interdisciplinary in nature.

RESPONSE: The GRF applicant module includes a field that identifies "interdisciplinary" applications and the core disciplines represented. The preliminary results of the 2007 competition show that 1,559 of the 8,336 applicants specifically identified their applications as interdisciplinary.

The 2006 program solicitation includes a separate deadline for "interdisciplinary" applications and revised language to differentiate those that propose to incorporate multiple disciplines in the proposed research plan, complete courses outside the home department, work on collaborative research projects with persons outside the home department, and blend the core disciplines seamlessly in the proposed professional development plan. The program will continue to encourage and track these applications.

RECOMMENDATION: Regional and/or web-based workshops should be offered to result in more successful applications from students at non-research institutions.

RESPONSE: The program office and the GRF Operations Center will expand outreach to non-research institutions to attract more applicants and to increase the success rate of applicants from those institutions. The outreach strategy will include regional workshops, web-based briefings, and more direct communication with academic deans and department heads.

RECOMMENDATION: Recipients' annual activity reports should include a clarification of this terminology <integration of research and education> to ensure that it is accurately reported.

RESPONSE: The program office will clarify the intent of integration of research and education in the revised program guidelines to ensure more accurate and consistent reporting of this information in the annual activity report.

RECOMMENDATION: The taxonomy of disciplines and sub-disciplines should be updated.

RESPONSE: The list will be updated for the 2007 program solicitation. The fields of study listed in the appendix of the program solicitation are aligned with those of the NSF directorates and the National Research Council taxonomy of disciplines for STEM graduate programs. Applicants are not confined to the fields and sub-fields presented and can select and specify "other" sub-fields under each field. This arrangement allows for the recruitment and review of cross-cutting applications.

RECOMMENDATION: Additional strategies should be developed to increase the number of applications submitted by underrepresented students. Nothing can be more important than training the next generation of leaders and scientists. Since large numbers of the PhDs produced in this country are from abroad, it behooves the country to encourage as many able young scientists in this country as possible.

RESPONSE: In addition to the expanded efforts to increase the number of applications from non-traditional STEM populations and more aggressive outreach to institutions with the fewest awardees presented earlier (A.1.1), the program office will continue efforts to attract more underrepresented minority applicants, including women and persons with disabilities, as well as applicants from rural communities. The GRF program collaborates with the LSAMP and Bridges to the Doctorate programs to recruit more applicants from that pool of participants. Efforts will be expanded to leverage CREST, HBCU-UP, and Tribal Colleges programs similarly. Preliminary data for the 2007 competition show an increase in the number and percentage of underrepresented applicants from that of 2006.

RECOMMENDATIONS:

- Give greater recognition and acknowledgement to the NSF GRF honorable mention (HM) recipients. Notify the graduate school at which the HM is enrolled. The HM's graduate school of enrollment is then more aware of and can encourage and support the HM (if they are eligible) to apply to the GRFP the following year.

Response: The names of Honorable Mention recipients are posted on the NSF Fastlane GRFP website. The program office will explore ways to elevate the attention given to this designation and to encourage more HM recipients to reapply.

- Identify the GRFP applicants by level (i.e. graduating senior, first year graduate student, etc.) and notify their respective institutions. Presently, universities are not aware of applicants until awards are made; and, even then, universities are not aware of the entire pool of internal applicants. The action of identifying and notifying NSF applicants informs and allows the student recipient's current institution of enrollment to support student applicants in their quest to succeed.

Response: The program office includes applicants by level in its reports of each competition. GRF applications must remain confidential until official award decisions are made.

- Notify the institution's NSF coordinator or NSF university representative about the status of his/her institution's applicants (similar to U.S. Dept. of State's management of Fulbright applicants) and provide a list of NSF awardees – not only those currently attending the particular institution but also those who will be attending as incoming graduate students. Institutions are not notified about which students from their institution are finalists. Institutions are only able to access the list of finalists after announcements are made regarding awardees and honorable mentions.

Response: The integrity of the NSF merit review process requires confidentiality up until an award is actually offered.

- Provide each institution's NSF coordinator or NSF university representative access to their institution's NSF fellows' activity reports (that are required to be completed several times during the academic year). By doing so, reports can be shared with university community members and others in support of the NSF fellow.

Response: NSF Fellows are required to submit activity reports annually in the spring, but they can amend these reports anytime during the academic year. The program office plans to enhance the management system by providing coordinating officials' access to their fellows' activity reports. Implementation is planned for Spring 2007.

- It is important to more directly inform our nation's legislators about the achievements of GRFP recipients. An added benefit from this approach is that this would also promote the program and attract highly talented students to apply. The COV recommends that senators be informed on an annual basis by identifying the newly selected GRFP recipients who graduated from their respective state's high schools. For example, last

year the GRFP awarded 50 fellowships to GRF recipients who graduated from high schools in Massachusetts and 103 awards went to students who graduated from California high schools. Given the large investment of capital and support provided by the U.S. Congress, it is imperative senators gain a greater understanding of, and appreciation for, the impact that the GRFP has on their respective state's constituents.

Response: The program office is working with the Office of Legislative and Public Affairs toward a more aggressive public relations strategy to inform key constituents of the significance, accomplishments, and impact of the GRFP. This includes press releases and an annual report that highlights applicant and fellow statistics and descriptive information.

PART B. RESULTS OF NSF INVESTMENTS

RECOMMENDATION: The GRFP should be focused on developing diverse, competitive and globally engaged future ***leaders*** since these fellows, as a group, constitute an elite group of graduate students.

RESPONSE: The COV noted the program's success in gender and disciplinary diversity compared to the overall pool of citizens and permanent residents in graduate programs. However, there is a need to increase the number of underrepresented minority fellows. The program office will implement alternative strategies to increase the number and enhance the quality of applicants from this pool as presented earlier. (Refer to A.1.1, A.4.3, A.4.8, and A.4.11)

RECOMMENDATIONS:

- In order to approach parity, the COV recommends that the NSF should set a goal of increasing the number of applications from underrepresented minorities to at least twice the current number.

RESPONSE: The program office will continue its efforts to significantly increase the number of applications from underrepresented minorities to the fullest extent possible. The proposed strategy to accomplish this is presented in response to recommendations A.1.1, A.4.3, A.4.8, and A.4.11. The preliminary data for the 2007 competition shows an increase in the number and percentage of applicants from this group.

- ASEE has used a combination of advertisements and regional visits to stimulate interest in the GRFP. They have done a good job of targeting those regions of the country with large numbers of underrepresented minorities and have partnered with LSAMP programs and some REU sites in several states. Judging from the agendas provided for those meetings, it appears that the outreach efforts are little more than information sessions. While these sessions may provide encouragement, students may need more detailed

workshops to be successful applicants. The COV recommends that the ASEE be directed to use other tools such as web-based seminars and mentoring to provide support for students and faculty, particularly at institutions that have less experience with successful applications.

RESPONSE: The program office will work closely with ASEE to incorporate more of these strategies into their program outreach and publicity plan. Much of the direct intervention will be accomplished through collaboration with campus officials such as fellowship coordinators and graduate schools and with other NSF programs that are designed to provide direct intervention.

RECOMMENDATIONS:

- External evaluation should endeavor to understand how students take their three years of funding within the five-year time frame to see if there are currently any differences in gender or race/ethnicity.

RESPONSE: The GRFP plans to issue requirements for a formal external evaluation and longitudinal study to be initiated in 2007. In addition, the program office plans to launch a series of focused studies to examine topical issues. The evaluation and studies will include data to help inform the NSF about trends such as the one cited.

- To encourage faster Ph.D. completion a bonus could be provided to fellows completing the degree within 6 years.

RESPONSE: The program office is exploring ways to capture degree completion data by fellow and institution. The current budget will not allow for additional financial bonuses.

- The GRFP is a good source of exemplary students that can serve as role models. Hence, we recommend that the NSF work to create more widespread media coverage of their work in order to motivate more students around the country to pursue STEM fields.

RESPONSE: The GRFP will enhance its public relations and outreach efforts as described earlier. (Refer to A.1.1, A.4.3, A.4.8)

RECOMMENDATION (a): The GRFP should compile statistics on the fellows' Activities Reports regarding the time spent abroad on research and the number of international trips to present at conferences so that global participation by US students is more vigorously promoted.

RECOMMENDATION (b): Only about 100 students use the $1000 international supplement each year. The GRFP should highlight the work of these students and encourage others to explore international options for study. Science is a

global enterprise and it is important for the next generation of the nation's scientific leaders to be knowledgeable about the best in international science and comfortable in international collaboration.

RESPONSE: Although few students use the $1,000 international research travel supplement each year, 666 reported international experiences in their annual activity reports for 2005-2006. Additionally, there are 71 fellows studying full-time at 28 institutions abroad for 2006-2007. The program office will continue to include examples of international activities in nuggets, annual reports, the GRFP web page, presentations, and program briefings to highlight the importance of global experiences in graduate education.

RECOMMENDATIONS:

- As appropriate, other programs and directorates should be encouraged to take advantage of the innovations developed by GRF fellows in K-12 outreach. Fellows should also be encouraged to share their expertise with local schools.

- The fellows would benefit from knowing what their peers are doing in integrating research and education, engaging societal problems, conducting outreach to K-12., and participating in international studies. It is not clear, even at institutions with large numbers of fellows, that there are adequate opportunities for this kind of exchange. NSF should consider ways of using technology to inform the fellows of the work of their peers.

RESPONSE: The program office and the GRF Operations Center will continue to encourage institutions to publicize the accomplishments of their fellows through campus media, to encourage fellows to serve as program ambassadors and resources for campus forums involving other fellows, to seek opportunities to serve as speakers for local events, and other similar activities. The program office also will try to connect GRF fellows with GK-12 fellows on the same campus. Internally, the program office will provide better feedback to directorates and programs through briefings and other appropriate forums, including an annual NSF Fellows Conference that is being considered for 2008.

PART C. OTHER TOPICS

RECOMMENDATION: The GRFP should consider guiding applicants to apply to and engage in interdisciplinary fields of study that address the national needs identified through STC, ERC, and other high-profile funding. Both applicants and reviewers could be provided with a summary of these key areas of study that could have a particularly important impact on the future development of science. These references could change each year in order to respond to new areas of study that need to be identified, and challenges that need to be addressed in this country and in the global enterprise.

RESPONSE: The GRFP program solicitation emphasizes the importance of innovation and creativity in fellowship applications for applicants and reviewers. It also includes a taxonomy of "fields of study" that enable interdisciplinary applications as well as those that are more traditionally disciplinary. Applicants are instructed to present themselves as potential "leaders" in the STEM workforce and to focus on national priorities.

RECOMMENDATION: Consideration should be given to engaging institutions who receive NSF Fellows in the process of tracking their fellows' progress and reporting it to the NSF through FastLane. It also would be helpful for institutions to develop resources to assist those Fellows who are not progressing as they should.

RESPONSE: Coordinating officials currently are responsible for tracking their Fellows' progress and reporting it through the Fastlane Graduate Fellowship Management System. The program office will encourage institutions to have more direct intervention with Fellows to facilitate their professional development or attainment of their research and educational goals.

RECOMMENDATION: The NSF should seek more funding from Congress and/or reallocate the NSF budget to provide more money in order to (1) increase individual GRFP stipends, (2) increase the number of GRFP awards made each year, and (3) increase the cost of education allowance. It should be noted that recommendation #2 was made in the COV report in 2003, but flat funding in 2004 and 2005 and a decrease in 2006 made their recommendation impossible to implement.

RESPONSE: The program office will support the agency's budget proposals to the fullest extent possible by providing performance data and other information.

RECOMMENDATION: If the Cost of Education (COE) allowance is increased, the NSF should work with institutions to give students flexibility to use new funds to help meet these costs.

RESPONSE: The Cost-of-Education allowance is a fixed amount awarded to and administered by the institution. The current program guidelines recognize the differences in the actual cost-of-education among institutions and allow considerable flexibility in the use of the COE. The program office will always work with the institutions to provide as much discretion as possible in the use of the funds toward the support of the students' graduate education.

RECOMMENDATION: NSF should make a more serious, permanent commitment to providing adequate staffing in support of the program's continually changing roles and responsibilities to gaining greater public confidence in the value of S& E research and education.

RESPONSE: This recommendation was made in observation of the volume and complexity of the program and its increased relevance to national priorities and the NSF mission. The program office will assess the short-term and long-term infrastructure and resource requirements for the GRFP to function effectively and to meet the changing needs of the major stakeholders. This information will be forwarded to help guide internal discussions about resource allocations.

RECOMMENDATIONS:

- Closer cooperation among GRFP, LSAMP, AGEP, and REU programs should be encouraged to support applications to the GRFP from underrepresented students in order to address the nation's scientific manpower needs.

- All directorates benefit from the GRFP fellows; and, outreach by all NSF directorates should include efforts to increase GRFP applicants and reviewers from traditionally underrepresented populations.

- It would be useful for NSF to determine how many faculty and researchers at US universities and colleges are alumni of the GRFP, highlighting the longitudinal impact on preparation of the of the nation's existing scientific workforce. This could be accomplished by adding a checkbox to the PI profile. If checked yes, then identify current post secondary institution of employment.

RESPONSE: These recommendations pertain to the need to encourage "broader participation". They have been addressed earlier in this report. (Refer to A.4.11 and B.1)

RECOMMENDATION: The practice of "double dipping" should be closely monitored as this practice continues to expand.

RESPONSE: Under the current program construct, fellows may reserve the NSF fellowship for up to two years to utilize alternative funding such as other fellowships. This leveraging is a comparative advantage of the GRFP and considered an enabler for fellows to complete the masters' and Ph.D. However, the practice will be monitored to ensure that it accomplishes the intended purpose.

RECOMMENDATION: The COV recommends that the next assessment conducted by GRFP provide some consistency in questions with previous reviews so that longitudinal measures can be established. In addition, the past 10 years have produced a number of requests for reform in Ph.D. education, starting with the 1995 COSEPUP Report1 that specifically addressed the education of scientists and engineers. The next GRFP evaluation should use these reports for guidance in developing questions regarding the experience of

fellows in a variety of disciplines that are primarily under institutional control but that address research fields considered important for the preparation of the next generation of scientists.

RESPONSE: The program office is completing the requirements for the next formal evaluation. This recommendation will be used to guide those requirements.

RECOMMENDATIONS:

- Provide the COV with a CD containing program information prior to the meeting.
- Refine the use of web-casting for briefing the COV prior to the meeting.
- Use a shared drive for the template during the review. This expedited the work of the COV.
- Maintain continuity in the review process by including a member of the last COV on future committees or schedule a briefing by the past chair of the COV to permit questions and confidential dialog that can inform COV efforts and reduce duplication.

RESPONSE: The 2006 COV received a CD containing program information prior to the meeting, was the first to use web-casting for the COV orientation, used a shared drive for template during the review, and included a member of the last COV for continuity. The GRFP will make use of the recommendations to improve the efficiency of the COV process for the next review.