

**NSF'S SENIOR MANAGEMENT INTEGRATION GROUP (SMIG) RESPONSE
TO THE COMMITTEE OF VISITORS FOR THE
FACULTY EARLY CAREER DEVELOPMENT (CAREER) PROGRAM
December 14, 2001**

The first Committee of Visitors (COV) review of NSF's Faculty Early Career Development (CAREER) Program took place May 2-4, 2001. The COV comprised eighteen members representing the wide range of science and engineering disciplines supported by NSF. NSF provided the COV members with opportunities to examine review procedures, proposal files, statistical program data, and annual and final reports of a broad range of CAREER funding programs in all NSF Directorates and OPP.

On July 30, 2001, the CAREER COV submitted a report describing their assessment of the program. The report has since been given careful consideration by NSF staff, including the CAREER Coordinating Committee and NSF senior management.

This document describes NSF's response to the recommendations made by the COV.

Overall Goals and Performance

COV Recommendation I.

Strengthen the emphasis on integrating research and education, by:

- **making selected examples accessible on the web and presenting them at workshops, and further clarifying proposal solicitations, so as to provide better information to prospective applicants about the intent of CAREER and possible methods of integration;**

NSF Response: The Foundation has been developing strategies to communicate what is meant by "Broader Impacts" criterion for the benefit of all proposers and reviewers. This has been a high priority for NSF for all of the agency's programs. We are moving towards strictly requiring sufficient information about the "Broader Impacts" criterion in proposals, abstracts, proposal documentation, and annual and final reports for all NSF programs. The issue is being addressed in the GPG, program solicitations, and FastLane for all programs. Work is underway to clarify the wording for the "Broader Impacts" criteria to explain more fully what that criteria entails. In addition, representative examples of activities (across all NSF programs) that integrate research and education have recently been developed with the assistance of directorate/OPP Advisory Committees as part of a strategy to increase proposer/reviewer consideration

of "Broader Impacts" criterion activities. These representative examples will be posted on the NSF web site prior to releasing the FY'03 CAREER competition information.

NSF is developing new language for inclusion in the FY'03 CAREER solicitation to strengthen its emphasis on integrating research and education. To provide potential grantees and reviewers with examples of activities that integrate research and education, we will first take steps to ensure that CAREER award abstracts fully explain awardees' plans to integrate research and education. Potential applicants will then be encouraged to review these abstracts before preparing their career development plans. In addition, the CAREER Coordinating Committee has additional activities underway to clarify the intent of CAREER and possible methods of integration of research and education.

- **developing assessment indicators for awardees to use over the course of their award within the mission of their institution, to assess the progress, impact, and outcomes of their education and career development plans;**

NSF Response: NSF is planning a comprehensive evaluation of the CAREER program in FY'05, which will be the 10th year of the program. The evaluation will include the development of indicators of success for the integration of education and research. The assessment indicators will be formulated in such a way that PIs and universities can select appropriate indicators from the list to evaluate individual programs and the overall CAREER program. NSF will also revise the annual/final report guidelines for CAREER awards to make explicit the need to address the impact and outcomes of the education and career development plans.

- **once assessment indicators are disseminated, instructing program directors to return annual and final reports that do not contain sufficient information about progress, impact, and outcomes;**

NSF Response: This problem is not unique to CAREER. Many COVs have expressed concern that annual and final reports do not contain sufficient information about impact and outcomes especially related to Criterion Two. As indicated in the response above, we plan to provide guidance to CAREER PIs in reporting requirements for annual and final reports. Once this guidance is in place, we will encourage program directors to return reports that do not contain sufficient information about progress, impact, and outcomes.

- **strengthening institutional buy-in and respect for awardees' education plans during the award, and afterwards; and**

NSF Response: This is a critical issue -- one that requires balance in achieving institutional buy-in for CAREER awardees without overstepping the boundaries between NSF and institutions of higher education. The Foundation continues to try different mechanisms for ensuring meaningful departmental endorsements. When we required unrestricted letters of endorsement, there was concern about equity and fairness.

Some letters were essentially letters of recommendation and some promised financial contributions if an award was recommended. In an attempt to level the playing field, NSF instituted the three-line endorsement requiring the same language for all. This has not proven to be particularly helpful either. As a compromise, we are recommending an expanded Departmental Endorsement. The endorsement would consist of three components: (1) the current three-sentence endorsement statement attesting to the support of the career-development plan; (2) a description of the support that will be provided; and (3) a verification of the CAREER eligibility information that the PI self-certified in the application process.

There is a current reporting requirement that annual and final reports be approved by the awardee's department head or equivalent, thereby reaffirming the department's endorsement of the work plan and continuing partnership in the individual's career development. We plan to bring increased attention to this requirement and make sure the rule is enforced. We feel that these combined steps will strengthen institutional buy-in and commitment to the awardee.

- **designing a declination letter for CAREER proposals that does not leave the impression that the proposal was reviewed on its research merits only.**

NSF Response: The NSF declination letter template reviewed by the COV has already been replaced with a template that corrects this impression.

COV Recommendation II.

Achieve broader diversity of proposing individuals and institutions by:

- **staging regional workshops for eligible investigators, specifically including those whose CAREER proposals have been declined;**
- **reaching out to types of institutions other than the major research universities, such as minority-serving institutions, predominantly undergraduate institutions, and those in EPSCoR jurisdictions;**
- **assisting professional societies in presenting sessions or workshops about CAREER as part of their regular meetings.**

NSF Response: NSF will strengthen information dissemination about the CAREER program through NSF Regional Workshops, EPSCoR conferences, special sessions at professional society meetings, and at meetings held at predominantly undergraduate and minority-serving institutions. The CAREER Coordinating Committee (CCC) is developing these plans in collaboration with representatives from the NSF Policy Office (who organize NSF regional workshops and NSF meetings with SROs) and the EPSCoR office (who are planning a major emphasis on CAREER in their outreach efforts). The CCC is also actively encouraging special sessions at professional society

meetings and other organizational meetings. We will pay particular attention to outreach to meetings in which minority investigators are likely to be in attendance such as NSF's annual meetings of minority postdoctoral grantees and conferences such as the upcoming SUCCEED (Southeastern Universities and Colleges Coalition for Engineering Education) conference. The Chair of the CCC has met with representatives of the Council on Undergraduate Research to talk about ideas for increasing program participation from primarily undergraduate institutions, and she will make a presentation about the CAREER program at their next national conference. NSF is committed to expanding such activities to other venues. There are also plans to assess the impact of these outreach efforts related to COV Recommendation V (assessment of program impact).

COV Recommendation III.

Encourage submission of more proposals and funding of more awards in divisions and programs where much smaller or larger award sizes are the norm, by addressing the gap between their CAREER award amounts and the amounts for their normal research grants.

NSF Response: CAREER award sizes and durations must be commensurate with the prestige of the program. In addition, such awards must be sufficiently enabling that awardees can concentrate on their research and education plans without constantly having to seek additional support.

NSF also recognizes that average award sizes vary greatly across the agency's disciplinary programs. The CAREER Coordinating Committee has given some consideration to asking directorates to propose CAREER award sizes that are commensurate with disciplinary norms and practices and that take into account what is "big" and "prestigious" for the different fields. However, the committee decided that this would not be a viable strategy for maintaining a coherent and prestigious program. The exercise would result in too many proposals for differing award sizes. Also, in some cases it would be counter to the overall Foundation goal of increasing award size and duration for all awards.

While the overall NSF budget has increased in recent years, most of these increases have been directed to priority area investments. However, CAREER investments are made from the core programs where budgets have remained static or have decreased slightly. Thus, it is becoming more difficult for program officers to support CAREER awards and especially to increase the number of awards. For the FY'03 competition we plan to maintain the current minimum award sizes that are in place for the FY'02 competition. As has been true since the initiation of the program, we continue to review each year what constitutes an appropriate award size and duration for awards in this prestigious program.

COV Recommendation IV.

Improve effectiveness of award selection, by:

- **requiring reviewers to apply review criterion two to CAREER proposals;**

NSF Response: The concerns of the COV are applicable to all NSF proposals. As requested by the National Science Board, NSF is working across all programs to introduce a more effective approach to the the "Broader Impacts" criterion. We have drafted revisions to the GPG, FastLane Proposal Guidelines, and the standard language in the Proposal Announcement Template System that instruct proposers that they must clearly address broader impacts in their proposals. Also NSF has developed a draft set of examples of activities that address the broader impacts criterion. The agency anticipates disseminating this information to proposers via a link embedded in the Grant Proposal Guide (GPG) and in every NSF announcement and solicitation. It will also be available to proposers and reviewers in FastLane. In addition, we have designed activities to increase program director attention to the "Broader Impacts" criterion through training of new program directors and through electronic tracking of program director use of both criteria in making funding or declination recommendations. For FY02, NSF specifically emphasized to CAREER reviewers the importance of addressing the "Broader Impacts" criterion. The CCC developed a special letter for program officers to send to ad hoc reviewers and special reviewer instructions for both ad hoc reviewers and panelists. Both emphasized the importance of addressing the broader impacts criterion as well as the merit of the education development plans. NSF's FastLane reviewer system links directly to both documents. The CCC members and/or Division CAREER contacts are also meeting with panels in their respective directorates to reinforce this emphasis. The CCC has created overheads and handouts for program directors to distribute at panel meetings.

- **ensuring that CAREER reviewers and panelists are diverse in terms of geography, type of institution, gender, disability, and minority status; and**

NSF Response: The agency continues to seek diversity in reviewers and panelists and instructs all program officers and division directors that this is a very high priority. The agency has begun requesting that reviewers provide gender and ethnicity/race data when they log in to provide a FastLane review. This measure will allow us to evaluate the diversity of its reviewer pool and to take steps to diversify this pool where necessary.

- **including reviewers for each CAREER proposal who are qualified to assess plans for integration of research and education.**

NSF Response: CAREER reviewers are selected based on their qualifications to assess both the proposed research and education plans and their integration.

COV Recommendation V.

Continue its efforts to assess program impact and management effectiveness, by, for example:

- **understanding the perceptions of eligible applicants who choose not to apply, (e.g. faculty at minority-serving and/or predominantly undergraduate institutions who may be hesitating because they believe that they are at a disadvantage);**
- **determining the degree to which CAREER awardees succeed in obtaining follow-on awards from NSF and other funding sources;**
- **determining CAREER applicants' prior award/decline profiles with NSF, including earlier submissions to CAREER, and with other funding sources; and,**
- **assessing the long-term impact of CAREER in light of the goals NSF has set for it.**

NSF Response: NSF is committed to the continued assessment of the CAREER program. In 1999, NSF contracted with Abt Associates to conduct a study of the first three years of the CAREER program (1995-1997). The study included comparison groups of faculty members who applied for CAREER and were not funded, those who applied and received funding, and those who met the eligibility requirements but chose not to apply. The results of the study were useful, but many felt it was too soon to derive meaningful data about the program.

CAREER awards are four to five years in duration and the first cohort of awardees have just recently completed their awards. In order to properly evaluate the results and impacts of the program a larger population of awardees and a longer time to follow the careers of CAREER recipients is necessary. Consequently, another major study might be undertaken in three or four years. At that time the results will be more helpful in assessing the program.

The considerable amount of analytic information that was generated expressly for the COV has been beneficial to NSF in its decision-making process for the program and its management. The CCC will continue to collect this type of data on a yearly basis to maintain an awareness of CAREER success rates, award sizes, and diversity of applicants and institutions.

SUMMARY RESPONSE FROM NSF

Putting the CAREER program in perspective, there are approximately 235,000 science and engineering faculty members with doctorate degrees in U.S. academic institutions. From 1995-2000, NSF received 119,188 proposals of which 10,376 or 8.7% were CAREER proposals. During those same years, NSF funded 35,008 proposals of which 2,132 or 6% were CAREER awards. That averages out to approximately 355 CAREER awards per year with a success rate for CAREER applicants of about 20%. The CAREER program is at the heart of NSF's commitment to quality education, research, and connection to public responsibility. The best leaders for our future are faculty members who bring to the education agenda the same rigor, enthusiasm, and intensity that they bring to their research agenda. It is quite evident to us that our CAREER awardees are accomplishing these goals. We need to find mechanisms for better communication of their efforts in order to facilitate cultural change in academe. We will continue to seek out ways to make the CAREER program more diverse and inclusive in all respects. NSF is dedicated to the CAREER program and its continued growth and influence.