Faculty Early Career Development (CAREER) Program

Committee of Visitors

Meeting Dates
October 18-19 2006

Final Report

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Contents

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2006 NSF COMMITTEE OF VISITOR (COV) REVIEWS
(Modified for use by Committee of Visitors for the CAREER Program)

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the ***processes*** related to proposal review; and (B) the quality of the ***results*** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. 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.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. The reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

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.

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The table below should be completed by program staff.

Date of COV: October 18-19 2006
Program/Cluster/Section: Faculty Early Career Development (CAREER) Program
Division: All Divisions
Directorate: All Directorates
Number of actions reviewed: Awards: 53   Declinations: NA   Other:
Total number of actions within Program/Cluster/Division during period under review: **   Awards: 1700   Declinations: Other:**
Manner in which reviewed actions were selected: We selected a random sample of awards, over sampling Divisions with few awards. We then ensured that every Division that supports CAREER would have at least one award in the panel. Because CAREER awards and proposals are part of the regular program COVs, this COV did not look at the review process or declines.

PART A. 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.

Section A1

Q1	In most technical fields, the COV felt that the research was of high quality. In Education disciplines, however, the research was adjudged more variably, ranging from excellent to "pedestrian". The educational components of individual projects varied widely, and most of the COV felt that the pedagogy and curriculum content were not particularly innovative. The COV noted that many reviews of CAREER proposals did not address the educational component of the project and its relative importance varied greatly among disciplinary programs.
Q2	The size and duration of the projects are appropriate to the funding in most fields. In some fields, however, the minimum CAREER funding far exceeds typical research awards in the disciplinary program and the COV noted that proposal reviewers frequently commented that projects were over-ambitious and unwieldy. There were other issues related to disparity among disciplines, but these are covered in other sections of this report.
Q3	Most of the COV felt that CAREER proposals, on average, were as risky as regular NSF proposals. There are several examples of CAREER projects that were ranked relatively low by the initial review panel but subsequent project reports indicated successful attainment of CAREER expectations.

Q4	The COV felt that many of the CAREER projects were multidisciplinary, but that the degree of integration varied widely. Some panelists felt that the strong focus on research placed most projects squarely with the traditional discipline.
Q5	The geographic distribution of PIs was broad and representative.
Q6	The diversity of institutions associated with CAREER PIs generally appeared to be representative, with the notable lack of funded projects from minority serving institutions. The COV was unable to determine whether this disparity resulted from lack of proposals submitted by PIs from minority serving institutions, reduced success of submitted proposals, or other factors. This is addressed further in C.1.2.
Q7	Many projects addressed integration that went beyond what is normally expected from new faculty. COV panelists were unsure how and to what degree educational outcomes were assessed and evaluated, and whether they were particularly valued by disciplinary programs. This is addressed further in Section C.1.1.
Q8	Panelists differed in their assessment of how well CAREER proposals reflected emergent approaches and new ideas in disciplines. Most felt, however, that coverage of disciplinary research was adequate and that CAREER PIs were given sufficient flexibility by their disciplinary programs to follow promising new directions.
Q9	Women and under-represented minorities had CAREER funding rates relative to those achieved among NSF PIs as a whole, but the COV felt that it was imperative that the CAREER program should work to improve participation.
Q10	CAREER successfully tracks NSF policy in meeting national priorities for science and technology research, and the NRC "Rising Above the Gathering Storm" report.

A2:   Management of the Program under Review

1. Management of the Program:

CAREER management has produced major elements of uniformity across all directorates and divisions, but some elements of the funding program are strikingly varied across units:

> *Uniform*: Number of years (5) and Total award size (but BIO 20% more now)
> *Highly uneven*: form of review (mail, separate panel, regular panel) and frequency of CAREER awards by various units.

This illustrates that current management policies are mixed in achieving consistency across the various parts of NSF giving CAREER awards. Policies towards uniform administration are least successful in divisions/directorates with very small budgets or with very low award sizes for other reasons. This lack of uniformity precludes the CAREER program from having a substantial impact on leadership and capacity building in those fields. More thinking "outside the box" by CAREER management is encouraged, rather than further rehashing longstanding debates about relatively fixed dollar amounts for CAREER awards across directorates.

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One way of dealing with variability among fields in funding levels for research could involve imposing a per year minimum of 125% of average award size in that division. NSF management could reconsider the appropriateness of funding levels in those directorates (e.g., SBE) or divisions/programs in directorates significantly under funded historically. NSF management could also better link and promote CAREER with mechanisms for education-related supplements available to research awards outside of the CAREER program (e.g., ISE and REU supplements) in order to extend the research/education integration goals of the CAREER program to other types of funding in the Foundation.

One other point to note about management is that divisions should review the extent to which panelist rankings correlate with award decisions, as the COV noted some disparities.

Equity and Diversity Issues

The CAREER program has the potential to lead in increasing participation by individuals from underrepresented groups and from institutions that primarily serve underrepresented groups. However, program management has not realized its leadership and strategic role for this topic. Recommendations on this issue are discussed in Section C.

2. Responsiveness of the Program to Emerging Research and Education Opportunities

The career solicitation wording has changed little over a decade, but shifts have occurred within NSF's Foundation-wide statements about the nature of "research" and "education." However, in many ways this integration of education (i.e., a form of "broader impacts") occurred with the CAREER program much earlier.

Some members of the COV believed that the CAREER solicitation could incorporate illustrations about what constitutes cutting edge integration in these evolving definitions of research and education, based on NSF activities such as the Cyber infrastructure reports, the International Programs, and the Science of Learning Centers. Also, program officers could actively seek CAREER reviewers familiar with these issues. Staff could publicize research/education integration practices proven effective within programs such as IGERT to CAREER applicants and awardees. Staff could also inform CAREER awardees about IGERT investigators with similar interests, or close geographic locations.

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

The CAREER program is planned and prioritization developed within the context of an NSF-wide committee that reports to the Director. This is broadly appropriate, but could benefit from specific modifications, some of which are addressed above and in other sections.

4. Additional comments on program management:

See other sections of the report.

PART B. RESULTS OF NSF INVESTMENTS

NSF investments produce results that appear over time. The answers to the first three (People, Ideas and Tools) questions in this section are to be based on the COV's study of award results, which are direct and indirect accomplishments of projects supported by the program. These

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projects may be currently active or closed out during the previous three fiscal years. The COV review may also include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made. Incremental progress made on results reported in prior fiscal years may also be considered.

The following questions are developed using the NSF outcome goals in the NSF Strategic Plan. The COV should look carefully at and comment on (1) noteworthy achievements of the year based on NSF awards; (2) the ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcomes; and (3) expectations for future performance based on the current set of awards. NSF asks the COV to provide comments on the degree to which past investments in research and education have contributed to NSF's progress towards its annual strategic outcome goals and to its mission:

1.   To promote the progress of science.
2.   To advance national health, prosperity, and welfare.
3.   To secure the national defense.
4.   And for other purposes.

Excellence in managing NSF underpins all of the agency's activities. For the response to the Outcome Goal for Organizational Excellence, the COV should comment, where appropriate, on NSF providing an agile, innovative organization. Critical indicators in this area include (1) operation of a credible, efficient merit review system; (2) utilizing and sustaining broad access to new and emerging technologies for business application; (3) developing a diverse, capable, motivated staff that operates with efficiency and integrity; and (4) developing and using performance assessment tools and measures to provide an environment of continuous improvement in NSF's intellectual investments as well as its management effectiveness.

Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes (nuggets) as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 <u>OUTCOME GOAL for PEOPLE</u>: Developing "a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens."

Comments:
Individuals from a range of institution types were represented, but minority serving institutions, and minority applicants, were underrepresented. In general PIs progressed in a manner that was consistent with the stated outcomes of their proposal, but there were some exceptions in which the PIs had an unusually low rate of scholarly productivity. One significant point was the apparent lack of reporting on progress in the integration of research and education. In one notable case, the teaching component of the proposal was very weak relative to others in the reviewed group, and the PI's annual reports had minimal mention of education activities.

It is commendable that CAREER PIs seemed actively engaged in the training and mentoring of graduate and undergraduate students, and several were involved in outreach to K-12 students and community organizations. Several female PIs were involved in mentoring female undergraduate and graduate students.

Overall, the Foundation can assist the advancement of CAREER recipients by providing clear guidance on preparing the annual report, and giving timely feedback on noted gaps or points of weakness in the annual reports.

Moreover we recommend that a reminder alert be automatically sent to all PIs 90 days **in advance** of the annual report due date so that reports will be prepared in a more thoughtful manner.

B.2 OUTCOME GOAL for IDEAS: Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."

Comments:
There is a broad range of innovative ideas represented in the proposals. Only a very small number of these could be considered high risk. This is probably desirable, considering the early stage of the career of the PIs involved, and the long duration of the grant. Some proposals had truly innovative ideas and well thought-out education plans, including ideas for self-evaluation. Some PIs have seemingly become further entrenched in their research while others have begun interacting with a range of colleagues in new disciplines. It may be that the ability to interact broadly correlates with the number of years post-PhD and that may warrant consideration in revisions to the eligibility criteria. On the whole, education aspects of the projects are much less well developed than the research parts. Overall the program allows PIs the intellectual latitude to develop and disseminate new ideas. NSF should be diligent in ensuring that PIs continue to make satisfactory progress by responding to noted gaps in their annual reports. Again, this relates to the need to provide clear guidelines to PIs on preparing the annual report.

B.3 OUTCOME GOAL for TOOLS: Providing "broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation."

Comments:
Facility and instrumentation needs vary by PI and research type. However, for those projects that require instrumentation, the program does a good job of enabling the development of appropriate equipment to conduct their research. Indeed, individual PIs appeared able to build upon CAREER funding to obtain new equipment and to explore new educational and research horizons. In some commendable cases, the PIs are involving undergraduates in instrumentation research.

B.4 OUTCOME GOAL for ORGANIZATIONAL EXCELLENCE: Providing "an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices."[1]

Comments:
As noted previously throughout this review, timely and specific feedback on points of weakness and strengths in the annual reports is a potentially good opportunity to improve the overall performance of CAREER recipients, and outcomes of the program overall. In addition, the drop-box format for annual reports may not facilitate the thoughtful, nuanced responses that can provide good assessment information for program officers.

Comments by proposal reviewers were inconsistent with respect to the educational component. In too many cases there was none or only cursory mention of the education component in the reviews. Perhaps, clearer directions from the program officer to reviewers might improve this situation. Also,

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[1] For examples and further detail on the Organizational Excellence Goal, please refer to pp. 19-21 of NSF's Strategic Plan, FY 2003-2008, at <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04201>.

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a more uniform review process across programs might reduce this variable feedback. In general, the program is a good example of NSF meeting the challenge of a globally competitive science, and engineering research and education.

There is a clear need for improvement in the area of minority participation, through the use of innovative strategies to bring information and guidelines for the CAREER program to institutions and individuals from underrepresented groups.

PART C. OTHER TOPICS

C.1. NSF would appreciate your recommendations on whether the CAREER program should be continued as is or should changes be made to the program goals and objectives. (E.g., award size, duration, eligibility requirements, focus on the integration of research and education, support of collaboration among multiple researchers, etc.)

- The program targets young faculty to support their early career and development into leaders with a strong sense of commitment to the educational and research goals of their institutions. This is consistent with its goal of encouraging and supporting future leaders in research and education. The program is currently implemented according to a single solicitation across the directorates but the review process varies by directorate in order to be consistent with the specific intellectual community. There is an increasing attempt to draw in a wider diversity of individuals and institutions as applicants for and recipients of CAREER grants.

- The award size and duration are crucial to the success of the CAREER program. The duration of the awards should be continued. In addition, for the most part the size of the awards should continue as is, with exceptions to this addressed in C.1.3 subsection below on Disparity/Consistency across Directorates)

- Eligibility requirements have been adjusted over the years and seem appropriate. The focus on single investigator awards is appropriate to the purpose of the program

- Integration of education and research is addressed in a dedicated subsection C.1.1 below

- Additional consideration should be given to diversifying the pool of applicants and this is addressed in C.1.2 below.

C.1.1 Integration of research and education

- Define integration more clearly in program announcement, also emphasizing the need for variations in integration as appropriate to differing disciplines
- Emphasize the need for realism of the innovative aspects of the education component
- Modify the language in the program announcement on the evaluation of the education component

Definition of Integration

The panel was unclear on the meaning of integration of research and education components in the program announcement. The operational standards for integration may need to differ between disciplines, as some disciplines readily permit integration of research, teaching, and public outreach (e.g., Web-casts of exploration in biology, physics, or the geosciences), whereas it is more difficult to achieve comparable integration in other disciplines. For some PI's, a synergistic approach to integrating research and education may be particularly effective and should be encouraged, such that investments into the education component indirectly enhance also the research component. For other PIs a different model may best take advantage of personal strengths in research and education.

Not all of the components listed in the solicitation should be considered required for effective integration of research and education. Proposal review panels should be instructed to maintain a broad and PI-appropriate perspective in interpreting the meaning of integration in the guidelines.

Emphasis on Realism of the Education Component

Emphasize in the program announcement, as well as in the guidelines for reviewers, the importance that the education component should be realistic, such that both research and education components are likely to be accomplished under the time constraints of a beginning faculty.

As explained above, for some PI's the diverse goals of a CAREER proposal are most likely realized if the educational and research components interact synergistically, i.e., if investments into the education component enhance the research component, and vice versa. Such synergism can be realized through a diversity of mechanisms, depending on the discipline, but may include: creation of a Website that explains significant research concepts of the discipline, lists seminal publications or links to relevant Websites, provides online simulations for exploration of mathematical, physical, biological, or social processes; creation of software or statistical tools useful in both research in teaching; training of high-school teachers/students and laypeople in routine observations and contribution of these observations to a database (e.g., astronomical observations; biological surveys; climatic records).

The program announcement should be reframed to be more realistic in the general expectations for educational research and evaluation. Instead, the bulk of examples should focus on more realistic modes of integrating research and education. To avoid the unintended consequence of discriminating against or discouraging PIs on the basis of their research areas, it is important that the language of the solicitation and the instructions to reviewers construe the "integration or research and education" as appropriate to the PI's discipline and personal strengths (see also above Definition of Integration).

The program announcement might also reference a website with successful CAREER proposals and education plans that represent a range of disciplines from theoretical, experimental, social, biological, engineering, and education sciences.

Language Pertaining to the Development and Evaluation of the Education Component

The current language in the program announcement, particularly the term "pedagogy", suggests a formal process for developing and evaluating the educational component. To relax language, it may help eliminate the word "pedagogy".

Whereas the research component receives independent evaluation through the peer review process of publications, the educational component does not receive similar, independent evaluation. The program directors could provide oversight of the education component, requiring updates during the annual progress reports (this was not the case in many of the annual reports examined by the panel). The program could consult documents from the Carnegie Foundation on the Advancement of Teaching (www.carnegiefoundation.org) and their CASTL Fellows program for ideas about both how to document innovative educational practice and the scholarship of teaching. Lastly, many campuses have Centers for Teaching and Learning that provide help with creating teaching portfolios, document educational efforts, assessing success. It seems that such level of self-evaluation by the CAREER awardees is more reasonable than the formal educational evaluation suggested by the language in the current program announcement.

C.1.2 Diversity/Representation

The committee concluded that the awards rates for underrepresented minorities including women were unacceptably low. We do not know whether the problem reflects insufficient participation by these underrepresented minorities or that the quality of applications was low. We speculate that it is a combination of both. One comment from the previous COV report worries COV members: the suggestion that success in acquiring a CAREER grant at a minority institution might lead to "brain drain" when PIs use their CAREER award to secure themselves a position at a majority institution. Such results may tend discourage minority institutions from promoting the CAREER program. In the opinion of the COV, increasing participation of underrepresented minorities is of considerable importance. Our suggestions fit into four areas: knowledge dissemination, pre-award support, mentoring, and post-award support.

1) We think that NSF should consider a number of ways to disseminate knowledge about the program. We suspect that underrepresented minorities either do not know about the program or believe that they would not be successful if they did submit. Our suggestions intentionally include redundancies in order to disseminate information about CAREER from a number of different directions thereby enhancing the likelihood of greater coverage and participation. One suggestion is to "market" CAREER to Minority Serving Institutions through special visits, mailings, workshops, or conversations. Another suggestion would be to target various minority programs whether institutionally (associated e.g. with HBCUs) or programmatically based (e.g. AGEP, various Minority science program pathways, Summer Research Opportunity Program, Ronald McNair Programs, etc). COV members also suggested that outreach to underrepresented faculty at the top universities would be an important consideration.

   We understand that some previous NSF workshops have been targeted at disseminating information about the CAREER program, but COV members believe that the existing efforts are missing a significant set of potential applicants. One challenge that COV members pointed out is that travel to workshops may present a

significant hardship to participants from minority institutions, since these institutions may find it difficult to justify the expense.

2) The COV believes that a significant problem is the lack of pre-award support for young faculty at underrepresented institutions. COV members pointed out that majority institutions have significant infrastructure available to proposal writers in the form of grant support (for budget writing, etc) and prior awardees (for mentors and examples of successful proposals). The COV believes this lack of infrastructure puts applicants from minority institutions at a significant disadvantage. As a specific suggestion, we recommend that a pool of successful proposals be made readily available to proposal writers.

3) The benefits of mentoring to young faculty, both before and after winning a CAREER award, were pointed out by the COV. Majority institutions have a significant advantage here because of the prevalence of prior award winners (both junior and senior). Some of the larger NSF centers (e.g. centers for learning) could play a role in helping and mentoring CAREER applicants from other institutions.

4) Finally, we discussed the benefits of support for post-awardees in the form of workshops or conferences to bring people together to talk about their work. The resulting networking could have positive benefits to participants at minority institutions or to minority populations in general, counteracting the small number of CAREER awardees directly available to them. Several COV members sound a cautionary point here, however, that the time commitment could be a significant hardship to young faculty with children. To reduce the burden, coupling these workshops with other disciplinary academic conferences was suggested as important. We also believe that some financial support for minority attendees would be important for this activity.

C.1.3 Disparity across programs

1. Success rates for CAREER proposals (relative to success rates for other proposals submitted to the programs)

Support for CAREER proposals varies significantly across divisions, and for some panels, the success rate for CAREER proposals is lower than that for other proposals. Duration and award size are relatively consistent, while the frequency of funding for CAREER awards varies across units. This illustrates that current management policies are mixed in achieving consistency across the various parts of NSF giving CAREER awards. Policies towards uniform administration are least successful in divisions/directorates with very small budgets or with very low award sizes for other reasons. This lack of uniformity may preclude the CAREER program from having a substantial impact on leadership and capacity building in those fields.

One potential solution to this issue is to lower the minimum funding level or to allow directorates to set their own funding levels such that the minimum grant size is proportional to average grants in the program. This suggestion was also made by the last COV and it would be worthwhile to determine why the suggestion proposed by the last COV was not implemented. Allowing flexibility by program in minimum award size may allow applicants to programs with less funds (perhaps like SBE and Math) a more equal chance of getting a prestigious CAREER award, as applicants to larger funded programs. NSF could also

provide mechanisms for education-related supplements available to research awards outside of the CAREER program (e.g., ISE supplements that used to be available) can extend the research/education integration goals of the CAREER program to other types of funding in the Foundation.

2. Consistency in the review process: reviews together with all programs within a directorate, separately within in each program, with regular proposals, by mail review, etc.

The COV was generally in favor of allowing some flexibility across divisions in the way that proposals are handled. Proposal review at the program level ensures that proposals are considered in the context of other research proposals in the same field, and makes it clear to CAREER applicants that they are being evaluated by, and compared with those within their community.

We recommend that a distinct panel be convened within each program for review of CAREER proposals. In cases where only a few proposals are received, we recommend that proposals be aggregated into a distinct panel at the directorate level.

3. Integration of research and education emphasized differently in the review panels.

The COV suggests that efforts be made to establish greater uniformity in emphasis and quality of education. At the same time, some flexibility in evaluating proposed integrated research and education is appropriate. Different communities may have different expectations for the education component of CAREER proposals, reflecting difference practices in each field.

One approach to address this issue would be to include an education specialist on each panel to review the education component of the proposal. Another would be to create a special review form for CAREER proposals where the education component is clearly emphasized, along with instructions to reviewers on how to evaluate the integration of research and education. The call for proposals should include these new education review criteria.

C.2. Please comment on the <u>management</u> of the CAREER program as a cross-directorate   activity.

- The CCC has clearly built a very healthy cross-directorate culture for management of the CAREER program.
- In fact, given the cross-directorate nature of this enterprise it is a minor miracle that such high quality results are achieved in such a timely manner.
- Support should clearly continue with ongoing involvement from senior management.
- Issues of cross-directorate consistency/disparity of CAREER program management was discussed in detail in C.1.2 above.

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C.3. Please provide comments as appropriate on the CAREER program's <u>performance</u> in meeting program-specific goals and objectives

- The program appears to have significant impact on the careers of young faculty across the agency. The formal evaluation will help to substantiate and clarify what on an anecdotal basis is quite positive and is one of the flagship programs of NSF both within directorates and across the agency as a whole.

C.4. What recommendations, suggestions or questions do you have for the ongoing program evaluation?

- We appreciate the difficulty of defining and collecting quantitative measures for the evaluation. In presenting their results we encourage the evaluators to include explicit caveats regarding the inherent imperfections, approximations, and generalizing assumptions that are inherent to such efforts.

- The committee recommends strongly that the evaluation should focus on feedback from the PIs research and educational communities. We recommend that anonymous peer review be used in this phase of assessment, in place of depending on reviews by department chairs.

- The committee recognizes that teaching evaluations and evaluations of education in general can favor more conservative approaches, and that students and faculty peers may not be aware of informal education efforts or curricular changes. With that in mind, talking with students or groups that participated in educational activities may be the best way to assess the educational activities.

- The evaluation process needs to separate institution-wide values and processes from those manifest at the level of the individual faculty member. Interviews with Provosts or VPs for Research would provide an institutional overview with the emphasis on (and reward for) integration of teaching and research. The control group for these interviews could be representatives from institutions that   (a) do not submit proposals to CAREER (e.g., including MSIs as discussed elsewhere), and (b) have many submissions but no success, as well as c) those that have received awards.

- To assess the impact on PIs we recommend interviews with - not just web based questionnaires - CAREER awardees

- The COV process should be continued with the improvements noted in C7

C.5. Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.

- NSF should investigate several perceptions that exist in the research community regarding long term impact of CAREER awards on PI development. The COV did not have the data needed to determine the validity of these perceptions, which are posed as the following questions:
  - o Does the program in any way discourage awardees from being nimble and moving on to new research areas not anticipated in their proposals?

- o Does the program rob the awardees of the year-to-year experience of grantsmanship skill development, leaving them in disadvantaged positions when their CAREER project is over?
  - o Does the long-standing view that educational success cannot be achieved without diminished research capability actually hinder CAREER PIs at some institutions?
  - o How can NSF mitigate these possible adverse consequences of CAREER grants if in fact they are real?

- CAREER awards are a daunting introduction to competitive proposal writing. We would ask that NSF explore either systematizing or advertising the availability of small research initiation grants (SGER or other mechanisms) to help potential future awardees develop their ideas. Additionally, access to electronic versions of past successful proposals would likely be helpful to new applicants.

- NSF should take the initiative to highlight/showcase CAREER research and researchers to potential CAREER applicants, such as at professional society meetings.

- The significant budget impact of CAREER awards on disciplinary programs can affect both program directors and reviewers. In order to encourage funding of excellent and risk-taking research, NSF should make an effort to increase the oversight and feedback provided to CAREER awardees during the lifetime of the award. In particular we recommend that cognizant program directors provide feedback to the PI following the third year annual report (or earlier if warranted). This modified process should be communicated to applicants, PIs, and reviewers so that they have appropriate expectations for oversight.

- Institution changes may take place during the 5-year period of the grant that could affect a PI's performance and promotion evaluation either positively or negatively. The current annual review process should include review of the letter from the department head, reaffirming the institutional support for the PI. This annual review process should be indicated clearly in the award letter as part of the reporting requirements.

C.6. Please provide comments on any other issues the COV feels are relevant including discussion of PECASE if appropriate.

- The COV did not address PECASE specific issues but believe the program should be continued.

C.7. NSF would appreciate your comments on how to improve the COV review process, format and report template.

- The NSF staff provided excellent support in planning and executing the COV. The IT staff in particular were very responsive (Emory?)

- However, it is clear that the ejacket system, as well as networking more generally at NSF, is quite taxed/overloaded and should not be relied upon for timely access to proposals. Therefore it is essential that the committee members be provided with files they must study on a CD so that they are not depending on the online access during

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the meeting, nor at their hotels in the evening when important COV tasks must be executed. To the extent online support for shared workspaces can be improved, in a way that works on individuals' laptops, this would also help the process. But until such a system is clearly available, important files should be made available on CD.

- It would also help the COV to function more effectively if they received more focused guidelines in advance of the meeting. The more the committee members understand about the process in advance, the better they can prepare. For example, it became clear that the committee members benefited tremendously from reading the reviews of proposals, not just the proposals themselves. The packet sent out to committee members should include a set of such recommended preparation guidelines.

- Some committee members felt that the single day was an insufficient amount of time to do justice to the review process. It's possible that additional pre-meeting preparation could offset the need for a longer COV meeting. This must include guidance on how to use the online system, access to necessary data, and much clearer guidelines as to the goals and process.

SIGNATURE BLOCK:

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For the Committee of Visitors
Faculty Early Career Development (CAREER) Program
Dr. Deborah Estrin
Chair

Faculty Early Career Development (CAREER)
National Science Foundation
Committee of Visitors

Meeting: October 18-19 2006
Room 375 Stafford 1

October 18 2006

12:30 p.m. – 1:00 p.m.	Registration and Lunch
1:00 p.m. - 1:30 p.m.	Welcome from National Science Foundation

1:00 p.m. -   1:30 p.m.   Welcome from National Science Foundation
                                    Dr. Wanda E. Ward, Assistant Director (Acting)
                                    Education and Human Resources Directorate
                              Introductions of Members of COV
                              Introductions of CAREER Coordinating Committee (CCC)
                              Conflicts of Interest (CCC Member)
                              Charge to the COV by COV Chair

1:30 p.m. – 2:00 p.m.   Overview presentations
                              1) *CAREER Program*
                                   Elizabeth VanderPutten
                              2) *NSF response to recommendations from last COV*
                                   Lloyd E. Douglas
                              3) *Brief Review of Statistics/data on CAREER*
                                   Sonia Esperanca

2:00 p.m. – 2:30 p.m.   Discussion and questions for NSF Staff if needed

2:30 p.m. – 2:45 p.m.   Break/ Coffee

3:00 p.m. – 4:00 p.m.   Review elements of the report
                              Divide into 2 -3 person groups to write sections of reports
                              Review awards and write nuggets for 3 – four awards

4:00 p.m. – 5:00 p.m.   Draft sections of reports

5:00 p.m. – 5:15 p.m.   Presentation by Abt on ongoing program evaluation

5:15 p.m. – 5:30 p.m.   Discussion of evaluation plans if needed

5:30 p.m. - 6:00 p.m.   Discussion of issues in the report sections
                              More writing of report sections.

6:00 p.m.   **Shuttle to Hotel**

Evening   *Dinner on your own*

October 19 2006   Room 380 for plenary session

Before meeting, send draft sections to the chair

8:15 a.m. – 8:30 a.m.	Continental Breakfast for COV
8:30 a.m. – 9:15 a.m.	Overview of previous day's discussions Additional Questions for CCC members, Refinement of writing tasks and assignments
9:15 a.m. – 10:15 a.m.	Report Writing
10:15 a.m. – 10:30 a.m.	Break/Coffee
10:30 a.m. – 11:45 p.m.	Report writing, Drafts sent to Chair
12:00 noon . 1:00 p.m	*Report synthesis* Working Lunch
1:00 p.m. – 1:30 p.m.	COV recommendations to NSF with NSF Program Officers
1:30 p.m. - 2:00 p.m.	Final editing of report

CAREER Committee of Visitors
October 18-19 2006

Members

Name	Institution	Department
Deborah Estrin	University of California at Los Angeles	Computer Science Department
Jeanne Altmann	Princeton University	Department of Ecology and Evolutionary Biology
Douglas Causey	University of Alaska Anchorage	Office of Academic Affairs Office of Sponsored Programs
Chris Dede	Harvard University	Graduate School of Education
Tanya Furman	Pennsylvania State University	Geosciences
Leah Gerber	Arizona State University	School of Life Sciences
Karen King	New York University	School of Education
John Kubiatowicz	University of California at Berkeley	Computer Science Division
Jennifer Lerner	Carnegie Mellon University	Department of Social and Decision Sciences
Garrick Louis	University of Virginia	Systems and Information Engineering
Michael Manga	University of California at Berkeley	Dept Earth and Planetary Science
Ulrich Mueller	University of Texas	Section of Integrative Biology
Christine Ortiz	Massachusetts Institute of Technology	Department of Materials Science and Engineering
Eve Ostriker	University of Maryland	Department of Astronomy
Winfred Phillips	University of Florida	Vice President for Research and Dean of the Graduate School
Dianne M. Pinderhughes	University of Notre Dame	Department of Political Science Department of Africana Studies
Venugopal Veeravalli	University of Illinois, Urbana Champaign	Department of ECE
Linda Weavers	Ohio State University	Department of Civil and Environmental Engineering and Geodic Science

Brief Member Biographies

Dr. Deborah Estrin Professor of Computer Science and Electrical Engineering at UCLA, holds the Jon Postel Chair in Computer Networks, and is Founding Director of the NSF-funded Center for Embedded Networked Sensing (CENS). Estrin received her Ph.D. (1985) in Computer Science from the Massachusetts Institute of Technology, her M.S. (1982) from M.I.T. and her B.S. (1980) from U.C. Berkeley. Before joining UCLA she was a member of the University of Southern California Computer Science Department from 1986 through the middle of 2000. In 1987, Professor Estrin received the National Science Foundation, Presidential Young Investigator Award for her research in network interconnection and security. During the subsequent 10 years much of her research focused on the design of network and routing protocols for very large, global, networks, such as: scalable multicast routing and transport protocols, self-configuring protocol mechanisms for scalability and robustness, and tools and methods for designing and studying large scale networks. Professor Estrin is a fellow of the ACM, AAAS and the IEEE. She has served on numerous panels for the NSF, National Academy of Sciences/NRC, and DARPA. She has also served as an editor for the ACM/IEEE Transactions on Networks, and as a program committee member for many networking related conferences, including Sigcomm and Infocom. She was General Co-Chair for the first ACM Conference on Embedded Networked Sensor Systems, Sensys 2003, and served as one of the first Associate Editors for the new ACM Transactions on Sensor Networks. Professor Estrin has been selected as the 2006-2007 ACM-W Athena Lecturer.

Members COV

Dr. Jeanne Altmann is Professor of Ecology and Evolutionary Biology at Princeton University and faculty associate in the Office of Population Research, Princeton Environmental Institute, and Program in African Studies. She is a behavioral ecologist whose research focuses on the relationship between behavior and demographic processes, social and genetic structure, physiology, and the environment. She is interested in non-invasive research methodologies, and her empirical studies have been conducted on a wild population of baboons in the Kilimanjaro region of Africa for over three decades. A member of the National Academy of Sciences, she is also a conservation associate at Brookfield Zoo and an honorary faculty member in Animal Physiology at the University of Nairobi. She participates as member or chair of various external scientific advisory or review committees, including the Integrated Primate Biomaterials and Information Resource.

Dr. Douglas Causey is Vice Provost for Research, Dean of the Graduate School, and Professor of Biological Sciences at the University of Alaska Anchorage. Previous to this he was Senior Biologist at Harvard's Museum of Comparative Zoology and Senior Fellow of JFK School of Government. He served as Program Officer at NSF in the Office of Polar Programs and Division of Environmental Biology. In his spare moments, he is still active in funded research on zoonotic disease and ecosystem ecology. Dr. Causey serves as a research associate with the Carnegie Museum of Natural History in Pittsburgh and as a research associate with the Smithsonian Institution's Arctic Studies Center. He also brings strong ties to the National Science Foundation, both as a program officer — with the Arctic Sciences section of the NSF's Office of Polar Programs, for example — and as a highly funded researcher. He has extensive experience in Alaska and has authored numerous publications on such related topics as arctic paleoclimatology, the breeding ecology of seabirds and the human dimensions of environmental change.

Chris Dede is the Timothy E. Wirth Professor of Learning Technologies at Harvard's Graduate School of Education. His fields of scholarship include emerging technologies, policy, and leadership. His funded research includes a grant from the National Science Foundation to aid middle school students learning science via shared virtual environments and a Star Schools grant from the U.S. Department of Education to help high school students with math and literacy skills using wireless mobile devices to create

augmented reality simulations. His co-edited book, Scaling Up Success: Lessons Learned from Technology-based Educational Improvement, was published by Jossey-Bass in 2005. A second volume he edited, Online Professional Development for Teachers: Emerging Models and Methods, was published by the Harvard Education Press in 2006.

Tanya Furman is a professor in Penn State's Department of Geosciences and Associate Director of the Alliance for Earth Science, Engineering and Development in Africa. She recently served as Associate Department Head for Undergraduate Programs in Geosciences. Furman holds a bachelor's degree in Geological Engineering from Princeton University and a PhD in Geochemistry from the Massachusetts Institute of Technology. Her research focuses on fundamental questions about the evolution of the thermal and chemical structure of the planet, and uses the geochemistry of lavas erupted in East Africa, Indonesia and Turkey to infer the thermal and mineralogical conditions in the earth's mantle. Furman's activities also include extensive work with students from groups traditionally underrepresented in the sciences. In 2005 she received the Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring.

Leah Gerber is a quantitative conservation biologist at the Arizona State University. Dr. Gerber's research program integrates field and modeling approaches to address questions at the interface of conservation science and policy. She works on developing approaches to connect scientific uncertainty to decision-making in endangered species recovery, marine reserve design, and disease and conservation. While her research focuses primarily on marine ecosystems, she is most broadly driven by questions rather than particular species or ecosystems. Primary research foci in her laboratory include: 1) the application of decision analysis to prioritize endangered species recovery actions, 2) developing design and monitoring criteria for marine protected areas in the Gulf of California, and 3) developing approaches to integrate data on individuals (e.g., disease, behavior) into population-level analyses of extinction risk.

Karen D. King, Ph.D., Associate Professor of Mathematics Education at New York University, recently served as a Program Director at the National Science Foundation in the Division of Elementary, Secondary, and Informal Education. At NSF, she was primarily in the Teacher Professional Continuum (TPC) Program, but she also had responsibility for curriculum projects in Instructional Materials Development (IMD) and policy for the Education and Human Resources Directorate. She received her Ph.D. at the University of Maryland, where she conducted research on undergraduate teacher thinking. Her current research focuses on the mathematics preparation of elementary and secondary teachers, the role of mathematical knowledge for teaching in the mathematical integrity of reform mathematics lessons, and the policies of mathematics teacher professional development. She also served as the associate editor of the Journal for Research in Mathematics Education and was a member of the RAND Mathematics Study Panel, which made recommendations to the Department of Education about future research funding in mathematics education. She is currently a member of the Research Committee of the National Council of Teachers of Mathematics. She has previously been on the faculty in both Teacher Education and Mathematics at San Diego State University and in the Department of Mathematics at Michigan State University.

John Kubiatowicz is an Associate Professor of EECS at the University of California at Berkeley. Prof. Kubiatowicz received a dual B.S in Physics and Electrical Engineering (1987), as well as an MS in EECS (1993) and PhD in EECS (1998), all from MIT. His research interests include multiprocessor and multi-core CPU designs, quantum computing design tools and architectures, Internet-scale distributed systems, and long-term digital information preservation. Professor Kubiatowicz is the recipient of an NSF PCASE award (2000) and was chosen as one of Scientific American's top 50 researchers (2002).

Jennifer Lerner is the Estella Loomis McCandless Associate Professor in the Department of Social and Decision Sciences at Carnegie Mellon University. Lerner directs the Emotion and Decision Making

Laboratory at Carnegie Mellon. The laboratory draws on psychology, economics, and neuroscience to study emotional influences on human judgment and decision-making. Professor Lerner has received several awards for her research, including a junior endowed chair from Carnegie Mellon and the 2004 Presidential Early Career Award for Scientists and Engineers (PECASE) from the National Science Foundation. Her work has appeared in scientific journals and in major media outlets around the world, including The London Times, The New York Times, Pravda, The Wall Street Journal, The Washington Post, USA Today, and National Public Radio."

Garrick Louis is Associate Professor in Systems & Information Engineering, and Civil Engineering at the University of Virginia. He is currently an AAAS Energy, Environment, and Natural Resources (EENR) Fellow at the Environmental Protection Agency, working in the National Center for Environmental Research. Dr. Louis received his PhD in Engineering and Public Policy from Carnegie Mellon University, MSc. in Chemical Engineering from Rensselaer Polytechnic Institute, and BSc. in Chemical Engineering from Howard University. His research and teaching interest are in sustainable infrastructure, smart growth, and service learning, with a special emphasis on engineering for developing communities. He received an NSF PECASE award in 2000 and was named a University Teaching Fellow at the University of Virginia in 2002, and is the co-organizer of the session on 'Engineering for Developing Communities," at the National Academy of Engineering's Frontiers of Engineering Annual Meeting in September 2005. Dr. Louis was a Warren Weaver Fellow in the Rockefeller Foundation's Global Environment Division in 1995, and is the director of the Design-In Action network for community-based municipal sanitation projects in low-income communities worldwide.

Michael Manga is Associate Professor in the Department of Earth and Planetary Sciences at the University of California Berkeley. He is involved with the study of geological processes involving fluids, including problems in physical volconology, geodynamics, hydrogeology, and geomorphology. Though the range of topics may appear diverse, the common theme is an attempt to develop a better quantitative understanding of physical processes operating in the Earth. Depending on the nature of the problem, he has used some combination of theoretical, numerical and experimental approaches. Recent contributions include studies of convection, the properties and dynamics of suspensions, flow and transport in porous materials, percolation theory, and high-pressure mineral physics. This work is currently funded by the National Science Foundation, the Petroleum Research Fund, the Sloan Foundation, and Lawrence Berkeley National Lab.

Ulrich Mueller teaches molecular ecology, behavioral ecology, and evolution in the Section of Integrative Biology at the University of Texas at Austin. He received his PhD from Cornell University, conducted postdoctoral work at the Smithsonian Tropical Research Institute in Panama, and was briefly a faculty at the University of Maryland before moving to his present position at UT-Austin. Research in the Mueller Lab integrates animal behavior, ecology, evolution, microbiology, and systematics, with a focus on social insects. Dr. Mueller's personal interests aims at understanding the evolution of organismal interactions, particularly the evolution of mutualisms and the evolution of social conflict and cooperation. Current research focuses largely on the co-evolution between fungus-growing ants and their fungi, but Dr. Mueller admits to an inordinate fondness for social insects in general. Dr. Mueller holds the W.M. Wheeler Chair in Integrative Biology at the University of Texas at Austin.

Eve Ostriker, Professor of Astronomy at the University of Maryland, received her Ph.D. from U.C. Berkeley in 1993 and held a postdoctoral fellowship at the Harvard-Smithsonian Center for Astrophysics before moving to the University of Maryland in 1996, where she is involved in both undergraduate and graduate education and mentoring of students. Dr. Ostriker's main scientific interests are in the processes of star and planet formation, dynamics of the interstellar medium, structure and evolution of spiral galaxies, and physics of accretion/outflow systems. Her research focus is theoretical, with technical work involving both computational and analytic solution of hydro- and MHD flow problems to model

COV Member Biographies

astrophysical systems, and development of detailed observational diagnostics from these models. She is a member of the MPS Advisory Committee at NSF, and has served on various other national advisory panels, including as a member of the National Academy of Sciences/National Research Council's Committee on Astronomy and Astrophysics.

Christine Ortiz received a B.S. in Materials Science and Engineering from Rensselaer Polytechnic Institute in 1992 and a M.S. and Ph.D. from Cornell University in the same field in 1994 and 1997, respectively. Following completion of her thesis, she spent two years as a National Science Foundation-NATO post-doctoral fellow at the University of Groningen in the Department of Polymer Chemistry in the Netherlands. In 1999, Dr. Ortiz joined the faculty in the Department of Materials Science and Engineering at the Massachusetts Institute of Technology and developed a research program on the ultrastructure and nanomechanics of biological, biomedical, and biomimetic materials with the primary goal being to quantify and understand the fundamental nanoscale structure-property relationships responsible for material function and dysfunction. She has given more than 100 invited presentations in 15 countries on her research, which has been featured in Physics Today, Science News, USAToday, The Daily Planet, and on the cover of the Journal of Structural Biology. Funding for her research has been provided for by the Dupont-MIT Alliance, NSF-PECASE and NIRT, the Cambridge-MIT Institute, the MIT Institute for Soldier Nanotechnologies, MIT-France Institute, General Electric, and 3M Corporation. Dr. Ortiz was awarded a tenure promotion to associate professor in July of 2006.

Winfred Phillips, D.Sc., was named Vice President for Research and Dean of the Graduate School at the University of Florida in 1999. Prior to that he had served as dean of the College of Engineering since 1988. A fellow and past president of the American Society of Mechanical Engineers, Dr. Phillips has held leadership positions in numerous engineering and science societies. Among other positions, he is a fellow and past president of the Accreditation Board for Engineering and Technology, fellow of the American Association for the Advancement of Science, chair of the Board of the American Association of Engineering Societies, a fellow and past president of the American Institute for Medical and Biological Engineering, a fellow and past president of the American Society for Engineering Education, fellow of the New York Academy of Sciences, chair of the Board of the Southeastern Consortium for Minorities in Engineering, and member of the Board of Enterprise Florida, Inc.

Dianne M. Pinderhughes is Full Professor in the Departments of Political Science and Africana Studies at the University of Notre Dame. She was formerly a member of the faculty at the University of Illinois, Urbana-Champaign (1985-2006). Professor Pinderhughes was awarded the 2001 American Political Science Association Frank J. Goodnow Distinguished Service Award. In 1988 she was named University Scholar. She was vice-president of the American Political Science Association (1995-96), president of the National Conference of Black Political Scientists (1987-88), and has served on the Council of the American Political Science Association (1987-89). Her publications include Race and Ethnicity in Chicago Politics. She is President-Elect of the American Political Science Association. Her current research project is The Evolution of Civil Rights Organizations in the Twentieth Century: Voting Rights and African American Politics.

Venugopal V. Veeravalli is a Professor in the department of Electrical and Computer Engineering, and a Research Professor in the Coordinated Science Laboratory at the University of Illinois at Urbana-Champaign. He received the Ph.D. degree from the University of Illinois at Urbana-Champaign in 1992, the M.S. degree from Carnegie-Mellon University in 1987, and the B. Tech. degree from the Indian Institute of Technology, Bombay (Silver Medal Honors) in 1985. Dr. Veeravalli served as a program director for communications research at the U.S. National Science Foundation in Arlington, VA during 2003-2005. Prior to joining the University of Illinois, he held academic positions at Rice University and Cornell University. His research interests include distributed sensor systems and networks, wireless communications, detection and estimation theory, and information theory. He is a Fellow of the IEEE

and a recipient of the IEEE Browder J. Thompson Best Paper Award. He is also a recipient of the NSF CAREER Award and Presidential Early Career Award for Scientists and Engineers (PECASE).

Linda Weavers Currently, the John C. Geupel Chair and Associate Professor in the Department of Civil and Environmental Engineering and Geodetic Science at the Ohio State University, Dr. Weavers recently returned from sabbatical at the University of Minnesota where she was the J.S. Braun/Braun Intertec Visiting Professor in the Department of Civil Engineering. After obtaining her B.S. in Civil Engineering from the University of Minnesota, she received M.S. and Ph.D. degrees in Environmental Engineering Science from the California Institute of Technology. Dr. Weavers' current research is multi-pronged with research projects in the area of advanced oxidation processes (including sonochemistry and photochemistry), contaminants contained on fly ash and flue gas desulfurization by-product (FGD), and defouling of membranes for water treatment. All of these research areas are loosely related in that they investigate the fate and transformation of pollutants. Dr. Weavers has done fundamental research into the mechanisms of organic pollutant destruction, particle dispersion and desorption of contaminants from particles by sonolysis. Also, she has been exploring how to improve and optimize sonochemical systems for environmental applications.   In addition to her research, Dr. Weavers runs a summer camp for middle school girls at OSU to spark their interest in engineering. She has received a National Science Foundation CAREER Award, a Presidential Early Career Award for Scientists and Engineers (PECASE) from President Bush, and the American Association of University Women Emerging Scholar Award for her research.

CORE QUESTIONS and REPORT TEMPLATE
for
FY 2006 NSF COMMITTEE OF VISITOR (COV) REVIEWS
(Modified for use by Committee of Visitors for the CAREER Program)

Guidance to the COV: The COV report should provide a balanced assessment of NSF's performance in two primary areas: (A) the integrity and efficiency of the ***processes*** related to proposal review; and (B) the quality of the ***results*** of NSF's investments that appear over time. The COV also explores the relationships between award decisions and program/NSF-wide goals in order to determine the likelihood that the portfolio will lead to the desired results in the future. 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.* Discussions leading to answers for Part B of the Core Questions will involve study of non-confidential material such as results of NSF-funded projects. The reports generated by COVs are used in assessing agency progress in order to meet government-wide performance reporting requirements, and are made available to the public. Since material from COV reports is used in NSF performance reports, the COV report may be subject to an audit.

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.

The table below should be completed by program staff.

Date of COV: October 18-19 2006
Program/Cluster/Section: Faculty Early Career Development (CAREER) Program
Division: All Divisions
Directorate: All Directorates
Number of actions reviewed: Awards: 53   Declinations: NA   Other:
Total number of actions within Program/Cluster/Division during period under review: **Awards: 1700   Declinations: Other:**
Manner in which reviewed actions were selected: We selected a random sample of awards, oversampling Divisions with few awards. We then ensured that every Division that supports CAREER would have at least one award in the panel. Because CAREER awards and proposals are part of the regular program COVs, this COV did not look at the review process or declines.

PART A.   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.

A1 Questions concerning the resulting portfolio of awards under review. Provide comments in the space below the question. Discuss areas of concern in the space provided.

RESULTING PORTFOLIO OF AWARDS	**APPROPRIATE, NOT APPROPRIATE[2], OR DATA NOT AVAILABLE**
1. Overall quality of the research and/or education projects supported by the program. Comments:	

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[2] If "Not Appropriate" please explain why in the "Comments" section.

2. Are awards appropriate in size and duration for the scope of the projects? Comments:	
3. Does the program portfolio have an appropriate balance of: • Innovative/high-risk projects?[3] Comments:	
4. Does it appear as though the topics of the award winning proposals lend themselves to cross/multidisciplinary research? Comments:	
5. Does the program portfolio have an appropriate balance of: • Geographical distribution of Principal Investigators? Comments:	
6. Does the program portfolio have an appropriate balance of: • Institutional types? Comments:	
7. Does the program portfolio have an appropriate balance of: • Projects that integrate research and education? Comments:	
8. Does the program portfolio have an appropriate balance: • Across disciplines and subdisciplines of the activity and of	

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[3] For examples and concepts of high risk and innovation, please see Appendix III, p. 66 of the Report of the Advisory Committee for GPRA Performance Assessment, available at <www.nsf.gov/about/performance/acgpa/reports.jsp>.

COV Report Template

emerging opportunities? Comments:	
9. Does the program portfolio have appropriate participation of underrepresented groups? Comments:	
10. Is the program relevant to national priorities, agency mission, relevant fields and other customer needs? Include citations of relevant external reports. Comments:	
Additional comments on the quality of the projects or the balance of the portfolio:	

COV Report Template

A.2 Management of the program under review. Please comment on:

1.   Management of the program. Comments:
2.   Responsiveness of the program to emerging research and education opportunities. Comments:
3.   Program planning and prioritization process (internal and external) that guided the development of the portfolio. Comments:
4.   Additional comments on program management:

PART B. RESULTS OF NSF INVESTMENTS

NSF investments produce results that appear over time. The answers to the first three (People, Ideas and Tools) questions in this section are to be based on the COV's study of award results, which are direct and indirect accomplishments of projects supported by the program. These projects may be currently active or closed out during the previous three fiscal years. The COV review may also include consideration of significant impacts and advances that have developed since the previous COV review and are demonstrably linked to NSF investments, regardless of when the investments were made. Incremental progress made on results reported in prior fiscal years may also be considered.

The following questions are developed using the NSF outcome goals in the NSF Strategic Plan. The COV should look carefully at and comment on (1) noteworthy achievements of the year based on NSF awards; (2) the ways in which funded projects have collectively affected progress toward NSF's mission and strategic outcomes; and (3) expectations for future performance based on the current set of awards. NSF asks the COV to provide comments on the degree to which past investments in research and education have contributed to NSF's progress towards its annual strategic outcome goals and to its mission:
  5.   To promote the progress of science.
  6.   To advance national health, prosperity, and welfare.
  7.   To secure the national defense.
  8.   And for other purposes.

Excellence in managing NSF underpins all of the agency's activities. For the response to the Outcome Goal for Organizational Excellence, the COV should comment, where appropriate, on NSF providing an agile, innovative organization. Critical indicators in this area include (1) operation of a credible, efficient merit review system; (2) utilizing and sustaining broad access to new and emerging technologies for business application; (3) developing a diverse, capable, motivated staff that operates with efficiency and integrity; and (4) developing and using performance assessment tools and measures to provide an environment of continuous improvement in NSF's intellectual investments as well as its management effectiveness.

B. Please provide comments on the activity as it relates to NSF's Strategic Outcome Goals. Provide examples of outcomes (nuggets) as appropriate. Examples should reference the NSF award number, the Principal Investigator(s) names, and their institutions.

B.1 <u>OUTCOME GOAL for PEOPLE</u>: Developing "a diverse, competitive and globally engaged workforce of scientists, engineers, technologists and well-prepared citizens."

Comments:

B.2 OUTCOME GOAL for IDEAS: Enabling "discovery across the frontier of science and engineering, connected to learning, innovation, and service to society."

Comments:

B.3 OUTCOME GOAL for TOOLS: Providing "broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation."

Comments:

B.4 OUTCOME GOAL for ORGANIZATIONAL EXCELLENCE: Providing "an agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices."[4]

Comments:

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[4] For examples and further detail on the Organizational Excellence Goal, please refer to pp. 19-21 of NSF's Strategic Plan, FY 2003-2008, at <http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04201>.

COV Report Template

PART C. OTHER TOPICS

C.8. **NSF would appreciate your recommendations on whether the CAREER program should be continued as is or should changes be made to the program goals and objectives. (E.g., award size, duration, eligibility requirements, focus on the integration of research and education, support of collaboration among multiple researchers, etc.)**

C.9. **Please comment on the <u>management</u> of the CAREER program as a cross-directorate activity.**

C.10. **Please provide comments as appropriate on the CAREER program's <u>performance</u> in meeting program-specific goals and objectives.**

C.11. **What recommendations, suggestions or questions do you have for the ongoing program evaluation?**

C.12. **Please identify agency-wide issues that should be addressed by NSF to help improve the program's performance.**

C.13. **Please provide comments on any other issues the COV feels are relevant including discussion of PECASE if appropriate.**

C.14. **NSF would appreciate your comments on how to improve the COV review process, format and report template.**

SIGNATURE BLOCK:

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For the Committee of Visitors
Faculty Early Career Development (CAREER) Program
Dr. Deborah Estrin
Chair

COV Report Template