

EXECUTIVE SUMMARY

It is the unanimous judgment of the 2009 Advisory Committee for GPRA Performance Assessment (AC/GPA) that the National Science Foundation successfully met its performance objectives by demonstrating *significant achievement* for each of the following three long-term, qualitative, strategic outcome goals in its 2006-2011 Strategic Plan:

- **DISCOVERY:** Fostering research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the nation as a global leader in fundamental and transformation science and engineering.
- **LEARNING:** Cultivating a world-class, broadly inclusive science and engineering workforce, and expanding the scientific literacy of all citizens.
- **RESEARCH INFRASTRUCTURE:** Building the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure and experimental tools.

The Committee's assessments were made during its June 18 and 19, 2009 meeting to consider the activities and achievements of NSF relative to its performance under the Government Performance and Results Act (GPRA). Our charge was to assess NSF's performance with regard to the three long-term strategic outcome goals for FY 2009, using primarily performance highlights prepared by NSF program officers and staff and to provide a report to the NSF Director. Program highlights provided the Committee with evidence of specific scientific achievements, as well as with a body of data to identify substantive themes and patterns which are reflected in this year's subcommittee reports.

We were also charged with examining alternate methods of performance assessment, which we did by organizing a Future Assessment Task Group to undertake a more holistic view of ways in which NSF might demonstrate longer-term achievement of its strategic goals. The task group organized presentations and discussions around those topics, which occupied a large part of our two-day meeting. As a result, the task group has put forth the following five recommendations, which have been endorsed by the full Committee (see the next section of this report for detailed information about the task group's work and recommendations):

RECOMMENDATIONS

1. *Consider an assessment framework that uses multiple measures and methods, applied over various time scales. Use both quantitative and qualitative evidence, including highlights.*
2. *Emphasize the dynamic relationships among strategic goals and outcomes.*
3. *Use performance assessment as an opportunity and means to document the strategic value of NSF's science investments to the nation and the public.*
4. *Engage the scientific community as a partner in performance assessment.*
5. *Build assessment into the organizational and programmatic infrastructure of NSF.*

Details on NSF's performance evaluation under the Discovery, Learning, and Research Infrastructure strategic outcome goals are presented in subsequent sections of this report, along with several examples or highlights that illustrate specific achievements. Those sections represent the deliberations of three subgroups organized according to the three goals. Based on the deliberations of each subgroup, and after discussion and evaluation by the Committee as a whole, the opinions of each subgroup were supported unanimously by the entire AC/GPA Committee.

The Committee did not form an assessment or opinion of NSF's performance under the fourth goal: *Stewardship*, which is: *to support excellence in science and engineering research and education through a capable and responsive organization*. Performance outcomes under Stewardship are reported internally within NSF using a number of measures and milestones developed by NSF senior leadership.

The 2009 AC/GPA was comprised of 21 members, each of whom had strong academic credentials and substantial experience in academia, government, and/or industry. More than half the AC/GPA members presently serve on advisory committees within the Foundation. As a group, the Committee is familiar with NSF processes and procedures and, as individuals, the Committee members have personal experience with NSF and a wide range of its programs.

NSF Response to 2008 AC/GPA Recommendations

A key part of overall performance is following up to be sure the agency has adequately responded to the prior year's recommendations. Each year, the Committee reviews the progress NSF has made in responding to the recommendations of the previous year's Committee. The recommendations of the 2008 AC/GPA Committee are categorized as follows:

Summary of FY 2008 Recommendations:

1. *Track future outcomes from "people" trained and supported by NSF.* Consider ways of capturing the longer term "people" outcomes. This extends beyond principal investigators, and includes advisors and professors, particularly junior professors who oversee the work, and graduate students, staff, and other researchers. The current performance outcomes (annual highlights) do not capture this essential "value added" aspect of NSF investments.
2. *Consider ways to convey the long view of NSF investments in science and engineering.* While highlights are an excellent way to document and illustrate the breadth of NSF's investments in a wide variety of fields and disciplines at a particular point in time, Committee members expressed interest in finding ways to demonstrate the long-term impacts of NSF support. Committee members look forward to ways to tell this deeper, more comprehensive story of scientific advancement supported by NSF funding.
3. *Reconsider the format and value of COV reports.* The Committee recommended that Committee of Visitor (COV) reports be reviewed annually at the NSF Director level in order to gain insight into common process issues that may affect performance on an agency-wide basis. In addition, the Committee concluded that Part B (Research and Education Outcomes) is not very informative and provides little, in fact far less, outcome information than the Committee receives in the performance highlights. The Committee recommended that Part B of the COV reports should be either enhanced or eliminated.
4. *Continue to improve assessment processes and contextual information available to the AC/GPA.* The Committee recommended that the methods and guidelines that program officers use to select and describe highlights be shared with Committee members as part of their preparation for the annual meeting. NSF should continue to provide access to other reports to give the Committee a broader context in which to consider performance goals under the strategic

goals. In addition, the Committee recommends continuation of the practice of having NSF program officers available during the Committee meeting.

The Committee is pleased to report that each of these recommendations has been fully addressed, or is being addressed, by NSF staff and NSF management to the satisfaction of the Committee, as follows:

Regarding the first and second recommendations, NSF responded by recommending that a task group of the AC/GPA be organized in preparation for the 2009 meeting. The task group focused on alternative ways to assess the impact of the people that NSF supports as well as ways to take a longer, deeper view of NSF investments. As a result, the majority of time at the 2009 meeting was spent on discussing these important issues for NSF's future performance assessment activities. A report by the task group, with details about their recommendations, may be found in this report.

Regarding the third recommendation, NSF stated that the Office of the Director now conducts an annual review of COV reports to identify common themes and issues. In addition, the guidance to COVs for completion of Part B of their report on outcomes has been revised. COVs are asked to comment on the impact of NSF-supported contributions to the field, in addition to identifying *noteworthy* accomplishments or highlights.

Regarding the fourth recommendation, NSF provided the Committee with information on guidelines for Program Officers in writing their highlights, and informed the Committee about the result of staff interviews with Program Officers about how they decide what to write about. NSF staff has continued to provide the Committee with reports and other performance-related information throughout the year through the Committee's website. In addition, several program officers attended the 2009 meeting to provide additional insight and answer questions when needed.

Committee Members' Comments on the Issue of Broadening Participation

On several occasions during the meeting, but especially in the closing session, Committee members spoke with both eloquence and passion of their vision of the scientific community of the future. They imagine a community not only enhanced but potentially transformed by an infusion of new experiences and perspectives from groups that are traditionally underrepresented in science and engineering, such as women, African-Americans, Hispanics, and Native Americans, as well as others. The unique histories, backgrounds, and cultural traditions and orientations of these groups can bring dramatically new approaches to the strategic goals of scientific discovery and

learning that are the core of NSF's mission. By aggressively providing opportunities to these groups and expanding their participation in NSF programs and STEM disciplines, the discovery and learning missions can be taken beyond their historical boundaries and lead to new ways of understanding and experiencing the universe, which could be transformational. Thus the goal of broadening participation is not only an issue of fairness and equal opportunity, but is the means of bringing diversity and intellectual breadth to the transformation of science itself.

Acknowledgements

The Committee is most grateful to the NSF staff for the tremendous effort made in preparing the AC/GPA website and providing all the documentation which was assembled for review in advance of the formal meeting. There were many organizational meetings and subcommittee telephone calls needed to prepare our efforts so face to face meeting time could focus on group analysis, collaboration, and consensus building. In particular, we would like to extend our deepest gratitude to Jennifer Thornhill and Pat Tsuchitani, for their work in diligently gathering data in preparation for the Committee meeting, making arrangements for the meeting, and helping prepare and edit this report. They deserve special recognition for their contributions to the processes and to the final product. In addition, we would like to recognize the contribution of Amber Baum, AAAS Fellow, who worked with the task force examining alternative methods of performance assessment. We also thank Michael Sieverts for his insights and advice. Lastly, we thank the NSF program officers for their thoughtful reporting of program highlights, and NSF's Director, Dr. Arden L. Bement, Jr., for his commitment to this effort and for his insightful remarks at our meeting.