

**PERFORMANCE**

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## NSF’S PERFORMANCE CONTEXT

The following information on NSF’s mission statement, organizational structure, and strategic goals is required to be included in the agency’s Annual Performance Plan and Annual Performance Report by the GPRA Modernization Act of 2010 (P.L. 111-352).

### Mission Statement

The NSF Act of 1950 (Public Law 81-507) states the Foundation’s mission: “to promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.”

### Strategic Plan and Performance Goals

NSF’s Strategic Plan, *Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years (FY) 2011-2016*<sup>1</sup>, lays out three strategic goals—Transform the Frontiers, Innovate for Society, and Perform as a Model Organization—that relate directly to this mission. This goal structure enables NSF to link its investments to longer-term outcomes. To bridge the gap between these strategic goals and measurable outputs, the Strategic Plan establishes a set of performance goals (also called strategic objectives) for each strategic goal:

Strategic Goal	Strategic Objectives / Performance Goals
<p><i>Transform the Frontiers (T)</i> emphasizes the seamless integration of research and education as well as the close coupling of research infrastructure and discovery.</p>	<p>T-1: Make investments that lead to emerging new fields of science and engineering and shifts in existing fields.</p> <p>T-2: Prepare and engage a diverse science, technology, engineering, and mathematics (STEM) workforce motivated to participate at the frontiers.</p> <p>T-3: Keep the United States globally competitive at the frontiers of knowledge by increasing international partnerships and collaborations.</p> <p>T-4: Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and to enable transformation at the frontiers.</p>
<p><i>Innovate for Society (I)</i> points to the tight linkage between NSF programs and societal needs, and it highlights the role that new knowledge and creativity play in economic prosperity and society’s general welfare.</p>	<p>I-1: Make investments that lead to results and resources that are useful to society.</p> <p>I-2: Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.</p> <p>I-3: Support the development of innovative learning systems.</p>
<p><i>Perform as a Model Organization (M)</i> emphasizes the importance to NSF of attaining excellence and inclusion in all operational aspects.</p>	<p>M-1: Achieve management excellence through leadership, accountability, and personal responsibility.</p> <p>M-2: Infuse learning as an essential element of the NSF culture with emphasis on professional development and personal growth.</p> <p>M-3: Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.</p>

<sup>1</sup> <http://www.nsf.gov/about/performance>

Under each of these performance goals are one or more strategic targets, 14 in all. In FY 2011, each strategic target was monitored through one or more annual performance goals, 16 in all. The NSF set 18 performance goals for FY 2012-FY 2013.

**GPRM Modernization Act of 2010**

The GPRM Modernization Act of 2010 (P.L.111-352, 31 U.S.C. 1115(b)(10)) revises the federal government's performance management framework, retaining and amplifying certain aspects of the Government Performance and Results Act of 1993 (GPRM). The Act shifts the focus of its predecessor from the production of plans and reports to the use of goals and performance data to improve outcomes. Among other changes, it strengthens leadership engagement in setting ambitious goals, reviewing progress, and clearly communicating results.

The GPRM Modernization Act (GPRM-MA) institutes important changes to existing strategic planning, performance planning, and reporting requirements. GPRM-MA serves as a foundation for helping agencies to focus on their highest priorities and creating a culture where data and empirical evidence plays a greater role in policy, budget, and management decisions.

As required in the GPRM Modernization Act, this FY 2013 Congressional Budget Request includes the following reports on NSF's performance framework:

- FY 2012 - 2013 Agency Priority Goals. This section also includes a report on the FY 2010-2011 Priority Goal.
- FY 2012 - 2013 Annual Performance Plan, Goals and Priorities section
- FY 2011 Annual Performance Report, including information about the program evaluations completed in FY 2011
- FY 2011-2016 Strategic Plan Addendum
- Supporting Information, including discussion of the strategies and supporting analyses used in development of the FY 2012-2013 Plan and the methods used to verify and validate performance data.

## AGENCY PRIORITY GOALS

### FY 2012-FY 2013 Agency Priority Goals

NSF has set three priority goals for accomplishment in FY 2012 and FY 2013. These goals cover the range of programmatic activities that NSF supports, from basic research to training of the science and engineering workforce to education of the general public. The goals will require cross-agency coordination to make progress, and NSF is leveraging its experiences with FY 2010-FY 2011 Priority Goal achievement towards this end.

The information on the following pages about the FY 2012-2013 Goals is also available on NSF's Performance.gov page. NSF also participates in cross-agency Federal Priority Goals. Please refer to Performance.gov for information on these Federal Priority Goals and NSF's contributions to them.

<b>FY 2012-FY 2013 NSF Agency Priority Goals</b>		
<b>Goal Short Title</b>	<b>Impact Statement</b>	<b>Goal Statement</b>
Access to Digital Products of NSF-Funded Research	Increase opportunities for research and education through public access to high-value digital products of NSF-funded research.	By September 30, 2013, NSF will have established policies for public access to high-value data and software in at least two data-intensive scientific domains.
Undergraduate Programs	Develop a diverse and highly qualified science and technology workforce.	By September 30, 2013, 80 percent of institutions funded through NSF undergraduate programs document the extent of use of proven instructional practices.
NSF Innovation Corps	Increase the number of entrepreneurs emerging from university laboratories.	By September 30, 2013, 80 percent of teams participating in the NSF Innovation Corps program will have tested the commercial viability of their product or service.

## **FY 2012-FY 2013 Priority Goal: Access to Digital Products of NSF-Funded Research**

### **Impact Statement**

Increase opportunities for research and education through public access to high-value digital products of NSF-funded research.

### **Goal Statement**

By September 30, 2013, NSF will have established policies for public access to high-value data and software in at least two data-intensive scientific domains.

### **Lead Organization**

Directorate for Mathematical and Physical Sciences

### **Relevant Strategic Objective/Performance Goal**

Under the “Transform the Frontiers” strategic goal, Objective T-4, “Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and enable transformation at the frontiers.”

### **Description**

Digital data are increasingly one of the primary products of scientific research. As advanced by the National Science Board, open data sharing is closely linked to public access to scholarly publications resulting from federally funded unclassified research, and they should be considered in concert. The digital data underlying figures and the key findings in the literature should be accessible and linked to one another so that scientists can verify and reproduce major findings in the literature and repurpose the data to enable new discoveries. Simultaneously, access to digital products of research enhances openness and transparency in the scientific enterprise and enables new types of multi-disciplinary research and education. Therefore, it is increasingly important for NSF to facilitate and encourage access to data and research results. The priority goal supports this vision of increasingly collaborative and multi-disciplinary science by assuring that knowledge and data can flow easily across traditional disciplinary boundaries.

This goal is also linked to the National Science Foundation’s concept for “OneNSF”, which promotes collaboration in well-integrated and efficient ways across organizational and disciplinary boundaries.

### **Contributing Programs**

The effort is led by the Assistant Director of the Mathematical and Physical Sciences Directorate. All programmatic directorates and offices will provide appropriate program staff for working groups. The NSF will help staff and liaise to related activities of the National Science Board. Personnel from the NSF Policy Office (Office of Budget and Finance and Award Management, Division of Institutional and Award Support) and NSF Information Systems (Office of Information and Resource Management, Division of Information Systems) will be required for working groups and implementation.

Other research agencies, such as the National Institutes of Health (NIH) and the Department of Energy (DOE), face similar challenges with regard to products of federally funded scientific research. NSF staff communicate with representatives of other agencies to identify best practices for facilitating access to data. Prototyping and implementation will engage a variety of external stakeholders.

**FY 2012-FY 2013 Priority Goal: Undergraduate Programs**

**Impact Statement**

Develop a diverse and highly qualified science and technology workforce.

**Goal Statement**

By September 30, 2013, 80 percent of institutions funded through NSF undergraduate programs document the extent of use of proven instructional practices.

**Lead Organization**

Directorate for Education and Human Resources (EHR).

**Relevant Strategic Objective/Performance Goal**

Under “Transform the Frontiers” strategic goal, T-2: “Prepare and engage a diverse STEM workforce motivated to participate at the frontiers.”

**Description**

NSF’s Strategic Plan emphasizes the pressing need for science and engineering workforce development and emphasizes diversity and innovation as aspects of high quality preparation and engagement. The current priority goal addresses NSF’s long-term core commitment to using undergraduate education to engage and prepare a diverse and highly qualified science and engineering workforce. Research shows that evidence-based instructional practices lead to improved student learning, and thus are a useful metric for assessing impact on a well-prepared workforce. Therefore, one way that NSF can advance its efforts to invest in the preparation of a strong science and engineering workforce is by encouraging and facilitating the use of empirically-based instructional practices in undergraduate science, technology, engineering, and mathematics (STEM) education. To do this first means establishing a baseline about the use of such practices.

Implementation of this goal will include the design, piloting, and testing of a suite of methods to gather information about the nature of undergraduate STEM instructional practice in institutions. These methods will enable academic institutions to benchmark their instructional practices in STEM fields.

By September 30, 2013, 80 percent of the institutions funded through NSF undergraduate programs will be expected to document the extent of their use of evidence-based instructional practices.

**Contributing Programs**

All NSF programs that support undergraduate science, technology, engineering, and mathematics (STEM) education.

**FY 2012-FY 2013 Priority Goal: NSF Innovation Corps**

**Impact Statement**

Increase the number of entrepreneurs emerging from university laboratories.

**Goal Statement**

By September 30, 2013, 80 percent of teams participating in the NSF Innovation Corps program will have tested the commercial viability of their product or service.

**Lead Organization**

Directorate for Engineering

**Relevant Strategic Objective/Performance Goal**

Under “Innovate for Society” strategic goal, Objective I-1, “Make investments that lead to results and resources that are useful to society,” and Objective I-2, “Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.”

**Description**

Through the NSF Innovation Corps (I-Corps) program, NSF seeks to accelerate the development of new technologies, products and processes that arise from fundamental research. The goals of I-Corps are to spur translation of fundamental research, to encourage collaboration between academia and industry, and to train students to understand innovation and entrepreneurship. With I-Corps, NSF supports NSF-funded researchers whose efforts will be augmented - in the form of mentoring and funding - to accelerate the translation of knowledge derived from fundamental research into emerging products and services that can attract subsequent third party funding. NSF investments will strategically strengthen the innovation ecosystem (<http://www.nsf.gov/eng/iip/innovation.pdf>) by addressing the challenges inherent in the early stages of the innovation process.

Implementation of this goal will require the development of mechanisms and partnerships to support I-Corps teams. The teams will consist of three people and will include an NSF Principal Investigator (PI), an Entrepreneurial Lead (typically a graduate student) and a mentor from the private sector. Teams will propose a specific service or product concept for six months of I-Corps-funded development and testing. The concepts will have arisen from basic research led by the PI and funded by NSF within the previous five years. The selected teams will proceed through an intensive prescribed curriculum designed to develop their entrepreneurial skills and to ensure that the critical assumptions underpinning their perceived opportunities are tested. At the end of the six months, teams will decide whether or not to proceed with development of their concept.

**Contributing Programs**

NSF Innovation Corps, [http://www.nsf.gov/news/special\\_reports/i-corps/](http://www.nsf.gov/news/special_reports/i-corps/)



## FY 2010-FY 2011 Priority Goal Report

NSF had one priority goal for accomplishment in FY 2010 and FY 2011. A summary of this priority goal, including the goal's achievements, is provided below.

### **FY 2010-FY2011 Priority Goal: Science, Technology, Engineering and Mathematics (STEM) Workforce Development**

#### **Goal Statement**

By the end of 2011, at least six major NSF science, technology, engineering and mathematics (STEM) workforce development programs at the graduate, postdoctoral, or early career level have evaluation and assessment systems providing findings enabling program re-design or consolidation for more strategic impact.

#### **Lead Organization**

Directorate for Education and Human Resources

#### **Relevant Strategic Objective/Performance Goal**

Transform the Frontiers strategic goal, subgoal T-2: "Prepare and engage a diverse STEM workforce motivated to participate at the frontiers."

#### **Result: Achieved. Twelve programs reached the target.**

NSF's goal aimed to strengthen NSF's internal culture and practices to rely more heavily on assessment and evaluation for decision-making and grants program improvement. The NSF Priority Goal (PG) target was for six of the twenty-five participating grants programs to have evaluation and assessment systems capable of providing enough information for program re-design or consolidation. A theoretical model of program design and evaluation was developed to help provide a framework for assessment and measurement.

At the close of the performance period, September 30, 2011, materials from each of the twenty-five programs were rated by an expert against the theoretical model. Twelve of the twenty-five programs in the target program universe reached the goal, identified below by NSF managing directorate or office and program focus:

<b>Program</b>	<b>Directorate</b>	<b>Focus</b>
Alliances for Graduate Education and the Professoriate (AGEP)	EHR/SBE	Graduate
Faculty Early Career Development Program (CAREER)	EHR	Early Career
Fellowships for Transformative Computational Science using Cyberinfrastructure (CI-TraCS)	OCI	Postdoctoral
Earth Sciences Postdoctoral Fellowship (EAR-PF)	GEO	Postdoctoral
Graduate Research Fellowship Program (GRF)	EHR	Graduate
Integrative Graduate Education and Research Traineeship Program (IGERT)	EHR	Graduate
International Research Fellowship Program (IRFP)	OISE	Postdoctoral
Mathematical Sciences Postdoctoral Research Fellowships (MSPRF)	MPS	Postdoctoral
Robert Noyce Teacher Scholarship Program (NOYCE)	EHR	Postdoctoral
Opportunities for Enhancing Diversity in the Geosciences (OEDG)	GEO	Graduate

<b>Program</b>	<b>Directorate</b>	<b>Focus</b>
Postdoctoral Research Fellowship in Biology (PRFB)	BIO	Postdoctoral
Scholarship for Service/Cybercorps (SFS)	EHR	Graduate

All twenty-five programs made progress towards achieving the goal. Of the thirteen programs that did not achieve the goal, four have not been active long enough to meet all the criteria of the theoretical model.

A more comprehensive report is available for download at <http://www.nsf.gov/about/budget/fy2013>. Posting of this report addresses concerns about transparency and accountability, which were raised by an Office of the Inspector General audit in FY 2011 of NSF's process for achieving Priority Goals. The audit found that "the detail and documentation provided to support milestone accomplishment was inadequate and did not provide for the transparency and accountability intended of priority goal processes." However, it also stated:

*NSF has taken steps consistent with OMB guidance related to coordinating, measuring, monitoring, and communicating progress towards achieving its priority goal. Through the priority goal process, NSF appears to be moving towards a foundation of increased performance data-driven program evaluation and assessment, as evidenced by improvements in both the quantity and quality of the performance information included in its budget requests to Congress.<sup>1</sup>*

#### **Lessons Learned and Future Directions**

NSF will not continue this Priority Goal in FY 2012-2013, but will continue efforts to bring a stronger orientation toward evidence as a basis for program improvement. Changing culture is a slow process, but, as a direct result of undertaking this Priority Goal, a culture of evaluation and performance assessment is gaining momentum across the Foundation. Agency-wide collaborations will continue.

Unanticipated positive impacts of the Priority Goal process include:

- As a result of their involvement in the Priority Goal activities, staff leaders of the twelve postdoctoral and early career programs increased their level of collaboration. One major activity undertaken, for example, was the development of a common logic model for postdoctoral programs which could serve as an umbrella for individual programs. And, the programs collectively convened a group of postdoctoral grantees to discuss how to best improve postdoctoral programming. In the future, this effort could help the programs make maximal use of limited resources, improve assessment, and share best practices to improve effectiveness.
- Partially in response to needs of program staff working on the Priority Goal activities, in FY 2011 NSF's Office of Integrative Activities (OIA) began developing capabilities for NSF-wide data mining and analysis of available program information. The office collaborated with a number of Priority Goal programs to attempt to address specific questions formulated by the programs as part of the Priority Goal process. This new capacity for improved data mining of existing program documents provided substantial evidence for evaluative analysis of the programs participating in the PG activity. Given NSF's commitment to developing Foundation-wide evaluation capability, the OIA participation in this component of the Priority Goal was critical in helping to build needed resources.
- Ongoing discussion of metrics and monitoring systems for STEM education and workforce development, in programs across the agency, has benefitted from the Priority Goal activity, and there are new efforts for a range of programs to work with logic models and goal development.

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<sup>1</sup> <http://www.nsf.gov/oig/11-2-008.pdf>

## FY 2012-FY 2013 PERFORMANCE PLAN

This Annual Performance Plan, together with other sections of this chapter, addresses the topics specified in the GPRA Modernization Act. One exception however, is the topic of Federal Priority Goals. Per the GPRA Modernization Act, P.L. 111-352, requirement to address Federal Goals in the agency Strategic Plan and Annual Performance Plan, please refer to Performance.gov for information on Federal Priority Goals and NSF's contributions to those goals, where applicable.

NSF's FY 2012 and FY 2013 performance goals are presented in the table below in context with their associated strategic goal. As in FY 2011, all program activities within the agency are covered, and all longer-term objectives under each strategic goal are covered.

Strategic Goal	FY 2012-FY 2013 Performance Goal		New or continuing activity?
Transform the Frontiers	T-1.1	INSPIRE*	Continuing
	T-2.1	Priority Goal, Undergraduate Programs	New
	T-2.2	Career-Life Balance	New
	T-3.1	International Implications	Continuing
	T-4.1	Construction Project Monitoring	Continuing
	T-4.2	Priority Goal, Access to Digital Products	New
Innovate for Society	I-1.1	Priority Goal, Innovation Corps	New
	I-1.2	Industrial and Innovation Partnerships	Continuing
	I-2.1	Public Understanding and Communication	Continuing
	I-2.2	K-12 Scale-up	Continuing
	I-3.1	Innovative Learning Systems	Continuing
Perform as a Model Organization	M-1.1	Model EEO* Agency	Continuing
	M-1.2	IPA* Performance Plans	Continuing
	M-1.3	Performance Management System	New
	M-2.1	Assess Developmental Needs	Continuing
	M-3.1	Financial System Modernization	Continuing
	M-3.2	Time To Decision	Continuing
	M-3.3	Virtual Panels	New

\*Acronyms:

INSPIRE: Integrated NSF Support Promoting Interdisciplinary Research and Education

EEO: Equal Employment Opportunity

IPA: Intergovernmental Personnel Act

This FY 2012-FY 2013 Plan builds on NSF's FY 2011 Performance Plan, which was the first under a new set of Strategic Goals introduced by NSF's FY 2011-FY 2016 Strategic Plan, *Empowering the Nation Through Discovery and Innovation*. Almost all FY 2011 goals continue into FYs 2012 and 2013, and several activities with no FY 2011 precedents have been added as performance goals, including goals to advance the OneNSF framework (INSPIRE, Expeditions in Education, Innovation Corps) and the Career-Life Balance Initiative. NSF's three Priority Goals for FY 2012 and FY 2013 are also included in this Plan.

In FY 2012 and FY 2013, NSF expects to continue refining its implementation of the GPRA Modernization Act. This will involve internal process modifications to integrate lessons learned from past experience with ideas from the growing performance management community of practice in the Federal government.

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-1:** Make investments that lead to emerging new fields of science and engineering and shifts in existing fields.

**Strategic Target:** The NSF portfolio fully incorporates emerging areas with transformative potential, including those forming at disciplinary boundaries.

**Goal T-1.1 INSPIRE (Integrated NSF Support Promoting Interdisciplinary Research and Education)**

Fiscal Year	2012	2013
<b>Statement</b>	Strengthen support of unusually novel, potentially transformative, interdisciplinary research (IDR), through new funding mechanisms, systems, and incentives that facilitate and encourage IDR.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, <ul style="list-style-type: none"> <li>• Track 1: Gather baseline data on NSF-supported IDR.</li> <li>• Track 2: Make 25 awards via the pilot CREATIV (Creative REsearch Awards for Transformative Interdisciplinary Ventures) mechanism.</li> </ul>	By September 30, 2013, <ul style="list-style-type: none"> <li>• Track 1: Modify NSF’s eBusiness systems to facilitate co-review and management of proposals by multiple divisions, and to ease tracking of co-funded IDR.</li> <li>• Track 2: Award up to one-third of FY 2013 INSPIRE funds via the CREATIV mechanism.</li> <li>• Track 2: Establish a second pilot award mechanism for funding mid-scale IDR (up to \$3 million), and make first round of awards.</li> </ul>
<b>Explanation</b>	<p>INSPIRE was established to address some of the most complicated and pressing scientific problems that lie at the intersections of traditional disciplines. INSPIRE will strengthen NSF’s support of interdisciplinary, potentially transformative research by complementing existing efforts with a suite of new, highly innovative Foundation-wide activities and funding opportunities.</p> <p>The INSPIRE program has two goals. The first goal is to provide NSF program officers with the necessary tools and management support to empower cross-cutting collaboration and risk-taking in developing and managing their awards portfolio. The second goal is for researchers to submit, and NSF to support, a greater proportion of unusually novel, creative interdisciplinary proposals.</p> <p>For more information about INSPIRE’s background, goals, design, and investment and evaluation framework, refer to the NSF-Wide Investments tab.</p>	

<p><b>Potential Methods and Processes</b></p>	<p>Track 1 of INSPIRE seeks to make changes to NSF systems and practices that will facilitate identification, review, support, management, and tracking of IDR. Activities will encompass improvements in business practices, funding culture, training, and evaluation.</p> <p>The pilot CREATIV (Creative Research Awards for Transformative Interdisciplinary Ventures) award mechanism will invest all of the INSPIRE funds for FY 2012. CREATIV awards, with a maximum award size of \$1.0 million, will generally be internally reviewed and will support bold high-risk IDR projects that investigators may be reluctant to submit to a conventional review process. The CREATIV funding mechanism will be open to ideas on any NSF-supported topic as long as they are interdisciplinary and potentially transformative.</p> <p>To facilitate later evaluation of INSPIRE, baseline data on NSF-supported IDR will be gathered, and internal and external surveys about support of IDR and potentially transformative research (PTR) will be conducted. In FY 2013, the 2012 portfolio of CREATIV awards will be analyzed to determine whether the new mechanism is resulting in types of awards that were not being funded with previous mechanisms. Case studies and qualitative assessments of the review process for projects with transformative results are expected to provide helpful information.</p> <p>In FY 2013, the INSPIRE awards activities will continue, supporting the second year of the CREATIV pilot and expanding to include larger “mid-scale” awards up to the range of \$2.5-3.0 million. This second pilot INSPIRE mechanism will be open to IDR proposals on any NSF-supported topic and will utilize novel merit review mechanisms involving both internal and external review. Directorates and offices will co-fund CREATIV and mid-scale awards, together with centralized funds from the Office of Integrative Activities.</p> <p>This and future reports on this activity to support fundamental, high-risk, and potentially transformative research is provided also per Section 1008 of the 2007 America COMPETES Act.</p>
<p><b>Trend information</b></p>	<p>INSPIRE is a new activity in FY 2012. Its centralized IA funds and interdisciplinary aspects have no clear precedent at NSF. Baseline data is yet to be gathered.</p> <p>NSF has been experimenting with how to support potentially transformative research (PTR) for several years. The EAGER (Early-concept Grants for Exploratory Research) mechanism, first used in FY 2009, is designed to support small-scale PTR (two years, &lt;\$300,000). In FY 2010, the directorates funded by the Research and Related Activities appropriations account allocated a total of \$138.44 million to explore different methodologies to support PTR, which created a set of awards that are collectively considered case studies for the various methodologies used. The tracking of this activity was a GPRA performance goal in FY 2010 and FY 2011.</p>
<p><b>Lead Organization</b></p>	<p>Office of Integrative Activities</p>

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-2:** Prepare and engage a diverse science, technology, engineering, and mathematics (STEM) workforce motivated to participate at the frontiers.

**Strategic Target:** NSF STEM workforce development programs, models, or strategies have rigorous evidence about the impact on diversity and innovation in the workforce.

**Goal T-2.1 PRIORITY GOAL: Undergraduate Programs**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	Develop a diverse and highly qualified science and technology workforce.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2013, 80 percent of institutions funded through NSF undergraduate programs document the extent of use of proven instructional practices.	
<b>Explanation</b>	<p>NSF’s Strategic Plan emphasizes the pressing need for science and engineering workforce development and emphasizes diversity and innovation as aspects of high quality preparation and engagement. The current priority goal addresses NSF’s long-term core commitment to using undergraduate education to engage and prepare a diverse and highly qualified science and engineering workforce. Research shows that evidence-based instructional practices lead to improved student learning, and thus are a useful metric for assessing impact on a well-prepared workforce. Therefore, one way that NSF can advance its efforts to invest in the preparation of a strong science and engineering workforce is by encouraging and facilitating the use of empirically-based instructional practices in undergraduate science, technology, engineering, and mathematics (STEM) education. To do this first means establishing a baseline about the use of such practices.</p> <p>Implementation of this goal will include the design, piloting, and testing of a suite of methods to gather information about the nature of undergraduate STEM instructional practice in institutions. These methods will enable academic institutions to benchmark their instructional practices in STEM fields.</p> <p>By September 30, 2013, 80 percent of the institutions funded through NSF undergraduate programs will be expected to document the extent of their use of evidence-based instructional practices.</p>	
<b>Potential Methods and Processes</b>	Action Plan will be posted on performance.gov in Summer 2012.	
<b>Trend information</b>	NA. This Priority Goal is a newly developed activity for FY 2012-FY 2013.	
<b>Lead Organization</b>	Directorate for Education and Human Resources	

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-2:** Prepare and engage a diverse science, technology, engineering, and mathematics (STEM) workforce motivated to participate at the frontiers.

**Strategic Target:** NSF STEM workforce development programs, models, or strategies have rigorous evidence about the impact on diversity and innovation in the workforce.

**Goal T-2.2 Career-Life Balance**

Fiscal Year	2012	2013
<b>Statement</b>	Promote Career-Life Balance policies and practices that support more fully utilizing the talents of individuals in all sectors of the American population – principally women, underrepresented minorities and persons with disabilities.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, establish the FY 2012 baseline for number and value of award support provided to CAREER awardees and postdoctoral fellows intended to fund research technicians.	By September 30, 2013, <ul style="list-style-type: none"> <li>• Establish the FY 2013 baseline for number and value of awards provided to ADVANCE institutions intended to fund dual career supports.</li> <li>• Increase the number and value of research technician award support provided to CAREER awardees and postdoctoral fellows by 10 percent over FY 2012.</li> </ul>
<b>Explanation</b>	<p>Although women comprise a significant and growing fraction of the U.S. STEM talent pool, recent studies demonstrate the challenges that they face when attempting to balance the often extreme demands of career and life without adequate institutional support. Utilizing women’s talent and potential in STEM fields is critical to the nation’s future success in science and technology and to economic prosperity.</p> <p>To address this challenge, NSF’s Career-Life Balance (CLB) Initiative, a set of forward-looking policies and practices, will help to increase the placement, advancement, and retention of women in STEM disciplines, particularly women who are seeking tenure in academe. NSF aims to enhance existing – and implement new – gender-neutral, family-friendly policies, as it is important that our nation’s colleges and universities accommodate the needs of the largest-growing segment of our science and engineering workforce. The Foundation is pursuing an agency-level pathway approach across higher education and career levels (i.e., graduate students, postdoctoral students, and early-career scientists, and engineers). CLB seeks new and innovative ways in which NSF can partner with U.S. universities, colleges, and research institutions to help attract, nurture, and retain a much greater fraction of women engineers and scientists in the nation’s STEM workforce.</p> <p>In FY 2012 and FY 2013, NSF will introduce CLB supports for technicians for awardees (CAREER and postdoctoral fellows) who need temporary help to continue research while facing the demands of child and/or elder dependent care. In FY 2013, the NSF will introduce a support through the ADVANCE Institutional Transformation award for hiring dual-career spouses. Achievement of the FY 2012 and FY 2013</p>	

	targets will signify significant new CLB supports for postdoctoral students and early-career scientists and engineers.
<b>Potential Methods and Processes</b>	<p>The following methods will be used:</p> <ul style="list-style-type: none"> <li>• A Working Group with representation from across the agency to coordinate activities.</li> <li>• Communications strategy to raise awareness around the Foundation and in the S&amp;E community about the CLB initiative (e.g. dedicated dynamic webpage, email announcements, town hall meetings, conferences, and activity fairs).</li> <li>• Training of NSF staff in opportunities and resources, and award management provided through CLB.</li> <li>• Establishment of unique accounting codes to facilitate financial reporting of CLB supports.</li> <li>• Individual program officers to work with grantees to identify opportunities to use the supports.</li> <li>• Development of an integrated documentation, assessment and evaluation approach to guide and determine the added value of the CLB initiative.</li> </ul>
<b>Trend information</b>	NA. The CLB Initiative is new in FY 2012. Such support provided in past years was not trackable.
<b>Lead Organization</b>	Office of the Director



**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-3:** Keep the United States globally competitive at the frontiers of knowledge by increasing international partnerships and collaborations.

**Strategic Target:** NSF programs increasingly establish international partnerships that advance the frontiers of knowledge.

**Goal T-3.1 International Implications**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	Increase proportion of new NSF solicitations, announcements, and Dear Colleague Letters that have international implications.	
<b>Target Measure, Milestone, or Deliverable</b>	Increase proportion of new NSF solicitations, announcements, and Dear Colleague Letters that have international implications by 10 percent over FY 2011.	Increase proportion of new NSF solicitations, announcements, and Dear Colleague Letters that have international implications by 10 percent over FY 2012.
<b>Explanation</b>	<p>As science and engineering expertise and infrastructure advance across the globe, it is expected that the United States will increasingly benefit from international collaborations and a globally engaged workforce leading to transformational science and engineering breakthroughs. To this end, NSF promotes cooperation among scientists and engineers from all nations and encourages funding of international collaborative activities through all of our programs. By supporting institutions that collaborate on research, education and related activities with international colleagues, U.S. scientists and engineers gain access to unique facilities and research sites and to partnerships with the global research community. In these ways, they are able to augment what might otherwise be purely domestic activities and resources in their field and have an opportunity to better understand the increasingly global character of science and engineering.</p> <p>In NSF’s internal document clearance process, program officers have the opportunity to indicate whether a given solicitation, announcement, or Dear Colleague Letter has international implications. For example, study of earthquakes may require international travel or collaboration, so a solicitation on the topic may have implications for international activity. OISE will work with NSF directorates and offices to identify opportunities to expand international engagements among NSF activities and incorporate them into these proposal-generating documents.</p>	
<b>Potential Methods and Processes</b>	The number of new NSF solicitations, announcements, and Dear Colleague Letters that have international implications will be compared to the total number of such documents issued by NSF in each year.	
<b>Trend information</b>	<p>This was a new goal in FY 2011 under NSF’s new strategic plan framework. OISE conducted a count of these materials in FY 2011 and established a baseline of 23 solicitations, announcements, and Dear Colleague Letters.</p> <p>FY 2011 baseline: 20 percent (23 of 116 solicitations, announcements, and Dear Colleague Letters issued in FY 2011.)</p>	

*Performance*

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	FY 2012 target: 22 percent of solicitations, announcements, and Dear Colleague Letters issued in FY 2012. FY 2013 target: 24 percent of solicitations, announcements, and Dear Colleague Letters issued in FY 2013.
<b>Lead Organization</b>	Office of International Science and Engineering

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-4:** Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and to enable transformation at the frontiers.

**Strategic Target:** NSF prioritizes and manages facility investments throughout their life-cycle in a transparent and effective way.

**Goal T-4.1 Construction Project Monitoring**

Fiscal Year	2012	2013																					
<b>Statement</b>	For all MREFC facilities under construction, keep negative cost and schedule variance at or below 10 percent.																						
<b>Target Measure, Milestone, or Deliverable</b>	100 percent of construction projects that are over 10 percent complete.																						
<b>Explanation</b>	The Major Research Equipment and Facilities Construction (MREFC) account supports the acquisition, construction, and commissioning of major research facilities and equipment that provide unique capabilities at the frontiers of science and engineering. This goal provides a monitoring component for NSF’s “no cost overrun” policy, discussed on page 2 of the MREFC chapter. The 10 percent target is consistent with OMB and Congressional guidelines for large projects.																						
<b>Potential Methods and Processes</b>	<p>Performance of construction projects funded by the MREFC account is monitored using the Earned Value Management (EVM) system. EVM is an integrated management control system for assessing, understanding, and quantifying what a contractor or field activity is achieving with program dollars. Monitoring cost and schedule is a standard measure of performance for construction projects.</p> <p>Projects that are under ten percent complete are not considered eligible for this goal because EVM data is less meaningful statistically in the very early stages of a project. Early in a project, the actual costs of the work, and the total values of the work scheduled and performed, are small compared to the total project cost and schedule. Consequently, their ratios - the reported cost and schedule variances - can change by large amounts even though the real values of their differences are small.</p>																						
<b>Trend information</b>	<p>Monitoring construction projects using the EVM method is an ongoing practice at NSF.</p> <p><b>Construction Project Monitoring performance trends, FY 2006-FY 2011</b></p> <table border="1"> <caption>Construction Project Monitoring performance trends, FY 2006-FY 2011</caption> <thead> <tr> <th>Fiscal Year</th> <th>Actual Performance (%)</th> <th>Target (%)</th> </tr> </thead> <tbody> <tr> <td>FY 2006</td> <td>73%</td> <td>100%</td> </tr> <tr> <td>FY 2007</td> <td>90%</td> <td>100%</td> </tr> <tr> <td>FY 2008</td> <td>80%</td> <td>100%</td> </tr> <tr> <td>FY 2009</td> <td>100%</td> <td>100%</td> </tr> <tr> <td>FY 2010</td> <td>60%</td> <td>100%</td> </tr> <tr> <td>FY 2011</td> <td>100%</td> <td>100%</td> </tr> </tbody> </table>		Fiscal Year	Actual Performance (%)	Target (%)	FY 2006	73%	100%	FY 2007	90%	100%	FY 2008	80%	100%	FY 2009	100%	100%	FY 2010	60%	100%	FY 2011	100%	100%
Fiscal Year	Actual Performance (%)	Target (%)																					
FY 2006	73%	100%																					
FY 2007	90%	100%																					
FY 2008	80%	100%																					
FY 2009	100%	100%																					
FY 2010	60%	100%																					
FY 2011	100%	100%																					
<b>Lead Organization</b>	Large Facilities Office, Office of Budget, Finance, and Award Management																						

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-4:** Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and to enable transformation at the frontiers.

**Strategic Target:** Ensure data generated by NSF’s major multi-user facilities are widely accessible to the research community.

**Goal T-4.2 PRIORITY GOAL: Access to Digital Products of NSF-Funded Research**

Fiscal Year	2012	2013
<b>Statement</b>	Increase opportunities for research and education through public access to high-value digital products of NSF-funded research.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2013, NSF will have established policies for public access to high-value data and software in at least two data-intensive scientific domains.	
<b>Explanation</b>	<p>Digital data are increasingly one of the primary products of scientific research. As advanced by the National Science Board, open data sharing is closely linked to public access to scholarly publications resulting from federally-funded unclassified research, and they should be considered in concert. The digital data underlying figures and the key findings in the literature should be accessible and linked to one another so that scientists can verify and reproduce major findings in the literature and repurpose the data to enable new discoveries. Simultaneously, access to digital products of research enhances openness and transparency in the scientific enterprise and enables new types of multi-disciplinary research and education. Therefore, it is increasingly important for NSF to facilitate and encourage access to data and research results. The priority goal supports this vision of increasingly collaborative and multi-disciplinary science by assuring that knowledge and data can flow easily across traditional disciplinary boundaries.</p> <p>This goal is also linked to the National Science Foundation’s concept for “OneNSF”, which promotes collaboration in well-integrated and efficient ways across organizational and disciplinary boundaries.</p> <p>The effort is led by the Assistant Director of the Mathematical and Physical Sciences Directorate. All programmatic directorates and offices will provide appropriate program staff for working groups. The NSF will help staff and liaise to related activities of the National Science Board. Personnel from the NSF Policy Office (Office of Budget and Finance and Award Management, Division of Institutional and Award Support) and NSF Information Systems (Office of Information and Resource Management, Division of Information Systems) will be required for working groups and implementation. Other research agencies, such as the National Institutes of Health (NIH) and the Department of Energy (DOE), face similar challenges with regard to products of federally-funded scientific research. NSF staff communicate with representatives of other agencies to identify best practices for facilitating access to data. Prototyping and implementation will engage a variety of external stakeholders.</p>	
<b>Potential Methods and</b>	Action Plan will be posted on performance.gov in Summer 2012.	

<b>Processes</b>	<p>The National Science Foundation (NSF) has aligned its Priority Goal on Access to Digital Products with the open data policy process being led by OSTP. NSF participates in OSTP's Open Data Policy initiative by serving on the National Science and Technology Council (NSTC)'s Interagency Working Group on Digital Data (IWGDD). The IWGDD is tasked with identifying the specific objectives and public interests that need to be addressed by any policies in this area. The working group includes representatives from the Department of Energy, the National Institutes of Health, and other science funding agencies as well as NSF. The group is assessing the varying missions, types of data, standards, and dissemination models associated with the range of Federal science agencies and scientific disciplines, and will help OSTP address other public access requirements in the COMPETES Act. The two NSF representatives on the IWGDD also serve on the NSF-wide group on data and access, and facilitate regular communications among these two groups, NSF leadership, and the National Science Board (particularly the Task Force on Data Policies) in order to ensure that the Foundation's activities to facilitate increased accessed to digital products of federally funded research are aligned with those led by OSTP. NSF's activities for the Priority Goal will take into account the processes and short-term and intermediate-term outcomes of the IWGDD.</p>
<b>Trend Information</b>	<p>NA. This Priority Goal is a newly developed activity for FY 2012-FY 2013.</p>
<b>Lead Organization</b>	<p>Directorate for Mathematics and Physical Sciences</p>

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-1:** Make investments that lead to results and resources that are useful to society.

**Strategic Target:** NSF investments underpin long-term solutions to societal challenges such as economic development, climate change, energy, and cyber-security.

**Goal I-1.1 PRIORITY GOAL: Innovation Corps**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	Increase the number of entrepreneurs emerging from university laboratories.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2013, 80 percent of teams participating in the Innovation Corps program will have tested the commercial viability of their product or service.	
<b>Explanation</b>	<p>Through the Innovation Corps (I-Corps) program, NSF seeks to accelerate the development of new technologies, products and processes that arise from fundamental research. The goals of I-Corps are to spur translation of fundamental research, to encourage collaboration between academia and industry, and to train students to understand innovation and entrepreneurship. With I-Corps, NSF supports NSF-funded researchers whose efforts will be augmented - in the form of mentoring and funding - to accelerate the translation of knowledge derived from fundamental research into emerging products and services that can attract subsequent third party funding. NSF investments will strategically strengthen the innovation ecosystem (<a href="http://www.nsf.gov/eng/iip/innovation.pdf">http://www.nsf.gov/eng/iip/innovation.pdf</a>) by addressing the challenges inherent in the early stages of the innovation process.</p> <p>Implementation of this goal will require the development of mechanisms and partnerships to support I-Corps teams. The teams will consist of three people and will include an NSF Principal Investigator (PI), an Entrepreneurial Lead (typically a graduate student) and a mentor from the private sector. Teams will propose a specific service or product concept for six months of I-Corps-funded development and testing. The concepts will have arisen from basic research led by the PI and funded by NSF within the previous five years. The selected teams will proceed through an intensive prescribed curriculum designed to develop their entrepreneurial skills and to ensure that the critical assumptions underpinning their perceived opportunities are tested. At the end of the six months, teams will decide whether or not to proceed with development of their concept.</p>	
<b>Potential Methods and Processes</b>	Action Plan will be posted on performance.gov in Summer 2012.	
<b>Trend information</b>	NA. The Innovation Corps program began in the fourth quarter of FY 2011.	
<b>Lead Organizations</b>	Office of Integrative Activities and Directorate for Engineering	

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-1:** Make investments that lead to results and resources that are useful to society.

**Strategic Target:** NSF investments underpin long-term solutions to societal challenges such as economic development, climate change, energy, and cyber-security.

**Goal I-1.2 Industrial and Innovation Partnerships**

Fiscal Year	2012	2013
<b>Statement</b>	Identify the number and types of partnerships entered into by Industrial & Innovation Partnerships (IIP) Division grantees.	
<b>Target Measure, Milestone, or Deliverable</b>	<ul style="list-style-type: none"> <li>• Count number of financial partnerships in FY 2010 and FY 2011 made by IIP program grantees.</li> <li>• Evaluate the potential to collect other types of partnership data in the future. (e.g. strategic, people partnerships, in-kind partnerships, lab sharing, acquisitions, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Count number of financial partnerships in FY 2012 made by IIP program grantees.</li> </ul>
<b>Explanation</b>	<p>The IIP programs are:</p> <ul style="list-style-type: none"> <li>• Small Business Innovation Research (SBIR)</li> <li>• Small Business Technology Transfer (STTR)</li> <li>• Industry/University Cooperative Research Centers (I/UCRC)</li> <li>• Partnerships for Innovation (PFI)</li> <li>• Grant Opportunities for Academic Liaison with Industry (GOALI)</li> </ul> <p>“Partnership” here includes only "financial investments" for the purpose of baselining all IIP Programs. Examples of a financial investment would include:</p> <ul style="list-style-type: none"> <li>• Subcontractor in SBIR Award</li> <li>• Executed third party investment package in SBIR supplement (required for award)</li> <li>• Partnership condition in award (e.g. GOALI, PFI, STTR, SBIR: Phase IICC, Phase IIA, TECP)</li> <li>• I/UCRC Industrial Advisory Board Member</li> <li>• I/UCRC Interagency Agreement and Military Interdepartmental Purchase Requests (MIPRs)</li> </ul>	
<b>Potential Methods and Processes</b>	Development of a sound methodology and collection mechanism that if approved (e.g. a final report template) would be used starting with FY 2013 awards.	
<b>Trend information</b>	This was a new goal in FY 2011 under NSF’s new strategic plan framework. A baseline of FY 2010 partnerships (1,567) was determined in FY 2011 in three of the IIP division’s five programs: SBIR/STTR, PFI and I/UCRC. However, due to changes in data collection systems and clarification of the “partnership” definition, FY 2010 will be re-baselined in FY 2012.	
<b>Lead Organization</b>	Industrial & Innovation Partnerships Division, Directorate for Engineering	

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-2:** Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.

**Strategic Target:** NSF’s scientific literacy and public engagement programs are supported by rigorous evidence about learning outcomes

**Goal I-2.1 Public Understanding and Communication of Science and Engineering**

Fiscal Year	2012	2013
<b>Statement</b>	Establish a common set of evidentiary standards for programs and activities across the agency that fund public understanding and communication of science and engineering activities.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, <ul style="list-style-type: none"> <li>• Deliver an internal report defining standards of evidence for the models used by the 16 programs identified in FY 2011 that fund public understanding and communication of science and engineering.</li> <li>• Identify all programs across the agency that employ the models and strategies.</li> </ul>	By September 30, 2013, utilize report to inform the revision of solicitation language in one-half of programs identified in FY 2012 to reflect evidence standards
<b>Explanation</b>	<p>Certain programs in EHR’s Division of Research and Learning (DRL) aim to address public understanding and communication of science and engineering, but other NSF activities also work towards this aim. This Goal’s intent is to identify all such activities across the Foundation and provide them with evidence-based criteria for evaluation of such projects. This can lead to more consistent expectations across NSF for use of and production of evidence.</p> <p>Three-year trajectory: search NSF core programs to identify programs that explicitly address Public Understanding and Communication; extract models and evidence strategies used by those programs and reassess NSF’s investments to identify those that implicitly address Public Understanding and Communication; use this list of programs to establish common criteria for Public Understanding and Communication activities in general across programs.</p>	
<b>Potential Methods and Processes</b>	EHR staff will collect, search, and analyze NSF data and information; NSF-wide group of program staff to be convened and solicitations revised. This effort will also include collaboration with the Office of Legislative and Public Affairs (OLPA).	
<b>Trend information</b>	This was a new goal in FY 2011 under NSF’s new strategic plan framework. In FY 2011, a keyword search of NSF program solicitations using the term “public understanding” was used to generate a baseline. Sixteen programs had this phrase in their solicitations. Searches performed using awarded project descriptions and abstracts identified a number of projects that include the focus in ways other than specifically mentioned as part of a formal program solicitation. Consequently, a baseline based on those numbers was not used because the context and definition of the phrase “public understanding” in funded project descriptions varied.	
<b>Lead Organization</b>	Division of Research on Learning in Formal and Informal Settings (DRL), EHR	



**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-2:** Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.

**Strategic Target:** NSF’s K-12 STEM education investments are designed and tested for scale-up.

**Goal I-2.2 K-12 Components**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	Establish a common set of evidentiary standards for programs across the agency that fund activities with K-12 components.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, <ul style="list-style-type: none"> <li>Identify the number of programs that fund activities with K-12 components in FY 2012.</li> <li>Develop common standards of evidence for inclusion in future solicitations of the identified programs.</li> </ul>	By September 30, 2013, <ul style="list-style-type: none"> <li>100 percent of programs identified in FY 2012 (“the portfolio”) will include the common standards in their solicitations.</li> <li>A baseline count will be taken of the projects in the portfolio that already meet these standards.</li> </ul>
<b>Explanation</b>	<p>There is increasing interest across the federal government not just to count the number of programs addressing K-12 education, but to examine the potential of projects for “going to scale”: moving beyond the initial project site to be adapted and implemented successfully under more representative conditions and with appropriate population groups.</p> <p>There are multiple sets of standards for identifying a project’s readiness for scale-up. Sources for standards of evidence that will be examined in FY 2012 include those under development at the Department of Education and NSF, individual NSF programs (e.g. Arctic Sciences rigor standards; DRK-12 Horizon Research Standards), and National Academies of Science reports.</p>	
<b>Potential Methods and Processes</b>	<p>NSF expert staff will review standards of evidence in the literature, repeat and revise the FY 2011 analysis, update solicitations, and write reports.</p> <p>A baseline count of the number of projects that meet the standards will be conducted in FY 2013. It is estimated that approximately 15 percent of the projects in the portfolio will already meet the standards.</p>	
<b>Trend information</b>	<p>This was a new goal in FY 2011 under NSF’s new strategic plan framework. A baseline of NSF’s K-12 programs (FY 2011 baseline: 16) was established as the first step in a three-year trajectory to establish a set of standards in common across NSF to articulate a pathway toward readiness to scale up.</p>	
<b>Lead Organization</b>	Directorate for Education and Human Resources	

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-3:** Support the development of innovative learning systems.

**Strategic Target:** NSF invests in innovative learning tools and structures that use emerging technologies and are tested for effectiveness and scalability.

**Goal I-3.1 Innovative Learning Systems**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	Integrate common language about, or goals for, innovative learning research into the Cyberlearning, Data and Observation for STEM Education focus area of the Expeditions in Education (E2) investment, and into other programs across the agency that fund innovative learning tools, structures, and systems.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, write a synthesis report on NSF support of Innovative Learning Systems supporting common language for solicitations.	By September 30, 2013, <ul style="list-style-type: none"> <li>• Programs with significant innovative learning system research will update their solicitations with the language developed in FY 2012 to include common language or goals about innovative learning systems.</li> <li>• At least 50 percent of new projects funded in the innovative learning systems portfolio have in place research and evaluation mechanisms that will provide high quality evidence about the nature of student learning.</li> </ul>
<b>Explanation</b>	<p>Networked computing and communications technologies that support learning, teaching, and education are already opening up access for all learners, in all age groups, in all settings. Innovative learning systems can bring authentic scientific data immediately to learners, which enable learners to experience science through modeling, simulation, sensor networks, digital telescopes and remote instruments.</p> <p>Expeditions in Education (E<sup>2</sup>) is an NSF initiative to infuse cutting-edge science, engineering, and innovation into the preparation of a world-class scientific workforce for the twenty-first century, and to ensure that all of NSF’s education and workforce investments are drawing on the latest educational theory, research, and evidence.</p> <p>E<sup>2</sup> activities will integrate, leverage, and expand STEM education research and development to improve learning in science and engineering (S&amp;E) disciplines and capitalize on the scientific assets across NSF to bring engaging new science content, knowledge, and real-world applications to more learners.</p> <p>The “Cyberlearning, Data, and Observations for STEM Education” focus area of E<sup>2</sup> aims to address the many questions associated with how STEM learning can be enhanced and how new content can be introduced using cyberlearning resources and tools.</p>	
<b>Potential Methods and Processes</b>	NSF staff will review standards of evidence in the literature, confer with experts in other agencies and the field, repeat and revise the FY 2011 analysis, update solicitations, and write reports.	

<b>Trend information</b>	This was a new goal in FY 2011 under NSF's new strategic plan framework. Its intent was to identify activities across the Foundation that contribute to development of innovative learning systems, which are not funded by any one program. In FY 2011, a latent semantic analysis tool was used to find awards made in FY 2011 that fit into the general category of Research-Based Innovative learning Systems (ILS). 150 awards were identified, 95 percent of which were made by eight divisions within the EHR, CISE, and ENG directorates. The awards corresponded to 28 distinct programs.
<b>Lead Organization</b>	Directorate for Education and Human Resources

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.1 Model EEO Agency**

<b>Fiscal Year</b>	<b>2012</b>	<b>2013</b>
<b>Statement</b>	<p>Perform activities necessary to attain essential elements of a model EEO agency, as defined by the Equal Employment Opportunity Commission (EEOC).</p> <p>Collaborate with the Chief Human Capital Officer (CHCO) in drafting the Office of Diversity and Inclusion’s responsibilities within NSF’s first Diversity and Inclusion (D&amp;I) Strategic Plan for submission to the Office of Personnel Management (OPM).</p>	
<b>Target Measure, Milestone, or Deliverable</b>	<ul style="list-style-type: none"> <li>• Attain four of six essential elements.</li> <li>• Submit D&amp;I Strategic Plan to OPM by March 30, 2012.</li> </ul>	<ul style="list-style-type: none"> <li>• Attain five of six essential elements.</li> </ul>
<b>Explanation</b>	<p>For NSF to achieve model EEO agency status, it must meet and maintain each of the six criteria established by the EEOC. The EEOC refers to these criteria as the “Essential Elements” of a Model Agency, which are:</p> <ul style="list-style-type: none"> <li>A. Demonstrated commitment from agency leadership;</li> <li>B. Integration of EEO into the agency’s strategic mission;</li> <li>C. Management and program accountability;</li> <li>D. Proactive prevention of unlawful discrimination;</li> <li>E. Efficiency; and</li> <li>F. Responsiveness and legal compliance.</li> </ul> <p>Per Executive Order 13583, which establishes a coordinated government-wide initiative to promote diversity and inclusion in the federal workforce, NSF will submit a D&amp;I Strategic Plan to OPM in FY 2012.</p> <p>Specifically, the Office of Diversity and Inclusion’s (ODI’s) focus in the D&amp;I plan will include, after review of the required barrier analysis, action plans to eliminate any identified barriers and implementation progress for at least two NSF directorates.</p>	
<b>Potential Methods and Processes</b>	<p>To evaluate NSF’s progress towards meeting measures in the essential elements of a model EEO agency, ODI will conduct an annual self assessment, as required by the EEOC. Such assessment is certified for accuracy by both the ODI and NSF Director. At the end of each fiscal year, ODI will provide to the verifiers a narrative illustrating NSF’s progress, based on the certified self assessment, as well as provide data, such as training, and any supporting documentation that is not protected under privacy laws.</p> <p>In evaluating targets regarding NSF’s D&amp;I Strategic Plan, the following will be measured:</p> <ol style="list-style-type: none"> <li>1. Whether the D&amp;I Plan was timely submitted to OPM.</li> <li>2. Whether ODI, upon review of its annual barrier analysis, identified any potential</li> </ol>	

	barriers to EEO, worked with applicable senior leaders in at least two directorates in devising plans to eliminate any barriers, and provided an assessment of the plan for effectiveness.
<b>Trend information</b>	In FY 2011, the first year of this performance goal, model EEO agency criteria A (Demonstrated commitment from agency leadership), B (Integration of EEO into the agency's strategic mission), and E (Efficiency) were achieved.
<b>Lead Organization</b>	Office of Diversity and Inclusion, Office of the Director.

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.2 IPA Performance Plans**

Fiscal Year	2012	2013
<b>Statement</b>	Include assignees on temporary appointment to NSF under the Intergovernmental Personnel Act (IPAs) under an NSF performance management system.	
<b>Target Measure, Milestone, or Deliverable</b>	<p>By March 31, 2012, 95 percent of executive-level IPAs whose assignments have at least 90 days remaining will have performance plans in place.</p> <p>By September 30, 2012, 90 percent of non-executive IPAs whose assignments have at least 90 days remaining will have performance plans in place.</p>	<p>By March 31, 2013, 100 percent of executive IPAs with appointments exceeding 90 days will have performance plans in place.</p> <p>By September 30, 2013, 95 percent of all non executive IPAs whose assignments have at least 90 days remaining will have performance plans in place.</p> <p>By October 1, 2013, an evaluation of the effectiveness of executive and non-executive IPA performance plans in setting and communicating expectations will be completed.</p> <p>By October 31, 2013, best practices for managing executive and non-executive IPA performance will be identified and shared.</p>
<b>Explanation</b>	<p>This goal addresses human resource management challenges specific to NSF that were identified by Congress, the Office of Personnel Management, and NSF’s Office of the Inspector General.</p> <p>The Intergovernmental Personnel Act (IPA) mobility program (5 CFR part 334) provides the authority for NSF to bring in scientific staff for limited periods of time. IPA assignees are on detail to NSF and remain on the payroll of their home institution. Using the IPA authority to recruit active researchers infuses new talent and expertise into NSF and provides scientists and engineers with valuable information and knowledge to bring back to their home institutions. NSF’s use of the IPA helps to maintain the Foundation’s close association with the nation’s colleges and universities and the contributions made by NSF’s IPA scientists furthers the agency’s mission of supporting the entire spectrum of science and engineering research and education.</p>	
<b>Potential Methods and Processes</b>	In order to facilitate tracking and documentation, HRM will seek to develop an electronic process for submitting and tracking IPA performance plans and appraisals. HRM will conduct interviews, focus groups, and/or surveys with IPAs and their	

	supervisors to determine the impact of these performance plans on IPAs' understandings of what is expected of them and their ability to support NSF's mission.
<b>Trend information</b>	Before FY 2011, IPAs were not required to submit performance plans. In FY 2011, a performance goal to expand the coverage of NSF's performance management framework to include IPAs was set. In the first year, 92 percent of all non-executive IPAs (target: 80 percent) and 90 percent of executive-level IPAs (target: 90 percent) had performance plans on file.
<b>Lead Organization</b>	Division of Human Resources Management (HRM), Office of Information and Resource Management (OIRM)

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.3 Performance Management System**

Fiscal Year	2012	2013
<b>Statement</b>	Use findings from assessments to guide improvement of NSF’s employee performance management systems.  Acronyms: <ul style="list-style-type: none"> <li>• CHCO: Chief Human Capital Officer</li> <li>• EVS: Employee View Point Survey</li> <li>• GWF: General Workforce</li> <li>• PAAT: Performance Appraisal Assessment Tool</li> <li>• SES: Senior Executive Service</li> </ul>	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, deliver an action strategy for improvement of one to three areas noted in NSF’s SES or GWF PAAT or identified in NSF’s EVS results to the NSF CHCO.	By July 31, 2013, <ul style="list-style-type: none"> <li>• Submit 2013 NSF SES PAAT to OPM.</li> <li>• Put in place the needed supporting materials for full implementation of the government-wide SES Performance Plan and Appraisal Process.</li> </ul> By September 30, 2013, achieve a 65 percent positive response rate on the 2012 EVS to the question: “In my most recent performance appraisal, I understood what I had to do to be rated at different performance levels (for example, Fully Successful, Outstanding).”
<b>Explanation</b>	NSF has two primary performance management systems for NSF employees, one that covers members of the Senior Executive Service (SES) and one that covers the General Workforce (GWF). In 2011 NSF added a third performance system to cover staff on assignment to NSF through the Intergovernmental Personnel Act (IPA) mobility program. Staff under this third system are covered by goal M-1.2.  In 2011, NSF administered OPM’s Performance Appraisal Assessment Tool (PAAT) for both the SES and GWF performance management systems. The SES PAAT was submitted to OPM in September 2011, and NSF’s SES performance management system was certified in January 2012. NSF can use the OPM review materials and internal review to identify potential areas of weakness and to develop a strategy for improving the SES performance management system in conjunction with a new government-wide approach to SES performance management. The GWF PAAT was submitted to OPM in December 2011. It is still under review at OPM. Feedback	



	<p>from OPM will be incorporated with related internal review processes to develop a strategy for improving the GWF performance management system.</p> <p>The Federal EVS is a tool that measures employees' perceptions of whether, and to what extent, the conditions that characterize successful organizations are present in their agencies. The EVS includes questions related to performance appraisal.</p> <p>This goal addresses human resource management challenges specific to NSF that were identified by Congress, the Office of Personnel Management, and NSF's Office of the Inspector General.</p>
<p><b>Potential Methods and Processes</b></p>	<p>HRM will:</p> <ul style="list-style-type: none"> <li>• Analyze the findings of SES PAAT, the GWF PAAT, and the EVS.</li> <li>• Partner with others to benchmark against and identify promising practices in other organizations to assist NSF in addressing priority areas.</li> <li>• Develop action strategy for implementation in FY 2013.</li> </ul>
<p><b>Trend information</b></p>	<p>The NSF's most recent SES-PAAT Assessment Report (released in December of 2011) identified a need for the NSF to establish guidelines about how organizational performance should be considered when deciding ratings and awards and to develop a plan for setting and adjusting SES rate of basic pay.</p> <ul style="list-style-type: none"> <li>• On the question related to organizational assessment guidelines, the NSF scored 4 out of 6 because the NSF did not provide written guidelines about how organizational performance should be considered when deciding ratings and awards.</li> <li>• On the question related to pay policy, the NSF scored 3 out of 5 because some criteria outlined in 5 CFR 534.404(g) were missing.</li> </ul> <p>NSF is still awaiting OPM's review of the GWF PAAT.</p> <p>The 2011 EVS found that the percentage of NSF employees who understood what they had to do to be rated at different performance levels was lower than in previous years. For the EVS question "In my most recent performance appraisal, I understood what I had to do to be rated at different performance levels (for example, Fully Successful, Outstanding)":</p> <p>2010 EVS positive response rate: 68 percent.          2011 EVS positive response rate: 63 percent.          2012 EVS target: 65 percent.          2013 EVS target: 68 percent.</p> <p>A given year's EVS results are made available approximately six months following the survey. Thus, the 2012 EVS results will be available in late FY 2012 or early FY 2013, and the 2013 results will be available in late FY 2013 or early FY 2014.</p>
<p><b>Lead Organization</b></p>	<p>Division of Human Resources Management (HRM), Office of Information and Resource Management (OIRM)</p>

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-2:** Infuse learning as an essential element of the NSF culture with emphasis on professional development and personal growth.

**Strategic Target:** NSF emphasizes learning for personal and professional development for all staff.

**Goal M-2.1 Assess Developmental Needs**

Fiscal Year	2012	2013
<b>Statement</b>	Enhance NSF capabilities to provide training of staff for their current positions.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, design a structured curriculum which meets assessed needs for at least two types of NSF staff roles (e.g. leaders, program officers, administrative professionals, technical professionals).	<ul style="list-style-type: none"> <li>• By September 30, 2013, identify gaps between desired curricula and current course offerings and recommend approaches to filling identified gaps.</li> <li>• Attain a 60 percent positive response rate on the 2013 Employee Viewpoint Survey (EVS) on the question “How satisfied are you with the training you receive for your present job?” (results available in FY 2014)</li> </ul>
<b>Explanation</b>	NSF core values and strategic goals place a high priority on learning and development for its staff. NSF stresses personal learning and development to enhance performance, further our knowledge base on all aspects of NSF activity, and continue to build for the future. This directly reflects the specific action identified in the Strategic Plan: “review current NSF learning opportunities and develop a plan for addressing gaps.”	
<b>Potential Methods and Processes</b>	HRM will continue to evaluate data from the 2011 and 2012 needs assessments to determine gaps between identified needs and current curricula and course offerings. Needs assessments will be designed to reflect the needs of key elements of the NSF workforce. They will use a combination of survey and focus group methods. Once identified, the gaps will be assigned a priority status and the Academy will recommend options for filling those gaps. Note that training around implementation of performance management systems will be important components of both this goal and the goals regarding improvement in performance management systems.	
<b>Trend information</b>	<p>In FY 2011, HRM developed and launched targeted needs analysis questionnaires designed to generate new learning needs data. Questionnaires asked NSF administrative professional staff to rate the performance of specific skills necessary to complete their work, and rated the importance of creating additional skill-based learning and development opportunities to help them successfully complete their work. Approximately 38% of administrative support staff participated in the survey. In September 2011, contract support for assessment of the broader spectrum of NSF staff was obtained.</p> <p>The 2010 and 2011 Employee Viewpoint Surveys found that the number of employees satisfied with the training they received had decreased. For the EVS question “How satisfied are you with the training you receive for your present job?”:</p> <p>2008 EVS positive response rate: 66 percent.                  2010 EVS positive response rate: 61 percent.                  2011 EVS positive response rate: 57 percent.                  2012 EVS target: 60 percent.</p>	

	2013 EVS target: 63 percent.  A given year's EVS results are made available approximately six months following the survey. Thus, the 2012 EVS results will be available in late FY 2012 or early FY 2013, and the 2013 results will be available in late FY 2013 or early FY 2014.
<b>Lead Organization</b>	Division of Human Resources Management (HRM), Office of Information and Resource Management (OIRM)

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-3:** Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

**Strategic Target:** NSF uses the innovation and creativity of our staff to improve agency processes and systems on a continuing basis.

**Goal M-3.1 Financial System Modernization**

Fiscal Year	2012	2013
<b>Statement</b>	Upgrade NSF's financial system.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, to support the iTRAK initiative, the Division of Financial Management (DFM) and the Division of Acquisition and Cooperative Agreements (DACs) will award a contract for the iTRAK financial system implementation and integration services.	By September 30, 2013, to support the transition to the grant-by-grant payment process known as the Award Cash Management Service (ACMS), DFM will reconcile 100 percent of the grantee's reported cash on hand balances as of December 31, 2012 with NSF's general ledger.
<b>Explanation</b>	"iTRAK" is the Foundation-wide effort to transition NSF from its legacy financial support systems to a fully integrated, commercial-off-the-shelf (COTS) financial management shared services solution. In FY 2012, NSF will select a system integration contractor to implement the COTS solution.	NSF is transitioning its financial processing of grants from a pooled system (quarterly reporting of expenditures by institution) to a grant-by-grant payment process where grant funds are requested and reported on an individual grant level.
<b>Potential Methods and Processes</b>	The iTRAK Technical Evaluation Panel (TEP) reviews and rates the proposals submitted by vendors. Upon award, a memo from the Contracting Officer Technical Representative (COTR) will be given to the CFO stating that this goal has been met.	DFM will reconcile each grantee's award balance with NSF's Financial Accounting System (FAS). Upon completion of the reconciliation process, a memo from the Cash Management Branch Chief will be given to the DCFO stating that this goal has been met.
<b>Trend information</b>	Financial system modernization efforts have been underway at NSF for several years. The iTRAK effort—a Foundation-wide effort to transition NSF from its legacy financial support systems to a fully integrated, commercial-off-the-shelf (COTS) financial management shared services solution—is central, but other modernization steps are required as prerequisites. GPRA performance goals related to the activities were first developed in FY 2011 to measure one of these prerequisites, when functional requirements were gathered for changes in current system processes that will accommodate the transition to a grant-by-grant payment method. This payment method is a prerequisite for the transition to a COTS financial management shared services solution.  The FY 2011 target for this goal was the documentation of functional requirements to transition to a real-time payment method. Documentation detailing business rules and	

	<p>functional requirements was prepared by the Office of Budget, Finance, and Award Management in FY 2011. However, during cross-agency working group meetings, additional requirements were raised that needed to be addressed. Consequently, this target was not met in FY 2011. In fulfillment of the goal, the requirements were delivered in December 2011.</p> <p>Establishing the capability to monitor expenditures at the award level is an essential aspect of NSF's financial system modernization. NSF is committed to transition its financial processing of grants from a pooled system (quarterly reporting of expenditures by institution) to grant-by-grant (near real-time reporting of expenditures by award) by FY 2013. This change will result in more timely financial data and stronger monitoring programs. This initiative is per the Administration and CFO directive to increase efficiency and transparency in the agency.</p>
<p><b>Lead Organizations</b></p>	<p>Divisions of Acquisition and Cooperative Agreements (DACs) and Financial Management (DFM), Office of Budget, Finance, and Award Management (BFA).</p>

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-3:** Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

**Strategic Target:** NSF organizations achieve high levels of customer satisfaction

**Goal M-3.2 Time-to-Decision**

Fiscal Year	2012	2013																					
<b>Statement</b>	Inform applicants whether their proposals have been declined or recommended for funding within six months of deadline, target date, or receipt date, whichever is later.																						
<b>Target Measure, Milestone, or Deliverable</b>	70 percent.																						
<b>Explanation</b>	Time-to-decision or “dwell time” is the amount of time that passes between receipt of a proposal and notification to the principal investigator about the funding decision. One of the most significant issues raised in customer satisfaction surveys is the time it takes NSF to process proposals. Too long a time period inhibits the progress of research as it delays the funding process, but too short a time period may inhibit the merit review process. The six-month target seeks to strike a balance between the need of the investigator for timely action and the need of NSF for a credible and efficient merit review system.																						
<b>Potential Methods and Processes</b>	NSF automates the collection of data and calculation of result for this goal, thereby ensuring the quality of the data. The NSF databases used (FastLane and eJacket) have internal controls that ensure data quality.																						
<b>Trend information</b>	<p>Monitoring the merit review process with the time-to-decision metric is an ongoing practice at NSF.</p> <p>The most relevant recent variations in performance took place in FY 2009 and FY 2010. In the second quarter of FY 2009, the American Recovery and Reinvestment Act (ARRA) was passed. This goal was suspended for the second, third, and fourth quarters of that year to allow for a greater number of proposals to be processed with additional funds from ARRA. The goal was reinstated in FY 2010, when NSF exceeded this goal despite a significant increase in workload. Overall, staffing levels increased by 5.5 percent between FY 2008 and FY 2011, while proposal pressure increased by 17.4 percent.</p> <div style="text-align: center;"> <p><b>Time to decision performance trends, FY 2006-FY 2011</b></p> <table border="1"> <caption>Time to decision performance trends, FY 2006-FY 2011</caption> <thead> <tr> <th>Fiscal Year</th> <th>Performance (%)</th> <th>Target (%)</th> </tr> </thead> <tbody> <tr> <td>FY 2006</td> <td>78%</td> <td>70%</td> </tr> <tr> <td>FY 2007</td> <td>78%</td> <td>70%</td> </tr> <tr> <td>FY 2008</td> <td>78%</td> <td>70%</td> </tr> <tr> <td>FY 2009</td> <td>61%</td> <td>70%</td> </tr> <tr> <td>FY 2010</td> <td>75%</td> <td>70%</td> </tr> <tr> <td>FY 2011</td> <td>78%</td> <td>70%</td> </tr> </tbody> </table> </div>		Fiscal Year	Performance (%)	Target (%)	FY 2006	78%	70%	FY 2007	78%	70%	FY 2008	78%	70%	FY 2009	61%	70%	FY 2010	75%	70%	FY 2011	78%	70%
Fiscal Year	Performance (%)	Target (%)																					
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FY 2011	78%	70%																					
<b>Lead Organization</b>	Office of the Director																						

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-3:** Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

**Strategic Target:** NSF organizations achieve high levels of customer satisfaction

**Goal M-3.3 Virtual Merit Review Panels**

Fiscal Year	2012	2013
<b>Statement</b>	Expand the use of virtual merit review panels.	
<b>Target Measure, Milestone, or Deliverable</b>	By September 30, 2012, develop guidelines and training modules for NSF staff on the use of virtual merit review panels.	In FY 2013, as a pilot activity, five percent of merit review panels will be virtual panels.
<b>Explanation</b>	<p>This goal will test ways to make NSF’s merit review process more innovative, sustainable and family-friendly to encourage greater participation and the best use of resources.</p> <p>NSF makes extensive use of panels of reviewers to evaluate proposals. The predominant practice is for the panelists to travel to a single location, usually NSF, and meet face-to-face for one to five days. In FY 2010, approximately 1,800 review panels were held. Of these, just over one quarter involved six or fewer panelists. Face-to-face panels impose a significant time burden on the reviewers, making some potential reviewers reluctant to participate. For example, panelists with young children may not be able to obtain two continuous days of childcare, or panelists in remote locations or foreign countries may find the amount of travel required prohibitive. It also causes NSF to incur significant travel costs.</p>	
<b>Potential Methods and Processes</b>	<p>As used here, the term “virtual panel” refers to a panel meeting in which the reviewers do not travel to a common location but instead participate via teleconference, videoconference or an online meeting technology.</p> <p>In FY 2012, administrative offices and program staff will collaborate to develop:</p> <ul style="list-style-type: none"> <li>• An internal web-site that provides guidance to NSF staff on when to choose a virtual panel and how best to implement such panels; and</li> <li>• Training opportunities for NSF staff and reviewers.</li> </ul> <p>During the FY 2013 pilot, several different technologies to support virtual panels will be made available to programs experimenting with virtual panels. After the pilot has been completed, an evaluation of the effectiveness and efficiency of different approaches will be made and used to inform development of future policies on the use of virtual panels.</p>	
<b>Trend information</b>	NSF has experimented with virtual panels at a small scale for several years. In FY 2011, approximately one percent of panels were virtual panels.	
<b>Lead Organization</b>	Office of Integrative Activities	

## Other Goals, Priorities, and Activities

This section provides information required by the GPRA Modernization Act on discontinued goals, lower-priority programs, unnecessary reports to Congress, and management challenges.

### Changes from FY 2011

Most FY 2011 goals continued into FY 2012 and FY 2013. Several had modified goal statements but are logical follow-ons to former activities. A few were discontinued as GPRA goals, although activities towards the objectives continue. For more about these goals see the FY 2011 Performance Report.

<b>Strategic Goal</b>	<b>FY 2011 Annual Performance Goal</b>	<b>Status in FY 2012-FY 2013 Performance Plan</b>
Transform the Frontiers	T-1.1 Potentially Transformative Research	Modified
	T-2.1 STEM Workforce Priority Goal	Modified--new Priority Goal
	T-3.1 International Implications	Continuing
	T-4.1 Construction Project Monitoring	Continuing
	T-4.2 Data Management Practices at Large Facilities	Modified--new Priority Goal
Innovate for Society	I-1.1 IIP Grantees' Partnerships	Continuing
	I-2.1 Public Understanding and Communication	Continuing
	I-2.2 K-12 Components	Continuing
	I-3.1 Innovative Learning Systems	Continuing
	I-3.2 Partnerships for Learning Technologies	Discontinued
Perform as a Model Organization	M-1.1 Model EEO Agency	Continuing
	M-1.2 IPA Performance Plans	Continuing
	M-1.3 360 Degree Evaluation Instrument	Discontinued
	M-2.1 Staff Developmental Needs	Continuing
	M-3.1 Grant-By-Grant Payments	Continuing
	M-3.2 Time to Decision	Continuing

### Lower-Priority Programs

The 2013 Cuts, Consolidations, and Savings (CCS) Volume of the President's Budget identifies the lower-priority program activities under the GPRA Modernization Act (31 U.S.C. 1115(b)(10)). The public can access the CCS volume at: <http://www.whitehouse.gov/omb/budget>.

### Burden Reduction/Unnecessary Plans and Reports to Congress

The GPRA Modernization Act 2010 requires that agencies identify which of the plans and reports they provide to Congress are outdated or duplicative of other required plans and reports. The complete list of reports that NSF suggested for consolidation or elimination can be found in the President's Budget: <http://www.whitehouse.gov/omb/budget>.

### Management Challenges

A discussion of agency management challenges can be found in the FY 2011 Agency Financial Report, <http://www.nsf.gov/pubs/2012/nsf12001/>.



## FY 2011 ANNUAL PERFORMANCE REPORT

In FY 2011, NSF set 16 performance goals, which between them cover all program activities within the agency. 13 were achieved in FY 2011; achievement for the remaining three was delayed, but all were achieved by the time of publication of this Report. Below is a tabular overview.

<b>Strategic Goal</b>	<b>Annual Goal</b>	<b>FY 2011 Result</b>
Transform the Frontiers	T-1.1 Potentially Transformative Research	Achieved
	T-2.1 STEM Workforce Priority Goal	Achieved
	T-3.1 International Implications	Achieved
	T-4.1 Construction Project Monitoring	Achieved
	T-4.2 Data Management Practices at Large Facilities	Achieved
Innovate for Society	I-1.1 IIP Grantees' Partnerships	Achieved
	I-2.1 Public Understanding and Communication	Achieved
	I-2.2 K-12 Components	Achieved
	I-3.1 Innovative Learning Systems	Achieved
	I-3.2 Partnerships for Learning Technologies	Achieved
Perform as a Model Organization	M-1.1 Model EEO Agency	Achieved
	M-1.2 IPA Performance Plans	Achieved
	M-1.3 360 Degree Evaluation Instrument	Not met (achieved 10/2011)
	M-2.1 Staff Developmental Needs	Achieved after deadline
	M-3.1 Grant-By-Grant Payments	Not met (achieved 12/2011)
	M-3.2 Time to Decision	Achieved

The following pages present the results for each goal individually. Goals are presented in their strategic context, with reference to strategic goals, objectives, and targets from NSF's FY 2011-FY 2016 Strategic Plan (see the first section of this chapter). The majority of FY 2011 goals were new because NSF's Strategic Plan introduced impact-oriented goals that could not be measured with existing measures or techniques. Therefore, multiple years of trend data are available only for NSF's long-standing quantitative performance measures, time to decision (M-3.2) and construction cost and schedule variance (T-4.1). A few goals monitor activities begun in recent years and therefore have limited historical or trend data (e.g. T-1.1, T-2.1, M-1.2).

A statement by the NSF Director verifying the reliability and completeness of the performance data in this report can be found in the FY 2011 Performance and Financial Highlights report at <http://www.nsf.gov/about/history/annual-reports.jsp>.

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-1:** Make investments that lead to emerging new fields of science and engineering and shifts in existing fields.

**Strategic Target:** The NSF portfolio fully incorporates emerging areas with transformative potential, including those forming at disciplinary boundaries.

**Goal T-1.1 Potentially Transformative Research (PTR)**

Lead Organization: Office of the Director.

<b>Fiscal Year</b>	<b>Goal Statement and Target</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2010 (new goal)	Each directorate in the Research and Related Activities account will invest a minimum of \$2.0 million per research division to leverage and facilitate activities that foster PTR.	\$94.0 million	Achieved: \$138.44 million
2011	Produce an analysis of NSF's FY 2010 investments in activities undertaken to foster potentially transformative research.	Deliverable: One analysis.	Achieved: Report delivered in fourth quarter.

**Discussion**

NSF identifies PTR as work that may lead to:

- Dramatically new ways of conceptualizing or addressing major scientific and technological challenges, or
- New methods or analytical techniques that could put a discipline on a new scientific pathway, provide tools that allow unprecedented insights, or radically increase the rate of data collection.

In FY 2010, each Research and Related Activities (R&RA) directorate allocated a minimum of \$2.0 million per research division (\$94.0 million Foundation-wide) to explore methodologies that help support PTR. Each directorate devised its own methods to distribute the funds.

In FY 2011, using information collected from NSF directorates and offices, an analysis of the methods used to identify and/or facilitate potentially transformative research was performed. Challenges to these processes were also assessed. This analysis was drafted into an internal report including recommendations on how NSF can continue to promote PTR in the future.

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-2:** Prepare and engage a diverse science, technology, engineering, and mathematics (STEM) workforce motivated to participate at the frontiers.

**Strategic Target:** NSF STEM workforce development programs, models, or strategies have rigorous evidence about the impact on diversity and innovation in the workforce.

**Goal T-2.1 STEM Workforce Priority Goal**

Lead Organization: Directorate for Education and Human Resources.

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2010	Develop goals and metrics for NSF’s programmatic investments in its FY 2010 Learning portfolio.	100 percent of programs (baseline: 80 percent)	Achieved: 100 percent of programs that received funding in FY 2010.
2011	NSF science, technology, engineering, and mathematics (STEM) workforce development programs at the graduate, professional, or early career level participate in evaluation and assessment systems. (Priority Goal)	Six programs.	Achieved: 12 programs.

**Discussion**

NSF’s Learning portfolio includes activities funded by the Education and Human Resources (EHR) and R&RA accounts. In FY 2009, an EHR working group developed performance metrics for all EHR programs. In FY 2010, efforts continued: EHR expanded and refined these goals and metrics, goals and metrics were developed for R&RA account programs, and all programs submitted evaluation plans. These can be found at <http://nsf.gov/about/budget/fy2012>.

NSF’s FY 2010-2011 Priority Goal built on the learning portfolio metrics activities. Achieving the Priority Goal in FY 2011 also achieved Goal T-2.1. The following programs met the target:

- Alliances for Graduate Education and the Professoriate (AGEP)
- Faculty Early Career Development Program (CAREER)
- Fellowships for Transformative Computational Science using Cyberinfrastructure (CI-TraCs)
- Earth Sciences Postdoctoral Fellowship (EAR-PF)
- Graduate Research Fellowship Program (GRF)
- Integrative Graduate Education and Research Traineeship Program (IGERT→)
- International Research Fellowship Program (IRFP)
- Mathematical Sciences Postdoctoral Research Fellowships (MSPRF)
- Robert Noyce Teacher Scholarship Program (NOYCE)
- Opportunities for Enhancing Diversity in the Geosciences (OEDG)
- Postdoctoral Research Fellowship in Biology (PRFB)
- Scholarship for Service/Cybercorps (SFS)

For more information on the achievement of the Priority Goal, see the Priority Goal section of this chapter or the Additional Performance Information at <http://www.nsf.gov/about/budget/fy2013>.

## Strategic Goal 1: Transform the Frontiers

**Strategic Objective/Performance Goal T-3:** Keep the United States globally competitive at the frontiers of knowledge by increasing international partnerships and collaborations.

**Strategic Target:** NSF programs increasingly establish international partnerships that advance the frontiers of knowledge.

### Goal T-3.1 International Implications

Lead Organization: Office of International Science and Engineering (OISE).

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
2011	Identify number of new NSF program solicitations, announcements, and Dear Colleague Letters with international implications.	Establish baseline.	Achieved. Baseline: 23 solicitations, announcements, and Dear Colleague Letters

### Discussion

NSF has a system for program officers to indicate which solicitations, announcements, and Dear Colleague Letters have international implications in the internal clearance stages. OISE conducted a baseline count of these materials. The solicitation numbers are listed in parentheses below.

- Wiki for Enabling International Partnerships for the BREAD (Basic Research to Enable Agricultural Development) Program (11-017)
- US-China Collaborative Research in Advanced Sensors and Bio-Inspired Technologies (11-024)
- Japan/New Zealand Earthquakes/Tsunami (11-045)
- NSF-Deutsche Forschungsgemeinschaft (DFG) Collaborative Research (11-053)
- The "Earth Cube" - Towards a National Data Infrastructure for Earth System Science (11-065)
- G8 Multilateral Funding Initiative "Interdisciplinary Program on Material Efficiency - A first step towards sustainable manufacturing" (11-068)
- Dear Colleague Letter: United States and Ireland (11-070)
- Catalyzing New International Collaborations (11-508)
- Network for Earthquake Engineering Simulation Research (11-512)
- Ethics Education in Science and Engineering (11-514)
- Cyberinfrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) (11-515)
- Dimensions of Biodiversity (11-518)
- Science and Technology Centers: Integrative Partnerships (11-522)
- Metabolomics for a Low Carbon Society (11-527)
- Research Coordination Networks (RCN) (11-531)
- Software Infrastructure for Sustained Innovation (SI2) (11-589)
- Centers for Chemical Innovation (CCI) (11-552)
- Partnerships for International Research and Education (PIRE) (11-564)
- Faculty Early Career Development (CAREER) (11-690)
- Sustainability Research Networks Competition (SRN) (11-574)
- NSF Graduate Research Fellowship Program (GRFP) (11-582)
- International Collaboration in Chemistry between US Investigators and their Counterparts Abroad (ICC) (11-585)
- Materials World Network: Cooperative Activity in Materials Research between US Investigators and their Counterparts Abroad (MWN) (11-568)

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-4:** Enhance research infrastructure and promote data access to enable transformation at the frontiers.

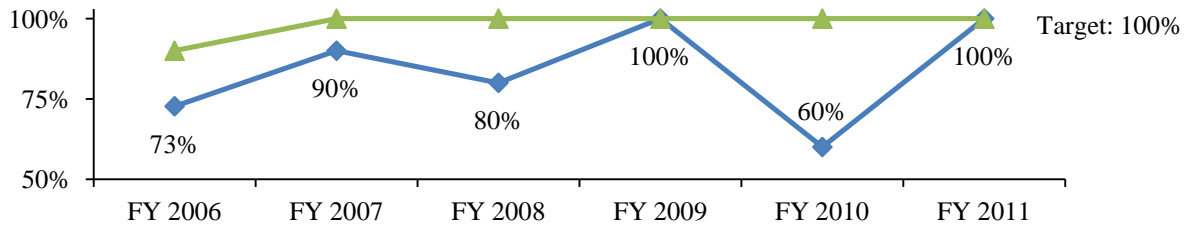
**Strategic Target:** NSF prioritizes and manages facility investments throughout their life-cycle in a transparent and effective way.

**Goal T-4.1 Construction Project Monitoring**

Lead Organization: Large Facilities Office.

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
Ongoing	For all MREFC facilities under construction, keep negative cost and schedule variance at or below 10 percent.	100 percent of construction projects that are over 10 percent complete	Achieved: 100 percent

**Construction Project Monitoring Performance Trends, FY 2006-FY 2011**



Four facilities under construction were over 10 percent complete at the end of FY 2011. Of those four, all had cost and schedule variances under 10 percent. One of the projects, the Ocean Observatories Initiative, was rebaselined in FY 2011 which resulted in revised earned value variance bases.

The Major Research Equipment and Facilities Construction (MREFC) account supports the acquisition, construction, and commissioning of major research facilities and equipment that provide unique capabilities at the frontiers of science and engineering. Performance of construction projects funded by the MREFC account is monitored using the Earned Value Management (EVM) system. EVM is an integrated management control system for assessing, understanding, and quantifying what a contractor or field activity is achieving with program dollars. Monitoring cost and schedule is a standard measure of performance for construction projects.

Projects that are under 10 percent complete are not considered eligible for this goal because EVM data is less meaningful statistically in the very early stages of a project. Early in a project, the actual cost of the work, and the total value of the work scheduled and performed, are small compared to the total project cost and schedule. Consequently, their ratios—the reported cost and schedule variances—can change by large amounts even though the real values of their differences are small.

**Strategic Goal 1: Transform the Frontiers**

**Strategic Objective/Performance Goal T-4:** Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and to enable transformation at the frontiers.

**Strategic Target:** Ensure data generated by NSF’s major multi-user facilities are widely accessible to the research community.

**Goal T-4.2 Data Management Practices at Large Facilities**

Lead Organization: Directorate for Mathematics and Physical Sciences.

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Determine current data management practices at NSF-funded facilities.	Current data management practices documented for 100 percent of NSF-funded facilities.	Achieved: 17 of 17 facilities.

The universe of facilities was defined as those appearing by name on the “Major Multi-User Research Facilities Funding” table in NSF’s FY 2011 Budget Request’s Facilities chapter:

- Academic Research Fleet
- Cornell High Energy Synchrotron Source/Cornell Electron Storage Ring
- EarthScope
- Gemini Observatory
- Incorporated Research Institutes for Seismology
- Integrated Ocean Drilling Program
- Large Hadron Collider
- Laser Interferometer Gravitational Wave Observatory
- National Astronomy and Ionosphere Center
- National Center for Atmospheric Research
- National High Magnetic Field Laboratory
- National Nanotechnology Infrastructure Network
- National Optical Astronomy Observatory
- National Radio Astronomy Observatory
- National Solar Observatory
- National Superconducting Cyclotron Laboratory
- Network for Earthquake Engineering Simulation

During FY 2011, these facilities provided documentation of their data management plans that contained the following elements:

- Types: Types of data, samples, physical collections, software, curriculum materials, and other materials that are managed and shared;
- Standards: The standards used for data and metadata format and content (where existing standards are absent or deemed inadequate, this should be documented as well);
- Access Policies: Policies for access and sharing including provisions for appropriate protection of privacy, confidentiality, security, intellectual property, or other rights or requirements;
- Re-use Policies: Policies and provisions for re-use, re-distribution, and the production of derivatives; and
- Archival: Plans for archiving data, samples, and other research products, and for preservation of access to them.

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-1:** Make investments that lead to results and resources that are useful to society.

**Strategic Target:** NSF investments underpin long-term solutions to societal challenges such as economic development, climate change, energy, and cyber-security.

**Goal I-1.1 IIP Grantees' Partnerships**

Lead Organization: Directorate for Engineering (ENG).

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Industrial and Innovation Partnerships (IIP): Identify the number and types of grantee's partnerships.	Establish baseline.	Achieved. Baseline: 1,567 partnerships.

Using ENG's IIP division as the model to start the process of collecting data on diverse types of partnerships is intended as the beginning of a process to identify how the links between science, industry, and innovation mediate the long term impacts of NSF investments.

The baseline for all SBIR/STTR, PFI and I/UCRC partnerships from FY 2010 is in the following table.

<b>PARTNER TYPE</b>	<b>TOTAL</b>	<b>SUB-TYPE</b>	<b>COUNT</b>
For Profit	929	< 500 Employees	453
		> 500 Employees	476
		Corporate Ventures	0
Not For Profit	95	Foundations	14
		501C3s	14
		Consortia/Associations	67
Government	205	State	41
		Local	30
		Federal	125
		Foreign	9
Academic	296	Community Colleges	6
		Colleges	7
		Universities	283
Investors	42	Angels	29
		Venture Capitalists	13
Unknown/Undisclosed	445		445
<b>Total Number of Partnerships</b>			<b>1,567</b>

## Strategic Goal 2: Innovate for Society

**Strategic Objective/Performance Goal I-2:** Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.

**Strategic Target:** NSF’s scientific literacy and public engagement programs are supported by rigorous evidence about learning outcomes.

### Goal I-2.1 Public Understanding and Communication

Lead Organization: Division of Research on Learning in Formal and Informal Settings (DRL), EHR.

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
2011	Identify number of programs that fund activities that address public understanding and communication of science and engineering.	Establish baseline.	Achieved. Baseline: 16 programs

Certain DRL programs explicitly aim to address public understanding and communication of science and engineering, but other NSF activities may also work towards this aim. This Goal’s intent was to identify all such activities across the Foundation. A keyword search of NSF program solicitations using the term “public understanding” was used to generate the baseline. As of September 27, 2011, 16 programs had this phrase in their solicitations. The solicitation numbers are listed in parentheses below.

- OPP: Antarctic Artists and Writers Program (11-549)
- OPP: Antarctic Research (11-532)
- GEO: Centers for Ocean Sciences Education Excellence (10-527)
- BIO: Collections in Support of Biological Research (11-558)
- OIA/Cross-Cutting: Experimental Program to Stimulate Competitive Research: Workshop Opportunities (EPS) (06-583)
- OIA/Cross-Cutting: EPSCoR Research Infrastructure Improvement Program: Track-1 (11-565)
- GEO: Geoscience Education (10-512)
- GEO: Opportunities for Enhancing Diversity in the Geosciences (OEDG) (10-599)
- Cross-Cutting: Climate Change Education (CCE): Climate Change Education Partnership (CCEP) Program, Phase I (10-542)
- Cross-Cutting: Nanoscale Science and Engineering Education (05-543)
- Cross-Cutting: Science and Technology Centers: Integrative Partnerships (11-522)
- Cross-Cutting: Sustainable Energy Pathways (11-590)
- EHR: Informal Science Education (11-546)
- EHR: Innovative Technology Experiences for Students and Teachers (11-525)
- EHR: Research and Evaluation on Education in Science and Engineering (10-586)
- EHR: Research on Gender in Science and Engineering FY 2010 (10-516)

Searches performed using awarded project descriptions and abstracts identified a number of programs that include the focus in ways other than specifically mentioned as part of a formal program solicitation, but a baseline based on those numbers was not used because the context in which the phrase “public understanding” is used in funded project descriptions varies.



**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-2:** Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.

**Strategic Target:** NSF’s K-12 STEM education investments are designed and tested for scale-up.

**Goal I-2.2 K-12 Components**

Lead Organization: Directorate for Education and Human Resources.

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Identify number of programs that fund activities with K-12 components.	Establish baseline.	Achieved. Baseline: 16 programs.

There is increasing interest across the federal government not just to count the number of programs addressing K-12 education, but to examine the potential of projects for going to scale and moving beyond the initial site to be implemented successfully under typical conditions and with population groups that are broadly reflective of that intended for the scale-up setting (Draft Evidence Standards). A more accurate and complete list of NSF’s K-12 programs is the first step in identifying the programs that have the capacity to identify the conditions that enable projects to go to scale.

The websites of all NSF directorates and divisions were searched for evidence of an explicitly stated K-12 programmatic mission or a programmatic component directed explicitly at K-12 education. Sixteen programs were identified:

- CISE: Research Assistantships for High School Students (RAHSS)
- CISE: Computing Education for the 21st Century (CE21)
- CISE: Research Experiences for Teachers (RET) Supplement
- CISE/EHR/SBE: Cyberlearning: Transforming Education
- EHR: Discovery Research K-12
- EHR: Innovative Technology Experiences for Students and Teachers (ITEST)
- EHR: Math and Science Partnership (MSP)
- EHR: Research & Evaluation on Education in S&E (REESE)
- EHR: Transforming STEM Learning (TSL) (Combines with DRK-12 in FY 2012)
- EHR: Advanced Technological Education (ATE)
- ENG: Research Experiences for Teachers (RET) Sites
- GEO: Geoscience Education (GeoEd)
- GEO: Opportunities for Enhancing Diversity in the Geosciences (OEDG)
- GEO: GEO Teach
- SBE: Science of Learning Centers (SLC)
- Multiple: Climate Change Education (CCE) Phase II (Not yet implemented)

The National STEM Digital Library (NSDL) program was originally on the list, but was last funded in FY 2011. The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) is a K-12 program, but since it is a teacher recognition program, has no potential for going to scale, and was not included.

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-3:** Support the development of innovative learning systems.

**Strategic Target:** NSF invests in innovative learning tools and structures that use emerging technologies and are tested for effectiveness and scalability.

**Goal I-3.1 Innovative Learning Systems**

Lead Organization: Directorate for Education and Human Resources (EHR).

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Identify number of programs that fund the development of research-based innovative learning systems.	Establish baseline.	Achieved. Baseline: 150 awards within 28 program elements.

This Goal's intent was to identify activities across the Foundation that contribute to development of innovative learning systems. Such activities are not funded by any one program within NSF. After determining NSF's baseline for this area of research, targets for subsequent years can be designed.

A latent semantic analysis tool was used to find awards made in FY 2011 that fit into the general category of Research-Based Innovative learning Systems (ILS). 150 awards were identified, 95 percent of which were made by eight divisions within the EHR, Computer and Information Science (CISE), and Engineering (ENG) directorates. The awards corresponded to 28 distinct programs.

**Strategic Goal 2: Innovate for Society**

**Strategic Objective/Performance Goal I-3:** Support the development of innovative learning systems.

**Strategic Target:** New partnerships among scientists, engineers, and educators (both theorists and practitioners) take innovations from development to practice.

**Goal I-3.2 Partnerships for Learning Technologies**

Lead Organization: Directorate for Education and Human Resources.

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Identify number of programs that fund activities that promote partnerships that support development of learning technologies.	Establish baseline.	Achieved. Baseline: 14 programs.

Interdisciplinary partnerships that support development of learning technologies are funded by organizational units across the Foundation. This Goal’s intent is to identify all such activities so an NSF-wide baseline can be determined. 14 core programs with capacity to fund partnerships for learning technologies were identified. The solicitation numbers are listed in parentheses below.

- CISE: Computing Education for the 21st Century (CE21) (10-619)
- OIA: Cyber-Enabled Discovery and Innovation (CDI) (11-502)
- OCI: Cyberinfrastructure Training, Education, Advancement, and Mentoring for Our 21st Century Workforce (CI-TEAM) (11-515)
- CISE: Cyberlearning: Transforming Education (11-587)
- EHR: Discovery Research K-12 (DR K-12) (11-588)
- CISE: Human-Centered Computing (HCC) (11-556)
- CISE: Human-Robot (and/or Agents) Interaction (HRI) (11-556)
- EHR: Informal Science Education (ISE) (11-546)
- EHR: Innovative Technology Experiences for Students and Teachers (ITEST) (11-525)
- EHR: Math and Science Partnership (MSP) (10-556)
- EHR: Research and Evaluation on Education in Science and Engineering (REESE) (10-586)
- SBE: Science of Learning Centers (SLC)
- EHR: Transforming STEM Learning (TSL) (10-602)
- EHR: Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES) (10-544)

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.1 Intergovernmental Personnel Agreement (IPA) Performance Plans**

Lead Organization: Division of Human Resources Management (HRM).

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
2011	Include temporary staff appointed under the Intergovernmental Personnel Act (IPAs) under NSF’s performance management system.	80 percent of all IPAs have performance plans as of July 1, 2011.	Achieved: 92 percent of all IPAs had performance plans as of July 1, 2011.
		90 percent of IPAs in executive-level positions have performance plans as of July 1, 2011.	Achieved: 90 percent of executive IPAs had performance plans as of July 1, 2011.

This goal is designed to establish agency-wide guidance for assessing IPAs’ performance and to ensure consistent implementation. It was formulated to address specific human resource management challenges identified by Congress, the Office of Personnel Management, and NSF’s Office of the Inspector General.

The Intergovernmental Personnel Act (IPA) Mobility Program allows the temporary assignment of personnel between Federal agencies and other governmental, academic, tribal, and eligible non-profit organizations. IPA assignments can strengthen management, assist in the transfer and implementation of new technology, involve officials of other organizations in developing and implementing Federal policies and programs, and enhance the professional abilities of the participants. IPA assignments are management-initiated and are made for the benefit of Federal agencies and non-Federal organizations.

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.2 360 Degree Evaluation Instrument**

Lead Organization: Division of Human Resources Management.

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Pilot use of OPM’s 360 degree evaluation instrument to provide feedback to NSF leaders and managers on skills and abilities.	By July 1, 2011, at least 20 NSF managers use OPM’s 360 instrument.	Achieved: 27 managers by 7/1/11
		By September 30, 2011, at least 20 NSF managers who used OPM’s 360 instrument establish a plan for improving performance.	Achieved late: six managers by 9/30/2011, 29 managers by 10/15/2011

This aim of this goal is to provide managers “structured feedback about leadership skills from their supervisors, peers, subordinates, and themselves.” The feedback is intended to be developmental in nature and help managers “identify leadership strengths and developmental opportunities.” It was formulated to address specific human resource management challenges identified by Congress, the Office of Personnel Management, and NSF’s Office of the Inspector General.

In FY 2011, a number of executive-level managers were invited to participate in the OPM 360 assessment process. Twenty-seven NSF managers completed the OPM 360 Leadership Assessment by the target date of July 1 2011, exceeding the target of 20 managers.

**Information on delayed achievement**

Only six of the managers who participated in the OPM 360 Assessment submitted an Executive Level Development Plan (EDP) for improving performance by 9/30/2011. NSF EDPs are not traditionally due until October 15. Twenty-nine managers who used the OPM 360 Evaluation Instrument had submitted updated performance plans by the 10/15/2011 standard submission date.

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-1:** Achieve management excellence through leadership, accountability, and personal responsibility.

**Strategic Target:** More effective management enables all staff to understand how their duties support the mission of the Foundation.

**Goal M-1.3 Model EEO Agency**

Lead Organization: Office of Diversity and Inclusion.

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
2011	Attain essential elements of a model Equal Employment Opportunity (EEO) program, as defined in Equal Employment Opportunity Commission (EEOC) requirements.	Three elements.	Achieved: Three elements obtained.

For NSF to achieve model EEO agency status, it must meet and maintain each of the six criteria established by the Equal Employment Opportunity Commission (EEOC). The EEOC refers to these criteria as the “Essential Elements” of a Model Agency, which are:

- A. Demonstrated commitment from agency leadership;
- B. Integration of EEO into the agency's strategic mission;
- C. Management and program accountability;
- D. Proactive prevention of unlawful discrimination;
- E. Efficiency; and
- F. Responsiveness and legal compliance.

The target of three is based on the progress reported in FY 2010 as compared to resource-responsive expectations for FY 2011. NSF took the following actions to achieve measures that were unmet in FY 2010 as related to essential elements A, B, and E:

- A. Demonstrated commitment from agency leadership
  - Training that included Alternative Dispute Resolution was offered to all managers and supervisors in which there was 100 percent participation.
  - Training that included a module on religious accommodations was offered to all managers and supervisors to ensure they have clear understanding of their roles and responsibilities, in which there was 100 percent participation.
- B. Integration of EEO into the agency's strategic mission
  - In FY 2011, ODI’s Director conducted NSF’s first “State of the Agency” briefing, covering all components of the EEO annual report to the EEOC, to NSF senior officials.
- E. Efficiency
  - ODI worked closely with the Office of the General Counsel (OGC), which represents the agency on EEO matters, to ensure impartiality in EEO matters processed within ODI.

Additionally, in conducting its annual barrier analysis, ODI accomplished the following:

- Worked with senior managers in three directorates in identifying potential barriers to EEO.
- Worked with these senior managers in devising plans to eliminate barriers, implementing such plans, and ensuring that ODI plays a role in assessing the effectiveness of such plans.

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-2:** Infuse learning as an essential element of the NSF culture with emphasis on professional development and personal growth.

**Strategic Target:** NSF emphasizes learning for personal and professional development for all staff.

**Goal M-2.1 Assess Developmental Needs**

Lead Organization: Division of Human Resources Management.

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
2011	Pilot process for assessing developmental needs and addressing them.	By March 31, 2011 commence survey of administrative support staff.	Achieved.
		By September 20, 2011, obtain contract support for assessment of non-administrative-support staff.	Achieved late: Contract support obtained September 23, 2011.

NSF stresses personal learning and development to enhance performance, further our knowledge base on all aspects of NSF activity, and continue to build for the future. This directly reflects the specific action identified in the Strategic Plan: “review current NSF learning opportunities and develop a plan for addressing gaps.”

In FY 2011, the Division of Human Resource Management (HRM) developed and launched targeted needs analysis questionnaires designed to generate new learning needs data. Questionnaires asked NSF administrative professional staff to rate the performance of specific skills necessary to complete their work, and rated the importance of creating additional skill-based learning and development opportunities to help them successfully complete their work. Approximately 38 percent of administrative support staff participated in the survey.

**Information on delayed achievement**

In support of the target “to obtain contract support for assessment of non-administrative-support staff”, in the Third Quarter of FY 2011, OPM issued a contract solicitation for this work. The results of NSF’s evaluation were sent to OPM on 8/8/11. OPM issued a Notice to Proceed to NSF for this contract on 9/23/11. While this notice to proceed fell beyond the target agreement date of 9/20/11, NSF had minimal control of the contract procurement effort following the contract solicitation issuance in Third Quarter FY 2011.

**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-3:** Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

**Strategic Target:** NSF uses the innovation and creativity of our staff to improve agency processes and systems on a continuing basis.

**Goal M-3.1 Grant-By-Grant Payments**

Lead Organization: Division of Financial Management, Office of Budget, Finance, and Award Management (BFA).

<b>Fiscal Year</b>	<b>Goal Statement</b>	<b>Target Measure, Milestone, or Deliverable</b>	<b>Result</b>
2011	Gather functional requirements for changes in current system processes that will accommodate the transition to a grant by grant payment method.	Documentation of functional requirements.	Achieved late: Functional requirements delivered first quarter of FY 2012

Establishing the capability to monitor expenditures at the award level is an essential aspect of NSF’s financial system modernization. NSF is committed to transition its financial processing of grants from a pooled system (quarterly reporting of expenditures by institution) to grant-by-grant (near real-time reporting of expenditures by award) by FY 2013. This change will have many advantages for both NSF and its grantees, such as better and more timely financial data and stronger monitoring programs. This initiative is per the Administration and CFO directive to increase efficiency and transparency in the agency.

**Information on delayed achievement**

The FY 2011 target for this goal was the documentation of functional requirements that will accommodate transition to a real-time payment method. Documentation detailing final business requirements and draft functional requirements was prepared by BFA in FY 2011. However, during cross-agency working group meetings, additional requirements were raised that needed to be addressed. Consequently, this target was not met in FY 2011. In fulfillment of the goal, the requirements were delivered in December 2011.



**Strategic Goal 3: Perform as a Model Organization**

**Strategic Objective/Performance Goal M-3:** Encourage and sustain a culture of creativity and innovation across the agency to ensure continuous improvement and achieve high levels of customer service.

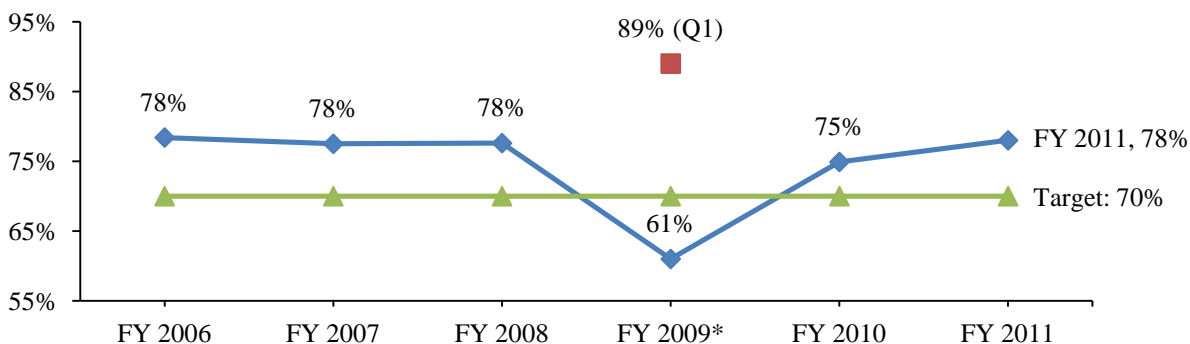
**Strategic Target:** NSF organizations achieve high levels of customer satisfaction.

**Goal M-3.2 Time to Decision**

Lead Organization: Office of the Director.

Fiscal Year	Goal Statement	Target Measure, Milestone, or Deliverable	Result
Ongoing	Inform applicants whether their proposals have been declined or recommended for funding within six months of deadline, target date, or receipt date, whichever is later.	70 percent.	78 percent.

**Time to Decision Performance Trends, FY 2006-FY 2011**



\* In FY 2009, this goal was in effect only for the period October 1 through December 31, 2008 (Quarter 1, FY 2009). The goal was suspended for all actions taking place between January 1, 2009 and September 30, 2009 to allow for a greater number of proposals to be processed with the additional funds from the American Recovery and Reinvestment Act of 2009 (ARRA).

Time to decision or “dwell time” is the amount of time that passes between receipt of a proposal and notification of the principal investigator about the funding decision made about the proposal. One of the most significant issues raised in customer satisfaction surveys is the time it takes NSF to process proposals. Too long a time period inhibits the progress of research as it delays the funding process, but too short a time period may inhibit the merit review process. The six-month target seeks to strike a balance between the need of the investigator for timely action and the need of NSF for a credible and efficient merit review system.

The most relevant recent variations in performance took place in FY 2009 and FY 2010. In FY 2009, the goal was suspended after the first quarter to allow for a greater number of proposals to be processed with additional funds from ARRA. The goal was reinstated in FY 2010, when NSF exceeded this goal despite a significant increase in workload. Overall, staffing levels increased by 5.5 percent between FY 2008 and FY 2011, while proposal pressure increased by 17.4 percent.



## **FY 2011 PROGRAM EVALUATIONS**

NSF relies on the judgment of external experts to maintain high standards of program management, to provide advice for continuous improvement of NSF performance, and to ensure openness to the research and education community served by the Foundation. NSF obtains this feedback through periodic scheduled reviews such as external evaluations, Committees of Visitors, directorate Advisory Committees, and facilities reviews.

### **External Evaluations Conducted by Contractors**

NSF directorates, divisions, and programs use the recommendations of external experts in their decision-making. During FY 2011, seven external evaluations of NSF's existing programs and strategic investments were published. These evaluations include the results of studies, reports, and workshops commissioned by various programmatic offices within the National Science Foundation.

- ENG: Research Experiences For Undergraduates in the Directorate For Engineering (ENG): Follow-up of FY 2006 Student Participants
- ENG: External education evaluations conducted by Engineering Research Center (ERC) Lead Universities
- ENG: Assessment of the National Science Foundation's Emerging Frontiers in Research and Innovation (EFRI) Program
- ENG: Grand Challenges in Earthquake Engineering Research: A Community Workshop Report
- MPS: Feasibility Study for Evaluation of the Mathematical Science Research Institutes
- MPS: Findings of the Feasibility Study for Evaluation of the Phased Approach Used to Implement the Centers for Chemical Innovation
- OPP: Future Science Opportunities in Antarctica and the Southern Ocean

Descriptions of these evaluations can be found on the following pages.

<b>DIRECTORATE FOR ENGINEERING</b>	
<b>Division of Engineering Education and Centers (EEC)</b>	
Evaluation Name	Research Experiences For Undergraduates (REU) in the Directorate for Engineering: Follow-Up of FY 2006 Student Participants
Contractor	SRI International
Program Name	Research Experiences for Undergraduates (REU) in Engineering
Completion date	October 2010

**Program Description**

Chief among the programs intended to increase graduate-degree production in fields covered by the National Science Foundation (NSF) is the Research Experiences for Undergraduates (REU) program, which has been in existence for more than 20 years. ENG has two major award types for REUs—Site and Supplement awards.

**Evaluation Description**

This is the second phase of a study of the REU in Engineering Program. It was conducted through a follow-up survey of the 1,248 FY 2006 REU students who responded to the student survey administered in the first phase of the study. The purpose of the second data collection was to measure the longer-term outcomes of the ENG REU and other undergraduate research experiences. The follow-up survey focused on the totality of undergraduate research experiences (rather than the FY 2006 ENG REU experience), and the effects of those experiences on academic and career decisions that former REU students had made by December 2009.

The evaluation report describes the major outcomes and other findings from the 2009 follow-up survey. The summary begins with the major outcomes, continues with other overall findings, and ends with the differences by sex, race/ethnicity, and REU award type.

**Findings**

Key findings include the following:

- Most respondents had earned their undergraduate degree and gone on to graduate school.
- The majority of respondents considered their undergraduate research experiences to be a factor in their decisions about whether to go to graduate school, what field to study, and where to apply, and in being accepted into their graduate institution.
- Most undergraduate engineering students stayed in engineering for graduate school.
- Most respondents raised their highest degree expectations over time. Today few expect to stop at a bachelor’s degree.
- For more than one-half of respondents, undergraduate research led to increased interest in engineering and/or research as potential careers. One-fourth of respondents reported that undergraduate research introduced them to a career they had not known existed. More than 4 in 5 respondents considered their undergraduate research experiences to have been extremely or fairly important to their career decision.
- About 3 in 10 respondents became less interested in a research career once they had a better understanding of what was involved.
- About 37% of respondents were employed and not in school at the time of the survey. A substantial majority of these workers had jobs that involved engineering and were employed in the for-profit sector.
- More than 7 in 10 non-student workers were using their research skills at least somewhat in their jobs.

**Recommendations**

By far the most frequent recommendation for how to improve undergraduate research experiences was to increase the involvement of mentors and faculty members.

**Agency response to recommendations**

The survey has been disseminated to all ENG REU Site Directors. Plans are to discuss recommendations with REU Site Directors during the March 2011 annual PI meeting to gain feedback from the PIs on how involvement of mentors and faculty members with undergraduate participants may be increased and improved.

**Publications**

Publications are located at <http://csted.sri.com/content/research-experiences-undergraduates-reu-directorate-engineering-eng-follow-fy-2006-student-p>

**Actual Cost:**

Pending

<b>DIRECTORATE FOR ENGINEERING Division of Engineering Education and Centers (EEC)</b>	
Evaluation Name	External education evaluations conducted by Engineering Research Center (ERC) Lead Universities
Contractor	Various organizations, please see narrative below
Program Name	Engineering Research Centers (ERC) Program of the Division of Engineering Education and Centers
Completion date	<i>Evaluations are ongoing in each separate ERC over a ten-year period</i>

**Program Description**

There are currently seventeen (17) active, NSF-funded ERCs. Each ERC provides an environment in which academe and industry can collaborate in pursuing innovations in research and education that can impact curricula at all levels, from pre-college to life-long learning. These education programs are required to carry out evaluations/assessment of progress and outcomes. To accomplish this, the ERC lead university employs staff, faculty, or contractors.

During FY 2011, program evaluations of three ERCs were conducted:

- Center for Collaborative, Adaptive, Sensing of the Atmosphere – University of Massachusetts;
- Mid-IR Tech. for Health & the Environment – Princeton University; and
- Synthetic Biology ERC – UC-Berkeley.

**Recommendations**

None of these programs provides direct recommendations to NSF. They provide feedback to the ERCs’ education program leaders and the Center Directors and the results are assessed by annual site visit review teams managed by the ERC Program.

**Agency response to recommendations**

N/A

**Publications**

N/A

**Actual Cost:**

- FY 2011: N/A since the evaluation costs are borne by the ERC.
- FY 2010: N/A since the evaluation costs are borne by the ERC.

<b>DIRECTORATE FOR ENGINEERING Emerging Frontiers in Research and Innovation (EFRI) Office</b>	
Evaluation Name	Assessment of the National Science Foundation’s Emerging Frontiers in Research and Innovation (EFRI) Program
Contractor	Science and Technology Policy Institute (STPI)
Program Name	Emerging Frontiers in Research and Innovation (EFRI) program
Completion date	March 2011

**Program Description**

The Emerging Frontiers in Research and Innovation (EFRI) program was created in October 2006 after a reorganization of the Directorate for Engineering (ENG) within the National Science Foundation (NSF). The overall goal of the program is to fund higher risk opportunities for research that will lead to “new research areas for NSF, ENG, and other agencies; new industries or capabilities that result in a leadership position for the country; and/or significant progress on a recognized national need or grand challenge.” The program achieves this through funding interdisciplinary teams to conduct potentially transformative research. The first EFRI solicitation was announced in FY 2007. Since then, EFRI has supported 44 projects through grant funding totaling about \$90 million.

**Evaluation Description**

In FY 2010–2011, ENG funded STPI to perform a formative assessment and evaluation of the processes by which topic areas and potentially transformative projects are selected by EFRI, and to design a protocol for future outcome evaluation of EFRI research projects.

**Findings**

The findings clustered in three areas: process related findings (related to program design and implementation); distinctiveness of the EFRI program within the Engineering Directorate (ENG), in particular that of its PIs, topics and proposals; and methodological findings.

**Recommendations**

The following recommendations were made:

- Consider using just the Grand Challenge criterion for topics.
- Use Web 2.0 and other collective intelligence tools for voting on topics.
- Have a definition of potentially transformative research that is easier to operationalize and standardize.
- Consider defining and specifying “cognitive integration” as a criterion rather than focusing on requiring PIs from multiple disciplines.
- Recruit non-traditional reviewers such as maverick researchers or entrepreneurs, among others.
- Provide standardized training regarding the criteria to ensure all panelists have the same understanding of what the EFRI program is seeking.
- EFRI should consider a more descriptive approach to an outcome evaluation.
- Test the emerging concept of calculating “integration scores” and data visualization tools on larger data sets to assess interdisciplinarity in the science and engineering policy community.

**Agency response to recommendations**

In response to this report and 2011 COV recommendations, the directorate substantially revised the research topic selection process and instituted several internal process innovations in FY 2011–2012.

**Publications**

Balakrishnan, A., M. B. Hughes, V. Peña, D. Roessner, B Lal. 2011. *Assessment of the National Science Foundation's Emerging Frontiers in Research and Innovation (EFRI) Program*. Science and Technology Policy Institute, Washington, DC.

**Actual Cost:** \$304,892



<b>DIRECTORATE FOR ENGINEERING</b>	
<b>Division of Civil, Mechanical and Manufacturing Innovation (CMMI)</b>	
Evaluation Name	Grand Challenges in Earthquake Engineering Research: A Community Workshop Report
Contractor	National Research Council
Program Name	George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES)
Completion date	2011

**Program Description**

The George E. Brown, Jr. Network for Earthquake Engineering Simulation (NEES), supported by the National Science Foundation (NSF), is an important component of the National Earthquake Hazards Reductions Program (NEHRP). NEHRP is a coordinated effort across four federal agencies to address earthquake risk in the United States. Since 2004, NEES researchers have produced significant advances in the science and technology for earthquake loss reduction that would not have been possible without the network's experimental facilities and cyberinfrastructure. By FY 2014, NSF will have supported 10 years of NEES operations and research.

**Evaluation Description**

As part of NSF's preparation of plans for FY 2014 and beyond, NSF sought an evaluation of next-generation U.S. needs for earthquake engineering research beyond 2014. At the request of NSF, the National Research Council (NRC) hosted a two-day workshop to give members of the community an opportunity to address two major questions:

- What are the high-priority Grand Challenges in basic earthquake engineering research that require a network of earthquake engineering experimental facilities and cyberinfrastructure?
- What networked earthquake engineering experimental capabilities and cyberinfrastructure tools are required to address these Grand Challenges?

The workshop featured invited presentations and discussion. Workshop participants were asked to describe the experimental infrastructure capabilities and cyberinfrastructure tools in terms of requirements, rather than by reference to any existing or specifically located future facilities. In responding to the foregoing questions, workshop participants were also asked to consider future technical and conceptual advances with the potential to influence future earthquake hazard research, such as early warning systems, new materials, sustainability, high-performance computing and networking, modeling, sensor and monitoring technologies, and other factors identified by the committee. The committee prepared a report summarizing discussions at the workshop.

**Findings**

The report did not include findings.

**Recommendations**

The report did not include recommendations.

**Agency response to recommendations**

The NSF response is under development as outlined in the NSF 10-071 Dear Colleague Letter (<http://nsf.gov/pubs/2010/nsf10071/nsf10071.jsp>). The response is anticipated to be final by fall 2012.

**Publications**

Committee for the Workshop on Grand Challenges in Earthquake Engineering Research--A Vision for NEES Experimental Facilities and Cyberinfrastructure Tools; Committee on Seismology and Geodynamics; National Research Council. 2011. *Grand Challenges in Earthquake Engineering Research: A Community Workshop Report*. The National Academies Press. [http://www.nap.edu/catalog.php?record\\_id=13167](http://www.nap.edu/catalog.php?record_id=13167).

**Actual Cost:** \$251,052

<b>DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES</b>	
<b>Division of Mathematical Sciences (DMS)</b>	
Evaluation Name	Feasibility Study for Evaluation of the Mathematical Science Research Institutes
Contractor	Science and Technology Policy Institute (STPI)
Program Name	Mathematical Science Research Institutes
Completion date	December 2010

**Program Description**

Eight Mathematical Science Research Institutes (“Institutes”) are currently supported by DMS. In recent years, DMS supervision of the Institutes awards has evolved from management of individual Institute awards to management of the suite of awards as a portfolio. This shift in management philosophy has generated interest in evaluation at the level of the portfolio to supplement regular NSF processes for peer review of individual Institutes.

**Evaluation Description**

DMS requested a study to assess the need for and feasibility of evaluation of the Institutes at the portfolio level. If formal program evaluation was determined to be warranted and feasible, an additional objective was to recommend an evaluation approach and strategy.

**Findings and Recommendations**

The study’s key findings are as follows:

- A separate evaluation approach and design would be required for Institutes using each of the three convening models.
- Evaluation of Institute for Advanced Study (IAS) and American Institute of Mathematics (AIM) as individual Institutes is feasible, but it does not appear to be warranted.
- Evaluation of the long program convening model as implemented by Mathematical Sciences Research Institute (MSRI), Statistical and Applied Mathematical Sciences Institute (SAMSI), Institute for Pure and Applied Mathematics (IPAM), Mathematical Biosciences Institute (MBI), and Institute for Mathematics and Its Applications (IMA) is warranted.
- Systematic evaluation of long program outcomes at the Institute level is not feasible in the short term, but it may be feasible in the long term if NSF standardizes key data collection processes.
- Evaluation of the long-program-convening-model is feasible using primarily qualitative methods to examine individual long programs.
- Evaluation of outcomes associated with additional education, training, and outreach activities at the various Institutes is neither feasible nor warranted.
- Formal evaluation of outcomes associated with coordination among the Institutes is neither feasible nor warranted, but opportunities and best practices could be explored informally.

**Agency response to recommendations**

N/A

**Publications**

Zuckerman, B., C. V. Srivastava, P. C. Boardman, C. Weber, and S. Jonas. 2010. *Feasibility Study for Evaluation of the Mathematical Science Research Institutes*. Science and Technology Policy Institute, Washington, DC.

**Actual Cost:** \$63,406

<b>DIRECTORATE FOR MATHEMATICAL AND PHYSICAL SCIENCES Division of Chemistry (CHE)</b>	
Evaluation Name	Findings of the Feasibility Study for Evaluation of the Phased Approach Used to Implement the Centers for Chemical Innovation
Contractor	Science and Technology Policy Institute (STPI)
Program Name	Centers for Chemical Innovation (CCI) program
Completion date	June 2011

### **Program Description**

The CCI program of CHE appears to be unique among NSF Centers programs in that it has been implemented using a phased approach. The program competitively awards up to \$1.5M over three years for “Phase I” activities prior to accepting “Phase II” applications for full Center awards at the beginning of the third year.

### **Evaluation Description**

In August 2009, NSF tasked the Science and Technology Policy Institute (STPI) of the Institute for Defense Analyses (IDA) to assess the feasibility of evaluating the phased implementation of the CCI program. The goals of the feasibility study were to identify potential research questions of interest to NSF, assess existing and potential sources of evidence about the program, and determine whether those questions can be answered. Potential research questions were identified through two sources: (1) in-depth discussions with NSF leadership about the program and priorities for evaluation; and (2) analysis of program logic. The assessment of available evidence included a thorough review of available program documents, including program announcements and applications for funding. Published literature on science policy and research evaluation was also consulted as appropriate.

### **Findings and Recommendations**

The study’s key findings are as follows:

- Evaluation of the phased implementation of the CCI program is warranted.
- There are serious concerns about the feasibility of assessing whether the phased approach encouraged experimentation while mitigating the Foundation’s exposure to undesirable risk.
- Comparative assessment of return on investment in Phase I Centers is likely feasible.
- There are serious concerns about the feasibility of assessing changes in level of ambition or creativity from Phase I to Phase II.

### **Agency response to recommendations**

The CCI Program accepted the STPI findings that several of the questions posed by the phased implementation of CCIs are not amenable to a program evaluation at this time. The NSF continues to develop the program, informed by multiple sources including the STPI study on evaluation design.

### **Publications**

B. Zuckerman, C. V. Srivastava, and M. E. Hughes. 2011. *Findings of the Feasibility Study for Evaluation of the Phased Approach Used to Implement the Centers for Chemical Innovation*. Science and Technology Policy Institute, Washington, DC.

**Actual Cost:** \$62,743

<b>OFFICE OF POLAR PROGRAMS</b>	
Evaluation Name	Future Science Opportunities in Antarctica and the Southern Ocean
Contractor	National Research Council
Program Name	U.S. Antarctic Program (USAP)
Completion date	September 2011

### **Program Description**

The U.S. Antarctic Program (USAP) within the National Science Foundation (NSF) is the primary U.S. agency responsible for supporting science in Antarctica and the Southern Ocean.

### **Evaluation Description**

In 2010, the NSF Office of Polar Programs, in coordination with the Office of Science Technology Policy, initiated two activities to provide guidance to the USAP program. In 2011, the National Research Council's Committee on Future Science Opportunities in Antarctica and the Southern Ocean released the first report in support of this activity. The committee's task was to identify and summarize the changes to important science conducted on Antarctica and the surrounding Southern Ocean that will demand attention over the next two decades. The second activity, an NSF-organized Blue Ribbon Panel intended to assist in making strategic decisions to improve the logistical support of the U.S. science program in Antarctica and the Southern Ocean over the next two decades, will take place in 2012.

### **Findings**

In response to its charge, the committee highlighted important areas of research by encapsulating each into a single, overarching question. The questions fall into two broad themes: (1) those related to global change and (2) those related to fundamental discoveries. In addition, the committee identified several opportunities to be leveraged to sustain and improve the science program in Antarctica and the Southern Ocean in the coming two decades.

### **Recommendations**

The committee made the following recommendations:

- Lead the development of a large-scale, interdisciplinary observing network and support a new generation of robust Earth system models.
- Continue to support a wide variety of basic scientific research in Antarctica and the Southern Ocean, which will yield a new generation of discoveries.
- Design and implement improved mechanisms for international collaboration.
- Exploit the host of emerging technologies.
- Coordinate an integrated polar educational program.
- Continue strong logistical support for Antarctic science.

### **Agency response to recommendations**

N/A

### **Publications**

Committee on Future Science Opportunities in Antarctica and the Southern Ocean. 2011. *Future Science Opportunities in Antarctica and the Southern Ocean*. The National Academies Press.

**Actual Cost:** \$465,000

## Committees of Visitors (COVs)

During FY 2011, seven Directorates convened 21 Committees of Visitors in FY 2011.

Committee of Visitors (COV) reviews provide NSF with external expert judgments in two areas: (1) assessments of the quality and integrity of program operations and program-level technical and managerial matters pertaining to proposal decisions; and (2) comments on how the outputs and outcomes generated by awardees have contributed to the attainment of NSF's mission and strategic outcome goals. COV reviews are conducted at regular intervals of approximately three years for programs and offices that recommend or award grants, cooperative agreements, and/or contracts and whose main focus is the conduct or support of NSF research and education in science and engineering. Approximately one-third of NSF's divisions are assessed each year.

A COV typically consists of up to 20 external experts, selected to ensure independence, programmatic coverage, and geographic balance, and they represent academia, industry, government, and the public sector. They meet for two or three days to review and assess program priorities, program management, and award accomplishments or outcomes. Each COV prepares a report and the division or program that is being reviewed must prepare a response. These reports and responses are submitted to the parent advisory committee and to the Director of NSF. COV recommendations must be addressed by the division director, and appropriate actions must be taken to comply. All reports and responses are public and posted on NSF's website at: [www.nsf.gov/od/oia/activities/cov/covs.jsp](http://www.nsf.gov/od/oia/activities/cov/covs.jsp).

Committees of Visitors for the following divisions and programs were convened in FY 2011:

- BIO: Integrative Organismal Biology
- BIO: Molecular and Cellular Biosciences
- EHR: Research on Learning in Formal and Informal Settings
- EHR: Informal Science Education
- EHR: Information Technology Experiences for Students and Teachers (ITEST)
- EHR: Noyce Scholarships
- EHR: Math and Science Partnership (MSP)
- EHR: Scholarship for Service, Scholarships (S-STEM in FY 2007)
- EHR: GK-12 Fellows
- EHR: Integrative Graduate Education and Research Traineeship (IGERT)
- EHR: ADVANCE
- ENG: Electrical, Communications and Cyber Systems(ECCS)
- ENG: Emerging Frontiers in Research and Innovation (EFRI)
- GEO: GeoSpace Section
- GEO: Surface Earth Processes Section
- GEO: Deep Earth Processes Section
- GEO: Integrative Projects Section
- MPS: Astronomical Sciences
- MPS: Materials Research
- Office of Cyberinfrastructure
- Office of International Science and Engineering

**NATIONAL SCIENCE FOUNDATION  
FY 2011 – 2016 STRATEGIC PLAN ADDENDUM**

This addendum to the NSF Strategic Plan for FY 2011-2016 includes three new sections required by the GPRA Modernization Act: Agency Priority Goals, Federal Priority Goals, and Congressional Consultation.

**FY 2012-FY 2013 Agency Priority Goals**

**Access to Digital Products of NSF-Funded Research**

Impact Statement	Increase opportunities for research and education through public access to high-value digital products of NSF-funded research.
Goal Statement	By September 30, 2013, NSF will have established policies for public access to high-value data and software in at least two data-intensive scientific domains.
Relevant Strategic Goal	Transform the Frontiers
Relevant Strategic Objective	T-4, “Enhance research infrastructure and promote data access to support researchers’ and educators’ capabilities and enable transformation at the frontiers.”

**Undergraduate Programs**

Impact Statement	Develop a diverse and highly qualified science and technology workforce.
Goal Statement	By September 30, 2013, 80 percent of institutions funded through NSF undergraduate programs document the extent of use of proven instructional practices.
Relevant Strategic Goal	Transform the Frontiers
Relevant Strategic Objective	T-2: “Prepare and engage a diverse STEM workforce motivated to participate at the frontiers.”

**Innovation Corps**

Impact Statement	Increase the number of entrepreneurs emerging from university laboratories.
Goal Statement	By September 30, 2013, 80 percent of teams participating in the Innovation Corps program will have tested the commercial viability of their product or service.
Relevant Strategic Goal	Innovate for Society
Relevant Strategic Objectives	I-1, “Make investments that lead to results and resources that are useful to society.” I-2, “Build the capacity of the nation’s citizenry for addressing societal challenges through science and engineering.”

**FY 2012-FY 2013 Federal Priority Goals**

Per the GPRA Modernization Act, P.L. 111-352, requirement to address Federal Goals in the agency Strategic Plan and Annual Performance Plan, please refer to [Performance.gov](http://Performance.gov) for information on Federal Priority Goals and the agency's contributions to those goals, where applicable.

**Congressional Consultations**

Members of the House Science Committee and Senate Commerce Committee were briefed on the content of this Plan during its development and given the opportunity for comment.



## **SUPPORTING INFORMATION**

### **Annual Performance Plan**

This section provides information required by the GPRA Modernization Act on “Strategies and Supporting Analysis.” The required information includes 1) a description of how agency goals will be achieved with the reason for choosing strategies and 2) a description of how human capital programs are used to advance agency performance goals. This required information follows.

### **Strategies and Supporting Analysis**

No one standard strategy is used across NSF for achievement of goals. Goal leaders at NSF choose strategies tailored to their stakeholders’ needs and their institutional capabilities. In general, NSF goals involve testing the impacts of new activities or new approaches to existing activities, so feedback mechanisms are built in. Use of analysis, evidence, and evaluation findings is also at the discretion of each individual goal leader. Performance at NSF is reviewed quarterly by NSF’s Performance Improvement Officer, who reports on goal progress to NSF senior management.

NSF employs a balanced set of performance indicators, milestones, and measures. Due to the nature of NSF investments, the two mission-oriented goals, *Transform the Frontiers* and *Innovate for Society*, tend to be output- or outcome-based. The management-oriented goal, *Perform as a Model Organization*, contains efficiency and customer-service measures, but also output and outcome measures relating to long-term activities such as financial system modernization and strategic human capital management.

### **Strategic Human Capital Management at NSF**

NSF’s Human Capital Strategic Plan constitutes the framework for managing NSF’s human capital system through 2012 and builds upon the strength and commitment of NSF’s workforce to fulfill the Foundation’s mission. This Plan identifies internal and external factors that shape human capital planning and creates an integrated framework of policies and practices that will guide the Foundation in meeting our workforce needs and enable NSF to perform as a model organization. The Plan, which seeks to inform NSF managers and staff alike, takes a strategic approach—both in terms of identifying the human capital challenges facing the Foundation as well as how best to maximize the vitality and capabilities of NSF’s workforce at all levels. Drawing from the Plan’s interdependent goals and the more focused workforce and succession planning action strategies, NSF’s individual directorates and offices will be able to develop organizationally-specific human capital implementation strategies. The Plan is intended as a “living” document—one that accommodates changing environments and needs as they arise. This strategic plan works in concert with NSF’s annual Human Capital Accountability Plan to define clear lines of responsibility and identify specific goals for each area in OPM’s Human Capital Accountability and Assessment Framework.

The next Human Capital Strategic Plan will be developed concurrently with the next NSF Strategic Plan, to be issued February 2014.

### **Annual Performance Report**

This section provides information required by the GPRA Modernization Act on the completeness and reliability of performance data. The required information includes 1) a discussion of the agency’s verification and validation (V&V) practices and 2) a description of data sources and known data limitations. This required information follows.

### **Verification and Validation of Performance Goals**

It is NSF's practice to follow Government Accountability Office (GAO) guidance and engage external contractors to conduct an independent validation and verification (V&V) review of its annual performance information, data, and processes. The guidance from GAO indicates that agencies should "...describe the means the agency will use to verify its performance data..." and "...provide confidence that [their] performance information will be credible."<sup>1</sup> NSF will continue this process in FY 2012 and FY 2013.

In FY 2011, IBM Global Business Services (IBM) assessed the validity of NSF data and verified the reliability of the methods used to collect, process, maintain, and report that data, and reviewed NSF's information systems based on GAO standards for application controls. IBM's FY 2011 report concluded:

*Overall, we verify that NSF relies on sound business practices, internal controls, and manual checks of system queries to ensure accurate performance reporting. NSF maintains adequate documentation of its processes and data to allow for an effective V&V review. Based on our assessment, IBM has confidence in the systems, policies, and procedures used by NSF to calculate results for its performance measures and targets. NSF continues to take concerted steps to improve the quality of their systems and data. We confirm NSF's commitment to ensuring the accuracy of its reported GPRA results, and the reliability of its processes for collecting, processing, maintaining, and reporting data for its performance goals<sup>2</sup>.*

### **Data Sources, Limitations, and Intended Use**

The data and information required to measure progress towards NSF's performance goals in FY 2011 and later years fall into three broad categories.

- NSF automated administrative systems. Performance monitoring can be a valuable secondary function of such systems. In FY 2011, reporting included data from systems that:
  - store and approve publications such as solicitations announcements, and Dear Colleague letters;
  - collect transactional data about proposal and award management;
  - perform financial transactions;
  - store human resources data; and
  - permit keyword search of abstract or full texts of proposals and awards.The data were used either directly or for achieving milestones that involve the writing of a report. While not all goals require a high level of accuracy, data from these systems are highly reliable.
- Reports on internal activities. Milestone achievement is often determined from review of records of certain activities and events. Records of this sort tend to be compiled from review of the evidence provided by goal leaders.
- Data requests of external parties. Qualitative or quantitative information is solicited directly from awardees.

### **Other parts of the Annual Performance Report required by the GPRA Modernization Act:**

Use of non-federal parties in preparation of this report: None

Classified appendices not available to the public: None

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<sup>1</sup> GAO, The Results Act: An Evaluator's Guide to Assessing Agency Annual Performance Plans, GAO/GGD-10.1.20 (Washington, D.C.: April 1998), pp. 40-41.

<sup>2</sup> IBM Global Business Services, *National Science Foundation Performance Measurement Verification and Validation Report, Fiscal Year 2011*. October 25, 2011