

OTHER INFORMATION

Management Reviews

Each quarter, NSF senior leadership reviews progress towards all performance goals of the agency in a data-driven review meeting led by the Chief Operating Officer and Performance Improvement Officer. While focus is on the quarterly performance of the priority goals, all of the agency's goals are discussed.

Alignment of Human Capital Efforts with Organizational Performance

NSF requires all employees, executives, and the general workforce to set individual goals aligned with the Foundation's mission and strategic goals in order to drive individual and organizational performance. NSF provides training and makes tools and templates available for all supervisors and employees on linking performance plans to agency mission, as well as providing assistance and training on the policies, processes, requirements, and timeframes for the development of performance plans and appraisals.

NSF also directly aligns its strategic human capital and accountability efforts to the agency goals identified in the NSF Strategic Plan. Agency performance goals currently outline specific human capital goals, and NSF uses HRStat as the agency reporting mechanism to articulate the nexus between NSF's strategic goals/objectives, including agency performance goals, and human capital initiatives at the agency. Senior leaders are briefed quarterly regarding the status of agency performance goals and the human capital initiatives aligned to those goals.

Strategies and Collaborations

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. NSF goals often 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, as is the decision to collaborate with other agencies or external entities or to invest in contract support for their activities. 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 of Science and Engineering* and *Stimulate Innovation and Address Societal Needs through Research and Education*, tend to be output- or outcome-based. The management-oriented goal, *Excel as a Federal Science Agency*, contains efficiency and customer-service measures, but also output and outcome measures relating to long-term activities such as strategic human capital management and diversity and inclusion.

Advisory Committees and Committees of Visitors

Each directorate and office has an external advisory committee that typically meets twice a year to review and provide advice on program management, discuss current issues, and review and provide advice on the impact of policies, programs, and activities in the disciplines and fields encompassed by the directorate or office. In addition to directorate and office advisory committees, NSF has several committees that provide advice and recommendation on specific topics: astronomy and astrophysics; environmental research and education; equal opportunities in science and engineering; direction, development, and enhancements of innovations; polar programs; advanced cyberinfrastructure; international and integrative activities; the agency's merit review processes; and business and operations.

Committees of Visitors (COVs) are subcommittees of NSF directorate advisory committees. 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. COV members come from 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 to the COV recommendations. These reports and responses are submitted to the parent advisory committee and to the Director of NSF. All reports and responses are public and posted on NSF's website at: www.nsf.gov/od/oia/activities/cov/covs.jsp.

In FY 2014, five directorates convened 10 Committees of Visitors (COVs), covering seven divisions and three programs. A list of the COVs performed is provided below. The chapters of the directorates also contain information on these COVs, as well as information on *ad hoc* reports.

Other Information

List of Committees of Visitors Meetings, FY 2012-FY 2016

| DIR | FY 2012 | FY 2013 | FY 2014 | FY 2015 (planned) | FY 2016 (planned) |
|------------|--|---|--|---|---|
| BIO | Environmental Biology | Biological Infrastructure: Plant Genome Research Program | <ul style="list-style-type: none"> • Molecular and Cellular Biosciences • Integrative Organismal Systems • Emerging Frontiers | Environmental Biology | Biological Infrastructure |
| CISE | - | - | - | <ul style="list-style-type: none"> • Computing and Communication Foundations • Computer and Network Systems • Information and Intelligent Systems | - |
| EHR | Graduate Education: GRFs Research on Learning in Formal and Informal Settings: <ul style="list-style-type: none"> • DR K-12 • REESE • GSE • RDE Undergraduate Education: <ul style="list-style-type: none"> • ATE • Noyce | Human Resource Development: <ul style="list-style-type: none"> • AGEP • CREST • HBCU-UP • LSAMP • TCUP Undergraduate Education: <ul style="list-style-type: none"> • STEP • TUES | Human Resource Development: ADVANCE | Research on Learning in Formal and Informal Settings: all programs Graduate Education: Integrative Graduate Education and Research Traineeship (IGERT) Undergraduate Education: multiple programs | Human Resource Development: <ul style="list-style-type: none"> • AGEP • CREST • HBCU-UP • LSAMP • TCUP Monitoring Data Collection, Analysis, and Storage |
| ENG | <ul style="list-style-type: none"> • Chemical, Bioengineering, Environmental and Transport Systems (CBET) • Civil, Mechanical and Manufacturing | <ul style="list-style-type: none"> • Engineering, Education and Centers (EEC) • Industrial Innovation and Partnerships (IIP) | <ul style="list-style-type: none"> • Electrical, Communications and Cyber Systems • Emerging Frontiers in Research and Innovation | <ul style="list-style-type: none"> • CBET • CMMI | <ul style="list-style-type: none"> • EEC • IIP |

| DIR | FY 2012 | FY 2013 | FY 2014 | FY 2015 (planned) | FY 2016 (planned) |
|------------|---|--|--|---|---|
| | Innovations (CMMI) | | | | |
| GEO | <p>Atmospheric & Geospace Sciences: Lower Atmospheric Facilities Oversight Section</p> <p>Earth Sciences: Deep Earth Processes Section</p> <p>Ocean Sciences:</p> <ul style="list-style-type: none"> • Integrative Programs Section • Marine Geosciences Section • Ocean Section | <p>Atmospheric and Geospace Sciences: Lower Atmosphere Research Section</p> <p>Earth Sciences: Instrumentation and Facilities</p> <p>Polar Programs:</p> <ul style="list-style-type: none"> • Antarctic Infrastructure & Logistics • Antarctic Sciences • Arctic Sciences <p>Education and Diversity programs</p> | <p>Atmospheric and Geospace Sciences: Geospace Section</p> <p>Earth Sciences</p> <p>Ocean Sciences: Integrative Programs Section</p> | <p>Atmospheric & Geospace Sciences: NCAR and Facilities Section</p> <p>Ocean Sciences: Research and Education</p> | <p>Atmospheric and Geospace Sciences: Atmosphere Section</p> <p>Polar Programs:</p> <ul style="list-style-type: none"> • Antarctic Infrastructure & Logistics • Antarctic Sciences • Arctic Sciences |
| MPS | Physics | <ul style="list-style-type: none"> • Chemistry • Mathematical Sciences | - | <ul style="list-style-type: none"> • Astronomy • Materials Research • Physics | - |
| SBE | Office of Multidisciplinary Activities (OMA) | <ul style="list-style-type: none"> • Behavioral and Cognitive Sciences (BCS) • Social and Economic Sciences | - | OMA | BCS |
| OIA/OIA | Experimental Program to Stimulate Competitive Research (EPSCoR) | - | International Science and Engineering | EPSCoR | Science and Technology Centers |

Other Information

Evaluations and Research

Evaluations at NSF are currently performed at the discretion of the individual directorate, office, or program being evaluated. For discussion of how NSF uses planned, current, and recently completed evaluations in its program decisions, refer to individual directorate and office chapters. A list of the evaluations completed in FY 2014 follows, along with a list of selected high-impact events (workshops, symposia, or other meetings resulting in publications) reported by directorates. For more details about how the results of these specific evaluations or events are being used to shape agency decisions, see the chapter of the sponsoring directorate. For more information about program evaluation and collection and management of NSF programmatic data, see the NSF-Wide investments chapter section on NSF's Evaluation and Assessment Capability.

External Evaluations Completed in FY 2014

| DIR/ Office | Program, Topic, or Area Evaluated | Name of Evaluation | Contractor | Link to report |
|----------------|--|---|---|--|
| EHR | K-12 STEM Education | Monitoring Progress Toward Successful K-12 STEM Education | National Research Council, National Academies | www.nap.edu/catalog/13509/monitoring-progress-toward-successful-k-12-stem-education-a-nation |
| EHR | GRF | Evaluation of the Graduate Research Fellowship Program | National Opinion Research Center | www.norc.org/Research/Projects/Pages/evaluation-of-the-graduate-research-Fellowship-Program.aspx |
| OIA | EPSCoR | The Experimental Program to Stimulate Competitive Research | National Academies | www.nap.edu/catalog/18384/the-experimental-program-to-stimulate-competitive-research |
| OIA | EPSCoR | Evaluation of the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR) | Science and Technology Policy Institute | www.ida.org/~media/Corporate/Files/Publications/STPIPubs/2015/P-5221.ashx |
| MPS | Mathematical Sciences Research Institutes | Pilot Case Studies for the Long Programs of the Mathematical Sciences Research Institutes | Science and Technology Policy Institute | Not available |

Selected Meetings, Symposia, and Workshops in FY 2014

| DIR | Workshop Name | Link to report |
|-----------------|---|--|
| BIO | New Frontiers for the Integrative Study of Animal Behavior | www.nsf.gov/bio/pubs/reports/New_Frontiers_for_the_Integrative_Study_of_Animal_Behavior_workshop_report.pdf |
| BIO/ENG/ MPS | Design, Engineering and Selection of Novel Proteins | www.novelproteins.org/ |
| BIO/ENG | Creating a Research Agenda for the Ecological Implications of Synthetic Biology | www.wilsoncenter.org/article/ecological-risk-research-agenda-for-synthetic-biology |
| CISE | Interacting with Computers All Around Us | www.cra.org/ccc/visioning/computing-visions-2025/interacting-with-the-computers-all-around-us |

| DIR | Workshop Name | Link to report |
|---------|--|--|
| CISE | The New Making Renaissance: Programmable Matter and Things | www.cra.org/ccc/visioning/computing-visions-2025/new-making-renaissance |
| ENG | Advanced Biomanufacturing Workshop | http://grantome.com/grant/NSF/CBET-1439418 |
| ENG | Noninvasive Imaging of Brain Function | http://people.bu.edu/bifano/NSF_NIBF_Workshop_Report_Final.pdf |
| OIIA | Broader Impacts Infrastructure Summit | www.nsf.gov/od/iia/publications/Broader_Impacts.pdf |
| MPS | Data-Driven Organic Chemistry | www.nsf.gov/awardsearch/showAward?AWD_ID=1447743 |
| MPS | Alternative Chemistries of Life | http://chemistry.emory.edu/home/assets/alternativechem.pdf |
| MPS | Combinatorial Approaches to Functional Materials | www.appliedmaterials.com/company/news/events/workshop-on-combinatorial-approaches-to-functional-materials |
| MPS | Opportunities in Theoretical and Computational Polymeric Materials and Soft Matter | http://aztec.ms.northwestern.edu/NSFReport2013.pdf |
| MPS/BIO | Industrialization of Biology: A Roadmap to Accelerate Advanced Manufacturing of Chemicals | http://nas-sites.org/synbioroadmap/ |
| SBE | International Convention on Science of Learning | http://solconvention.cite.hku.hk/ |
| SBE | Measuring Research and Development Expenditures in the U.S. Nonprofit Sector: Conceptual and Design Issues | http://sites.nationalacademies.org/DBASSE/CNS/TAT/CurrentProjects/DBASSE_087257 |
| SBE/MPS | Quantitative Theories of Learning, Memory and Prediction | http://physicsoflivingsystems.org/workshops/learningmemoryprediction/ |

Data Verification and Validation

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."¹ NSF will continue this process in FY 2015 and FY 2016.

In FY 2014, 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 was able to fully or partially verify the reliability of the processes and validate the accuracy of results reported for NSF's annual performance goals.² IBM's FY 2014 report concluded:

Overall, IBM verifies that NSF relies on sound business practices, internal controls, and manual checks of system queries to ensure accurate performance reporting. NSF

¹ 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.

² V&V identified data limitations for Goal 1, Public Access Priority Goal [FY 2015 goal, no FY 2014 targets], Goal 2, Data Science Priority Goal [FY 2015 goal, no FY 2014 targets]; Goal 4, Key Program Investments [data incomplete at time of publication of V&V report]; Goal 6, Enhance National Graduate Research Fellowships [NGRF program not established]; and Goal 10, Data-Driven Management Reviews [data incomplete at time of publication of V&V report]. V&V will be repeated in FY 2015 for the continuing goals (1, 2, 4, and 10).

Other Information

*maintains adequate documentation of its processes and data to allow for an effective V&V review. Based on the V&V assessment, IBM has confidence in the systems, policies, and procedures used by NSF to calculate results for its performance measures that contained targets. NSF continues to take concerted steps to improve the quality of its systems and data. IBM confirms 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.*³

Data Sources, Limitations, and Intended Use

The data and information required to measure progress towards NSF's performance goals 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.

Management Challenges

A discussion of agency management challenges can be found in the FY 2014 Agency Financial Report, www.nsf.gov/pubs/2015/nsf15002/.

Burden Reduction/Unnecessary Plans and Reports to Congress

The GPRA Modernization Act of 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 on performance.gov.

Lower-Priority Program Activities

The 2016 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)), available at: www.whitehouse.gov/omb/budget.

Use of Non-Federal Parties

No non-federal parties were involved in preparation of this Annual Performance Report.

Classified Appendices Not Available to the Public

None

³ IBM Global Business Services, *National Science Foundation Performance Measurement Verification and Validation Report, Fourth Quarter Fiscal Year 2014*. October 24, 2014.