CHAPTER I: MANAGEMENT'S DISCUSSION AND ANALYSIS

About This Report

For a second year, the National Science Foundation (NSF) is participating in the Office of Management and Budget (OMB) Pilot Program for Alternative Approaches to Performance and Accountability Reporting. The pilot is an alternative to the consolidated Performance and Accountability Report (PAR) prepared in previous years. NSF believes this approach will improve performance reporting by presenting information in a more focused and accessible format. As part of this project, NSF is producing four annual reports for FY 2008, pursuant to *OMB Circular A-136, Financial Reporting Requirements.* All four reports will be available on NSF's website at www.nsf.gov/about/performance.

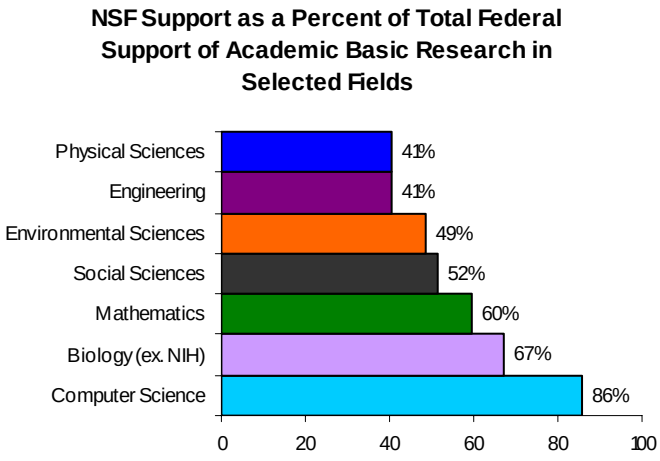
- This report, the **Annual Financial Report** (AFR), focuses on NSF's financial management, the results of the agency's annual financial audit, and its compliance with the Federal Managers' Financial Integrity Act (FMFIA) and the Federal Financial Management Improvement Act (FFMIA).
- The **Budget, Financial, and Performance Snapshot** is a new report that will provide the reader with a quick picture of the agency's mission, organization, performance, and financial results. OMB will compile the agency reports into a government-wide Performance Results Report. The **Snapshot** will be available December 15, 2008.
- The **Annual Performance Report (APR)** will present the results of NSF's FY 2008 Government Performance Results Act (GPRA) goals and a comprehensive discussion of NSF's performance assessment process. The APR will be available January 15, 2009. NSF's performance website will include additional, more detailed performance information.
- NSF's **Citizens' Report**, previously known as NSF's Performance Highlights report, summarizes key performance and financial information. It will be available January 15, 2009.

AGENCY OVERVIEW

Mission and Vision

The National Science Foundation (NSF) was established in 1950 to promote and advance the progress of science and engineering in the United States. With a budget of about $6 billion, NSF supports research across all fields of fundamental science and engineering and all levels of science and engineering education. NSF funds the best ideas and most promising people, searching out the frontiers of science and engineering to foster high-risk, potentially transformative research that will generate important discoveries, new technologies, and a dynamic workforce. This catalytic role is captured in NSF's vision statement: *Advancing discovery, innovation and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering.*

Figure 1.



Although NSF's annual budget represents less than 4 percent of the total federal budget for research and development, NSF provides nearly half of the federal support for non-medical basic research at America's colleges and universities. As shown in *Figure 1*, in many fields, NSF is the principal source of federal

academic support.[1] NSF supports research and education through a competitive, merit-based review process that is recognized throughout government as the exemplar for effective and efficient use of public funds. Ninety percent of NSF funding is allocated through this merit-based, competitive process.[2] In FY 2008, NSF received over 44,000 grant proposals and made 11,162 new awards, mostly to individual investigators or small groups of investigators at nearly 1,900 colleges, universities, and other public and private institutions throughout the United States. These awards directly involved an estimated 197,000 people, including researchers, teachers, and students from kindergarten through graduate school.

HOW NSF'S INVESTMENTS IN BASIC RESEARCH AND EDUCATION BENEFIT SOCIETY

NSF's investments produce both tangible and intangible benefits that keep the United States at the forefront of science and engineering.

New Knowledge *such as Quantum Computing, Nanotechnology, Computer Visualization Techniques, Metagenomics, Science of Science and Innovation Policy, and Plant Genome Mapping.*

NSF's support for basic research is at the core of its mission of advancing the frontier of science and engineering. The quality of these investments is reflected in the fact that since its inception NSF has supported 180 Nobel laureates for their seminal work. This broad and long-standing commitment sustains the nation's ability to generate and harness advances in science and technology.

World Class Facilities *such as the National Center for Atmospheric Research, the U.S. South Pole Station, and the Large Interferometer Gravitational-Wave Observatory.*

State-of-the-art facilities provide unique capabilities at the cutting edge of science and engineering that are necessary to expand the boundaries of technology and offer significant new research opportunities, often in totally new directions. NSF's polar research facilities, for example, provide access to the Earth's most extreme environments and advance discovery in fields as diverse as climate change, astronomy, geology, and biology.

New Tools, Methods, and Processes *such as the Internet, DNA Fingerprinting, Magnetic Resonance Imaging, and Novel Materials.*

The basic research supported by NSF is a proving ground for tools, methods, and processes that drive discovery and technology development. For example, fundamental work supported by NSF to create "libraries" of chemical compounds has since become a staple for drug design in the pharmaceutical industry.

Insight into National and Global Challenges *such as Green Gasoline, Climate Change, Environmental Protection, Cybersecurity, and Homeland Security.*

The fundamental knowledge generated by NSF's investments has time and again proved vital in addressing national and global challenges. NSF-supported work on ocean/atmosphere dynamics, for example, has led to more accurate and useful predictions of the weather cycles known as El Niño and La Niña.

A Highly Trained Workforce *such as Graduate Research Fellowships, Advanced Technological Education, and Louis Stokes Alliances for Minority Participation.*

By supporting science, technology, engineering, and mathematics (STEM) education at all levels, NSF is working to build a highly trained future workforce that will help the United States maintain its world-class status in science and engineering. NSF directly supports the advanced education of over 40,000 graduate and postdoctoral students in science and engineering.

Resources for Teachers and Students *such as Graduate Teaching Fellows in K-12 Education, Math and Science Partnership Program, and Curriculum and Laboratory Improvement Programs.*

NSF supports more effective approaches to teaching science, mathematics, and engineering. Research on how students learn provides the knowledge to train highly qualified teachers, develop effective curricular materials, and improve student learning. In FY 2008, for example, over 60,000 K–12 teachers were directly engaged in NSF-supported activities that provide intensive professional development activities in science and mathematics.

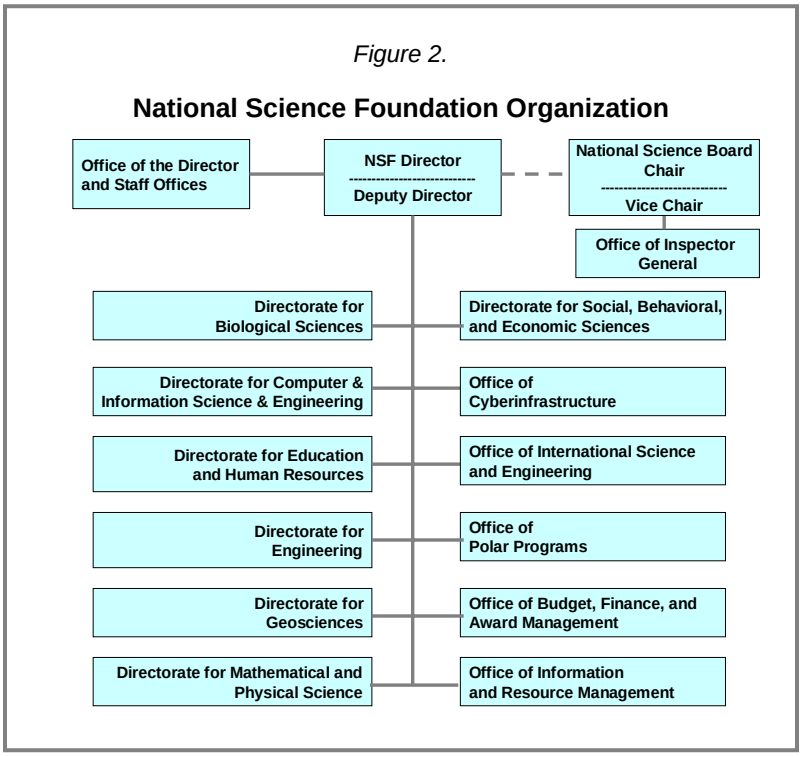
[1] Source: NSF/SRS/R&D Statistics Program, Survey of Federal Funds for R&D, FY 2005-2008.

[2] For more information about NSF's merit review process, see *Report to National Science Board on the NSF's Merit Review Process, FY 2007* at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsb0847 .

Organizational Structure

NSF is an independent federal agency headed by a Director and Deputy Director who are appointed by the President and confirmed by the Senate. A 24-member National Science Board, also appointed by the President with the consent of the Senate, meets about six times a year to establish the overall policies of the Foundation.[3] The Director is a member *ex officio* of the Board. The NSF workforce includes over 1,300 full-time staff. NSF regularly recruits visiting scientists, engineers, and educators who are leaders in their fields. Recruiting active researchers and educators to fill rotating assignments infuses new talent and expertise into NSF and is integral to NSF's mission of supporting the entire spectrum of science and engineering research and education, particularly research at the frontier.[4] In addition to the agency's headquarters located in Arlington, Virginia, NSF maintains offices in Paris, Tokyo, and Beijing to facilitate its international activities.

Figure 2.



President's Management Agenda

The President's Management Agenda (PMA) is a government-wide effort to improve the management, performance, and accountability of federal agencies. The PMA initiatives remain a high agency priority as management implements them to yield the best overall benefits for the agency (*Figure 3*).[5] In FY 2008, the ratings dropped for the *Strategic Management of Human Capital* and *Performance Improvement* initiatives, as NSF was not able to meet all the deliverables for each initiative.

▶ NSF's efforts in the area of *Strategic Management of Human Capital* during FY 2008 were focused on the alignment of the Foundation's workforce with its business processes; the agency's ability to attract, develop and retain a diverse, world-class workforce; and the transformation of the human resources (HR) service model at the Foundation. These efforts were undertaken in pursuit of the goals set forth in the NSF Strategic Plan and articulated in the NSF Human Capital Strategic Plan. In December 2005, NSF completed an in-depth study of the administrative work performed at the Foundation, which resulted in recommendations to redesign administrative positions in NSF's program directorates and to better align the new positions with the Foundation's business processes. The findings from this study were tested in a year-long pilot during FY 2008. NSF is improving its ability to attract, develop, and retain a diverse, world-class workforce through initiatives such as a new executive transition program, a revamped new employee welcome process, a childcare subsidy program, and enhanced advertising and outreach efforts. NSF has also transformed its HR service model to form strategic business partnerships between HR and

[3] For more information about the National Science Board, see www.nsf.gov/nsb.
[4] As of September 2008, temporary appointments included 149 under the Intergovernmental Personnel Act.
[5] For more information about the President's Management Agenda, see *www.Results.gov*.

its internal customer organizations. These partnerships have resulted in dramatic improvements in agency-wide workforce planning efforts as well as improved accuracy and timeliness of all HR services.

▶ NSF has no projected or actual savings from completed competitions. However, an independent validation confirms that competition for post-award monitoring for grant, contract, and cooperative agreement activities has resulted in significantly improved performance and the first financial statement audit report since FY 2001 with no negative findings on post-award monitoring practices.

▶ NSF continues to use an integrated strategy in its *Financial Performance* and *Performance Improvement* initiatives. During FY 2008, the Foundation refined its performance data to include milestones and measures to monitor stewardship project results. By integrating financial and budgetary information, management can gain additional insight into current stewardship and other projects and improve planning for future projects.

Figure 3.

President's Management Agenda Scorecard

	Status 9/30/07	Status 9/30/08	Progress 9/30/08
Strategic Management of Human Capital	Y	R	G
Commercial Services Management	R	R	R
Improving Financial Performance	G	G	G
Expanded E-Government	G	G	G
Performance Improvement	G	Y	G

Notes:

Eliminating Improper Payments Initiative: OMB has moved NSF from an annual to a three-year reporting cycle as a result of reporting low improper payments.

Green (G) indicates success; Yellow (Y), mixed results; and Red (R), unsatisfactory. Ratings are issued quarterly by OMB.

▶ NSF is a federal leader in the use of information technology, actively promoting simpler, faster, more accurate, and less expensive electronic business solutions. The agency is actively engaged in supporting numerous E-Gov and Line of Business initiatives, including the Grants Management Line of Business (GMLoB) through *Research.gov*, a partnership of federal research-oriented grant-making agencies led by NSF that is working to enhance customer service through streamlining and standardizing processes among partners. *Research.gov* leverages the capabilities of FastLane—NSF's own web-based system used by NSF customers to electronically conduct business with the agency—to deliver a single web portal for research institutions to find relevant information and conduct grants business with federal research agencies. In addition to providing electronic business solutions, the security of information technology systems remains a high management priority. During FY 2008, NSF focused on protection of privacy information, removing over 350,000 social security numbers from agency systems and encrypting mobile devices.

▶ As part of the *Performance Improvement* initiative, NSF has actively implemented Executive Order 13450 on Improving Government Performance by appointing a Performance Improvement Officer to focus on agency performance and efficiency goals and improvement plans. NSF's senior management meets regularly to coordinate Foundation-wide efforts to promote continuous improvement in all aspects of supporting excellence in science and engineering research and education. Significant improvements were made in the process by which the Advisory Committee for GPRA Performance Assessment conducts an annual evaluation of performance results under the Foundation's strategic outcome goals.

Management Challenges

The Office of Inspector General's (OIG) annual statement of management challenges for FY 2008 covered six broad areas: Award and Contract Administration; Human Capital; Budget, Cost and

Performance Integration; U.S. Antarctic Program; and Merit Review. Many of the management challenges noted are fundamental issues that the agency is dealing with on a continuing basis. The following chart presents several key management challenges and significant agency actions taken in the past year and anticipated actions to be taken in the near term. Appendix 3a of this report is the OIG's statement of management challenges for FY 2009 and Appendix 3b is the Director's response which includes a report of the significant actions taken in the past year by management with respect to each of the OIG's FY 2008 management challenges.

Figure 4.

Office of Inspector General FY 2008 Management Challenges

OIG's FY 2008 Management Challenge	NSF's Significant Actions Taken in FY 2008	NSF's Anticipated Next Steps
Post-Award Administration Policies	Assessed administrative performance of 29% of awardees managing 93% of NSF funds through advanced monitoring (30 site visits; 138 desk reviews) under the Award Monitoring and Business Assistance Program (AMBAP). Updated policies and procedures, including NSF's suite of grant administrative manuals, and the Standing Operating Guidance that outlines AMBAP procedures for ensuring grantee compliance in administering NSF funds. Fully implemented Portfolio Facilitation Model providing comprehensive support for NSF grant administration. Initiated implementation of "Division Director-concur" for awards in eJacket as the last step in establishing a paperless awards process.	Continue to develop new administrative tools to strengthen post award oversight. Incorporate additional business rules into NSF corporate business systems to further strengthen accountability. Implement policies and procedures to address new programmatic requirements legislated under the America COMPETES Act (ACA). Develop strategies and resources for training NSF staff on federal and agency policies, regulations, and procedures.
Contract Monitoring	Expanded the contract oversight program to include comprehensive post-award monitoring policies and procedures and training.	Continue administration of the contract post-award monitoring program.
U.S. Antarctic Program Property, Plant, and Equipment (PP&E)	Commenced verification and validation of PP&E activities. Implemented new methodology for freight cost estimation.	Complete the assessment of cost documentation for Construction-in-Progress and Real Property assets; Determine how best to expand the scope of financial management modernization effort.
Reporting Results of Scientific Research	Implemented data migration for Project Reporting System enhancements. Finalized agency recommendations on final project reporting requirements mandated by the ACA.	Develop additional flexibility to report on special award categories.

Meeting Future Opportunities and Challenges

NSF continually strives to be a dynamic and agile organization that employs a range of programmatic and organizational mechanisms and strategies to fulfill its mission and goals. NSF is now pursuing

fundamental changes in a number of areas in order to stay focused on the frontiers of science and engineering.

Support for Potentially Transformative Research (PRT): Both the National Science Board and the Congress have recently underscored NSF's vital role in supporting transformative research. Transformative research involves ideas, discoveries, or tools that radically change our understanding of an important existing scientific or engineering concept or educational practice or leads to the creation of a new paradigm or field of science, engineering, or education. NSF is now establishing new funding mechanisms and providing additional guidance for the merit review process to enhance its ability to identify and support research that is potentially transformative.

Investing in Technology to Support Program Oversight and Management: To ensure that critical, program-related information technology systems and solutions are appropriately acquired, developed, and maintained, NSF is undertaking efforts to make certain these investments meet current as well as future agency information, reporting, and accountability requirements. This approach gives staff who are the customers a stronger incentive to drive the requirements for IT systems, consistent with the best practices in industry and other federal agencies.

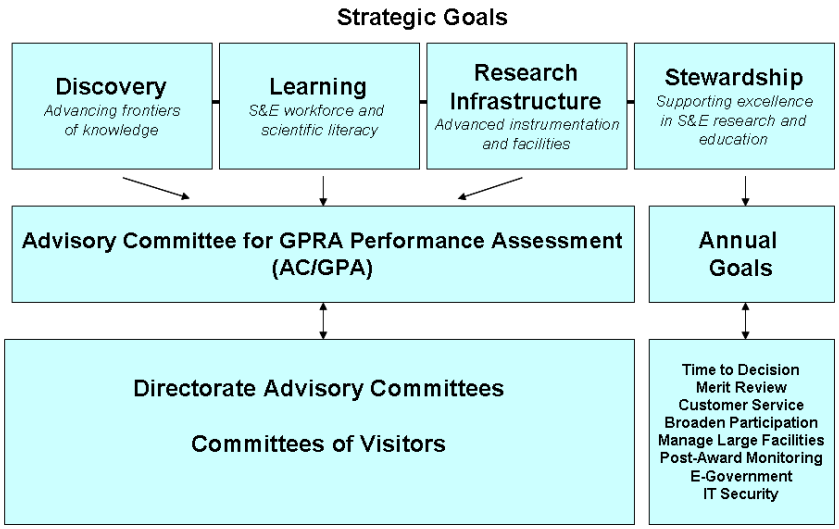
Addressing Decreased Funding Rate: The competition for NSF funds has always been intense, and it has grown more so in recent years. Since 2000, NSF's overall funding rate for research proposals decreased from 30 percent to 21 percent. To address this challenge, NSF is pursuing a variety of approaches that balance trade-offs between keeping the proposal workload at a productive and manageable level—for both NSF and the applicant community—and encouraging the free flow of ideas to NSF.

PERFORMANCE HIGHLIGHTS

NSF's leadership in advancing the frontiers of science and engineering research and education is demonstrated, in part, through internal and external performance assessments. The results of this process provide stakeholders and taxpayers with vital information about the return on their investments. In FY 2008, performance assessment at NSF was guided by the Government Performance and Results Act of 1993 (GPRA) and by NSF's *FY 2006–2011 Strategic Plan*.[6] To accomplish its mission to promote the progress of science and engineering, NSF invests in the best ideas generated by scientists, engineers, and educators working at the frontier of knowledge and across all fields of research and education. NSF's *FY 2006–2011 Strategic Plan* establishes four overarching strategic outcome goals by which NSF measures its annual performance: *Discovery*, *Learning*, *Research Infrastructure*, and *Stewardship*. The four interrelated outcome goals establish an integrated strategy to deliver new knowledge at the frontiers, meet vital national needs, and work to achieve the NSF vision. The first three goals focus on NSF's long-term investments in science and engineering research and education. *Stewardship* includes both qualitative and quantitative performance measures that focus on improving the effectiveness and efficiency of the agency's management practices.

Figure 5.

NSF Performance Assessment Framework



FY 2008 Results

The results of three strategic outcome goals—*Discovery*, *Learning*, and *Research Infrastructure*—are shown in *Figure 6.* The results for the remaining goals under *Stewardship* will be reported in NSF's FY 2008 Annual Performance Report (APR).[7] In addition to a comprehensive discussion of each of NSF's performance goals, the APR will also include a discussion of NSF's performance assessment process, use of the R&D investment criteria, NSF's extensive data verification and validation process, and trend data. [8]

[6] NSF's *FY 2006–FY 2011 Strategic Plan* is available at *www.nsf.gov/pubs/2006/nsf0648/nsf0648.jsp*.
[7] NSF's FY 2008 Annual Performance Report will be available January 15, 2009 at www.nsf.gov/about/performance.
[8] NSF's performance assessment website at www.nsf.gov/about/performance includes additional performance-related information.

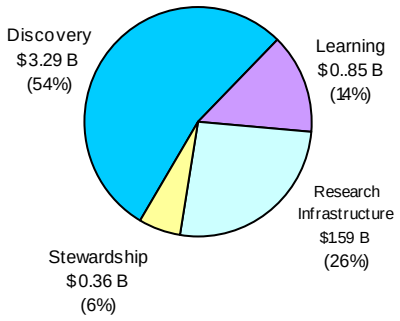
Figure 6.
FY 2008 Strategic Outcome Goals and Results

Performance Goal	Results
DISCOVERY Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit, and establishing the nation as a global leader in fundamental and transformational science and engineering.	● FY 2004 ● FY 2005 ● FY 2006 ● FY 2007 ● FY 2008
LEARNING Cultivate a world-class, broadly inclusive science and engineering workforce, and expand the scientific literacy of all citizens.	● FY 2004 ● FY 2005 ● FY 2006 ● FY 2007 ● FY 2008
RESEARCH INFRASTRUCTURE Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools.	● FY 2004 ● FY 2005 ● FY 2006 ● FY 2007 ● FY 2008

Note
● Indicates successful achievement. Assessments by a committee of external experts determined that NSF demonstrated significant achievement of the goal and successfully met all performance objectives. The assessment process itself was validated by an independent external review.

In FY 2008, *Discovery*, *Learning*, and *Research Infrastructure* accounted for 94 percent of NSF's investment portfolio (*Figure 7).*[9] Outcomes under these goals are assessed annually by an external review panel, the Advisory Committee for GPRA Performance Assessment (AC/GPA), composed of experts in various disciplines and fields of science, engineering, mathematics, and education. The Committee determined that NSF had demonstrated significant achievement of the *Discovery*, *Learning*, and *Research Infrastructure* goals and met all performance objectives based on a review of more than 1,200 outstanding accomplishments compiled by NSF program officers, award abstracts, investigator project reports, and Committees of Visitors (COV) reports.[10] Moreover, the process of assessment by the AC/GPA committee was itself reviewed and validated by IBM Global Business Services, an independent management consulting firm.

Figure 7.
FY 2008 Budget Obligations
$6.08 Billion*



**Totals may not add due to rounding.*

Assessing the Outcomes of Long-Term Research

GPRA requires federal agencies to develop a strategic plan, establish annual performance goals, and report annually on the progress made toward achieving these goals. NSF's mission is to fund long-term

[9] Base obligation of $6.08 billion plus Trust Funds ($49 million), H1-B Nonimmigrant Petitioner Receipts ($121 million), and upward adjustments posted against expired authority in FY 2008 ($5 million) equals Direct Obligations Incurred as shown on the Statement of Budgetary Resources ($6.26 billion).
[10]The FY 2008 AC/GPA report is available at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08207.

science and engineering research and education where outcomes and results can be unpredictable. Science and engineering research projects can generate discoveries in an unrelated area, and it can take years to recognize discoveries and their impact. Moreover, serendipitous results can be the most interesting and most important. Assessing the impact of advances in science and engineering is inherently retrospective and is best performed using the qualitative judgment of experts.

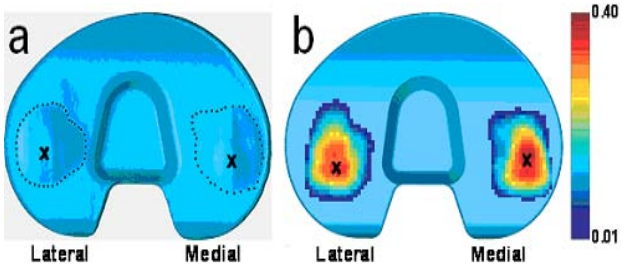
The value of expert review has been affirmed in two studies by the National Academies. In a 2001 report, the Committee on Science, Engineering, and Public Policy (COSEPUP) stated, "Because we do not know how to measure knowledge while it is being generated and when its practical use cannot be predicted, the best we can do is ask experts in the field—a process called *expert review*—to evaluate research regularly while it is in progress." In a 2008 report, a COSEPUP committee states, "EPA and other agencies should use expert-review panels to evaluate the *investment efficiency* of research programs." COSEPUP adds that "*Investment efficiency* is used …to indicate whether an agency is 'doing the right research and doing it well.'"[11]

As shown in *Figure 5*, NSF uses a multi-layer assessment approach, integrating quantitative metrics and qualitative reviews. The use of external experts to review results and outcomes is a longstanding practice in the academic community. NSF's use of such panels as the Committees of Visitors (COVs) and Advisory Committees pre-dates GPRA. On broader issues, NSF often uses external third parties such as the National Academies for review. NSF also convenes external panels of experts for special studies.[12] As previously noted, the AC/GPA was formed by NSF to provide an annual review of the agency's accomplishment with respect to its GPRA strategic goals. In addition, all NSF programs have been evaluated by OMB's Program Assessment Rating Tool (PART). All received a rating of "Effective" except one which was rated "Moderately Effective."[13]

Research and Education Highlights

The following are examples of NSF-supported research results reported in FY 2008 that were used by the AC/GPA in forming its assessment of the agency's success. Additional results can be found at www.nsf.gov/discoveries.

► **Virtual Prototyping of Artificial Knees:** Dr. Benjamin Fregly (University of Florida) and his team are addressing a growing need for the aging American population. By one estimate, 40 million Americans will be affected by osteoarthritis in the year 2020. This project could lead to an entirely new approach for designing knee replacements and testing innovative designs using computer software rather than physical simulator machines. This work is unique because of its ability to predict long-term wear characteristics of knee replacement designs in a matter of minutes or hours using computer simulations. In terms of broader impacts, high school students from underrepresented groups have been involved in the knee research, through the University of Florida



Comparison of experimental (a) and simulated (b) wear regions for a total knee replacement design after 5 million cycles of walking performed in a knee simulator machine. Xs indicate locations of maximum wear. Dotted lines in (a) indicate boundaries of experimental wear regions. Color bar in (b) indicates depth in millimeters of simulated wear regions.
Credit: B.J. Fregly, University of Florida.

[11] *Implementing the Government Performance and Results Act for Research: A Status Report* is available at www.nap.edu/catalog.php?record_id=10106 and *Evaluating Research Efficiency in the U.S. Environmental Protection Agency* is available at www.nap.edu/catalog.php?record_id=12150.
[12] A schedule of NSF's program evaluations and a summary of the findings of the external evaluations completed in FY 2008 will be available on NSF's performance assessment website in January 2009.
[13] PART results are available at www.expectmore.gov.

Summer Science Training Program. In addition, an orthopedic implant company has already enlisted the research team to participate in designing the next generation of knee replacements. Significant ethical and safety issues implicit in this study are ripe for further examination.

Damage from an EF1 tornado. CASA graduate student Patrick Marsh (University of Oklahoma) conducted a damage survey to verify the EF1 tornado identified in CASA data. *Credit: CASA.*

► **New Radar Network Evaluated in National Weather Service Experimental Warning Program:** Given the increasing frequency of tornadoes experienced today, new technologies to predict when and where tornadoes and other weather disturbances such as floods and severe thunderstorms will occur are of obvious importance. The NSF Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere (CASA), located at the University of Massachusetts at Amherst, has developed a method of weather sensing that utilizes dense, low-cost radar networks that can sense the lower atmosphere, an important area that is under-sampled by today's technologies The finely grained observations of the lower atmosphere obtained by the CASA researchers allowed forecasters to see small meteorological structures that are close to the ground, such as mini-wind clusters that are embedded in larger storms. During the 2007 tornado season, CASA transmitted real-time data from its first prototype network in Oklahoma to National Weather Service forecasters for evaluation in the Experimental Warning Program. Researchers continue to evaluate the Center's data in the Experimental Warning Program during the 2008 tornado season. The research is transformative because it will introduce a new dimension to weather forecasting and sensing, yielding capabilities that do not exist today.

► **Bendable Concrete for Safe, Durable, and Sustainable Infrastructure:** Investigators at the University of Michigan have designed a new type of concrete that maintains all the advantages of current concrete but adds ductility, allowing it to bend under stress without fracture. The new type of concrete has 300 to 500 times the tensile ductility of normal concrete; it can bend without fracturing when overloaded. The material also exhibits self-healing properties, which further enhances its durability. The work may establish the United States as the global leader in "designer" cement-based composites. It also embodies collaboration among several sectors: government, industry, and academic partners. It has potential consequences for the design of sustainable structures resistant to earthquakes and weather events. This research also exemplifies NSF's goal of integrating research with ethics and safety considerations.

This image shows the unique properties of Engineered Cementitious Composites in both its high ductility and ability to self-heal after fracture. *Credit: Victor Li, University of Michigan Ann Arbor.*

Two SEEDBEd high school students use micropipettes to move enzyme digested DNA into an electrophoresis gel. *Credit: Cindy Barton, Tulsa CommunityCollege.*

►**Project SEEDBed (Stimulating Enthusiasm, Exploration, and Discovery through Biotechnology Education):** Project SEEDBed engages middle and high school students and teachers in summer academies at community colleges designed to increase knowledge, stimulate interest in biotechnology among students and teachers, and encourage students to pursue further study, possibly leading to careers as biotechnicians. Teachers are provided with "footlockers" with all of the equipment necessary to conduct new laboratory activities in their classrooms. Evaluation data indicate significant impact on both students and teachers.

MANAGEMENT ASSURANCES

The Federal Managers' Financial Integrity Act of 1982 (FMFIA) requires agencies to establish internal control and financial management systems that provide reasonable assurance that the integrity of federal programs and operations are protected in accordance with guidance provided by the Office of Management and Budget (OMB) *Circular A-123, Management's Responsibility for Internal Control.* In December 2004, OMB issued a revision to *Circular A-123* which requires management to separately assess and document internal controls over financial reporting, prepare a separate assurance on internal controls over financial reporting, and identify material weaknesses and corrective actions.

In FY 2008, NSF fully implemented its agency-wide internal control program. Over the past three years, NSF has documented and tested all nine of its key business processes and 56 subprocesses. Through the establishment of the Accountability and Performance Integration Council (APIC) senior assessment team, the associated APIC Internal Controls Working Group (ICWG), numerous Business Process Owners, and the A-123 Team, NSF has developed a sustainable internal control program. Management has also enhanced the risk assessment aspect of the internal control program by adding additional levels of review which in turn has improved the methodology for determining the agency's 3-year cycle testing schedule.

In FY 2008, NSF refined its review process of entity-level controls by incorporating an annual assessment of the documented controls. NSF reviewed and evaluated significant entity-level control activities currently in place to support compliance with FMFIA and other applicable laws and regulations, including (but was not limited to) the NSF Act of 1950, as amended; Annual Appropriation Law; Government Performance and Results Act of 1993; Clinger-Cohen Act of 1996; Federal Information Security Management Act of 2002; Chief Financial Officers Act of 1990, as amended; Federal Financial Management Improvement Act of 1996; Improper Payments Information Act of 2002; Single Audit Act of 1984, as amended; and the Inspector General Act of 1978, as amended.

In the past year, in addition to conducting annual internal controls training for the ICWG and Business Process Owners, the A-123 team also conducted training sessions for program directorates. This facilitated the identification, documentation, and testing of the financial controls managed within the program directorates. The A-123 team also engaged in extensive outreach efforts to communicate the importance of agency internal controls and the agency's key role in ensuring effective and efficient operation of programmatic activities.

NSF conducted a review of its Financial Accounting System (FAS) in accordance with *OMB Circular A-127* and the Federal Financial Management Improvement Act (FFMIA). Based on the results of the review we can provide reasonable assurance that our financial management systems substantially comply with federal financial management systems requirements, applicable federal accounting standards, and the U.S. Government Standard General Ledger (SGL) at the transaction level. Based on the reviews conducted during the year, APIC and the Senior Management Round Table (SMaRT), with the concurrence of the Chief Operating Officer/Deputy Director, recommended an unqualified statement of assurance to the NSF Director for FY 2008. The recommendation noted that management found no evidence of material weakness in either financial controls or entity-wide controls. The recommendation also noted that NSF internal controls meet the provisions of FMFIA, as implemented by A-123, including compliance with OMB *Circular A-127, Financial Management Systems.*

In the FY 2008 Independent Auditor's Report, NSF received an unqualified opinion of our financial statements, with no material weaknesses.[14]

[14] See Appendix 1, page III-1, for the Summary of Financial Statement and Management Assurances tables.

NSF FY 2008 Federal Managers' Financial Integrity Act Assurance Statement

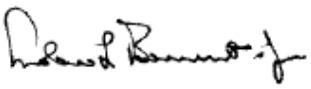
The National Science Foundation (NSF) is responsible for establishing and maintaining effective internal control and financial management systems that meet the objectives of the Federal Managers' Financial Integrity Act (FMFIA). These objectives are to ensure effective and efficient operations, compliance with applicable laws and regulations, and reliable financial reporting.

For Fiscal Year 2008, the Foundation is providing an unqualified statement of assurance that its internal controls and financial management systems meet the objectives of FMFIA.

NSF conducted its evaluation of internal control over the effectiveness and efficiency of operations and compliance with applicable laws and regulations in accordance with *OMB Circular A-123, Management's Responsibility for Internal Control*. Based on the results of this evaluation, NSF identified no material weaknesses under Section 2 of FMFIA and no system nonconformances under Section 4 of FMFIA. NSF provides reasonable assurance that its internal controls over the effectiveness and efficiency of operations and its compliance with applicable laws and regulations, as of September 30, 2008, were operating effectively, and no material weaknesses were found in the design or operation of these internal controls.

NSF management is responsible for establishing and maintaining effective internal control over financial reporting, which includes safeguarding of assets and compliance with applicable laws and regulations. NSF conducted its assessment of the effectiveness of the NSF internal control over financial reporting in accordance with Appendix A of *OMB Circular A-123.* Based on the results of this evaluation, the NSF can provide reasonable assurance that internal control over financial reporting as of June 30, 2008, was operating effectively and no material weaknesses were found in the design or operation of internal controls over financial reporting.

The Federal Financial Management Improvement Act of 1996 (FFMIA) requires agencies to implement and maintain financial management systems that are substantially in compliance with federal financial management systems requirements, federal accounting standards, and the United States Government Standard General Ledger at the transaction level. NSF financial management systems substantially comply with FFMIA.



Arden L. Bement, Jr.
Director
National Science Foundation

November 7, 2008

FINANCIAL DISCUSSION AND ANALYSIS

The National Science Foundation (NSF) is committed to excellence, transparency, and results-oriented financial management. The Foundation's goals for financial management stewardship are to deliver the highest level of business services to our customers, stakeholders, and employees through effective internal controls and efficient work processes; and to provide reliable and timely financial information to support sound management decisions. The result has been a long established record of effectiveness in federal financial management documented by clean audit opinions and "Green" scorecards along with a leadership role in government-wide grants management activities.

In FY 2008, NSF successfully maintained "Green" ratings in both the President's Management Agenda (PMA) financial performance initiative and the Department of Treasury's Financial Management scorecard. With respect to improper payments, since NSF has been below the OMB reporting threshold, the agency is now reporting on a three-year cycle. The next reporting year will be FY 2009.[15] In addition, NSF implemented the new Federal Financial Report (FFR) for grant recipients and for the second year is participating in OMB's Pilot Program for Alternative Approaches to Performance and Accountability Reporting. NSF has a leadership role in a number of federal initiatives, including the CFO Council Grants Policy Committee and the Federal Funding Accountability and Transparency Act (FFATA) initiative. Consistent with our leadership role, the agency is pursuing an integrated approach in its involvement with the grants and financial management lines of business initiatives.

As part of our stewardship commitment, NSF prepares annual financial statements in conformity with generally accepted accounting principles (GAAP) of U.S. federal government entities and subjects them to an independent audit to ensure their integrity and reliability in assessing performance. For FY 2008, NSF received its eleventh consecutive unqualified (clean) audit opinion with no material weaknesses or significant deficiencies. This was largely the result of the Foundation's efforts in strengthening its Contract Monitoring Program and accounting and reporting for property, plant and equipment, which closed the prior year significant deficiencies.

Understanding the Financial Statements

NSF's FY 2008 financial statements and notes are presented in accordance with *OMB Circular No. A-136, Financial Reporting Requirements* dated June 3, 2008. NSF's current year financial statements and notes are presented in a comparative format. The Stewardship Investment schedule presents information over the last five years. *Figure 8* summarizes the significant changes in NSF's financial position in FY 2008.

Figure 8.
Significant Changes in NSF's Financial Position in FY 2008[16]
(Dollars in Thousands)

Net Financial Condition	FY 2008	FY 2007	Increase/ (Decrease)	% Change
Assets	$9,055,028	$8,726,006	$329,022	3.8%
Liabilities	$555,048	$515,430	$39,618	7.7%
Net Position	$8,499,980	$8,210,576	$289,404	3.5%
Net Cost	$5,944,807	$5,636,129	$308,678	5.5%

[15] For more information about Improper Payments Information Act reporting, see Appendix 2, page III-3.
[16] The change in total asset primarily reflects a $362 million increase in *Fund Balance with Treasury*. Most of the change in net cost is the result of a $296 million increase in Research and Related Activities.

The following is a brief description of the nature of each required financial statement and its relevance. Certain significant balances or conditions are explained to help clarify their relationship to NSF operations.

Balance Sheet: The Balance Sheet presents the total amounts available for use by NSF (assets) against the amounts owed (liabilities) and amounts that comprise the difference (net position). Two line items consisting of *Fund Balance with Treasury* and *Property, Plant, and Equipment* represent 98.8 percent of NSF's current year assets (*Figure 9*). *Fund Balance with Treasury* is funding available from which NSF is authorized to make expenditures and pay amounts due through the disbursement authority of the Department of Treasury. *Property, Plant, and Equipment* comprises capitalized property located at NSF headquarters and NSF-owned property located primarily in the continental U.S., New Zealand and Antarctica that support the U.S. Antarctic Program. *Advances* are funds advanced to NSF grantees, contractors, and other government agencies.

Figure 9.
FY 2008 Assets

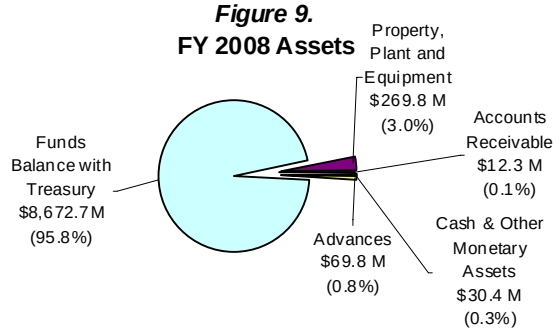
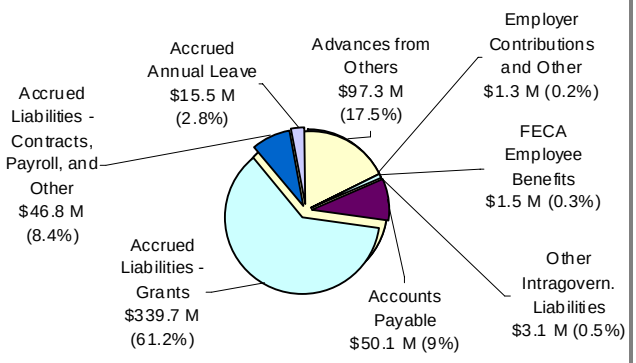


Figure 10.
FY 2008 Liabilities



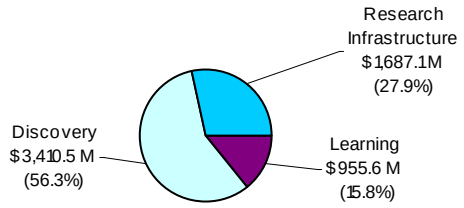
Note: Totals may not add due to rounding.

Three line items—*Accounts Payable, Accrued Liabilities-Grants,* and *Advances from Others*—represent 87.7 percent of NSF's current year liabilities *(Figure 10*). *Accounts Payable* includes liabilities to NSF vendors for unpaid goods and services received. *Accrued Liabilities–Grants* are amounts recorded for NSF's grants for which grantees have incurred costs but have not submitted their financial reports as either Federal Cash Transaction Reports (FCTR) or Federal Financial Reports (FFR). *Advances from Others* represents payments received in advance from other federal agencies through interagency agreements for services that have not been performed.

Statement of Net Cost: This statement presents the annual cost of operating NSF programs. Gross cost less any offsetting revenue for each NSF program is used to arrive at the net cost of specific program operations. *Intragovernmental Earned Revenues* are recognized when these related program or administrative expenses are incurred and deducted from the full cost of the programs to arrive at the *Net Cost of Operation*. Approximately 95.3 percent of all current year NSF costs incurred were directly related to the support of the *Discovery, Learning,* and *Research Infrastructure* strategic goals. Costs were incurred for indirect general operation activities (e.g., salaries, training, activities related to the advancement of NSF information systems technology) and activities of the National Science Board and the Office of Inspector General. These costs were allocated to the *Discovery, Learning,* and *Research*

Infrastructure strategic goals and account for 4.7 percent of the total current year *Net Cost of Operations*. These administrative and management activities are the focus of the agency's *Stewardship* strategic goal.

Figure 11.
FY 2008 Gross Cost



Note: Included in Discovery, Learning, *and* Research Infrastructure *is 4.7 percent of NSF's total funding that is devoted to Agency Operations and Award Management, the National Science Board, and the Office of Inspector General, for the administration and management costs addressed by NSF's Stewardship strategic goal. (Totals may not add due to rounding.)*

Statement of Changes in Net Position: This statement presents the cumulative net results of operation and unexpended appropriations in order to understand the nature of the changes to the net position as a whole. NSF's Net Position increased to $8.5 billion in FY 2008 — an increase of 3.5 percent — primarily due to the increase in *Unexpended Appropriations* and *Cumulative Results of Operations. Unexpended Appropriations* is affected mainly by *Appropriations Received* and *Appropriations Used* while the *Cumulative Results of Operations* is affected by the net results of operations since inception.

Statement of Budgetary Resources: This statement provides information on how budgetary resources were made available to NSF for the year and the status of those budgetary resources at year-end. For FY 2008, new *Budgetary Authority* for Research and Related Activities, Education and Human Resources and, Major Research Equipment and Facilities Construction were $4,844 million, $766 million and $221 million, respectively. The combined *Budgetary Authority* in FY 2008 for the National Science Board, OIG and Agency Operations and Award Management was $297 million. *Total Budgetary Resources* increased by 3.4 percent and *Net Outlays* increased by 5.8 percent in FY 2008. The *Net Outlays* reported on this statement reflects the actual cash disbursed for the year by Treasury for NSF obligations and is reduced by the amount of *Distributed Offsetting Receipts*.

Stewardship Investments: NSF-funded investments yield long-term benefits to the general public. NSF investments in research and education yield quantifiable outputs, including the number of awards made and the number of researchers, students, and teachers supported or involved in the pursuit of discoveries in science and engineering and in science and math education. The FY 2008 increase in Research and Human Capital Activities reflects increased agency funding.

Limitations of the Financial Statements

In accordance with the revised guidance *OMB Circular No. A-136* we are disclosing the following limitations of NSF's FY 2008 financial statements, which appear in Chapter II of this report: The financial statements have been prepared to report the financial position and results of operations of NSF, pursuant to the requirements of 31 U.S.C. 3515(b). While the statements have been prepared from NSF books and records in accordance with GAAP for federal entities and the format prescribed by OMB, the statements are, in addition to the financial reports, used to monitor and control budgetary resources which are prepared from the same books and records. The statements should be read with the realization that they are for a component of the U.S. government, a sovereign entity.

Budgetary Integrity: NSF Resources and How They Are Used

NSF is funded primarily through six Congressional appropriations that totaled $6.13 billion in FY 2008, which includes $62.50 million in supplemental funding. Other FY 2008 revenue sources included

$102.30 million in reimbursable authority, $104.43 in H-1B collections and $62.00 million in donations to support NSF activities.[17] NSF made investments in fundamental science and engineering research and education in support of the Foundation's three strategic outcome goals of *Discovery*, *Learning*, and *Research Infrastructure*. About 5 percent of NSF's budget was for Stewardship activities that focus on internal agency operations and award management activities. Investment priorities included the Cyber-enabled Discovery and Innovation program, the Experimental Program to Stimulate Competitive Research (EPSCoR), undergraduate education including The Robert Noyce Teacher Scholarship Program and the Math and Science Partnership Program, and International Polar Year Leadership. NSF also supported several interagency R&D priorities including the Networking and Information Technology R&D, the National Nanotechnology Initiative, the U.S. Climate Change Science Program, and Homeland Security. Among major research facilities and equipment projects supported were the Alaska Region Research Vessel, the Atacama Large Millimeter Array, and the Advanced LIGO project. At the time of this report, NSF had not yet received its FY 2009 appropriations.

Financial System Strategy

The goal of NSF's Financial Accounting System (FAS) is to provide quality business services to our customers through effective funds control, efficient award processes, and reliable and timely financial data to inform management decisions. FAS is a custom developed online, near real-time system that provides the full spectrum of financial transaction functionality required by a grants-making agency and complies with government-wide rules and regulations for financial management systems.

FAS is integrated with NSF's core business systems, including the Proposal and Reviewer System (PARS), Awards System, Guest (panelists) Travel and Reimbursement System, e-Travel System and the FastLane System that supports grants management. FAS supports both the grant and core financial processes and is used to monitor, control, and ensure the management and financial accountability of over 21,000 active awards with nearly 1,900 external grantee institutions. FAS distributes funds electronically to grantees in a seamless and controlled environment and interfaces information to the FastLane system that allows grantees the ability to check available funds in real-time on a daily basis. The reporting capabilities built into the FAS software include on-line lookups to verify funds, track commitments and obligations, and the ability to generate daily, weekly, monthly, and quarterly reports that provide up-to-date financial information about NSF operations for program and grantee decision support. All FAS-generated reports are posted electronically and are available to staff via *Report.web*, which is a web-based application that streamlines information distribution. In addition, information from FAS is captured and used in NSF's Enterprise Information System.

NSF's ability to meet interface and integration requirements of any government-wide initiative (e.g., e-Travel and e-Learning); to adopt new legislative, regulatory, and policy requirements as they are promulgated; and to implement required technical upgrades is resource dependent. Consistent with NSF's eGovernment Implementation Plan, FAS will remain in a steady-state phase in the FY 2008-FY 2012 timeframe. The Financial Management Line of Business (FMLoB) continues to define government-wide standards that all agencies will be required to implement. In order to meet these new requirements, NSF is beginning to develop a strategy for our future financial management system that complies with the FMLoB guidelines. A key element for the future financial management system is to ensure that NSF continues to support fully integrated grant financial requirements within the financial system framework. NSF has initiated planning activities, including documenting our current business processes and developing a business case. NSF will also identify the interrelationships between the FMLoB and the

[17] Donations of $62.00 million include $508,880 of interest earned on the donations received in FY 2008.

Grants Management Line of Business (GMLoB) to ensure that all requirements will be identified to support NSF's status as a GMLoB Consortia Lead for grants management.

Key Financial Metrics

This section presents selected key financial measures of NSF's core business of awarding grants and our progress in associated electronic processes.

► **Treasury Scorecard:** Since inception of the Department of Treasury's Financial Management Service Scorecard in FY 2004, NSF has consistently received the highest ("Green") ratings for accuracy and timeliness of our financial reporting in the quarterly ratings (*Figure 12.*)

Figure 12.

U.S. Department of Treasury Financial Management Scorecard

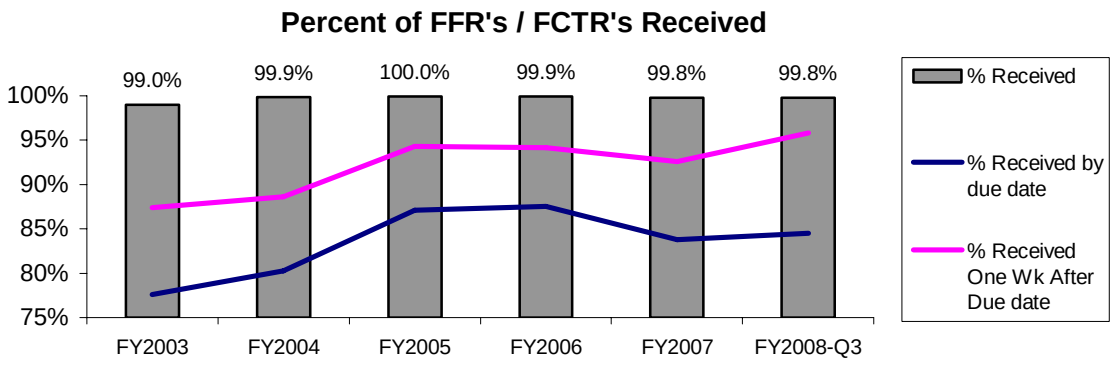
Category	Standard	Results (as of 6/30/08)*
Accuracy of Reporting**	*Green*: If differences are outstanding for less than 3 months. *Yellow:* If differences are older than 3 months but less than 6 months. *Red:* If differences are older than 6 months.	G
Timeliness of Reporting*	*Green*: If original and supplemental reporting are completed by the third workday. *Yellow:* If original report is submitted by the 3rd workday and supplemental report submitted on the 4th workday. *Red:* If original report is submitted after the 3rd workday and/or supplemental submitted after the 4th workday.	G

*Most current data available.

** FMS 224, SF1218/1221, and FMS 1219/1220.

► **Federal Cash Transaction Report (FCTR) and Federal Financial Report (FFR):** *Figure 13* focuses on OMB's SF 272 FCTR and FFR processes, which are key elements of NSF's core grant business.

Figure 13.

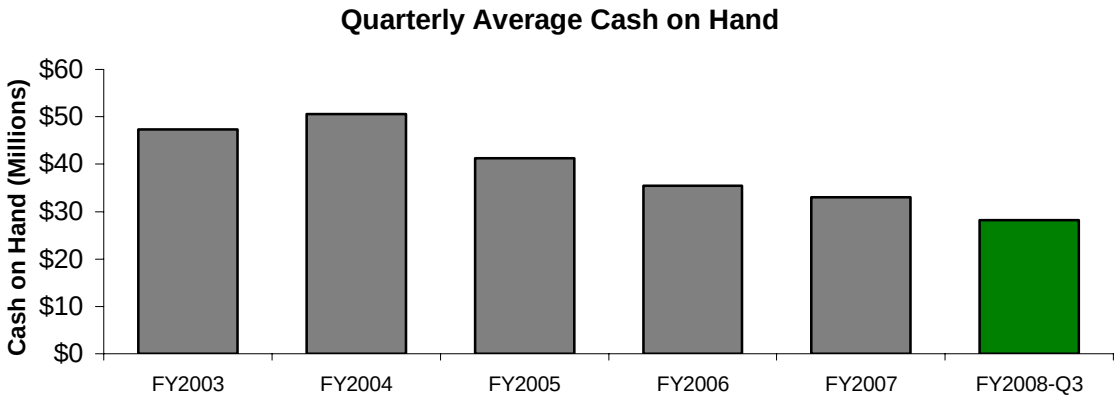


Note: FY 2008 includes only the first three quarters, which is the most recent data available at this time.

Grantees are required to report the status of funds received from NSF on a quarterly basis through the submission of a FCTR or FFR report. The reports are prepared and submitted electronically to NSF by the grantee through the FastLane Financial Function. NSF performs follow-up actions with the preparers to ensure receipt of reports, as evidenced by the increase in report submissions received by one week after the due date. As shown on the chart above, through the third quarter of FY 2008, nearly 85 percent of NSF grantees submitted their FCTR or FFR reports by the due date and over 95 percent of grantees submitted their FCTR or FFR reports within one week after the due date. By the end of the quarter, nearly 100 percent of grantees had submitted their reports.

► **Cash-on-Hand:** Figure 14 shows the results of NSF's increased emphasis on enhanced FFR/FCTR monitoring activities implemented in January 2005. Unexpended federal cash held by grantees has decreased by over $19 million from a quarterly average of $47.3 million in 2003 to a quarterly average of $28.2 million in 2008. This decrease was due to improved cash management by grantees as a result of the effective NSF monitoring activities.

Figure 14.



Note: FY 2008 includes only the first three quarters, which is the most recent data available at this time.

► **FMLoB Financial Management Services Metrics (FMSM) Program:** In 2007, NSF began participating in the FMSM Program developed by the FMLoB, in collaboration with the federal financial management community. The FMSM Program established a set of metrics to facilitate an assessment of financial services government-wide. FMSM metrics have been designed to help identify opportunities to improve the performance and affordability of the financial services provided by Shared Service Providers and federal agencies. NSF's collaboration with the FMLoB maintains progress in improving financial performance.

► **CFO Council Metric Tracking System (MTS) Financial Management Indicators:** Generally, since the MTS was launched in January 2005, NSF has had the most consistently high scores of any government agency. To see scorecards and for additional information about the Metrics Tracking System, see http://www.fido.gov/mts/cfo/public.

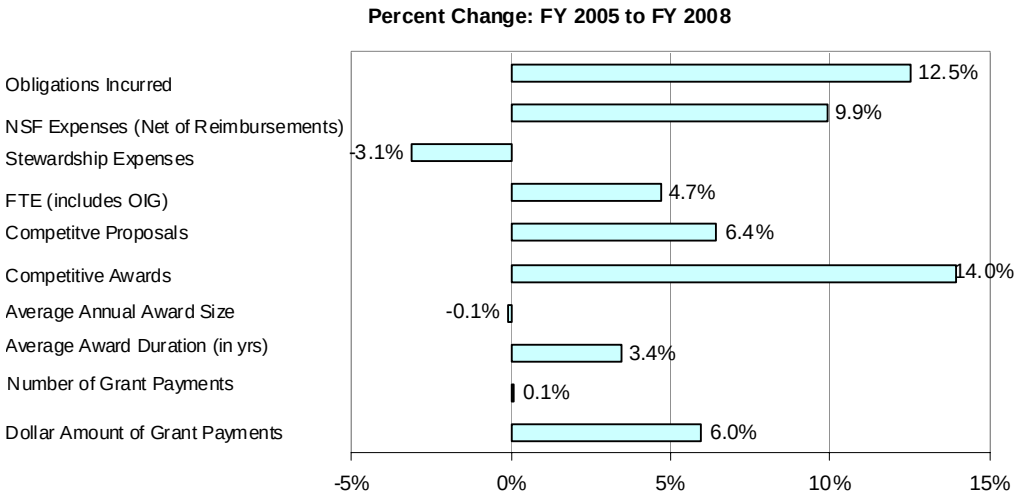
Figure 15.

Recent Trends

The following table summarizes several of NSF's key workload and financial indicators. Obligations are a direct result of each year's appropriation while expenses reflect multiple years of prior obligations. Of significance is the 14 percent increase since FY 2005 in the number of competitive awards while staffing (FTE) has increased less than 5 percent.

	FY 2005	FY 2006	FY 2007	FY 2008	%Change FY 05-08
Obligations Incurred *	$5,653.90	$5,878.01	$6,169.19	$6,361.93	12.5%
NSF Expenses (Net of Reimbursements)*	$5,408.17	$5,595.76	$5,636.13	$5,944.81	9.9%
Stewardship (Expenses) *	$292.43	$321.09	$275.99	$283.25	-3.1%
FTE (includes OIG)	1,279	1,277	1,310	1,339	4.7%
Competitive Proposals	41,760	42,377	44,598	44,441	6.4%
Competitive Awards	9,794	10,450	11,484	11,162	14.0%
Average Annual Award Size	$143,669	$134,595	$144,804	$143,527	-0.1%
Average Award Duration (in years)	2.9	2.9	2.9	3.0	3.4%
Number of Grant Payments	19,464	19,714	19,074	19,481	0.1%
Dollar Amount of Grant Payments*	$4,833.76	$4,884.51	$4,909.90	$5,122.54	6.0%

** Dollars in Millions*



Future Business Trends and Events

The future will require a continued focus on management excellence through increased attention to specific financial operations and strategic issues. New administrative policy initiatives mandate that NSF, like other federal agencies, demonstrate consistent progress in improving financial management practices as well as adapt to changing management and policy initiatives. We are committed to leveraging technology and human capital resources to improve operations and services to our customers and stakeholders. In addition, we proactively address management challenges identified through internal review and oversight. In this section, we describe some of the areas that the agency will be focusing on in both the immediate future and the long term.

► **Internal Controls:** In FY 2008, NSF fully implemented its agency-wide internal control program as required by *OMB Circular A-123, Management's Responsibility for Internal Control*. The Internal Control Program includes documentation of nine Key Business Processes relating to controls over financial reporting. NSF has developed a sustainable Internal Control Program and will continue making improvements to its program as it addresses emerging issues. The program also includes a practice of developing more effective and efficient ways of operating programmatic activities.

► **Federal Financial Report (FFR):** OMB has approved the FFR as the replacement for existing grant recipient financial reports with full implementation to be completed by all federal agencies not later than October 1, 2009. The FFR will simplify reporting requirements, procedures, and associated business processes by utilizing a standardized pool of data elements as defined by the Grants Policy Committee of the Federal Chief Financial Officers Council. NSF first implemented the FFR in FastLane Financial Functions as an optional grantee expenditure report during July 2007 and intends to make the FFR the required financial report in January 2009. Additionally, NSF developed an FFR within its *Research.gov* initiative that will be offered to other federal research-oriented agencies. NSF's FFR will assist OMB in advancing Federal Grants Streamlining initiatives. It will also reinforce NSF leadership within the federal grants management arena and maintain the customized integration of business processes and systems inherent in NSF's end-to-end systems.

► **Financial Service Offerings of the NSF FMLoB:** NSF has begun planning for a new financial and property management system under the FMLoB to replace the current legacy system. The current NSF financial management environment includes extensive integration with the grant systems and a host of other business systems. Implementing a new financial system will require extensive planning and coordination across all NSF business systems. One of the key success factors of NSF as a grant making agency is the integration between our financial and grant management systems.

Additionally, NSF is one of the federal government's consortia leads for the FMLoB in a fee-for-service environment to other federal agencies. As such, NSF is becoming a Shared Service Provider with its *Research.gov* initiative. Through *Research.gov*, NSF is in the process of developing financial service offerings that include grant payments, grantee financial reporting, and centralized grant accounting. These offerings will complement and extend the shared services to be offered for pre-and post-award grant management services. NSF is continuing to leverage the advantages of an integrated environment as it moves forward with its financial and property management systems' efforts.

► **Federal Funding Accountability and Transparency Act (FFATA) of 2006:** NSF has made significant progress in complying with the requirements of FFATA. In November 2007, NSF began submitting grants data in the required format for posting to *USASpending.gov*, and in December 2007 submitted a plan to OMB that identified data gaps, quality assurance measures, and a plan to address deficiencies for future data submissions. The future challenges for NSF in complying with the FFATA include the costs to be incurred and policy changes necessary to collect and report sub-award data as well as validation and certification of the data.