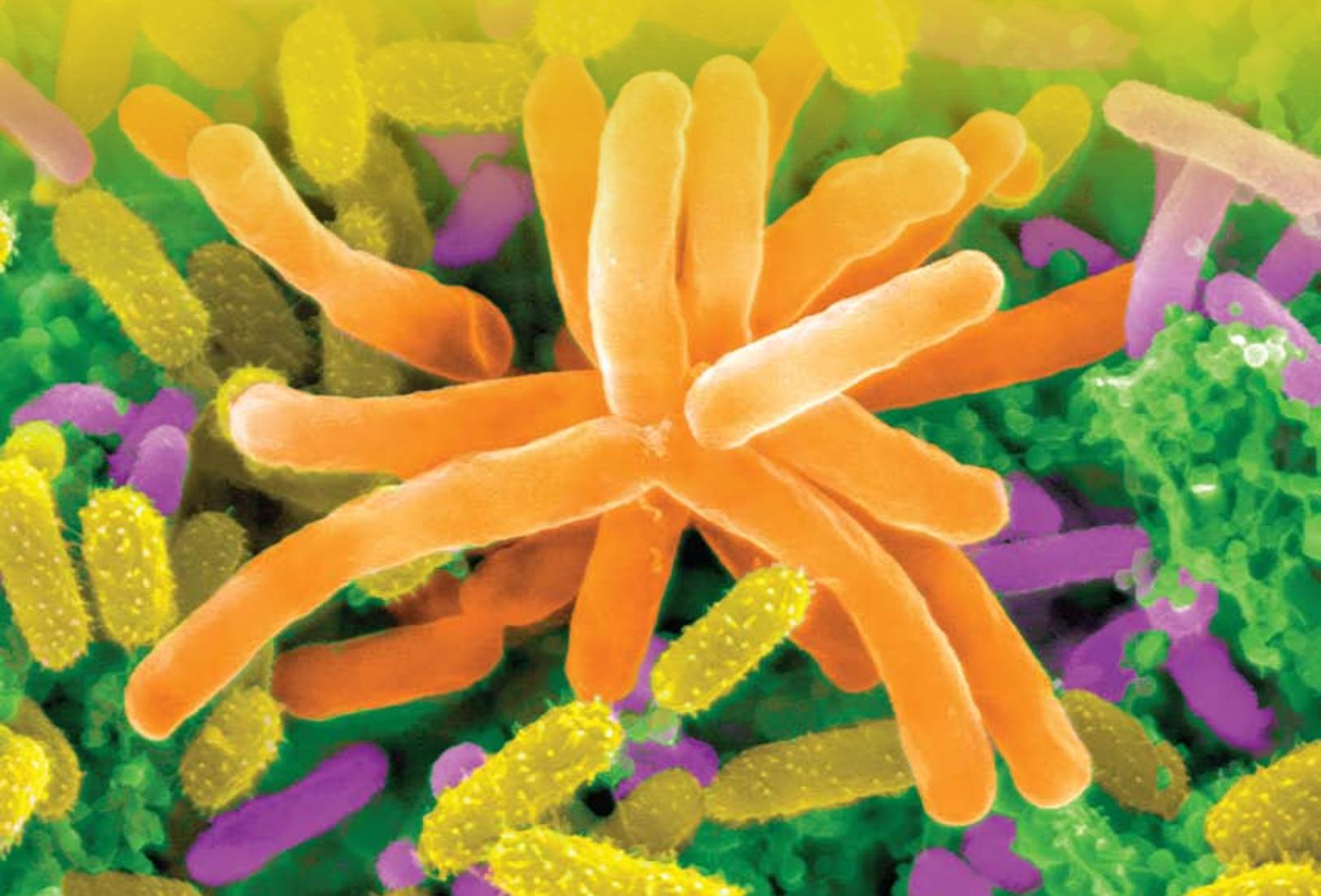


U N I T E D S T A T E S

National Science Foundation

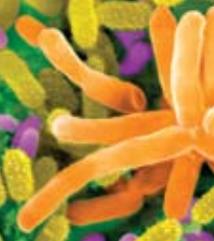


CITIZENS' REPORT

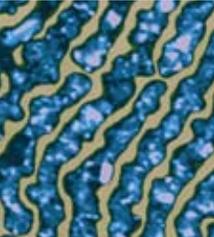
FY 2008 SUMMARY OF PERFORMANCE AND FINANCIAL RESULTS

Advancing Discovery, Innovation, and Education

TABLE OF CONTENTS



FROM THE DIRECTOR 1



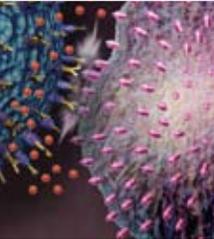
SNAPSHOT 2



ADVANCING THE FRONTIER 4



MEASURING PERFORMANCE 8



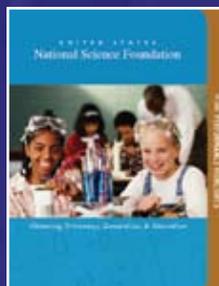
FINANCIAL HIGHLIGHTS 13



APPENDIXES 18



PHOTO CREDITS 20



Excellence in Science Communications

The National Science Foundation (NSF) earned multiple honors in a recent competition held by the National Association of Government Communicators (NAGC) to recognize the best in government communications. NSF received four Blue Pencil Awards for news releases and photography and four Gold Screen Awards for public affairs/education programs, web sites, and electronic publications.

In addition, NSF's FY 2007 *Performance and Accountability Highlights* report received a Vision Award from the League of American Communications Professionals (LACP). NSF, the only federal government agency to receive seven consecutive LACP awards for annual report excellence, competed among more than 3,000 entries from around the world. The report also earned a MarCom Gold Award. This global competition, which attracted more than 5,000 entries in 2008, is administered and judged by the Association of Marketing and Communication Professionals.

On the cover: An NSF-supported University of Washington-led team has taken a sample of mud collected at Lake Washington and successfully sequenced a complete genome for an unknown microorganism. Their method provides a way to discover new microscopic life in complex communities. Using the genetic technique of metagenomics, these researchers have revealed the possibility to uncover the genomes of unknown species with this approach. This is a particularly important finding for microbial research since few microbes survive in the lab and have therefore gone largely unidentified. Such techniques could allow scientists and engineers to identify microbial species based on particular, desired functions and to develop such microbes for practical applications.

For more information:

www.nsf.gov/news/news_summ.jsp?cntn_id=112138&org=NSF&from=news

FROM THE DIRECTOR

I am pleased to share with you the National Science Foundation's (NSF's) *Citizens' Report* for Fiscal Year (FY) 2008. This report describes how the agency is advancing discovery, innovation, and learning through performance-based management and strategic investments in research and education.

NSF is the only federal agency dedicated to the support of basic research across all fields of 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 investments that will generate important discoveries and new technology.

NSF's investments in research and education help ensure the nation remains globally competitive, prosperous, and secure. Two examples of the outstanding research and education projects we support are



Arden L. Bement, Jr.

- Durable, self-healing concrete. Professor Victor Li and his team at the University of Michigan have developed a new type of concrete that maintains all the advantages of current concrete but can bend without fracturing when overloaded. It also exhibits self-healing properties that enhance its durability. NSF's Advisory Committee for Government Performance and Results Act (GPRA) Performance Assessment noted that this work "may establish the United States as the global leader in 'designer' cement-based composites and has potential consequences in the design of sustainable structures resistant to earthquakes and weather events."
- Project SEEDBed: Simulating Enthusiasm, Exploration, and Discovery through Biotechnology Education. These summer academies held at community colleges are designed to increase knowledge, stimulate interest in biotechnology among middle and high school students and teachers, and encourage students to pursue further study. 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.

NSF's commitment to efficient and effective management practices and sound financial oversight underpins its investments in science and engineering research and education. Examples of NSF's management accomplishments in FY 2008 are the annual financial audit and the full implementation of NSF's new internal control program. NSF received its eleventh consecutive unqualified ("clean") audit opinion from an independent audit of its financial statements. No material weaknesses or significant deficiencies were identified and all prior year significant deficiencies were closed.

This *Citizens' Report* was developed as part of the Office of Management and budget's (OMB's) Pilot Program for Alternative Approaches to Performance and Accountability Reporting and provides an overview of NSF's key performance and financial information. This report, along with NSF's *Annual Financial Report*, *Annual Performance Report*, and *Budget, Financial, and Performance Snapshot* are available on NSF's website at www.nsf.gov/about/performance.

Thank you for taking the time to learn more about NSF.

A handwritten signature in black ink that reads "Arden L. Bement, Jr." The signature is written in a cursive, slightly stylized font.

Arden L. Bement, Jr.
Director

January 15, 2009



NATIONAL SCIENCE FOUNDATION

FY 2008 Budget, Performance, and Financial Snapshot

Who We Are

Mission. The National Science Foundation Act of 1950 (Public Law 81-507) sets forth NSF's mission: To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense. To carry out this mission, NSF supports basic research and education across all fields of science and engineering and at all levels of education. See NSF's Strategic Plan at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0648.

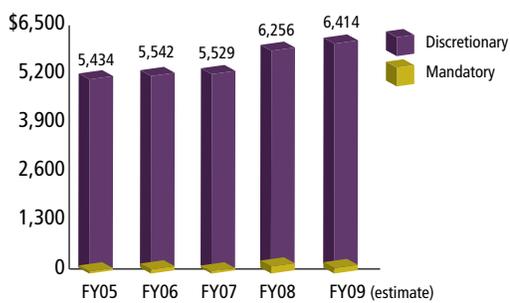
Organization. NSF's organization reflects the major fields of science and engineering. These include biological sciences, computer and information science and engineering, engineering, geosciences, mathematics and physical sciences, and social, behavioral, and economic sciences. NSF also carries out specific responsibilities for education and human resources, cyberinfrastructure, international science and engineering, and polar programs. The 24-member National Science Board establishes the overall policies of the Foundation. NSF's organization chart can be found at www.nsf.gov/staff/orgchart.jsp or on the inside back cover of this *Citizens' Report*.

Personnel. The NSF workforce includes over 1,300 full-time staff as well as about 150 temporary appointees under the Intergovernmental Personnel Act. For information about employment opportunities, see www.nsf.gov/about/career_opps/ and www.usajobs.opm.gov.

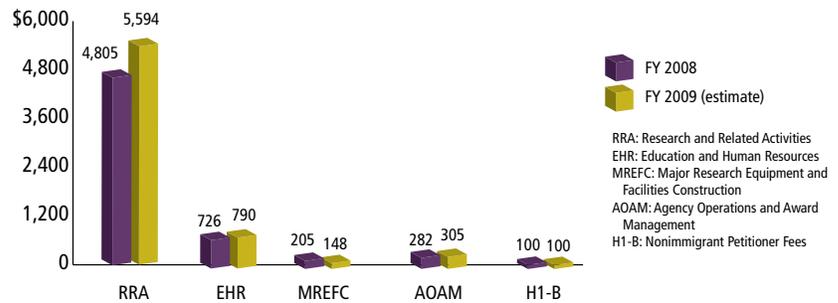
Budgetary Resources. FY 2008 appropriations totaled \$6,127.5 million or \$20 per capita.

Budget Snapshot

TOTAL SPENDING
(\$ in millions)



TOP 5 PROGRAMS BY BUDGET
(\$ in millions)



Performance Snapshot

Accomplishments. In FY 2008, the NSF evaluated over 44,400 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. Ninety percent of NSF's funding was allocated through a merit-based review process that is recognized throughout government as the exemplar for effective and efficient use of public funds, with 248,000 proposal reviews conducted. Results reported by NSF-supported investigators can be found at www.nsf.gov/discoveries.

Challenges. NSF is pursuing changes in a number of areas in order to stay focused on the frontiers of science and engineering: (1) 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. (2) Investing in technology to support program oversight and management. For example, the recently launched *Research.gov* portal provides a menu of grants management services tailored to the needs of the research community. (3) Addressing strong proposal pressure. The competition for NSF funds is intense. 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.

Financial Snapshot

| | |
|---------------------------------------|-----------------|
| Clean Opinion on Financial Statements | Yes |
| Timely Financial Reporting | Yes |
| Material Weaknesses | 0 |
| Improper Payment Rate | Not applicable* |
| Total Assets (in millions) | \$9,055 |
| Total Liabilities (in millions) | \$555 |
| Net Cost of Operations (in millions) | \$5,945 |

*NSF has moved to a 3-year reporting cycle for improper payments because of its low improper payments and the establishment of a robust post-award monitoring program. In FY 2005, NSF's improper payments rate was 0.093 percent.

Summary of NSF Operations and Performance Ratings for FY 2008

| STRATEGIC GOALS | FY 2008 PERFORMANCE RESULTS PER STRATEGIC GOAL | | | BUDGET PER STRATEGIC GOAL (\$ in millions) | |
|--|--|---------------------|--------------------|---|--------------------|
| | <ul style="list-style-type: none"> ■ Met/Exceeded ■ Not met but improved over prior years ■ Not met ■ Data not yet available | | | | |
| <p>DISCOVERY</p> <p>Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit, and establish the nation as a global leader in fundamental and transformational science and engineering.</p> |  | | | FY 2008 Actuals: \$3,285 million | |
| PERFORMANCE MEASURE | 2006 RESULTS | 2007 RESULTS | 2008 TARGET | 2008 RESULTS | 2009 TARGET |
| Demonstrate significant achievement according to an independent assessment by the NSF Advisory Committee for GPRA Performance Assessment. | Achieved | Achieved | To achieve | Achieved | To achieve |
| <p>LEARNING</p> <p>Cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens.</p> |  | | | FY 2008 Actuals: \$847 million | |
| PERFORMANCE MEASURE | 2006 RESULTS | 2007 RESULTS | 2008 TARGET | 2008 RESULTS | 2009 TARGET |
| Demonstrate significant achievement according to an independent assessment by the NSF Advisory Committee for GPRA Performance Assessment. | Achieved | Achieved | To achieve | Achieved | To achieve |
| <p>RESEARCH INFRASTRUCTURE</p> <p>Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools.</p> |  | | | FY 2008 Actuals: \$1,590 million | |
| PERFORMANCE MEASURE | 2006 RESULTS | 2007 RESULTS | 2008 TARGET | 2008 RESULTS | 2009 TARGET |
| Demonstrate significant achievement according to an independent assessment by the NSF Advisory Committee for GPRA Performance Assessment. | Achieved | Achieved | To achieve | Achieved | To achieve |
| <p>STEWARDSHIP</p> <p>Support excellence in science and engineering research and education through a capable and responsive organization.</p> |  | | | FY 2008 Actuals: \$362 million | |
| PERFORMANCE MEASURE* | 2006 RESULTS | 2007 RESULTS | 2008 TARGET | 2008 RESULTS | 2009 TARGET |
| For 70 percent of proposals, be able to inform applicants whether their proposals have been declined or recommended for funding within 6 months of deadline or target date, or of receipt of data, whichever is later. | 78% | 77% | 70% | 78% | 70% |

*This measure was selected from a number of performance measures aimed at the specific strategic goal. For further information about NSF's performance and accountability results, see NSF's *FY 2008 Annual Financial Report (AFR)* and *FY 2008 Annual Performance Plan (APR)*. The AFR is available at www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0902. The APR is available on NSF's performance and budget website at www.nsf.gov/about/performance/.



ADVANCING THE FRONTIER

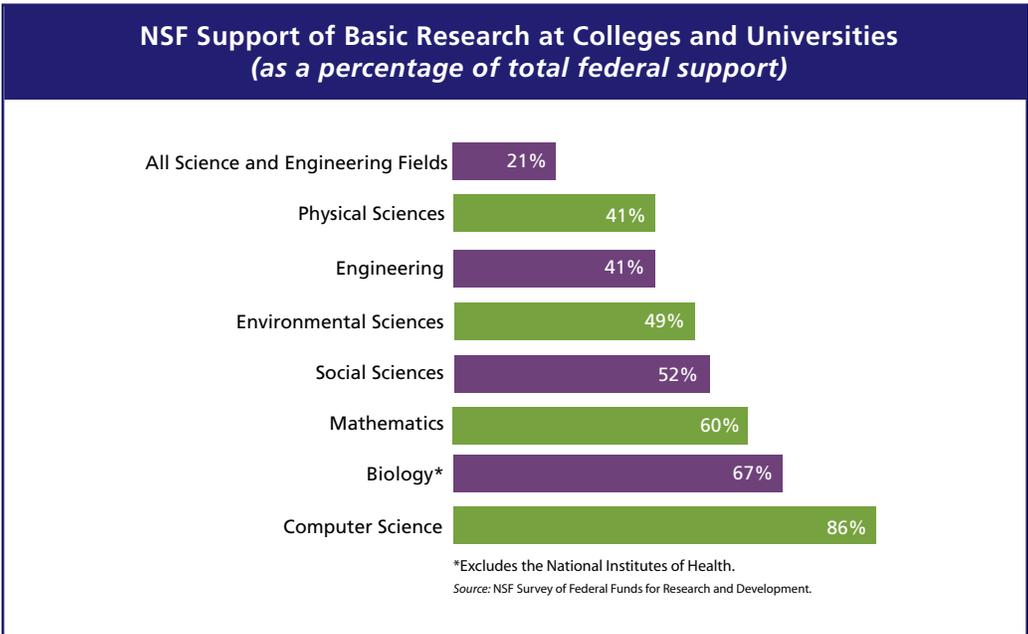
Above: Using a surprisingly simple, inexpensive technique, Massachusetts Institute of Technology (MIT) chemist Daniel Nocera and his postdoctoral student Matthew Kanan have found a way to pull pure oxygen from water using relatively small amounts of electricity, common chemicals, and a room-temperature glass of water. Because oxygen and hydrogen are energy-rich fuels, many researchers have proposed using solar electricity to split water into those elements—a stored energy source for when the sun goes down. One of the chief obstacles to that green-energy scenario has been the difficulty of producing oxygen without large amounts of energy or a high-maintenance environment. Now these researchers have discovered an efficient way to solve the oxygen problem. This breakthrough discovery has enormous implications for the large scale deployment of solar. This study demonstrates how research is critical for driving American competitiveness in the global energy marketplace. By funding fundamental research in water and renewable energy, we are investing in our economic and environmental futures. Nocera is a member of NSF's Power the Planet, a partnership that NSF forged between MIT, Caltech, and several other institutions as an NSF Chemical Bonding Center in 2005.

For more information: www.nsf.gov/news/news_summ.jsp?org=NSF&cntn_id=111975&preview=false

The National Science Foundation was established in 1950, with a mission of promoting the progress of science and engineering in America. With a budget of about \$6 billion, NSF supports basic research across all fields of 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. NSF also provides funding

for advanced instrumentation and facilities that allow scientists, engineers, and students to work at the forefront of knowledge.

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. In many fields, including computer science, mathematics, the social sciences, and nonmedical biology, NSF is the principal source of federal academic support.

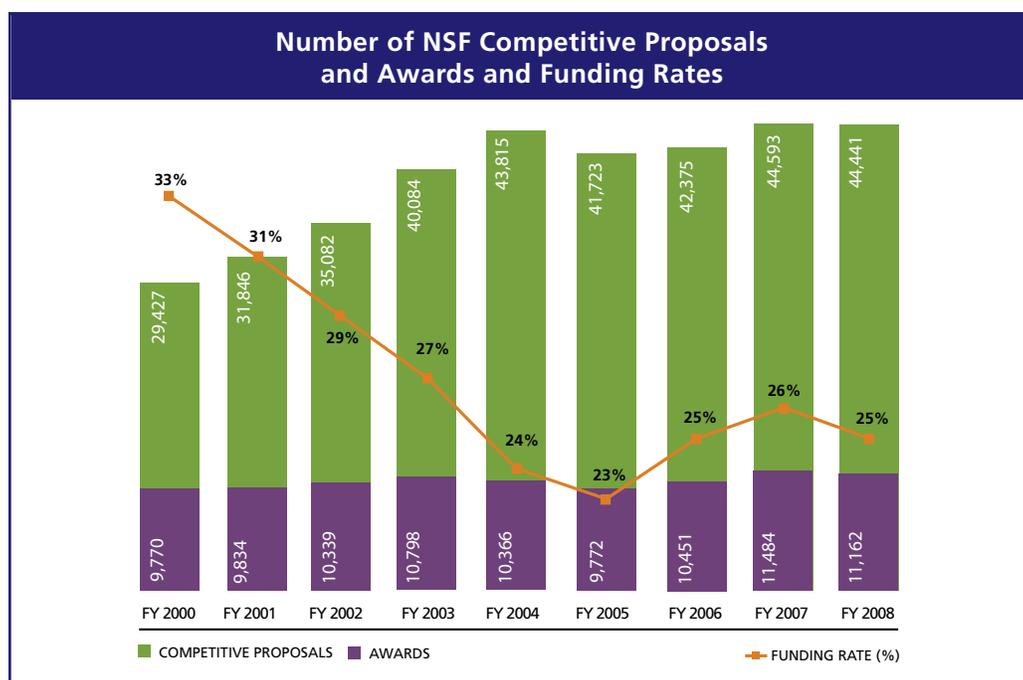


Leadership in Science and Engineering

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. Some 90 percent of NSF funding is allocated through this process. Each year, approximately 46,000 members of the science and engineering community participate in the merit review process as panelists and proposal reviewers.

In FY 2008, NSF received over 44,400 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. Moreover, NSF has supported the research of 183 Nobel laureates, including 29 in the last five years. Throughout this report are examples of results reported by NSF-supported investigators in FY 2008.



People Involved in NSF Activities (estimated numbers for FY 2008)

| | |
|-------------------------|----------------|
| Senior Researchers | 43,000 |
| Other Professionals | 12,000 |
| Postdoctoral Associates | 6,000 |
| Graduate Students | 37,000 |
| Undergraduate Students | 24,000 |
| K-12 Students | 13,000 |
| K-12 Teachers | 62,000 |
| TOTAL | 197,000 |

How NSF Investments 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. |
| World Class Facilities such as the National Center for Atmospheric Research, U.S. South Pole Station, and the Large Gravitational-Wave Observatory. |
| New Tools, Methods, and Processes such as the Internet, DNA fingerprinting, magnetic resonance imaging, and novel materials. |
| Insight into National and Global Challenges such as green gasoline, climate change, environmental protection, cybersecurity, and homeland security. |
| A Highly Trained Workforce through Graduate Research Fellowships, Advanced Technological Education, and Louis Stokes Alliances for Minority Participation. |
| 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. |

For more information:

NSF Research Highlights and Discoveries
www.nsf.gov/discoveries/

Nobel Laureates
www.nsf.gov/news/news_summ.jsp?cntn_id=100683&org=NSF&from=news

Report to National Science Board on NSF's Merit Review Process, FY 2007
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsb0847

BENDABLE CONCRETE



NSF-supported investigators at the University of Michigan have designed a new type of concrete called engineered cementitious composite (ECC) that is the most flexible concrete in the world. It maintains all the mechanically advantageous qualities of current composites but its tensile ductility is 300 to 500 times greater. When overloaded, it bends without fracturing, and it exhibits self-healing properties. ECC is also uniquely resistant to damage caused by weather and chemicals, making it ideal for bridges and buildings. Under simulated earthquake conditions, ECC structure elements showed extreme damage tolerance, high energy absorption, and maintenance of load capacity. This work has the potential to establish the United States as the global leader in “designer” cement-based composites as well as impact the future design of sustainable structures resistant to earthquakes and weather events. This work embodies collaboration among several sectors: government, industry, and academic partners. The image above shows the unique properties of ECC in both its high ductility and ability to self-heal after fracture.

PROJECT SEEDBed



Project SEEDBed—Stimulating Enthusiasm, Exploration, and Discovery through Biotechnology Education—engages middle and high school students and teachers in summer academies held at community colleges. These NSF-supported academies are 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.

For more information:

NSF Research and Education Highlights and Discoveries
www.nsf.gov/discoveries

President’s Management Agenda
www.Results.gov

Meeting Future Opportunities and Challenges

In order to maintain focus on the frontiers of science and engineering, NSF is pursuing changes in several areas. To enhance its ability to identify and support research that is potentially transformative, NSF is establishing new funding mechanisms and providing additional guidance for the merit review process. To enhance program oversight and management, NSF is investing in technology that allows the agency to meet current as well as future needs. Lastly, given the intense competition for NSF funds, 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.

In addition, the President’s Management Agenda (PMA) initiatives, which focus on management, performance, and accountability issues, are also an agency priority. As shown in the chart below, in FY 2008, NSF maintained “Green” status in two of the five initiatives, and dropped to “Yellow” in one and to “Red” in another, as NSF was not able to meet all the deliverables for all the initiatives.

- 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. In FY 2008, NSF established

a new executive transition program, revamped the employee welcome process, enhanced advertising and outreach efforts for recruitment, and improved the accuracy and timeliness of all HR services. NSF is “Red” in status for *Human Capital* because the agency did not have the resources to meet the Office of Personnel Management’s requirements for analysis, assessment, and reporting of results.

- In *Commercial Services Management*, NSF has no projected or actual savings from completed competitions. However, in 2008, an NSF assessment determined 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.
- NSF is a federal leader in *Expanded Electronic Government*, actively promoting simpler, faster, more accurate, and less expensive electronic business solutions.

| President’s Management Agenda Scorecard | | | |
|---|---------|---------|----------|
| | Status | Status | Progress |
| | 9/30/07 | 9/30/08 | |
| Strategic Management of Human Capital | ■ | ▲ | ● |
| Commercial Services Management | ▲ | ▲ | ▲ |
| Improving Financial Performance | ● | ● | ● |
| Expanded Electronic Government | ● | ● | ● |
| Performance Improvement | ● | ■ | ● |

Note: Eliminating Improper Payments Initiative: OMB has moved NSF from an annual to a 3-year reporting cycle as a result of reporting low improper payments.

● Indicates success ■ Indicates mixed results ▲ Indicates unsatisfactory

Ratings are issued quarterly by OMB. For more information about the PMA initiatives, see www.Results.gov.



The recently launched *Research.gov* portal improves service to applicants and grantees by offering a menu of standardized, common grant business process services to partner research agencies. 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 appointed a Performance Improvement Officer to focus on agency performance and efficiency goals and improvement plans. Special attention is given to coordinating agency-wide efforts to promote continuous improvement in administration and management of the research and education programs. NSF is “Yellow” in status because the K-12 Math and Science Education program lacks an efficiency measure that meets the PART criteria.

Management Challenges

The Office of Inspector General’s (OIG’s) annual statement of management challenges for FY 2008 focused on five areas: award and contract administration; human capital; budget, cost, and performance integration; the U.S. Antarctic Program; and merit review. Many of the management challenges noted are 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. The OIG’s management challenges statement and management’s report can be found in NSF’s *FY 2008 Annual Financial Report*.

| Office of Inspector General FY 2008 Management Challenges | | |
|---|---|---|
| Management Challenge | Significant Actions Taken | Anticipated Next Steps |
| <p>Post-Award Administration Policies</p> <p>Note: The FY 2008 financial audit report dropped post-award monitoring as a significant deficiency. See NSF’s <i>FY 2008 Annual Financial Report</i>.</p> | <p>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).</p> <p>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.</p> <p>Fully implemented a Portfolio Facilitation Model providing comprehensive support for NSF grant administration.</p> <p>Initiated implementation of “Division Director-concur” for awards in eJacket, NSF’s web-based proposal processing system, as the last step in establishing a paperless awards process.</p> | <p>Continue to develop new administrative tools to strengthen post-award oversight.</p> <p>Incorporate additional business rules into NSF corporate business systems to further strengthen accountability.</p> <p>Implement policies and procedures to address new programmatic requirements legislated under the America COMPETES Act (ACA).</p> <p>Develop strategies and resources for training NSF staff on federal and agency policies, regulations, and procedures.</p> |
| <p>Contract Monitoring</p> <p>Note: The FY 2008 financial audit report dropped contract monitoring as a significant deficiency. See NSF’s <i>FY 2008 Annual Financial Report</i>.</p> | <p>Expanded the contract oversight program to include comprehensive post-award monitoring policies and procedures and training.</p> | <p>Continue administration of the contract post-award monitoring program.</p> |
| <p>U.S. Antarctic Program Property, Plant, and Equipment (PP&E)</p> | <p>Commenced verification and validation of PP&E activities.</p> <p>Implemented new methodology for freight cost estimation.</p> | <p>Complete the assessment of cost documentation for Construction-in-Progress and Real Property assets.</p> <p>Determine how best to expand the scope of financial management modernization effort.</p> |
| <p>Reporting Results of Scientific Research</p> | <p>Implemented data migration for Project Reporting System enhancements.</p> <p>Finalized agency recommendations on final project reporting requirements mandated by the ACA.</p> | <p>Develop additional flexibility to report on special award categories.</p> |

MEASURING PERFORMANCE

Above: Astronomers recently observed three rare and exceptionally luminous supernovae explosions. These explosions may have created a new class of objects known as quark stars. Quarks are the fundamental components of protons and neutrons, which make up the nucleus of atoms. The densest objects known to exist today are neutron stars, which are composed entirely of tightly packed neutrons. When a neutron star becomes too dense, it may explode. The energy that powers this explosion comes from neutrons breaking down into their component parts: quarks.

One of the explosions was observed by a robotic telescope at the California Institute of Technology's Palomar Observatory. Data collected with Palomar's Samuel Oschin Telescope were transmitted from the Observatory's remote mountain site via the High-Performance Wireless Research and Education Network (HPWREN), funded by NSF. The Supernova Factory Research Group at the Lawrence Berkeley Laboratory, also funded in part by NSF, co-discovered the supernova, known as SN2005gj.

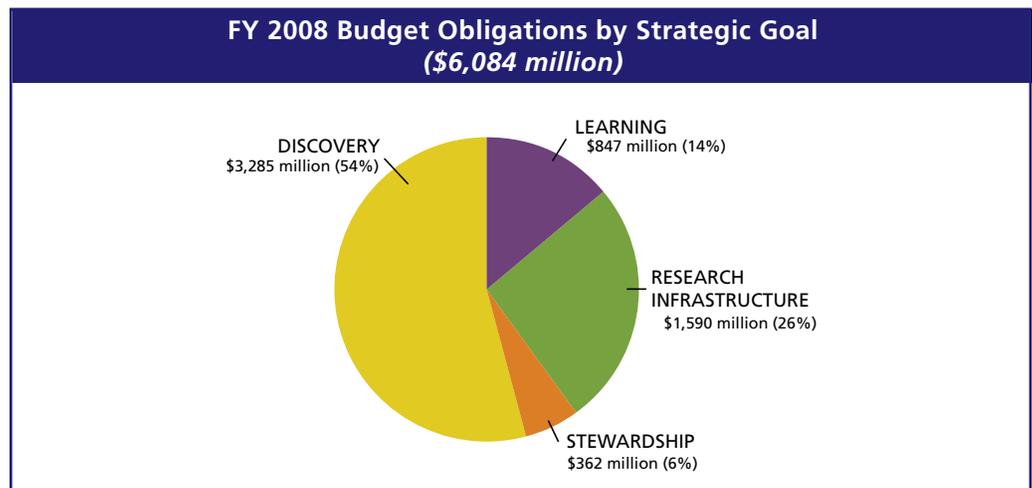
For more information: www.nsf.gov/news/news_summ.jsp?cntn_id=108617&org=NSF

NSF's leadership in advancing the frontiers of science and engineering research and education is monitored through internal and external performance assessments. The results of this process provide stakeholders and taxpayers with vital information about the return on NSF's investments. In FY 2008, performance assessment was guided by the Government Performance and Results Act of 1993 and by NSF's *FY 2006–2011 Strategic Plan*. 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 *FY 2006–2011 Strategic Plan* outlines the strategic outcome goals by which NSF

measures its annual performance: *Discovery*, *Learning*, *Research Infrastructure*, and *Stewardship*. These four interrelated 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. The fourth goal—*Stewardship*—is an internally focused goal that emphasizes management of the investment process.

As shown in the chart below, in FY 2008, NSF invested \$3,285 million to foster research that will advance the frontiers of knowledge (*Discovery*), \$847 million to support activities to cultivate a world-class science and engineering workforce (*Learning*), and



\$1,590 million to build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools

(*Research Infrastructure*). About 6 percent of NSF's budget, \$362 million, supports administration and management activities (*Stewardship*).

Performance Results

In FY 2008, NSF

- Successfully demonstrated significant achievement of its three strategic outcome goals of *Discovery*, *Learning*, and *Research Infrastructure*, according to an independent evaluation by an external panel of experts.
- Achieved 22 of 23 annual performance milestones and measures under the *Stewardship* goal.
- Completed the evaluation of all programs using the OMB Program Assessment Rating Tool (PART). All NSF programs have received a rating of *Effective* except one, which was rated *Moderately Effective*.
- Achieved 74 percent of the agency's PART performance targets. (See chart on page 11.) NSF failed to meet targets related to time-to-decision for pre-proposals for Centers; education proposals from outside the top 100 institutions NSF funds; SBIR/STTR Phase I awards to new investigators; non-academic partners for NSF centers; graduate students funded in three graduate fellowship programs; and scheduling for the Scientific Ocean Drilling Vessel. For additional information, see NSF's *FY 2008 Annual Performance Report*.

The following chart summarizes NSF's performance results from FY 2004 through FY 2008.

| FY 2004–FY 2008 Strategic Outcome Goals and Results | | Result |
|--|--|--|
| <p>DISCOVERY</p> <p>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.</p> | <p>Investments in <i>Discovery</i> support cutting-edge research that yields new and important discoveries and promotes the development of new knowledge and techniques within and across traditional boundaries. These investments enable NSF to meet its mission of promoting the progress of science while at the same time helping to maintain the nation's capacity to excel in science and engineering, particularly in academic institutions. The results of NSF-funded research projects provide a rich foundation for broad and useful applications of knowledge and the development of new technologies. Support in this area also promotes the education and training of the next generation of scientists and engineers by providing them with an opportunity to participate in discovery-oriented projects.</p> <p>Explanation of FY 2008 result: Assessments by external experts determined that NSF has demonstrated significant achievement of this goal. The assessment process was verified and validated by an external, independent consultant. Results reported in FY 2008 by NSF-funded researchers are featured throughout this report; additional results can be found at www.nsf.gov/discoveries.</p> | <p>FY 2004 ●</p> <p>FY 2005 ●</p> <p>FY 2006 ●</p> <p>FY 2007 ●</p> <p>FY 2008 ●</p> |
| <p>● Indicates successful achievement.</p> <p>■ Indicates partial achievement.</p> <p>▲ Indicates not achieved.</p> | | |

FY 2008 ANNUAL PERFORMANCE REPORT

A more detailed discussion of NSF's FY 2008 GPRA and PART performance results appears in NSF's *FY 2008 Annual Performance Report* (APR). The APR also includes an explanation of NSF's performance assessment process, data verification and validation process and trend data as well as other performance-related information. The APR is available at www.nsf.gov/about/budget.

For more information:

NSF Investing in America's Future: Strategic Plan FY 2006–2011
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0648

NSF Research Highlights and Discoveries
www.nsf.gov/discoveries/

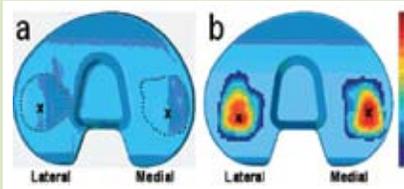
NSF's FY 2009 Budget Request to Congress
www.nsf.gov/about/budget/

Program Assessment Rating Tool (PART)
www.ExpectMore.gov

e-Gov and the Grants Management Line of Business initiative
www.whitehouse.gov/omb/egov/

FY 2008 Report from the Advisory Committee on GPRA Performance Assessment
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08064

VIRTUAL PROTOTYPING OF ARTIFICIAL KNEES



NSF-supported researchers at the University of Florida 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. High school students from underrepresented groups have been involved in the knee research, through the University of Florida 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.

NEW SATELLITE MAP OF ANTARCTICA



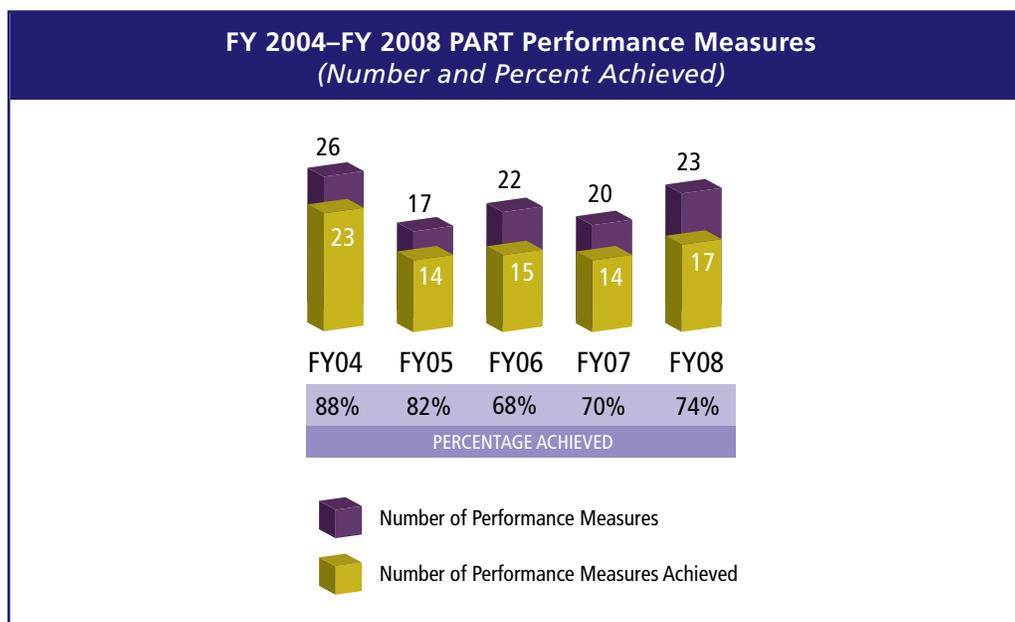
The most detailed satellite map of Antarctica ever produced combines more than 1,100 hand-selected Landsat satellite scenes digitally compiled to create a single seamless, cloud-free image. The map is the first major outcome of the International Polar Year (2007–2009), and represents the true spirit of the international collaboration between the United States and the United Kingdom. The map and raw data are freely available to the world community of scientists, educators and the general public online from the U.S. Geological Survey, the NSF-supported Antarctic Geospatial Information Center, and resources such as Google Earth. The map is a critical snapshot of Antarctica's ice sheets—a fundamental tool for scientists. It will be used in every discipline from biology to geology to glaciology to answer scientific questions and to plan fieldwork in the vast unexplored tracts of Antarctica. This image shows the McMurdo Dry Valleys, a major research focus for the U.S. Antarctic Program. The region hosts the largest ice-free areas of Antarctica. The project was supported entirely by NSF.

FY 2004–FY 2008 Strategic Outcome Goals and Results

| | | Result |
|---|--|--|
| LEARNING | <p>Cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens.</p> <p>Leadership in today's knowledge economy requires world-class scientists and engineers and a national workforce that is scientifically, technically, and mathematically strong. Investments in <i>Learning</i> aim to improve the quality and reach of science, engineering, and mathematics education and enhance student achievement. Each year, NSF supports an estimated 197,000 people—teachers, students, and researchers at every educational level and across all disciplines in science and engineering. All NSF programs focus on building a broadly inclusive, knowledgeable, and globally engaged workforce that fully reflects the strength of the nation's diverse population. Because science and engineering increasingly address questions of significant societal importance, today's research requires investigators working collaboratively across agencies and international organizations to apply the results of research to long-standing global challenges.</p> <p>Explanation of FY 2008 result: Assessments by external experts determined that NSF has demonstrated significant achievement of this goal. The assessment process was verified and validated by an external, independent consultant. Results reported in FY 2008 by NSF-funded researchers are featured throughout this report; additional results can be found at www.nsf.gov/discoveries.</p> | <p>FY 2004 ●</p> <p>FY 2005 ●</p> <p>FY 2006 ●</p> <p>FY 2007 ●</p> <p>FY 2008 ●</p> |
| RESEARCH INFRASTRUCTURE | <p>Build the nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools.</p> <p>NSF investments in <i>Research Infrastructure</i> provide state-of-the-art tools for research and education, such as multi-user research facilities, distributed instrumentation networks and arrays, accelerators, telescopes, research vessels, aircraft, and earthquake simulators. In addition, investments in Internet-based and distributed user facilities are increasing as a result of rapid advances in computer, information, and communication technologies. NSF support for large multi-user facilities helps create state-of-the-art, world-class research platforms vital to new discoveries and the progress of research. NSF support may include construction, upgrades, operations, maintenance, and personnel needed to assist scientists and engineers in the conduct of research at such facilities. NSF consults with other agencies and international partners to avoid duplication and optimize capabilities for U.S. researchers.</p> <p>Explanation of FY 2008 result: Assessments by external experts determined that NSF has demonstrated significant achievement of this goal. The assessment process was verified and validated by an external, independent consultant. Results reported in FY 2008 by NSF-funded researchers are featured throughout this report. Additional results can be found at www.nsf.gov/discoveries.</p> | <p>FY 2004 ●</p> <p>FY 2005 ●</p> <p>FY 2006 ●</p> <p>FY 2007 ●</p> <p>FY 2008 ●</p> |
| <p>● Indicates successful achievement.</p> <p>■ Indicates partial achievement.</p> <p>▲ Indicates not achieved.</p> | | |



| FY 2004–FY 2008 Strategic Outcome Goals and Results | | Result |
|--|---|--|
| <p>STEWARDSHIP</p> <p>Support excellence in science and engineering research and education through a capable and responsive organization.</p> | <p>FY 2008 results include the following:</p> <ul style="list-style-type: none"> Exceeded target of processing at least 70 percent of all proposals within 6 months of receipt of proposal. Revised the Committee of Visitors (COV) report instructions on examination of the merit review process. Improved access to NSF funding information by providing funding rate data for research grants on directorate web pages. Published a portfolio of NSF programs on broadening participation on the NSF website; developed new tools for NSF program officers to search more widely for proposal reviewers. Maintained operating time loss at all large facilities at less than 10 percent. Completed all post-award tasks and financial monitoring through on-site visits and desk reviews; completed all Federal Cash Transaction Report testing. Launched <i>Research.gov</i>, a portal that improves services to applicants and grantees by offering a menu of standardized, common grant business process services to partner research agencies. Successfully completed the Federal Information Security Management Act (FISMA) review; 100 percent of major applications and general support systems are certified and accredited; 100 percent of IT systems are installed in accordance with security configurations and all have had privacy impact assessments. | <p>FY 2007 ●</p> <p>FY 2008 ●</p> <p>(Goal established in FY 2007)</p> |
| <p>● Indicates successful achievement.</p> <p>■ Indicates partial achievement.</p> <p>▲ Indicates not achieved.</p> | | |



PART ASSESSMENTS

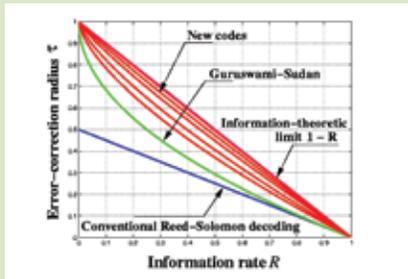
The Office of Management and Budget developed the Program Assessment Rating Tool (PART) as a systematic methodology for assessing the performance of program activities across the federal government. A PART evaluation focuses on program purpose and design, strategic planning, program management, and program results and accountability. All NSF programs have been evaluated by PART. All received the highest rating of *Effective* except one, which was rated *Moderately Effective*.

CROWD MOVEMENTS

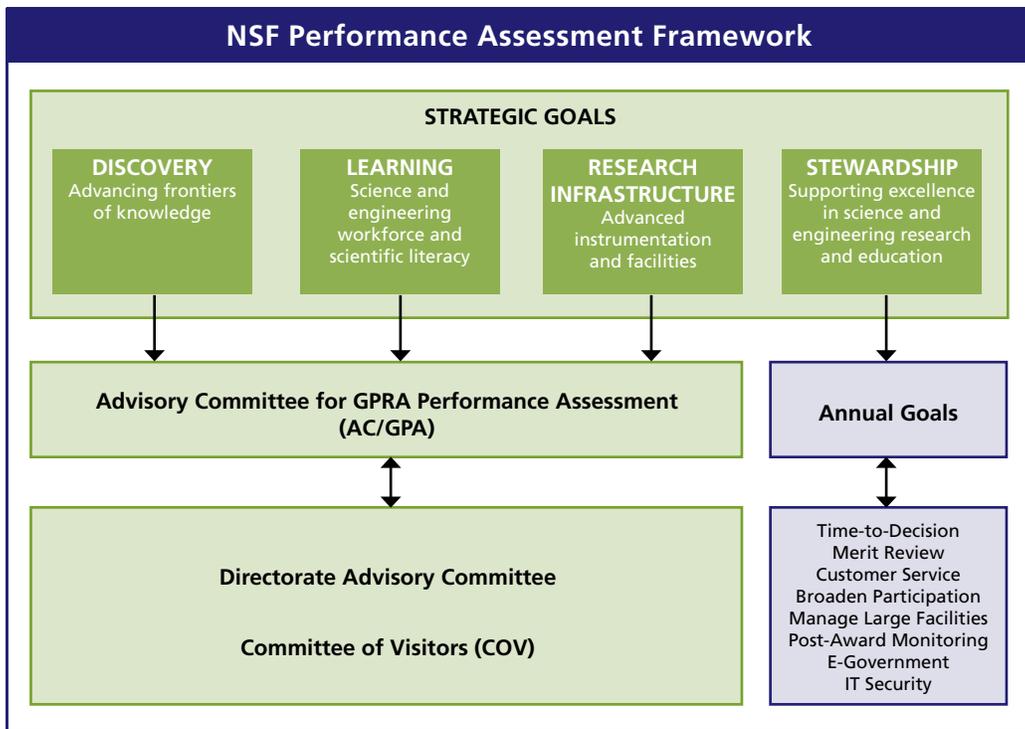


NSF-supported researchers at Arizona State University are developing computer-based models to help understand how an individual action in a large crowd affects the individual's subsequent actions and the crowd's behavior. The research builds artificial laboratories to experiment with ideas and theories about crowd behavior and dynamics that would otherwise be impenetrable to academic inquiry. The simulations consist of actions of thousands of artificial agents. Each agent possesses a computable "brain" that allows it to function as a distinctive individual within the broader group framework. Those conducting experiments can record and analyze each agent's behavior, activity, and social and anti-social interactions, and they can explore how those behaviors adapt as conditions unfold. For example, they found that an individual's subtle stop-and-start movement amid panicked crowds caused larger waves, which then washed through the crowd, causing further obstructions and ultimately large-scale congestion. These models enable law-enforcement officials to explore different strategies for maintaining calm in different settings.

ERROR CORRECTION IN DIGITAL INFORMATION



In the information age, reliable transmission and storage of digital information are of paramount importance. What makes reliable transmission and storage possible, despite the errors inherent to communication channels and storage media, are error-correcting codes, first conceived by Claude Shannon more than 60 years ago. Recent advances made by NSF-supported scientists at the University of Washington and the University of California at San Diego have led to the discovery of error-correcting codes with the best possible trade-off between error-correction capability and redundancy. The newly discovered codes yield an improvement by a factor of two over conventional error-correction algorithms currently used in every CD player and every desktop computer, as well as many other devices. Numerous challenges must be overcome to put this theoretical breakthrough to practical use, but it has the potential to transform electronic communication and data storage.



Assessing the Outcomes of Long-Term Research

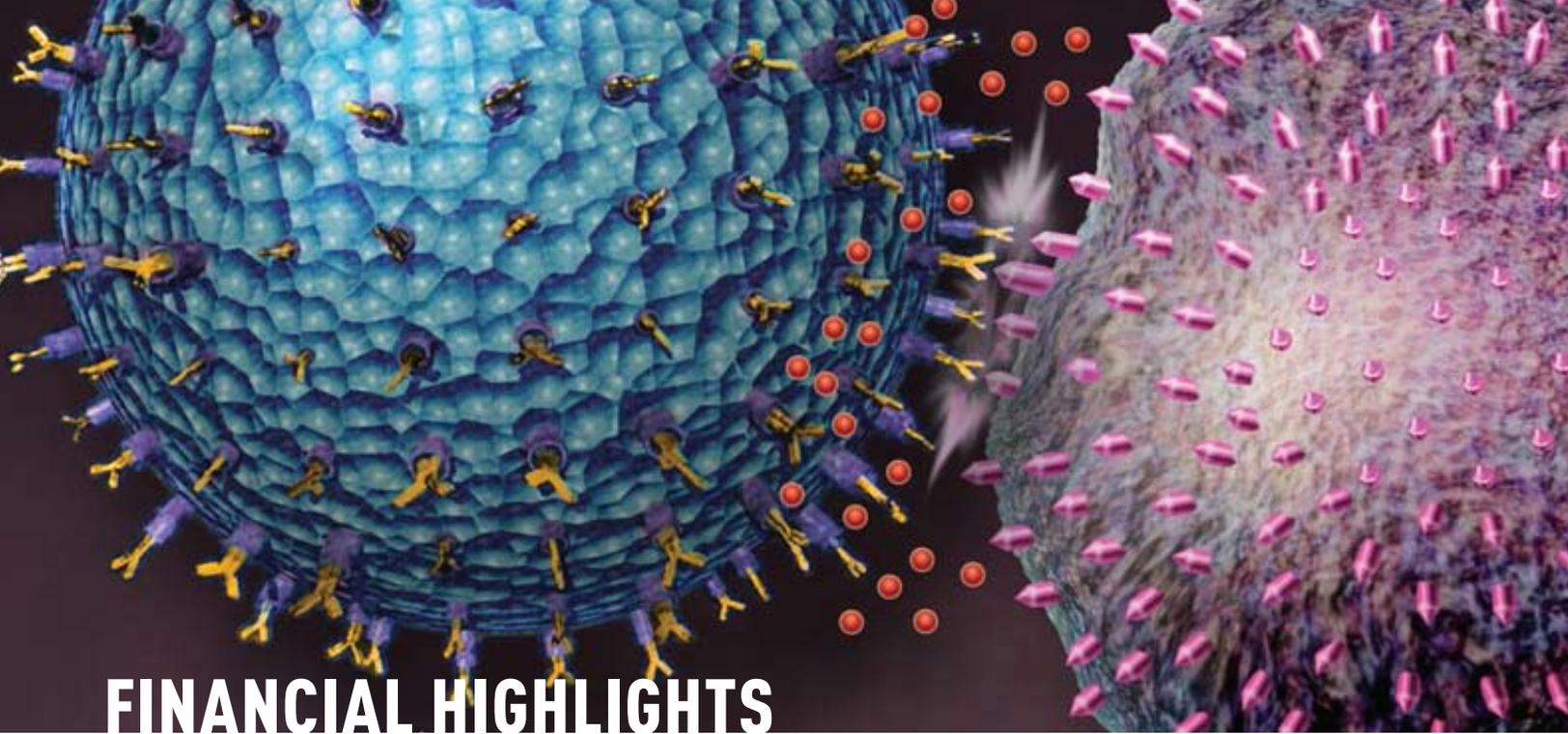
NSF's mission is to fund long-term science and engineering research and education, where outcomes and results can be unpredictable. Science and engineering research projects can generate discoveries in an unrelated area, and it can take years to recognize discoveries and their impact. Moreover, serendipitous 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 recent studies by the National Research Council of the National Academies.*

As shown in the chart above, NSF uses a multi-layer assessment approach, integrating quantitative metrics and qualitative reviews. Central to performance assessment of the agency as a whole is the Advisory Committee for GPRA performance (AC/GPA), which reviews outcomes under the strategic outcome goals. No less important, however, are the advisory committees for each of the directorates and offices and the Committees of Visitors (COVs) for each division or crosscutting program, all of which provide independent advice on program management and review program

outcomes. NSF's use of external experts such as the COVs and Advisory Committees predates 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.

NSF is the only federal agency that invites an external advisory committee to perform an analysis of its entire portfolio as part of the agency's GPRA assessment process. The AC/GPA uses evaluation criteria, or performance indicators, to evaluate the outcomes from NSF's programs in research, education, and research infrastructure. The AC/GPA leads the assessment of NSF's three externally-facing goals of *Discovery*, *Learning*, and *Research Infrastructure*. Assessment of the *Stewardship* goal is based on a set of annual goals and milestones that address administration, management, and customer service activities. The AC/GPA assessment process is verified and validated each year by an independent consulting firm. Performance measures for the *Stewardship* goal as well as all PART performance measures are included in this process.

* *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.



FINANCIAL HIGHLIGHTS

| Summary of NSF FY 2008 Financial Statement Audit and Management Assurances | | | |
|--|---|-------------|---------------------------|
| | Audit Opinion | Restatement | Total Material Weaknesses |
| Summary of Financial Statement Audit | Unqualified | No | 0 |
| Summary of Management Assurances | Statement of Assurance | | Total Material Weaknesses |
| Effectiveness of Internal Control over Financial Reporting (FMFIA § 2) | Unqualified | | 0 |
| Effectiveness of Internal Control over Operations (FMFIA § 2) | Unqualified | | 0 |
| Conformance with financial management system requirements (FMFIA § 4) | Systems conform to financial management system requirements | | 0 |
| Compliance with Federal Financial Management Improvement Act (FFMIA) | | Agency | Auditor |
| Overall Substantial Compliance | | Yes | Yes |
| System Requirements | | Yes | |
| Accounting Standards | | Yes | |
| U.S. Standard General Ledger at Transaction Level | | Yes | |

Above: Cancer cells can mask their presence and convince the body's immune system that they are part and parcel with the rest of their human host. If the white blood cells of our immune system—particularly the powerhouse “killer” T-cells—could easily identify cancer, they would become a nanoscale army dedicated solely to eradicating mutated cells. Bioengineer Tarek Fahmy and his colleagues at Yale University have created cell-sized plastic spheres that prep the immune system to fight a specific disease and stimulate the T-cells to multiply their forces. Currently targeting cancer, the work may eventually be applicable for a range of diseases, from AIDS to influenza. Nanotechnology and biomaterials science and our understanding of the fundamentals of how the immune system works in health and disease have progressed rapidly in the past few years. Fahmy wanted to find a bridge to link the advances in these sciences, making connections between engineering new nanoscopic and microscopic biomaterials and tailoring them to interact with immune system cells in defined ways. Artificial cells, as such, can be tailored to tackle immunity, and one of the most important outcomes in medicine is to have the body mount a strong protective immune response against cancer. The researchers are engineering existing drugs like cytokines and antibodies and using safe, established polymers in new ways to impact human health in a very significant way. Illustrated above are bioparticles binding antigens from tumor cells.

Dr. Fahmy is a recipient of a 2007 NSF Faculty Early Career Development (CAREER) program award, which supports this research.

For more information: www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=111875&org=NSF

IN SEARCH OF THE NORTH AMERICAN MONSOON



A group of undergraduate and graduate students in the Department of Earth and Environmental Science of New Mexico State University spent nearly 3 weeks in Sonora, Mexico, as part of a large international field campaign to study the North American Monsoon. The monsoon is a regional atmospheric phenomenon that controls hydrological and ecological conditions during the summer season in the southwestern United States and northwestern Mexico. Given its regional extent, ecohydrological studies of the North American Monsoon require coordinated research efforts between United States and Mexican scientists. All together, 21 students and researchers from the U.S. and Mexico participated this year in the Sonora Field Campaign, engaging in scientific and cultural exchanges. The students helped plan, organize, and carry out a series of ecohydrological experiments in a remote, mountainous region in northern Sonora. Predicting the North American Monsoon should prove very useful to communities affected by its weather patterns.

The Sonora Field Campaign is an example of the scientific and cultural exchanges supported by NSF's Office of Science and Engineering.

NOYCE SCHOLARS PREPARED TO TEACH IN HIGH-NEED SCHOOLS



The Robert Noyce Scholarship program at California State University, Fresno has recruited 63 new math and science teachers to teach in high-need school districts in California's Central Valley. Noyce Scholars are placed in a high-need school science or mathematics classroom under the guidance of a selected mentor teacher and spend 6 to 10 hours per week as a teaching assistant. This experience affords Noyce Scholars a chance to develop classroom "management skills" early on and to experience a wide range of activities associated with the teaching profession well before their student teaching semester. The program includes workshops taught by college faculty and expert K-12 teachers. Noyce Scholars have an opportunity to participate in cutting edge research through summer internships in Department of Energy laboratories. They also participate in professional development activities offered to area science and math teachers.

From the Chief Financial Officer

As is noted throughout this *Citizens' Report*, FY 2008 was replete with examples of the dedication, commitment, and professionalism of staff across NSF. Foremost among these is the fact that NSF received an unqualified audit opinion with no material weaknesses or significant deficiencies. Just as noteworthy is the closing of the two significant deficiencies reported in FY 2007: Contract Monitoring and Property Plant and Equipment (PP&E) Accounting and Reporting. This success is due to our concerted efforts to strengthen the contract monitoring program and PP&E accounting and reporting. NSF also fully implemented its agency-wide internal controls program in FY 2008, in line with the most recent guidance on agency internal control from the Office of Management and Budget. NSF has developed a sustainable internal control structure to ensure it stays updated with changing events.



Thomas N. Cooley

Other notable accomplishments during the year include

- Successfully maintaining a "Green" rating for the President's Management Agenda financial performance initiative.
- Consistently receiving more than 99 percent of quarterly Federal Cash Transaction Reports (FCTR) from grant recipients—a collection rate that significantly exceeds that of other federal agencies. As part of the Federal Grants Streamlining Initiative, beginning in January 2009, NSF will replace the FCTR with the new, more simplified Federal Financial Report (FFR). The NSF FFR pilot is the largest in the federal government; NSF will be the first federal agency to implement full use of the FFR. NSF continues to work with OMB to streamline and standardize federal grant recipient financial reporting and to replace the FCTR government-wide in FY 2009.
- Maintaining an active leadership role in the federal grants management arena including the CFO Council Grants Policy Committee and the Grants Management Line of Business Initiative. NSF is forging the integration of grants and financial management that should result in considerable cost and operations efficiencies.
- Participating in OMB's Pilot Program for Alternative Approaches to Performance and Accountability Reporting for the second year. As part of this pilot program, we prepared this *Citizens' Report*. Our participation in the pilot is in line with the agency's commitment to continuing improvement in performance and accountability reporting to our stakeholders and the public, and our efforts have been recognized recently with awards from two professional communication organizations.

This commitment to sound financial management is a prerequisite for securing the highest possible returns on NSF's investments in science and engineering research and education. Accountability and transparency are at the core of this commitment, and all of this is made possible through the dedicated work of NSF's staff.

Thank you for reviewing this *Citizens' Report* and for your interest in NSF and its programs.

Thomas N. Cooley
Chief Financial Officer and Director, Office of Budget, Finance, and Award Management

January 15, 2009



Financial Highlights

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 an 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 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 3-year cycle. The next reporting year will be FY 2009. 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.

Of note this year is NSF’s new agency-wide internal control program. The FY 2008 internal control review found no evidence of material weaknesses in either NSF’s financial controls or entity-wide controls and NSF programs and operations to be protected in accordance with OMB guidance. Management’s assurance statement is included in NSF’s *FY 2008 Annual Financial Report*. Meanwhile, NSF is continuing efforts in developing a new financial management system that will meet new legislative and regulatory requirements as well as the agency’s tracking, monitoring and real-time reporting requirements.

NSF prepares annual financial statements in conformity with generally accepted accounting principles of the United States and subjects them to an independent audit to ensure their reliability in assessing performance. In FY 2008, NSF received an unqualified “clean” audit opinion with no material weaknesses reported. In addition, both prior year significant deficiencies were closed. An unqualified audit opinion is a measure of the fair presentation of our financial statements. The Foundation prepares a Balance Sheet, Statement of Net Cost, Statement of Changes in Net Position, and Statement of Budgetary Resources. Supplementary information includes Stewardship Investments, Deferred Maintenance, and Budgetary Resources by Major Budget Accounts. The following pages feature highlights of NSF’s FY 2008 financial condition. A detailed discussion of NSF’s financial performance and the Independent Auditor’s Report on NSF’s complete set of financial statements can be found in NSF’s *FY 2008 Annual Financial Report*.

| NSF by the Numbers | |
|--------------------|--|
| \$6.128 billion | FY 2008 Appropriations received |
| 4% | NSF’s share of total annual federal spending for R&D |
| 44% | NSF’s share of federal funding for nonmedical basic research at academic institutions |
| 1,900 | Colleges, universities, and other institutions receiving NSF funding in FY 2008 |
| 11,162 | Competitive awards funded in FY 2008 |
| 44,000 | Students supported by NSF Graduate Research Fellowships since 1952 |
| 44,400 | Proposals evaluated in FY 2008 through a competitive merit review process |
| 197,000 | People NSF supports directly (researchers, postdoctoral fellows, trainees, teachers, and students) |
| 248,000 | Proposal reviews conducted in FY 2008 |

For more information:

NSF’s FY 2008 Annual Financial Report
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0802

NSF’s FY 2008 Management Assurance statement can be found in NSF’s *FY 2008 Annual Financial Report*.

UNDERSTANDING ALZHEIMER'S DISEASE



The TeraGrid, supported by a suite of NSF awards, is one of the largest computational instruments in the world. The TeraGrid delivers production services to the nation and experiments with new technologies that will help create the cyberinfrastructure of tomorrow. As part of the Bandwidth Challenge competition held at the SC07 conference in Reno, Nevada, a team led by Indiana University enabled IU faculty member Mu-Hyun Baik to analyze the structure of the Amyloid² protein. This protein is thought to be the cause of Alzheimer's disease, and the analysis performed provided new insights that may help fight Alzheimer's.

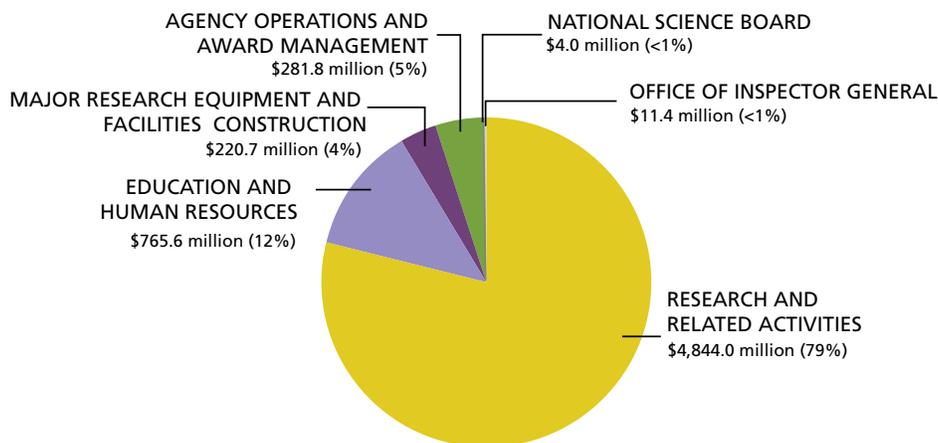
The Amyloid² protein structural analysis was done with a workflow that involved a Lustre Wide Area Network file system (based on the IU Data Capacitor), a Lustre file system set up on the SC07 exhibit floor, and IU's Big Red supercomputer. Using Dr. Baik's structural analysis software, along with a variety of other workflows, the IU-led team demonstrated a bidirectional transfer rate of 18.2 Gigabits per second (Gbps) out of a possible 20 Gbps. This shows Lustre-WAN's tremendous capabilities for supporting data-intensive research across wide area networks.

This "high-risk, high-reward" process, which won the SC07 Bandwidth Challenge competition, should lead to new uses for Lustre-WAN within the TeraGrid. It should also transform the ability of the TeraGrid to support data-intensive research and facilitate the activities of distributed virtual organizations. The project already has greatly enhanced Dr. Baik's research capabilities, assisting him with research under his current NSF CAREER award for physical inorganic chemistry.

TRACKING AVIAN FLU

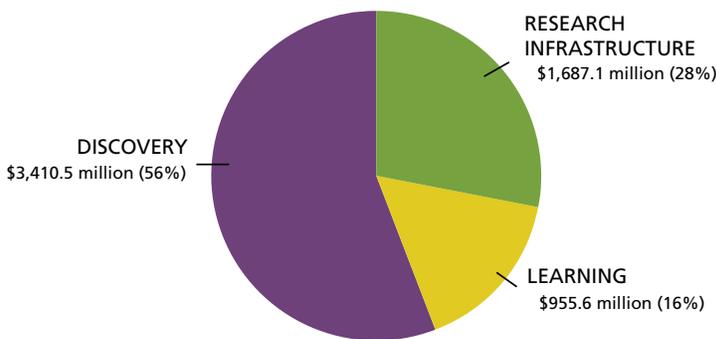
A graduate student from the University of Maryland organized a research team to outfit 30 bar-headed geese with GPS satellite transmitters in partnership with scientists at the newly opened Chinese Academy of Sciences Qinghai Lake Reserve Joint Research Center. The exploratory research uses satellite telemetry to determine the timing, pathways, stopover locations and habitat use of bar-headed geese originating, from the Qinghai Lake breeding grounds. Qinghai Lake was the site of a large outbreak of H5N1 avian influenza in 2005, where more than 6,000 birds died. The data expected from this study will be essential in tracking wild birds' interaction with domesticated poultry populations and thereby predicting the potential spread of avian influenza transmission in Asia. The research will provide important information with which to address the ecology and evolution of the H5N1 virus in relation to wild birds and domestic poultry in China, a global health concern.

FY 2008 Appropriation by Account (\$6,127.5 million)



NSF is funded primarily through six congressional appropriations. The Research and Related Activities (RRA) appropriation is NSF's largest, accounting for nearly 80 percent of the agency's budget. The RRA appropriation funds basic research and education activities at the frontiers of science and engineering as well as high-risk and transformative research. The Education and Human Resources appropriation accounts for 12 percent of NSF's budget and supports activities that ensure a diverse, competitive, and globally engaged U.S. science, technology, engineering, and mathematics workforce as well as a scientifically literate citizenry. The Major Research Equipment and Facilities Construction appropriation supports the construction and procurement of unique national research platforms and major research equipment that enable cutting-edge research. The Agency Operations and Award Management appropriation accounts for 5 percent of NSF's total budget. Funding for the operation of the Office of Inspector General and for the National Science Board are each provided in separate appropriations.

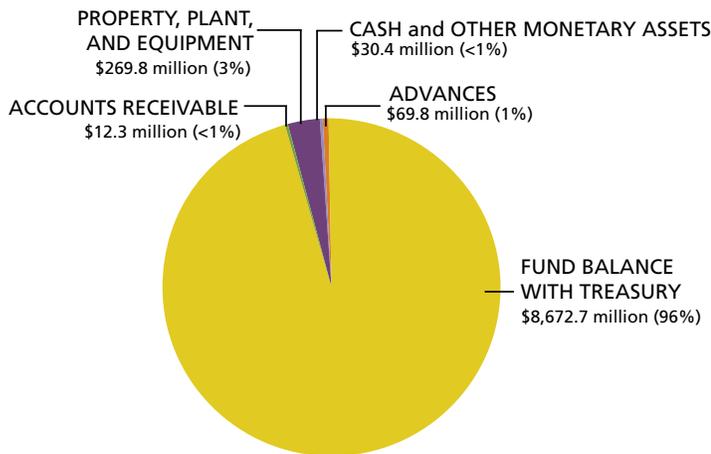
FY 2008 Gross Cost (\$6,053.2 million)



Shown are the costs incurred in FY 2008 in support of NSF's strategic outcome goals of *Discovery*, *Learning*, and *Research Infrastructure*. Costs incurred for indirect general operation activities—salaries, training, activities related to the advancement of NSF information technology, and the activities of the National Science Board and the Office of Inspector General—were allocated to the *Discovery*, *Learning*, and *Research Infrastructure* goals and account for about 5 percent of the total current year Net Cost of Operations. These administrative and management activities are the focus of the *Stewardship* strategic goal.



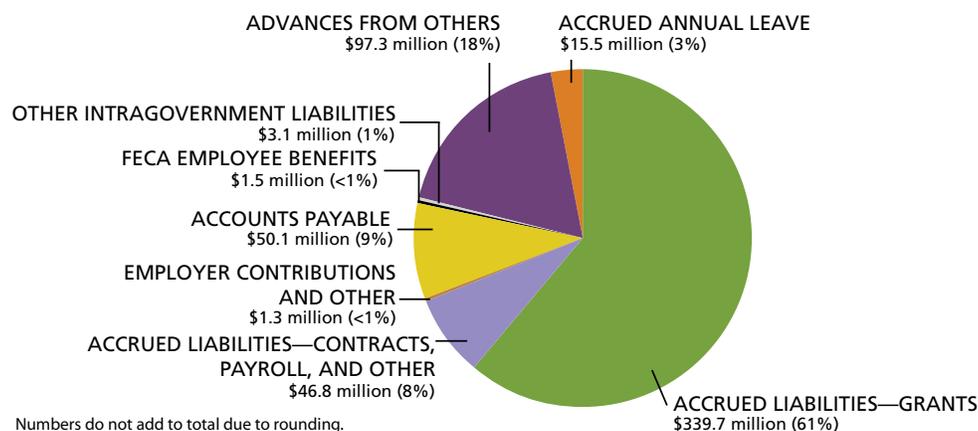
**FY 2008 Assets
(\$9,055.0 million)**



Two line items—*Fund Balance with Treasury* and *Property, Plant, and Equipment*—represent 99 percent of NSF's current year assets. *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 United States, New Zealand, and Antarctica that support the U.S. Antarctic Program. *Advances* are funds advanced to NSF grantees, contractors, and other government agencies.

Certain financial data referred to on pages 16 and 17 were derived from NSF's audited financial statements; however, such limited data have not been specifically audited as stand-alone information.

**FY 2008 Liabilities
(\$555.0 million)**



Numbers do not add to total due to rounding.

Three line items—*Accounts Payable*, *Accrued Liabilities—Grants*, and *Advances from Others*—represent 88 percent of NSF's current year liabilities. *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.

**Changes in Financial Position in FY 2008
(amounts 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% |



APPENDIXES

Above: Native to the warm waters of the Pacific and Indian Oceans, the red lionfish is a beautiful creature to behold so it is easy to see why this gracious predator was scooped up by aquarium enthusiasts and brought to Florida. Unfortunately, some of these *Pterois volitans* specimens apparently escaped their glassy confines and made it into the Atlantic Ocean, where, according to new research, this lion of the shallow seas is now on a deadly rampage. Work at the coral reef research station at Lee Stocking Island in the Bahamas by Mark Hixon and his team from Oregon State University have produced shocking results. The voracious lionfish decimated almost 80 percent of the young fish in the reefs they inhabited. Coral reefs are crucial to the health of oceans. In addition to forming natural breakwaters and helping to prevent shore erosion, the reefs provide a sanctuary for thousands of species of marine plants and fish. Reefs are complex ecosystems, so the introduction of a dangerous invasive species like the red lionfish can drastically upset the balance that keeps these rainforests of the ocean healthy. Reefs are also an important source of new medicines and other compounds useful to humans. Hixon recommends ways to address the lionfish threat including maintaining protected marine reserve areas in the ocean. Such areas can support many large predatory fish native to the Atlantic that may provide a natural control of lionfish.

For more information: www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=111976&org=NSF

Appendix 1: DESCRIPTION OF NSF DIRECTORATES AND OFFICES

The **Directorate for Biological Sciences** provides support for research to advance understanding of the underlying principles and mechanisms governing life.

The **Directorate for Computer and Information Science and Engineering** supports research on computer and information science and engineering, helps develop and maintain national computing and information infrastructure, and contributes to the education and training of the next generation of computer scientists and engineers.

The **Directorate for Education and Human Resources** supports activities that promote excellence in U.S. science, technology, engineering, and mathematics education at all levels and in all settings, both formal and informal.

The **Directorate for Engineering** supports research and education activities that provide a foundation for our nation's global leadership in technology and innovation.

The **Directorate for Geosciences** supports research in the atmospheric, earth, and ocean sciences.

The **Directorate for Mathematical and Physical Sciences** supports research and education in astronomical sciences, chemistry, materials research, mathematical sciences, and physics.

The **Directorate for Social, Behavioral, and Economic Sciences** supports research and education about human cognition, language, social behavior, and culture and on economic, legal, political, and social systems, organizations, and institutions as well as science resources studies.

The **Office of Cyberinfrastructure** coordinates and supports the acquisition, development, and provision of state-of-the-art cyberinfrastructure resources, tools, and services essential to the conduct of science and engineering research and education.

The **Office of Integrative Activities** promotes unity and alignment in support of the Foundation's mission, coordinating and overseeing cross-directorate activities and providing policy support to the Office of the Director.

The **Office of International Science and Engineering** promotes the development of an integrated, Foundation-wide international strategy and manages international programs that are innovative, catalytic, and responsive to a broad range of NSF interests.

The **Office of Polar Programs**, which includes the U.S. Polar Research Programs and U.S. Antarctic Logistical Support Activities, supports multidisciplinary research in the Arctic and Antarctic regions.

The **Office of Budget, Finance, and Award Management** is headed by the Chief Financial Officer, who has responsibility for budget, financial management, grants administration, procurement operations, and related policy.

The **Office of Information and Resource Management** provides human capital management, information technology solutions, continuous learning opportunities, and general administrative services to the NSF community of scientists, engineers, and educators.

Appendix 2: EXECUTIVE STAFF AND OFFICERS

NSF Executive Staff

Office of the Director

Arden L. Bement, Jr., Director

Office of the Deputy Director

Kathie L. Olsen, Deputy Director

National Science Board

Steven Beering (Chair)

Patricia D. Galloway (Vice Chair)

Directorate for Biological Sciences

James Collins, Assistant Director

Directorate for Computer and Information Science and Engineering

Jeanette M. Wing, Assistant Director

Directorate for Education and Human Resources

Cora Marrett, Assistant Director

Directorate for Engineering

Michael Reischman, Assistant Director (Acting)

Directorate for Geosciences

Timothy L. Killeen, Assistant Director

Directorate for Mathematical and Physical Sciences

Tony F. Chan, Assistant Director

Directorate for Social, Behavioral, and Economic Sciences

David W. Lightfoot, Assistant Director

Office of Cyberinfrastructure

Edward Seidel, Director

Office of International Science and Engineering

Larry H. Weber, Director (Acting)

Office of Polar Programs

Karl A. Erb, Director

Office of Equal Opportunity Programs

James H. Lightbourne, Director (Acting)

Office of the General Counsel

Lawrence Rudolph, General Counsel

Office of Inspector General

Christine C. Boesz, Inspector General

Office of Integrative Activities

W. Lance Haworth, Director

Office of Legislative and Public Affairs

Jeff Nesbit, Director

Office of Budget, Finance, and Award Management

Thomas N. Cooley, Director

Office of Information and Resource Management

Anthony A. Arnolie, Director

NSF Officers

Chief Financial Officer

Thomas N. Cooley (Office of Budget, Finance, and Award Management)

Chief Human Capital Officer

Anthony A. Arnolie (Office of Information and Resource Management)

Chief Information Officer/Chief Privacy Officer

George O. Strawn (Office of Information and Resource Management)

NSF Affirmative Action Officer

Ronald D. Branch (Office of Equal Opportunity Programs)

Appendix 3: NATIONAL SCIENCE BOARD MEMBERS DURING FY 2008

Steven Beering (Chair)

Purdue University

Patricia D. Galloway (Vice Chair)

The Nielsen-Wurster Group, Inc.

Mark R. Abbott

Oregon State University

Dan E. Arvizu

National Renewable Energy Laboratory

Barry C. Barish

California Institute of Technology

Camilla P. Benbow

Vanderbilt University

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American Association for the Advancement of Science

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University of Southern California

Jo Anne Vasquez

Helios Education Foundation

Member ex officio

Arden L. Bement, Jr.

Director, National Science Foundation

For more information:

Office of the Director
www.nsf.gov/od/index.jsp

National Science Board
www.nsf.gov/nsb/

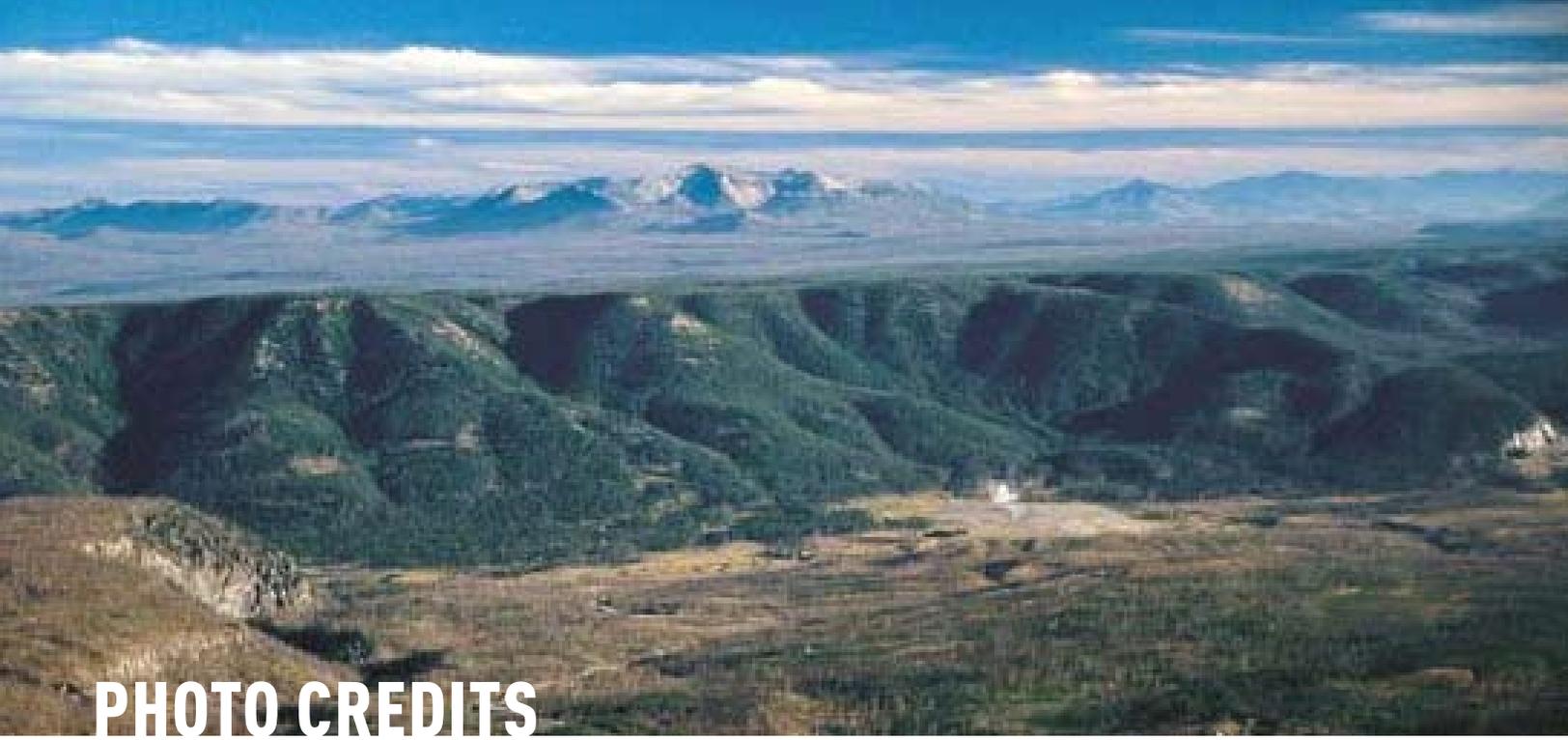


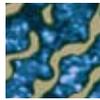
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Above: Geoscientists have discovered that Yellowstone National Park's caldera, a giant volcanic crater that is a remnant of an ancient volcano, has risen at a record rate since mid-2004, likely because a Los Angeles-sized, pancake-shaped blob of molten rock has boiled up 6 miles beneath the slumbering giant. The upward movement of the Yellowstone caldera floor—nearly 3 inches per year for the past 3 years—is more than three times greater than ever observed since such measurements began in 1923, reports Robert Smith, a geophysicist at the University of Utah. Smith has found no evidence of an imminent volcanic eruption or hydrothermal explosion. In this study, scientists measured uplift of the Yellowstone caldera from July 2004 through the end of 2006 with two techniques: 12 Global Positioning System (GPS) ground stations that receive timed signals from satellites, making it possible to measure ground uplift precisely, and the European Space Agency's Envisat satellite, which bounces radar waves off the Yellowstone caldera's floor. The research was funded by NSF, the U.S. Geological Survey, and the Brinson Foundation.

For more information: www.nsf.gov/discoveries/disc_summ.jsp?cntn_jsp?cntn_id=110651&org=NSF



Front Cover
Microorganisms from a mud sample collected in Lake Washington.
Credit: Photo by Dennis Kunkel (Dennis Kunkel Microscopy, Inc.); color by E. Letypova (University of Washington)



Page 2
Self-assembled silver nanowires
Credit: Heinrich Jaeger and Ward Lopes



Page 4
Credit: MIT/NSF



Page 6
Credit: Victor Li, University of Michigan Ann Arbor



Page 6
Credit: Cindy Barton, Tulsa Community College



Page 8
Credit: NASA/CXC/M. Weiss



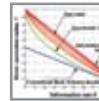
Page 10
Comparison of experimental and simulated wear regions for total knee replacement design after 5 million cycles of walking performed in a knee simulator machine.
Credit: B.J. Fregly, University of Florida



Page 10
Credit: Landsat Image Mosaic of Antarctica (LIMA) Project



Page 12
Credit: Paul Torrens



Page 12
Credit: Alexander Vardy, University of California San Diego



Page 13
Credit: Nicolle Rager Fuller, NSF



Page 14
Credit: Dr. Enrique Vivoni



Page 14
Credit: David Andrews



Page 16
Credit: Craig Stewart

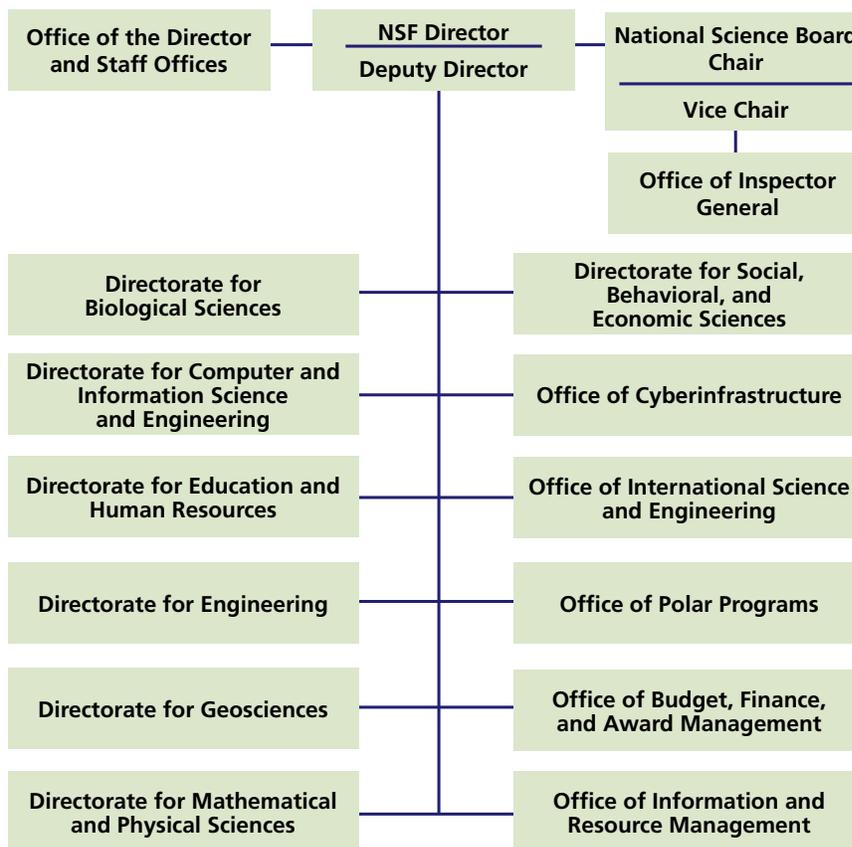


Page 18
Credit: National Oceanic and Atmospheric Administration



Page 20
Credit: Robert B. Smith, University of Utah

FY 2008 Organization Chart



NSF is headed by a Director who is appointed by the President and confirmed by the Senate. The 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. The NSF workforce includes approximately 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 the NSF's mission of supporting the entire spectrum of science and engineering research and education, particularly research at the frontier. In addition, NSF employs contractors who are engaged in commercial administrative activities.

For more information:

NSF Web Site
www.nsf.gov

NSF Research and Education
Highlights and Discoveries
www.nsf.gov/discoveries

NSF Investing in America's
Future: Strategic Plan
FY 2006-2011
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0648

NSF's FY 2009 Budget Request
to Congress
www.nsf.gov/about/budget/

NSF's FY 2008 Annual Financial
Report
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0902

NSF's FY 2008 Annual
Performance Report
www.nsf.gov/about/performance/

Report of the FY 2008
Advisory Committee on GPRA
Performance Assessment
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf08064

Report to National Science
Board on NSF's Merit Review
Process, FY 2007
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsb0847

America COMPETES Act
www.whitehouse.gov/news/releases/2007/08/20070809-6.html

President's Management
Agenda
www.Results.gov

Performance Assessment Rating
Tool (PART)
www.ExpectMore.gov

e-Gov and the Grants
Management Line
of Business Initiative
www.whitehouse.gov/omb/egov/c-6-3-grants.html

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