Overview

NATIONAL SCIENCE FOUNDATION
FY 2006 BUDGET REQUEST
OVERVIEW

Innovation and technology are the powerhouses of the American economy – and science and engineering research and education provide the fuel. The new knowledge, people, and capabilities that come out of America's research and educational institutions each year provide the foundation for generating the jobs and wealth that keep the economic engines humming.

Sustained output requires sustained resources. The National Science Foundation requests $5.605 billion in FY 2006 to maintain the science and engineering community's contributions to economic growth and ability to respond to a wide range of national needs.

With the wealth of benefits that investments in science and engineering bring to the nation, perhaps none is more powerful than the capability to respond quickly and effectively to challenges of all kinds. NSF's programs reach over 2,000 institutions across the nation, and they involve almost 200,000 researchers, teachers, and students in all fields of science and engineering and at all levels of education. This breadth of activity in and of itself creates a vital national resource, as it provides a nation with a constantly invigorated base of knowledge, talent, and technology. For example, in areas ranging from terrorism threats to natural disasters, NSF's ongoing support of research in areas such as advanced information technologies, sensors, and earthquake engineering ensures a broad base of expertise and equipment that allows the science and engineering community to respond quickly in times of need.

NSF Funding by Account
(Dollars in Millions)

				Change over FY 2005	
	FY 2004 Actual	FY 2005 Current Plan	FY 2006 Request	Amount	Percent
Research and Related Activities	$4,293.34	$4,220.55	$4,333.49	$112.94	2.7%
Education and Human Resources	944.10	841.42	737.00	-104.42	-12.4%
Major Research Equipment and Facilities Construction	183.96	173.65	250.01	76.36	44.0%
Salaries and Expenses	218.92	223.20	269.00	45.80	20.5%
National Science Board	2.22	3.97	4.00	0.03	0.8%
Office of Inspector General	9.47	10.03	11.50	1.47	14.7%
Total, NSF	$5,652.01	$5,472.82	$5,605.00	$132.18	2.4%

The FY 2006 Request focuses on four funding priorities that address current national challenges as well as strengthen the core portfolios of NSF's research and education investments:

- Strengthening core disciplinary research.
- Providing broadly accessible cyberinfrastructure and world-class research facilities.
- Broadening participation in the science and engineering workforce.
- Sustaining organizational excellence in NSF management practices.

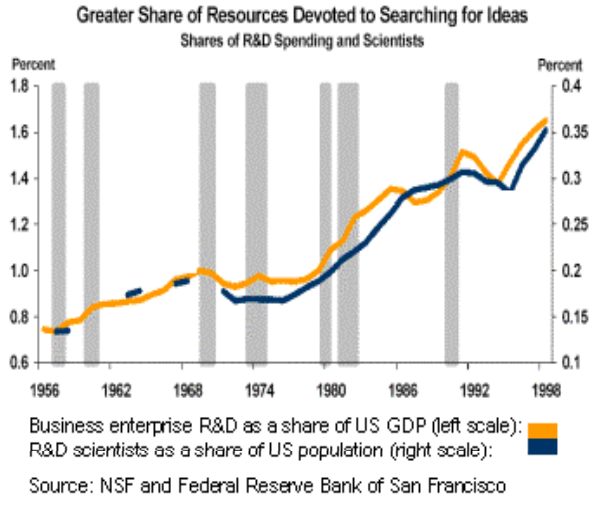
This year's investments will strengthen the core disciplines that empower every step of the process from discovery at the frontier to the development of products, processes, and technologies that fuel the economy. At the same time, NSF's investments will enable increasing connections and cross-fertilization among disciplines.

NSF's focus on a clear set of priorities will help the nation meet new challenges and take advantage of promising opportunities, while at the same time spurring the growth and prosperity needed to secure the nation's long-term fiscal balance. The FY 2006 budget will emphasize investments that address established interagency research priorities, meet critical needs identified by the science and engineering community, and advance the fundamental knowledge that strengthens the nation's base of innovation and progress. NSF will respond to these challenges by supporting the best people, ideas, and tools in the science and engineering enterprise, and by employing the best practices in organizational excellence.

A Proven Return

Federal investments in leading-edge research and education have paid extraordinary dividends over the past 50 years. Numerous studies have found that up to half of the U.S. economic growth in the latter half of the 20th Century stemmed from new technologies and the advances in science and engineering that enabled them. Today, the U.S. economy is shaped by ideas and innovation. Since the 1950's, the inputs to the economy from U.S. science, engineering and technology have risen steadily. As the graph below shows, the R&D intensity of U.S. business and industry has more than doubled, as has its share of leading-edge knowledge workers.

> *"Over the past half century, the increase in the value of raw materials has accounted for only a fraction of the overall growth of U.S. gross domestic product. The rest of that growth reflects the embodiment of ideas in products and services that consumers value."*
>
> Alan Greenspan
> Chairman
> Federal Reserve Board
> April 2003

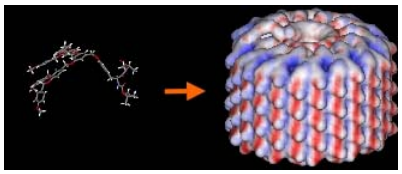


U.S. economic leadership is rooted in a long history of excellence in science, engineering and technology. New knowledge at the frontier and people trained to work at the frontier provide the nation's most critical capital – the engine of innovation and change. As the pace of discovery intensifies worldwide, greater federal investment is needed to keep the nation at the competitive edge and to reap the benefits that publicly funded research and education bring to every sphere of society – greater employment opportunities and wealth, better health and a cleaner environment, strengthened national security, and an enhanced ability to respond to critical needs.

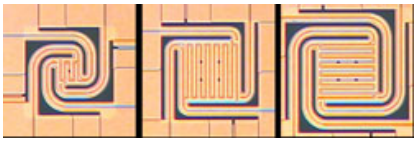
Securing the Future

During the past year, NSF-funded researchers reported numerous breakthroughs and advances that hold great promise for economic and societal benefit – and responded to urgent national and global needs with skill and alacrity. Just a few of the most promising examples are highlighted below.

Virgil Percec and colleagues at the University of Pennsylvania have created the first artificial analogs of nature's molecular "pores" – the tiny, hollow channels that perform a multitude of essential tasks in living cells. Potential applications range from the extraction of fresh water from seawater to an entirely new class of antibiotics.



A variety of small, protein-like molecules (left) will self-assemble into molecular-scale channels, or "pores" (right). *Credit: Virgil Percec laboratory, University of Pennsylvania*



Microhotplates crafted of silicon carbide, each consisting of a central plate surrounded by curved tethers. The largest is less than 100 microns across. *Credit: Boston Microsystems, Inc.*

With support from the Small Business Innovation Research (SBIR) program, engineers at Boston MicroSystems, Inc., have created a miniature hot plate only a few dozen microns across (about the width of a human hair) that can reach temperatures up to 1100ºC (2012ºF). These tiny "labs" on a microchip can serve as substrates, heaters and conductors for thin-film experiments ranging from materials analysis to the development of advanced sensors. Researchers are already developing applications such as oxygen and engine emissions sensors.

A global network of seismic instruments, long supported by NSF, produced a real-time record of the South Asian earthquake and subsequent seismic waves traveling through the earth, providing vital data needed for both earthquake studies and the potential development of tsunami warning systems.

Natural hazards researchers traveled to the field within weeks of the disaster to gather perishable information before it was lost in the cleanup and reconstruction. This yielded vital information on physical damage to structures and the environment and on the social and behavioral response of the population, which in turn advances the efforts of scientists and engineers working to improve the stability of buildings and infrastructure and the response capabilities of communities.

Earthquake engineering researchers from the University of Southern California recorded details of the destruction from the December 2004 South Asian earthquake, including the height of debris left by the subsequent tsunami. The researcher holds a 5-meter-high rod against a house in Panteraja, Sumatra. *Credit: © Jose C. Borrero, University of Southern California Tsunami Research Group, http://www.usc.edu/dept/tsunamis*

FY 2006 PRIORITIES

In FY 2006, NSF will focus significant resources on four priorities that build upon opportunities identified by the science and engineering community and address major national challenges identified by the Administration. Strengthening the capabilities in each of these areas will enhance the productivity and efficiency of the science and engineering enterprise while producing concrete economic and social benefits for the nation.

Strengthening Core Disciplinary Research

For FY 2006, total funding for NSF's Research and Related Activities Account increases by $113 million (nearly 3 percent) to a total of $4.33 billion. This investment encompasses both the established and the emerging areas supported through NSF's research directorates and programs. These fields and disciplines are the wellspring for discoveries that lead to the products, processes, and services that improve health, wealth, living conditions, environmental quality, and national security.

Researchers operate in an increasingly complex environment, in which emerging fields often cross disciplinary boundaries. But it is fundamental discovery and knowledge in core fields that open up avenues for more complex investigations and enable new multidisciplinary directions. NSF is the only federal agency that supports all fields of science and engineering research, and in some fields – such as anthropology, environmental biology, plant biology, psychology, sociology, mathematics, and computer and information sciences and engineering – NSF funds the majority of federally-supported academic basic research. In FY 2006, NSF will also provide leadership in planning U.S. participation in observance of the International Polar Year scheduled to take place in 2007.

A focus for NSF's programming in FY 2006 is the funding rate for research grants, which has declined from 30 percent in the late 1990s to an estimated 20 percent in FY 2005. In FY 2006, NSF will increase the funding rate to the FY 2004 level of 21 percent, while striving to maintain recent gains in award size and duration.

Preparing future scientists and engineers is the key to sustaining the spirit of innovation that underlies the nation's continued growth and prosperity. One of NSF's core values has been, consistently, to integrate education with research – ensuring that the science and engineering workforce gains the skills, knowledge, and insight that come from working at the frontiers of discovery.

Providing Broadly Accessible Cyberinfrastructure and World-Class Research Facilities

Leading-edge tools are essential to researchers working at the frontiers of science and engineering, and to students who will carry skill in their use into the workplace. In FY 2006, NSF is placing a high priority on investments in cyberinfrastructure and in unique, widely shared research facilities. These activities continue the longstanding NSF tradition of providing the most sophisticated tools to the broadest possible population of scientists, engineers, students and educators. In addition, the FY 2006 Request transfers responsibility to NSF from the U.S. Coast Guard for funding the operations and maintenance of polar icebreaking activities.

- **Cyberinfrastructure** is fast becoming one of the essentials of science and engineering productivity. Advances in modeling, simulation, visualization, data storage, communication, and other related elements are transforming the conduct of research and education, while accelerating their contributions to economic growth and responsiveness to national needs. In FY 2006, NSF investments in cyberinfrastructure total $509 million, an increase of $36 million (7.6 percent) over the FY 2005 level

– and an increase of $100 million over the FY 2004 level. With these resources, NSF and the research community aim to make cyberinfrastructure more powerful, stable and accessible to researchers and educators across the nation and around the world.

- Funding for **Major Research Equipment and Facilities Construction** increases by $76 million (44 percent), to fund five major facilities that will serve a broad spectrum of the science and engineering community. They include world-class astronomy, physics, and environmental observatories identified as the highest priorities for advancing the frontiers of science and engineering while seeking breakthroughs that will contribute to the nation's health and well being:
    - ALMA: the Atacama Large Millimeter Array, which will be the world's largest, most sensitive radio telescope operating at millimeter wavelengths.
    - EarthScope, a distributed, multi-purpose geophysical instrument.
    - IceCube, the world's first high-energy neutrino observatory, to be located under the ice at the South Pole.
    - RSVP, the Rare Symmetry Violating Processes project, which enables cutting-edge physics experiments to study the fundamental properties of nature.
    - The Scientific Ocean Drilling Vessel (SODV), a deep-sea drilling vessel for long-term use in a new international scientific ocean drilling program.

- **Polar Icebreaking Activities:** In FY 2006, NSF will assume the responsibility, from the U.S. Coast Guard, for funding the costs of icebreakers that support scientific research in polar regions; $48.0 million was transferred for those purposes.

Broadening Participation in the Science and Engineering Workforce

In our knowledge-intensive society, the nation needs to capitalize on all available talent to sustain a first-rate workforce of skilled technologists, scientists and engineers. NSF devotes considerable resources to strengthening the education and career opportunities available to a broad spectrum of the population.

The City University of New York (CUNY) is increasing the number of Black and Latino students receiving doctoral degrees in science and engineering fields through the NSF Alliances for Graduate Education and the Professoriate (AGEP) program. The share of STEM degrees awarded to minority students has risen from 7 percent to 21 percent over a five-year period.

The FY 2006 Request maintains a total investment of nearly $400 million in programs with a proven track record of tapping the potential of those underrepresented in the science and engineering workforce–especially minorities, women, and persons with disabilities.

Three highly successful programs – the Louis Stokes Alliances for Minority Participation, the Alliances for Graduate Education and the Professoriate, and the Centers of Research Excellence in Science and Technology – form the centerpiece of this investment. They serve as models for integrating resources in the educational community with those in the research community to improve minority enrollment and retention in science and engineering.

Sustaining Organizational Excellence in NSF Management Practices

To realize the agency's mission and vision, NSF expects its business practices and processes to meet the same high standards as its investments in science and engineering. Achieving results-oriented management and stewardship begins with adequate resources. FY 2006 funding for activities that

advance NSF's Organizational Excellence goal increases by $46 million over the FY 2005 level for a total of $336 million.

Staffing across the Foundation will increase by 25 full-time equivalent employees to help manage NSF's increasingly complex portfolio and address new requirements for security, accountability, and award oversight. Other priorities include expanding e-government systems and capitalizing on recommendations from the ongoing business analysis.

Already, in its continuing quest for organizational excellence, NSF has earned three "green lights" on the scorecard that tracks the President's Management Agenda (PMA). NSF was previously recognized for its achievements in financial management and for its forward-reaching e-government activities; more recently, its efforts to integrate budget with performance has achieved this level of recognition.

CROSS-CUTTING ACTIVITIES

In implementing its FY 2006 activities, NSF will emphasize four additional themes that cut across the budget priorities and strengthen their impact on science and engineering research and education.

- *Crosscutting areas of emerging opportunity.* NSF has provided sustained funding over several years to interdisciplinary endeavors that hold exceptional promise for advancing knowledge and addressing national interests. The FY 2006 Request continues to support the four NSF Priority Areas: $84 million for Biocomplexity in the Environment, $243 million for Nanoscale Science and Engineering, $89 million for the Mathematical Sciences Priority Area, and $39 million for Human and Social Dynamics.

- *International collaborations.* There has been a vast increase in the globalization of science and engineering in recent years. International research partnerships are critical to the United States in maintaining a competitive edge, capitalizing on global economic opportunities, and participating in addressing global problems. Toward this end, the FY 2006 Request provides $35 million for NSF's Office of International Science and Engineering.

A U.S.-Russian collaborative research project will develop an international microbial observatory to explore the microbial world in remote volcanic and geothermal areas of the Kamchatka Peninsula. U.S. researchers and graduate students gain access to a unique region of the world. The results of their research are likely to lead to the discovery of microorganisms with high potential for industrial applications.

- *Interagency initiatives.* In addition to strengthening the core portfolios of the NSF research directorates, NSF will continue to play a lead role in interagency collaborations that address pressing national needs and opportunities for substantial economic growth.
  - In FY 2006, NSF investments in the National Nanotechnology Initiative total $344 million, up $6 million from FY 2005.
  - Participation in the Networking and Information Technology Research and Development initiative will increase to $803 million, $8 million over the FY 2005 level.
  - Funding for the Climate Change Science Program is funded at $197 million, a decrease of $1 million from FY 2005.

- *Homeland Security Activities.* The FY 2006 Request includes a total of $344 million for activities directly related to government-wide efforts in homeland security R&D. This represents an increase of $2 million over FY 2005. Nearly 80 percent of this investment is devoted to a variety

of activities related to Critical Infrastructure Protection, including cybersecurity, risk management, modeling and simulation, distributed systems, and surveillance robotics. A particular focus is advancing research and innovation that will improve security in today's computer and network systems as well as embed the best practices of cybersecurity in the design and development of tomorrow's systems while also preparing a workforce with state-of-the-art security skills. Funding is also maintained for other key Homeland Security-related activities, including the Ecology of Infectious Diseases program, jointly sponsored by NSF and the National Institutes of Health, and the Microbial Genome Sequencing program, jointly sponsored by NSF and the U.S. Department of Agriculture. These will contribute to a better understanding of potential bioterrorism threats and how to combat them.

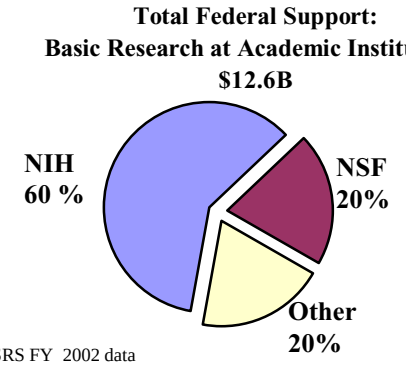
R&D INVESTMENT CRITERIA

The nation's economic productivity is enhanced when federal agencies work smarter, producing desired outcomes at acceptable costs.

NSF's FY 2006 Request incorporates the Research and Development Investment Criteria outlined in the President's Management Agenda. The three sections below describe NSF's approach to ensuring that its investments address Relevance, Quality, and Performance. More specific information on the criteria is integrated throughout this document in discussions of investments by each of NSF's directorates and major program offices.

Relevance

NSF is the only federal agency with a mandate to strengthen the health and vitality of U.S. science and engineering and support fundamental research and education in all scientific and engineering disciplines. NSF-sponsored activities result in new across-the-board knowledge and technologies and educate a world-class workforce of scientists, engineers, mathematicians, educators, and other technically trained professionals.



NSF/SRS FY 2002 data

Although NSF investments account for only 4 percent of total federal funding for research and development, the agency provides 20 percent of federal support to academic institutions for basic research. NSF investments are especially vital in non-medical fields and disciplines. For over two decades, NSF has been a principal source of federal support for basic research at colleges and universities in such areas as computer science, mathematics, the physical sciences, the social sciences, the environmental sciences, engineering, and non-medical areas of the life sciences. Much of this research, however, also directly benefits medical diagnosis, regenerative medicine, drug delivery and the design and processing of pharmaceuticals.

The NSF Strategic Plan for FY 2003-2008 is set in the context of the evolving long-term issues that are transforming science and education research. Researchers operate in an increasingly complex environment, in which science and engineering cross the boundaries of disciplines, organizations, and nations. The frontier changes quickly, and discovery requires ever-more-sophisticated skills and methods, as well as technology and instrumentation. Global competition for technical workers and science and education professionals has intensified, and so have the skills expected in today's changing workplace. Leadership and excellence in discovery, innovation and learning are the most effective means to meet and surpass these new challenges.

Quality

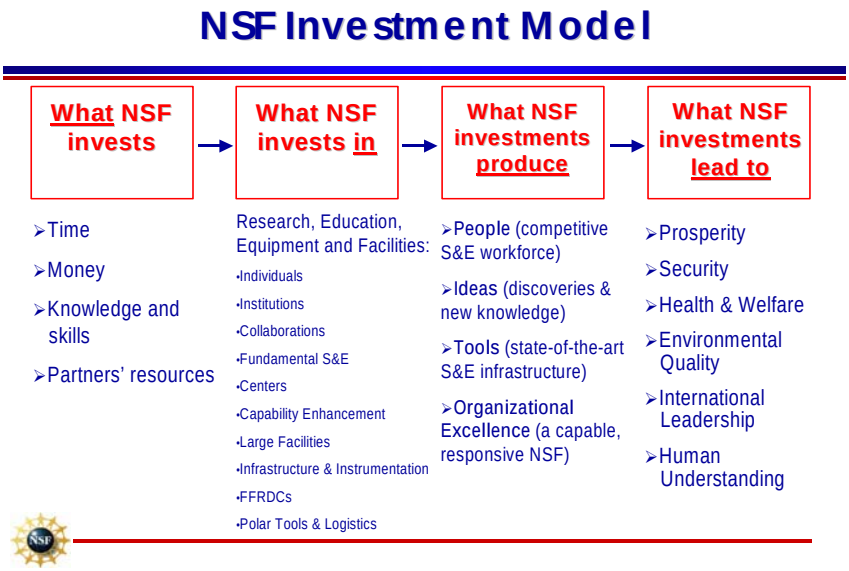
NSF leads federal agencies in funding research and education activities based upon competitive merit review, with nearly 90 percent of its research and education funding going to awards selected through a competitive merit review process. In FY 2004, NSF awarded more than 10,000 new grants from more than 44,000 competitive proposals.

All proposals for research and education projects are evaluated using two criteria: the *intellectual merit* of the proposed activity and its *broader impacts*, ranging from effects on teaching, training and learning to improvements in cybersecurity. Reviewers also consider how well the proposed activity fosters the integration of research and education and broadens opportunities to include a diversity of participants, particularly from underrepresented groups.

Perhaps the most dramatic indicator of the level of competition for NSF funding is the quality of the proposals that go unfunded every year. In FY 2004, for example, proposals totaling $2.1 billion were declined even though they were rated as highly as the proposals that received funding. These declined proposals represent a rich portfolio of highly-regarded yet unfunded opportunities to advance research and education.

Performance

Strategic investments intended to achieve long-term outcomes (illustrated in the Investment Model below) are the target of performance assessments at NSF. Specific measures of organizational effectiveness relate to the internal practices, operations and processes that support the NSF mission. Historically, NSF has relied upon external committees of experts to evaluate the long-term outcomes from research and education. This is appropriate given the broad scope of science and engineering covered by NSF, and the critical and extensive use of merit review for selecting new awards. Today, these external evaluations provide integral information for the assessments conducted using the Program Assessment Rating Tool (PART).



External Evaluations. The NSF Advisory Committee for GPRA Performance Assessment (AC/GPA) leads the annual evaluation of NSF's performance. In FY 2004, the Advisory Committee for Business

and Operations (AC/BO) assisted the AC/GPA in the evaluation of the Organizational Excellence goal. The AC/GPA summarized its findings as follows:

"It was the unanimous judgment of the Committee that NSF has demonstrated significant achievement for all indicators in all the three strategic outcome goals of People, Ideas, and Tools and for the merit review indicator for the Organizational Excellence outcome goal. The Advisory Committee for Business and Operations concluded that NSF demonstrated significant achievement for the other indicators in the Organizational Excellence goal."

"The Committee also concluded that the four outcome goals are mutually reinforcing and synergistic. They represent an integrated framework that combines research and education in a positive way and also provides the organizational infrastructure to advance the national scientific, technological, engineering, and mathematics enterprise."

Program Assessment Rating Tool (PART) Results

Investment Category/ Priority Area	Assessment (Budget) Year	Result
People		
Individuals	Fiscal Year 2005	Effective*
Institutions	Fiscal Year 2006	Effective*
Collaborations	Fiscal Year 2006	Effective*
Ideas		
Fundamental Science and Engineering	Fiscal Year 2007	**
Centers	Fiscal Year 2008	**
Capability Enhancement	Fiscal Year 2008	**
Tools		
Large Facilities	Fiscal Year 2005	Effective*
Infrastructure and Instrumentation	Fiscal Year 2008	**
Federally Funded Research and Development Centers	Fiscal Year 2007	**
Polar Tools, Facilities, and Logistics	Fiscal Year 2006	Effective*
Priority Areas		
Information Technology Research	Fiscal Year 2005	Effective*
Nanoscale Science and Engineering	Fiscal Year 2005	Effective*
Biocomplexity in the Environment	Fiscal Year 2006	Effective*
Mathematical Sciences	Fiscal Year 2008	**
Human and Social Dynamics	Fiscal Year 2008	**

* "Effective" is the highest rating issued by the Office of Management and Budget. Other ratings are "Moderately Effective," "Adequate," "Ineffective," and "Results Not Demonstrated."
** PART to be completed in the future.

Program Assessment Rating Tool. The PART process has also become a central component of NSF's performance framework. NSF developed the PART evaluation schedule shown on the left consistent with the investment categories and priority areas established in the Strategic Plan.

In recent years, only around 15 percent of the over 600 programs evaluated across federal agencies received the highest rating of "Effective." For the FY 2005 and FY 2006 PART evaluations, all eight NSF programs evaluated received a rating of effective. More detailed information on the PARTs completed for FY 2006 is included in Performance Information Chapter of this Request.

FY 2006 Budget Request by Strategic Goal

NSF invests in a rich mix of programs, platforms and partnerships developed by the research and education community. Funding levels for these programs and activities in the FY 2006 Request directly link with the Strategic Outcome Goals and Investment Categories established in the NSF Strategic Plan for FY 2003-2008.

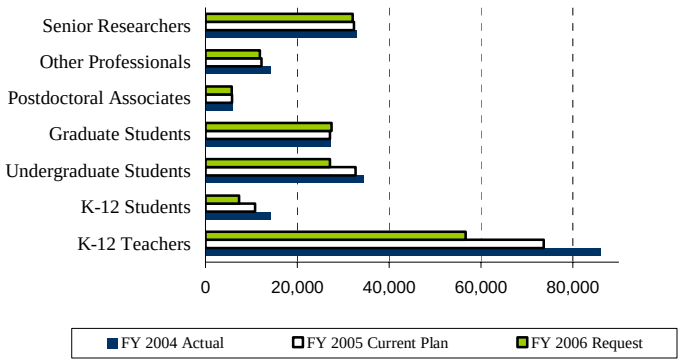
NSF Budget by Strategic Outcome Goal and Investment Category

(Dollars in Millions)

		FY 2004 Actual	FY 2005 Current Plan	FY 2006 Request	Change over FY 2005 Amount	Change over FY 2005 Percent
People	Individuals	567.37	547.12	519.15	-27.97	-5.1%
	Institutions	181.13	177.55	159.32	-18.23	-10.3%
	Collaborations	398.38	304.45	300.30	-4.15	-1.4%
		1,146.88	1,029.12	978.77	-50.35	-4.9%
Ideas	Fundamental Science and Engineering	2,200.88	2,151.52	2,144.17	-7.35	-0.3%
	Centers Programs	362.85	350.83	358.49	7.66	2.2%
	Capability Enhancement	258.79	247.49	254.47	6.98	2.8%
		2,822.52	2,749.84	2,757.13	7.29	0.3%
Tools	Facilities	594.95	644.03	714.89	70.86	11.0%
	Infrastructure and Instrumentation	335.84	320.01	334.32	14.31	4.5%
	Polar Tools, Facilities and Logistics	277.07	257.46	300.63	43.17	16.8%
	Federally-Funded R&D Centers	195.61	182.56	183.50	0.94	0.5%
		1,403.48	1,404.06	1,533.34	129.28	9.2%
Organizational Excellence		279.13	289.79	335.75	45.96	15.9%
Total, NSF		$5,652.01	$5,472.82	$5,605.00	$132.18	2.4%

Totals may not add due to rounding.

Number of People Involved in NSF Activities



People

A diverse, competitive, and globally-engaged U.S. workforce of scientists, engineers, technologists and well-prepared citizens.

The Robotics Academy, a program at Tufts University and the University of Nevada, Reno, provides opportunities for undergraduates to learn in the context of multidisciplinary problem solving. In order to mirror the diversity seen in many "real-world" teams, the Academy includes teams with engineers, human factors students, computer scientists, and child development majors. Here, undergraduates in child development and engineering teach youngsters in the after school program.

The Foundation's FY 2006 budget provides $978.77 million, a decrease of $50.35 million, or 4.9 percent, below the FY 2005 Current Plan, to prepare a highly skilled and diverse science and engineering workforce. Within this total, funds have been reallocated to target programs that have been successful in broadening participation among groups, communities, regions, and institutions that are underrepresented in science and engineering fields.

Individuals. Investments totaling $519.15 million, a decrease of $27.97 million, or 5.1 percent, support the education and training of world-class scientists, engineers, mathematicians, technologists and educators. Among programs targeted for sustained or increased investment are Noyce Scholarships, up $110,000 to a total of $8.0 million, CAREER, up $2.40 million to $133.79 million, and Research Experiences for Undergraduates (REU), up $2.57 million to $53.69 million. Support for the three flagship graduate programs – Graduate Research Fellowships, Integrative Graduate Education and Research Traineeships, and Graduate Teaching Fellowships in K-12 Education – will be sustained at FY 2005 levels ($215.69 million). Stipends will be maintained at $30,000 and an estimated 4,600 students will be supported in FY 2006. The Teacher Professional Continuum Program is decreased by $27.20 million (45 percent).

Institutions. Investments totaling $159.32 million in FY 2006, a reduction of $18.23 million, or 10.3 percent, enable colleges, universities and other institutions to strengthen the quality of science and engineering education and increase the numbers of students attracted to science and engineering fields at all levels. Programs that enable these institutions to ensure adequate training for a wider portion of the science and engineering workforce include ADVANCE, maintained at the FY 2005 level of $19.80 million, STEM Talent Expansion Program at $25.0 million, and the Advanced Technological Education program at $45.0 million. In addition, Engineering Education Reform increases by $1.0 million to $15.47 million. In order to fund these priorities, reductions were taken in Course, Curriculum and Laboratory Improvement (-$9.80 million to $37.14 million) and Instructional Materials and Assessment Development (-$9.52 million to $19.0 million).

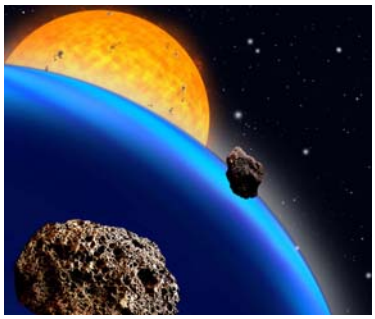
Informal science education engages millions of youngsters each year in science and engineering activities. Cast members of *ZOOM*, produced by WGBH, put their heads together for the show's sixth season. *Credit: Mark Ostow for WGBH.© 2004*

Collaborations. Investments totaling $300.30 million, a decrease of $4.15 million, or 1.4 percent, will foster partnerships among colleges, universities, school districts, and other institutions – public, private, state, local, and federal – to strengthen science and engineering education at all levels and broaden participation in science and engineering fields. The FY 2006 budget supports a wide range of partnership programs and collaborations including the Louis Stokes Alliances for Minority Participation ($35.0 million), Alliances for Graduate Education and the Professoriate ($15.0 million), and Historically Black Colleges and Universities-Undergraduate Program (HBCU-UP) ($25.0 million). Funding within Research and Related Activities to

enhance integration of programs to broaden participation increases substantially to $44.53 million. Informal Science Education is maintained at $63.0 million. In addition, the FY 2006 Request provides $60.0 million for the President's Math and Science Partnership program.

Ideas

Discovery across the frontier of science and engineering, connected to learning, innovation, and service to society.



Scientists using a network of small telescopes and the transit method of detection have made their first direct discovery of a planet orbiting a bright star. A periodic dimming of light from a bright star 500 light-years away revealed the planet's presence. *Credit: David A. Aguilar, Harvard-Smithsonian Center for Astrophysics*

In FY 2006, NSF is requesting $2.76 billion, an increase of $7.29 million, or 0.3 percent, over the FY 2005 Current Plan, to support the best ideas generated by the science and engineering community. In FY 2006, NSF will place greater emphasis on increasing the funding rate for research grants while striving to maintain recent gains in award size and duration.

Fundamental Science and Engineering. Investments totaling $2.14 billion, a decrease of $7.35 million, will support the best new ideas generated by the science and engineering community. Strengthening disciplinary research in all science and engineering fields is a priority for FY 2006 and will be accomplished through balanced investments across NSF programs. NSF plays a lead role in collaborating with other federal research agencies to fund initiatives of significant national importance. In FY 2006, NSF investments in the National Nanotechnology Initiative (NNI) total $343.77 million, up $5.55 million. NSF will increase its investment in Networking and Information Technology Research and Development (NITRD) by $8.34 million to a total of $803.24 million. NSF funding for the Climate Change Science Program decreases to $196.88 million, down $1.0 million. This includes an investment of $171.88 million for the U.S. Global Change Research Program and $25.0 million for the Climate Change Research Initiative. In addition, $94.24 million is provided for the Plant Genome Research program, which is vital to understanding the genomics of plants of major economic importance.

Centers Programs. By bringing together people, ideas and tools on scales large enough to effect significant progress in disciplinary and cross-disciplinary fields, Centers play a key role in advancing science and engineering in the U.S., particularly through their encouragement of interdisciplinary research and the integration of research and education. Investments in FY 2006 total $358.49 million, an increase of $7.66 million over the FY 2005 Current Plan. In FY 2006, NSF provides an increase of $2.0 million for the Science and Technology Centers to continue support for two Centers initiated in FY 2005. Funding for all ongoing STCs totals $53.89 million. Support for Science of Learning Centers increases by $3.16 million to a total of $23.0 million to provide startup support for up to four new SLCs.

The National Science Foundation and the National Institute of Environmental Health Sciences are funding four joint Centers for Oceans and Human Health launched in FY 2004.

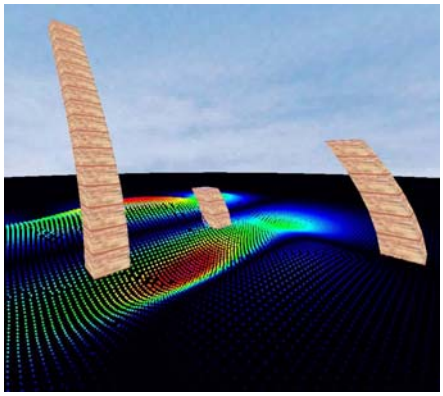
Capability Enhancement. In FY 2006, investments totaling $254.47 million, an increase of $6.98 million, will build the capability of individuals and institutions to perform high quality, competitive research, education, and technological innovation. Investments in Centers of Research Excellence in Science and Technology (CREST), up $2.63 million to $18.50 million, will strengthen research and education in minority-serving institutions. Funding is also increased for EPSCoR, up $320,000 to $94.0 million, and Small Business

Innovation Research (SBIR) and Small Business Technology Transfer (STTR), up $2.57 million to $105.33 million.

Tools

Broadly accessible, state-of-the-art S&E facilities, tools and other infrastructure that enable discovery, learning and innovation.

In FY 2006, NSF proposes to invest $1.53 billion, an increase of $129.28 million, or 9.2 percent, in the development and stewardship of a wide variety of facilities, instrumentation and other infrastructure. Leading-edge tools are essential to researchers working at the frontier of science and engineering, and to students who will bring skill in their use into the workplace. NSF is placing a high priority on investments in the development of cyberinfrastructure and in unique national facilities.



This figure represents a simulation of 3-, 6- and 16- story structures and maximum story drift in response to ground motion (strike-slip fault). Such computation and visualization research is being conducted under a SPUR (Seismic Performance of Urban Regions) alliance involving the Engineering Research Center at Mississippi State University, the Pacific Earthquake Engineering Research (PEER) Center at the University of California, Berkeley, and geotechnical engineers at Carnegie Mellon University. Together they are creating a powerful new system for analyzing the impact of an earthquake on a region, for use by public policy makers and earthquake engineering researchers. The goal is to forecast the amount and distribution of damage to buildings, bridges, and lifelines caused by an earthquake.

The goal of NSF and the research community is to make *cyberinfrastructure* highly powerful, stable, persistent, and widely accessible to researchers and educators across the nation and around the world. NSF will invest in two complementary, coordinated areas. Investments in shared cyberinfrastructure will address the need for interoperability and will provide the base for investment in individual disciplines. Domain-focused investments are driven by the identified research and education needs and opportunities in a particular science or engineering community. Some of the investments fall neatly within traditional disciplines, while others reach across a number of science and engineering fields. In FY 2006, NSF investments in widely-shared and domain-specific cyberinfrastructure total $509.15 million, an increase of $36.01 million. This investment will support a rich mix of projects and encourage broad community participation in developing tools that serve all fields as well as those that meet the needs of specific communities.

A new, deeper diving vehicle will replace *Alvin*, the submersible that has served scientists for 40 years. *Credit: Woods Hole Oceanographic Institution*

Facilities. NSF proposes investments in FY 2006 totaling $714.89 million, an increase of $70.86 million, in the development, construction, and operation of state-of-the-art facilities and platforms that enable researchers and educators to work at the frontier of discovery. The $250.01 million Request for the Major Research Equipment and Facilities Construction Account, a part of NSF's overall Facilities investment, will support projects of national importance. These include the Atacama Large Millimeter Array (ALMA) ($49.24 million), EarthScope ($50.62 million), IceCube ($50.45 million), Scientific Ocean Drilling Vessel ($57.92 million), and the Rare Symmetry Violating Processes (RSVP) ($41.78 million).

NSF also requests $62.82 million to initiate two new projects, Ocean Observatories ($13.50 million), and the Alaska Regional Research Vessel ($49.32 million), in FY 2007; and $28.48 million to initiate Advanced LIGO in FY 2008.

Infrastructure and Instrumentation. FY 2006 investments totaling $334.32 million, an increase of $14.31 million, support state-of-the-art instruments, platforms, information technology, databases, and other tools to advance U.S. leadership in science and education, and increase productivity and innovation among researchers, educators and students working at the frontier. This also includes $89.53 million to support the Major Research Instrumentation program (MRI). Investments in MRI support a wide variety of mid-sized state-of-the-art research equipment, and reach a broad range of institutions, including non-Ph.D-granting colleges, universities and community colleges.

Polar Tools, Facilities and Logistics. Investments totaling $300.63 million, an increase of $43.17 million, will provide state-of-the-art tools, facilities and other infrastructure to advance polar research and education. With a transfer from the U.S. Coast Guard of $48 million, NSF will assume the responsibility for funding the costs of icebreakers that support scientific research in polar regions. The FY 2006 Request will keep high priority projects (e.g., the McMurdo power plant and South Pole Traverse) on schedule. However, reallocations within the program base will be required, and some procurements and field relocation projects will be deferred.

Federally-funded Research and Development Centers. FY 2006 investments in FFRDCs total $183.50 million, up $940,000 over FY 2005. FFRDCs address research, development, and policy issues that create unique, important and long-term capabilities for the federal government, in response to law, mandate or widely recognized need. Funding of $82.27 million, an increase of $1.05 million, for the National Center for Atmospheric Research will support continued activities at the Center and provide $5.0 million to initiate operation of the new HIAPER (High-Performance Instrumented Airborne Platform for Environmental Research) research aircraft. Support for the National Radio Astronomy Observatory (NRAO) will also increase by $370,000 to a total of $47.40 million, and support for the National Optical Astronomy Observatory (NOAO) will decrease by $560,000 to a total of $37.36 million.

Organizational Excellence (OE)

An agile, innovative organization that fulfills its mission through leadership in state-of-the-art business practices.

NSF is committed to excellent, results-oriented management and stewardship. The FY 2006 Budget Request for Organizational Excellence totals $335.75 million, an increase of $45.96 million, or 15.9 percent, over the FY 2005 Current Plan of $289.79 million. In keeping with the President's Management Agenda, the FY 2006 Request maintains NSF's commitment to providing outstanding customer service and to maintaining leadership in eGovernment and state-of-the-art business practices.

President's Management Agenda Scorecard

	Baseline (Sep. 30, 2001)	Status (December 31, 2004)	Progress (December 31, 2004)
Strategic Management of Human Capital	R	Y	G
Competitive Sourcing	R	R	R
Improving Financial Performance	G	G	G
Expanded E-Gov't.	Y	G	G
Budget and Performance Integration	R	G	G

Highlights from NSF's FY 2006 investments in OE include:

- Strengthening the NSF workforce, through an increase of 25 employees across the Foundation and increased investments in human capital management, professional development activities, and funding for award monitoring and oversight activities.

- Strengthened information technology investments, including increased spending for IT Security and a four-fold increase for next-generation grants management capabilities and eGov investments.

A major driver in shaping these investments has been the ongoing NSF Business Analysis, which is addressing the fundamental challenges facing NSF as it becomes a fully integrated organization capable of working both within and across traditional disciplinary and organizational boundaries.