

# NATIONAL SCIENCE FOUNDATION

## **Since 2001, the Administration:**

- Funded 49,000 research grants in science and engineering at the National Science Foundation through a competitive, merit-based process;
- Directly supported 58,000 graduate students and 24,500 undergraduate students in science and engineering fields; and
- Completed funding for the construction of four major research facilities to support particle physics, supercomputing, and research on earthquakes and the atmosphere.

## **The President's Budget:**

- Dramatically improves the National Science Foundation's efforts to build and sustain U.S. world leadership across many fields of science and engineering;
- As part of the President's American Competitiveness Initiative, begins a 10-year commitment to double funding for research that will provide breakthroughs in information technology, nanotechnology, and other fields of science that will have significant impacts scientifically and economically;
- Provides enhanced infrastructure and tools to strengthen research capabilities in physics, astronomy, earthquakes, and the oceans;
- Strongly supports the United States' role in the International Polar Year; and
- Attracts more of the most promising U.S. students into graduate level science and engineering by funding over 4,500 new graduate fellowships.

## FOCUSING ON THE NATION'S PRIORITIES

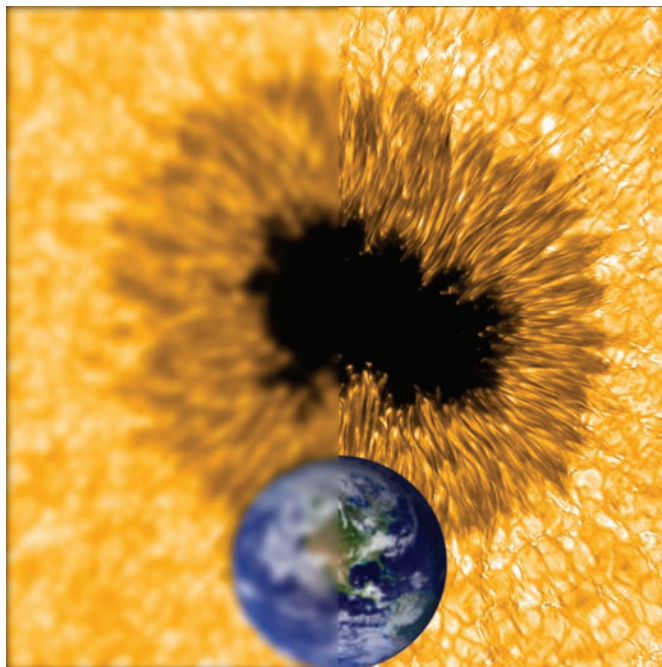
### *Doubling Research in the American Competitiveness Initiative*

As part of the President's American Competitiveness Initiative, the 2007 Budget provides an increase of 7.9 percent for the National Science Foundation (NSF), initiating a 10-year commitment to double NSF's investments in science and engineering. NSF research builds the foundations for innovative technologies that drive economic growth and enhance America's quality of life. A broad portfolio of research—from physics, chemistry, mathematics, engineering, and computer science, to the geological, biological, behavioral, and social sciences—will energize science broadly and sustain the productivity of the Nation's science and engineering enterprise and keep America at the forefront of world discovery and innovation. Past NSF research has contributed to the development of the Internet and Internet search engines, fiber-optics, color plasma displays, magnetic resonance imaging, and other advances that now help each of us in our daily lives.

Through the President's 10-year Competitiveness Initiative, the Administration is strategically targeting the investments of NSF and other agencies in emerging fields of research that are particularly likely to impact broadly across fields of science and engineering, stimulate innovation, enable a high-tech workforce, and further strengthen the economy.

NSF is a leading agency in the National Nanotechnology Initiative, funding nanotechnology investments at \$373 million in 2007, an increase of 8.6 percent from 2006 and of nearly 150 percent since 2001. Nanotechnology research will continue to advance fundamental understanding of materials at the subatomic, atomic, and molecular levels and will enable the development of capabilities to design, manipulate, and construct revolutionary devices and materials with unprecedented properties. A broad range of developing technologies is likely to emerge from this field, including high-performance materials; more efficient manufacturing processes; increased computer storage capacity; and biomedical applications ranging from efficient drug delivery systems to cancer therapies. The 2007 Budget funds approximately 50 new nanotechnology interdisciplinary research teams.

NSF is also a leading agency in Networking and Information Technology Research and Development (NITRD). The 2007 Budget provides \$904 million of NITRD funding, an increase of 11.5 percent from 2006. This investment will support fundamental research in information, computer, and communications sciences, laying the groundwork for next-generation technologies. NSF programs will also support access to cutting-edge computing and networking infrastructure essential for America's scientists, engineers, and students to remain at the forefront of discovery. Funding for



NSF's investments in adaptive optics give solar astronomers the sharpest insights yet into the magnetism that drives sunspots. This composite photo from the National Solar Observatory shows an image of a sunspot alongside an image of the earth, to convey scale. The clarity of the image to the right is possible due to adaptive optics, while normal ground-based telescope images would appear as shown on the left.

both nanotechnology and information technology research supports education and training for the next generation of researchers and the science, engineering, and technology workforce.

The 2007 Budget provides over \$55 million for research and education activities during the first year of the International Polar Year (IPY), 2007 to 2009. NSF will lead the U.S. research community in working with scientists supported by other agencies and countries to advance our understanding of the Earth's poles. Major areas of research will include Arctic environmental change, the influence of polar ice sheets on global phenomena, and organisms that live in the cold and dark. NSF's IPY research will include a focus on education and outreach to motivate future generations of scientists, engineers, and educators.

### ***Producing Tools for Science and Engineering***

The 2007 Budget supports research tools critical to scientists and engineers, such as instruments, equipment, facilities, databases, and large surveys. Development of state-of-the-art infrastructure and facilities substantially enhances research efforts throughout a wide range of fields, including astronomy, earthquake research, and environmental research.

Computing and advanced networking tools that broadly benefit the Nation's entire science and engineering community, collectively known as "cyberinfrastructure," have become essential to advancing the frontiers of knowledge through science and engineering. The Budget provides \$600 million for NSF's targeted investments in these tools. While hardware performance has been growing exponentially—with storage capacity doubling every 12 months and network capability every 9 months—it has become clear that increasingly capable hardware is not the only requirement for computation-enabled discovery. Sophisticated software, visualization tools, middleware (that is, software acting as intermediary between different application components) and scientific applications created and used by interdisciplinary teams are critical to turning bytes and bits into scientific breakthroughs. It is the combined power of these capabilities that is necessary to advance the frontiers of science and engineering, to make seemingly intractable problems solvable, and to pose profound new scientific questions.



The Alaska Region Research Vessel, pictured here in an artist's rendition, is a new addition to the national academic research fleet that will provide improved Arctic science capabilities for extended periods of the year in the challenging icy waters of the Arctic.

The 2007 Budget proposes two new research-related construction starts: the Alaska Region Research Vessel (ARRV) and the Ocean Observatories Initiative. ARRV is a ship that will provide dramatically improved access to Alaskan waters, enabling further research and exploration throughout a greater period of the year. As scientists strive to understand a variety of complex regional and global ecosystem and climate issues, the need to conduct research at the ice edge and in ice up to three feet thick has become increasingly urgent. With an operating year of up to 300 days, this ship could accommodate upwards of 500 scientists and students at sea annually. The Budget provides \$56 million to initiate ARRV construction.

Implementing the Ocean Observatories Initiative represents a bold step forward in advancing the Nation's ability to study and understand the world's oceans. Consisting of a network of sensors, imaging systems, cable networks, and buoys distributed among U.S. coastal and worldwide deep-sea sites, the observatories will improve

## FOCUSING ON THE NATION'S PRIORITIES—Continued

scientific understanding of physical and biological features and processes in the oceans. These observatories will be coordinated with the Government-wide Integrated Ocean Observing System to provide a large group of researchers with fundamentally new tools for local, regional, and global ocean science. The Budget provides \$13.5 million to start construction toward this initiative.

### *Strengthening the U.S. Science and Engineering Workforce*

The 2007 Budget will continue NSF's efforts to expand scientific and numerical literacy and prepare U.S. students for the science and engineering workforce, with a focus on broadening participation in those fields. NSF makes strategic investments in K–12, undergraduate, graduate, and postdoctoral education. The Budget funds graduate fellowships and traineeships for approximately 4,500 graduate students across the country. NSF funding for basic research at U.S. academic institutions supports the education of future U.S. scientists and engineers.

Critical to the success of future generations of scientists and engineers is the education that the Nation's youngest students receive today. NSF is working to address the critical issue of improving grade-school science education by increasing the funding for its core education programs, including rigorous education research and evaluation, by 3.6 percent, and making those programs more focused, flexible, and effective.

NSF's programs support participation in science and engineering by individuals and by institutions that serve significant numbers of students and communities, including women and minorities. An increasing emphasis on educational programming and outreach by NSF-supported researchers is expanding the resources available to the Nation's K–12 and postsecondary institutions to develop and strengthen programs in science, technology, engineering, and mathematics.

## RESTRAINING SPENDING AND MANAGING FOR RESULTS

NSF continues to demonstrate flexibility and responsiveness in managing its programs. This is evidenced in the Effective ratings across all the Program Assessment Rating Tool assessments for NSF’s programs, as well as in the leadership NSF has provided in E-Government and other President’s Management Agenda activities.











NSF uses a competitive awards process to ensure the quality of individual grant recipients, as well as periodic external expert review of its programs that approve those grants. This process is an efficient and effective way of funding the most promising proposals. The 2007 Budget supports enhancing the tools NSF uses to solicit, process, and review its proposals and monitor its awards. FastLane, NSF’s Internet-based grants processing system, enables NSF to electronically process virtually all of the proposals the Agency receives each year. Over 250,000 scientists, engineers, educators, and research administrators use this system to submit and review proposals and report project results.

NSF’s web-based system to process proposals electronically is the cornerstone of NSF’s efforts to modernization its information technology (IT) systems, leveraging innovative technology to re-engineer and optimize business processes. This system, called eJacket, provides NSF staff with a single, web-based application designed to process proposals electronically from submission through decision. eJacket is a key electronic work horse, supporting the processing of 41,700 proposals in 2005.



NSF will be providing IT services for other research-focused grant making agencies in light of the goals established by the Office of Management and Budget for the emerging Government-wide Grants Management Line of Business. As a designated Consortia Provider Candidate for that initiative, NSF will leverage its extensive capability and experience base to provide grants management-related information technology services for other Government agencies. In 2007, NSF will begin developing the infrastructure and capabilities necessary to cross-service other grant making agencies.

### *Update on the President’s Management Agenda*

The table below provides an update on NSF’s implementation of the President’s Management Agenda as of December 31, 2005.

	Human Capital	Competitive Sourcing	Financial Performance	E-Government	Budget and Performance Integration
<b>Status</b>					
<b>Progress</b>					
<p>NSF made great strides this year in improving its management of human capital, documenting its accountability system, and updating its Senior Executive Services performance policy and appraisal system. The Agency receives virtually all of its research proposals electronically and has a comprehensive plan for continued improvement of its information technology security program. It is an active partner in several interagency E-Gov initiatives, and was recently designated as a Consortia Provider Candidate for the Grants Management Line of Business. NSF prepared its 2005 audited financial statements on time and earned an unqualified opinion in its 2005 audits. NSF can report the full cost of achieving its performance goals. NSF completed a streamlined competition for administrative and technical support for award oversight and monitoring.</p>					

**RESTRAINING SPENDING AND MANAGING FOR RESULTS—Continued**

Initiative	Status	Progress
Eliminating Improper Payments		
<p><i>Arrows indicate change in status rating since the prior evaluation as of September 30, 2005. Double up arrows indicate that the status rating was upgraded from red to green.</i></p> <p>NSF produced a new Improper Payments plan and successfully executed it. A review found NSF's improper payments rate to be only a few hundredths of one percent.</p>		

**National Science Foundation**  
(In millions of dollars)

	2005 Actual	Estimate	
		2006	2007
<b>Spending</b>			
Discretionary Budget Authority:			
Research and Related Activities .....	4,230	4,331	4,666
Education and Human Resources .....	841	797	816
Major Research Equipment and Facilities Construction .....	174	191	240
Salaries and Expenses.....	223	247	282
Office of the National Science Board .....	4	4	4
Office of the Inspector General .....	10	11	12
Total, Discretionary budget authority .....	5,482	5,581	6,020
Total, Discretionary outlays .....	5,372	5,623	5,726
Mandatory Outlays:			
H-1B Fee Programs .....	44	76	87
All other .....	19	61	25
Total, Mandatory outlays .....	63	137	112
Total, Outlays .....	5,435	5,760	5,838