NATIONAL SCIENCE FOUNDATION

Since 2001, the Administration:

- Funded over 30,000 research grants through 2003 at the National Science Foundation through a competitive, merit-based process with external peer review;
- Increased average grant size from $114,000 per year in 2001 to a projected $139,000 per year in 2004;
- Completed funding for the construction of four major research facilities to support atmospheric research, particle physics, earthquake engineering research, and an integrated network of high-end computers;
- Initiated construction of three new research facilities for astronomy, astrophysics, and seismic research; and
- Implemented the research and development investment criteria at NSF, which has reinforced existing practices such as merit-based competition and external review to assess programs.

The President's Budget:

- Recognizes the National Science Foundation's performance by supporting its efforts to build and sustain U.S. world leadership across fields of science and engineering;
- Increases funding across NSF for nanotechnology research to $305 million in 2005, a 104-percent increase since 2001; provides $760 million for networking and information technology research and development, a 19-percent increase since 2001; and strengthens support for the mathematical and physical sciences to $1,115 million in 2005, an increase of 30 percent since 2001;
- Enhances the research facilities available in fields such as astronomy, physics, ocean sciences, earthquake research, materials research, and the environment;
- Modernizes the tools and processes the National Science Foundation uses to administer its grants in research and education; and
- Provides graduate fellowships and traineeships to 5,500 graduate students across the country, which is 1,800 more than in 2001.

National Science Foundation

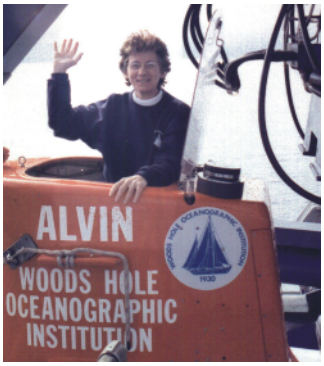
Dr. Rita R. Colwell, Director

www.nsf.gov 703–292–8000

Number of Employees: 1,300

2005 Discretionary Budget Authority: $5.7 billion

Major Assets: Antarctic facilities; five federally funded research and development centers.



Dr. Colwell emerges from the ALVIN submersible after a dive to the deep-sea vents of the Juan de Fuca Ridge.

OVERVIEW

The basic research investments of the National Science Foundation (NSF) form the backbone of many science and engineering disciplines and capabilities in the United States. Basic research has been responsible for many breakthroughs and has been strongly linked to economic growth. The agency provides merit-based awards to individual researchers and groups at over 2,000 U.S. colleges, universities, and other institutions. Although NSF represents about four percent of the total Federal budget for research and development (R&D), it accounts for approximately 45 percent of non-life-science basic research at U.S. academic institutions. NSF's broad support for basic research, particularly at U.S. academic institutions, provides crucial underwriting for discovery in many fields and supports the development of the next generation of scientists and engineers.

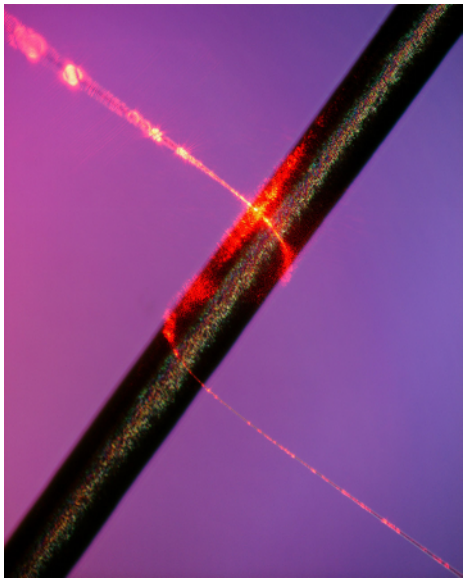
NSF awards research funding based on the merits of the proposed activities, including their potential impact on society. NSF ensures quality in its programs by using competitive merit review of grant proposals, coupled with periodic external review of its research and education programs that approve those grants. These practices are consistent with the Research and Development Investment Criteria, a component of the President's Management Agenda.

The 2005 Budget, which provides the highest amount ever requested for NSF and an increase of 29 percent since 2001, strengthens priority research investments in nanotechnology, information technology, and other fields of science and engineering; supports construction and operation of research facilities; advances development of the U.S. science and engineering workforce; and modernizes the tools that NSF uses to solicit, process, and review proposals, as well as monitor its awards. The Budget initiates construction of installations to support ecological observations, a ship that will drill samples of the ocean floor to give new insights into the earth's crust, and a facility to expand our understanding of fundamental particle physics.

America's economic strength depends on continuing our Nation's rich tradition of creativity and innovation provided through investment in fundamental research and development. To maintain and improve our Nation's security, prosperity, and quality of life, significant NSF resources are dedicated to delivering the scientific breakthroughs that will transform our future. Two top priority areas expected to have significant economic impact are the National Nanotechnology Initiative, funded at $305 million, a 20-percent increase over 2004, and Networking and Information Technology R&D, funded at $760 million, a four-percent increase over 2004.

UNDERWRITING DISCOVERY IN SCIENCE AND ENGINEERING

Most NSF awards are long-term investments that can have great payoffs, both in knowledge and in dollars. Basic research at NSF has yielded important scientific discoveries that have boosted economic growth and have enhanced the quality of life through, for example, earlier detection of cancer, better weather forecasting, and technologies that enabled the Internet. Basic research in nanotechnology and other emerging areas of science and engineering will provide more discoveries that will further improve the quality of life.



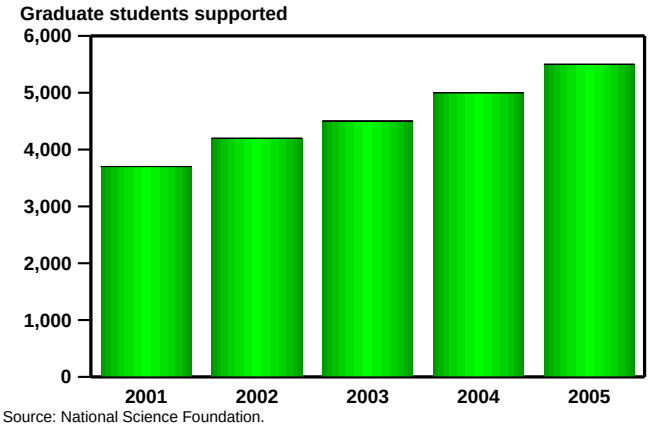
Wires Thinner than Light? NSF-funded researchers at Harvard are part of a team that has developed fibers—"nanowires"—that are thinner than the wavelengths of light they carry. As illustrated, they may be as thin as one-thousandth the width of a human hair.

The Administration's policy is to reinforce NSF investment in areas that will link discovery to innovation and learning, to maximize the likely benefit to society. For example, nanotechnology, which enables scientists and engineers to build mechanisms and structures atom by atom, holds promise for the development of technologies ranging from higher-performance materials to more efficient manufacturing processes, and from higher-capacity computer storage to advanced, microscopic biomedical instruments that could assist diagnosis or deliver medication in new ways within a patient's bloodstream. Since 2001, NSF funding for nanoscale science and engineering has increased by 104 percent, from $150 million to $305 million proposed in 2005. In that time, NSF-funded nanotechnology research has advanced our understanding of how materials function at the molecular level and of how nanoscale mechanisms can be constructed to function wherever they are used.

The 2005 Budget also provides significant NSF funding for fundamental research related to homeland security, information technology, and climate change. These investments will rapidly improve our understanding in these priority areas, while training the scientists and engineers who will spur innovation and transform these fields.

Strengthening the U.S. Science and Engineering Workforce

Three NSF Programs Will Support 5,500 Graduate Students in 2005



Source: National Science Foundation.

The 2005 Budget will enable NSF to increase the agency's efforts to prepare U.S. students for the science and engineering workforce, with a focus on broadening participation in these fields. NSF makes strategic investments in K-12, undergraduate, graduate, and post-doctoral education. Through three graduate fellowship programs, the President's proposal will provide graduate fellowships and traineeships to 5,500 graduate students across the country, nearly 50 percent more than in 2001.

The President's Budget seeks to attract the most promising U.S. students into science and engineering programs by providing more

competitive graduate stipends. Annual stipends for NSF's fellowship and trainee programs have increased from $18,000 in 2001 to a projected $30,000 in 2005. Reducing the financial pressures students face significantly affects their choice of advanced education in science or engineering. Thanks in part to the increase in stipends in 2002, there was a dramatic increase in applications for NSF graduate fellowships, up from 5,560 in 2001 to 7,788 in 2003.

Sharpening Tools for Science and Engineering

NSF invests in science and engineering tools that are available to scientists throughout the world, including instruments, equipment, facilities, databases, and large surveys. The agency does not directly operate the large facilities that it supports, except those of the U.S. Antarctic Program. NSF primarily makes awards to universities and non-profit organizations to construct, manage, and operate large facility projects.

The Program Assessment Rating Tool (PART) analysis of these activities indicates the overall purpose of NSF's investment in research infrastructure is clear and that the program is meeting most of its annual goals.

Imagine 64 of these in your back yard. The Atacama Large Millimeter Array will consist of an array of 64 mobile antennas based on one of these two prototypes.

Based on this performance, the President's 2005 Budget enhances science infrastructure capabilities in a wide range of fields of science and engineering, including astronomy, earthquake research, and environmental research. The Budget initiates construction of the National Ecological Observatory Network (NEON), the Scientific Ocean Drilling Vessel, and the Rare Symmetry Violating Processes (RSVP) installation. NEON is a proposed network of observatories across the country that would further advance ecology and climate research. The Scientific Ocean Drilling Vessel would provide a new resource to examine geological and biological processes beneath the ocean floor. RSVP would combine two groundbreaking experiments to address important scientific questions in physics that have the potential to transform our basic understanding of the universe.

Other continuing facility construction efforts include the Atacama Large Millimeter Array (ALMA), a telescope composed of 64 antennas, each 12 meters across, which will be located in Chile's Atacama Desert. The telescope is a joint effort among several countries, and is due to be completed by the end of 2011. ALMA's imaging qualities and its ability to change the configuration of its antennas will make ALMA astronomy's most versatile imaging instrument.

To enhance its ability to oversee the development and construction of research facilities, in 2003 NSF filled a new Deputy Director for Large Facility Projects position under the Chief Financial Officer and released a Facilities Management and Oversight Guide. The Large Facility Projects Deputy provides guidance for NSF projects to strengthen project management in accordance with policies and procedures that have been formalized in the Guide.

Accelerating in the Fast Lane

The 2005 Budget modernizes the tools NSF uses to solicit, process, and review proposals, as well as monitor its awards. Funding for the agency has grown significantly in the past decade, while the agency's staffing level has remained relatively flat. The agency has accommodated the increase in funding and responsibilities through effective use of information technology. NSF's FastLane grants processing system enables NSF to electronically process virtually all of the nearly 40,000 proposals NSF receives each year. Over 200,000 scientists, engineers, educators, and research administrators use this system to submit and review proposals and report project results. While the information technology investments of recent years have provided impressive gains in efficiency, dramatic increases in both the number and complexity of proposals submitted to NSF pose increasing administrative challenges. To address this challenge, NSF continues to enhance existing tools, while also reinventing fundamental agency processes to pursue an integrated approach to human capital, competitive sourcing, and E-Government. The 2005 Budget requests improvements in information technology to further modernize and coordinate the systems and processes NSF uses for merit review and grant management.

PERFORMANCE EVALUATION OF SELECT PROGRAMS

The Budget continues to focus on improving program performance. Four of NSF's programs were assessed using the Program Assessment Rating Tool (PART), which evaluated each programs' design and purpose, strategic planning efforts, how well they are managed, and whether they are generating positive results for taxpayers. Below are some of the highlights and recommendations from the PART evaluations. For further details on NSF's performance assessments, see the White House budget website at *www.whitehouse.gov/omb/budget/*.

Program	Rating	Explanation	Recommendation
Nanoscale Science and Engineering	Effective	The program has a clear purpose, is well-coordinated with other agencies, and is effective overall, but could be improved with additional attention to progress toward performance targets.	Increase support for peer-reviewed nanoscale science and engineering at NSF; continue to work with the agency to measure and assess progress as the program matures. NSF will initiate a more targeted review of the program in 2004.
Information Technology Research (ITR)	Effective	The program has had a clear purpose and has been effective in achieving that purpose.	The ITR priority area is being integrated into NSF's fundamental science and engineering core in 2005. It will be evaluated within that context in the future.

Program	Rating	Explanation	Recommendation
Facilities	Effective	The program is effective overall, but could be improved with additional attention to project management and progress toward performance targets.	Continue to monitor project management and progress toward performance targets.
Individuals	Effective	The program should continue to improve how it sets and meets its performance targets.	Continue to support NSF research and education to support individual researchers. Work with the agency to improve performance targets.

UPDATE ON THE PRESIDENT'S MANAGEMENT AGENDA

The table below provides information on NSF's implementation of the President's Management Agenda for the quarter ending December 31, 2003.

	Human Capital	Competitive Sourcing	Financial Performance	E-Government	Budget and Performance Integration
Status					
Progress					

NSF was recognized for its achievements in E-Government with a President's Quality Award. NSF receives virtually all of its research proposals electronically, has a comprehensive plan for continued improvement of its information technology security program, and continues as an active partner in several interagency E-Gov initiatives, including Grants.gov and E-authentication. NSF prepared its 2003 audited financial statements in 45 days, meeting the Government-wide deadline a full year earlier than required, and earning an unqualified opinion in its 2003 audits. NSF can now report the full cost of achieving its performance goals. For instance, NSF can calculate the total direct and indirect costs for efforts such as its Centers program. Improvements in the Human Capital and Competitive Sourcing Initiatives have been more challenging for NSF. NSF now has a new Human Capital Management plan that should lay the foundation for improvements in succession planning, recruitment, development, retention and employee recognition to ensure the high quality of the NSF workforce. While NSF has begun to develop an ambitious, integrated business plan for the agency, it will take time for this business plan to guide the agency's competitive sourcing strategy. NSF is one of 12 major R&D agencies that plan, manage, and assess their R&D programs consistent with the R&D Investment Criteria, which are discussed in detail in the Research and Development chapter in the *Analytical Perspectives* volume.

National Science Foundation

(In millions of dollars)

	Actual		Estimate	
	2001	2003	2004	2005
Spending				
Discretionary Budget Authority:				
Research and Related Activities	3,357	4,069	4,251	4,452
Education and Human Resources	785	903	939	772
Major Research Equipment and Facility Construction	122	149	155	213
Salaries and Expenses	161	189	219	294
National Science Board	—	4	4	4
Inspector General	6	9	10	10
Total, Discretionary budget authority	4,431	5,323	5,578	5,745
Total, Discretionary outlays	3,651	4,678	5,198	5,500
Mandatory Outlays:				
H–1B Fee Programs	11	35	109	61
All other	28	23	39	25
Total, Mandatory outlays	39	58	148	86
Total, Outlays	3,690	4,736	5,346	5,586