

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

National Science Foundation



FY 2011

BUDGET REQUEST

MISSION: To promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense.

—From the National Science Foundation (NSF) Act of 1950

VISION: Advancing discovery, innovation, and education beyond the frontiers of current knowledge, and empowering future generations in science and engineering.

—From National Science Foundation Investing in America's Future, FY 2006–2011 Strategic Plan

Discovery.

ABOUT NSF

- Created by Congress in 1950 as an independent federal agency to promote American science and engineering (S&E)
- Only federal agency that funds basic research and education across all fields of S&E and at all levels of S&E education
- Seeks high-risk, potentially transformative projects that will generate path-breaking discoveries and new technologies and develop a dynamic workforce
- Funds advanced instrumentation and facilities
- Supports Arctic and Antarctic research, science operations, and other related activities for the U.S. polar research program
- Supports cooperative research between universities and industry and United States participation in international scientific efforts
- Nearly 90 percent of funding allocated through a merit review process as grants or cooperative agreements to individual researchers and groups at colleges, universities, academic consortia, nonprofit institutions, and small businesses
- Supported 187 Nobel laureates, including 21 in last 5 years

BENEFITS TO SOCIETY

Investing in science and technology fosters economic growth; creates high-tech, high-wage jobs that allow American workers to lead the global economy; improves the quality of life for all Americans; and strengthens our national security. NSF's investments produce both tangible and intangible benefits that keep the United States at the forefront of science and engineering.

Examples of NSF Investments

New Knowledge such as quantum computing, nanotechnology, computer visualization techniques, and metagenomics

World-Class Facilities such as the U.S. South Pole Station, Alaska Region Research Vessel, Laser Interferometer Gravitational-Wave Observatory, and Large Hadron Collider

New Tools, Methods, and Processes such as the Internet, magnetic resonance imaging, novel materials, biofuels, and nanoelectronics

Insight into National and Global Challenges such as green gasoline, climate change, environmental protection, cybersecurity, sustainable energy, and homeland security

A Highly Trained Workforce through programs such as Advanced Technological Education and Graduate Research Fellowships

Resources for Teachers and Students such as Graduate STEM Fellows in K-12 Education, the Math and Science Partnership program, and curriculum and laboratory improvement programs

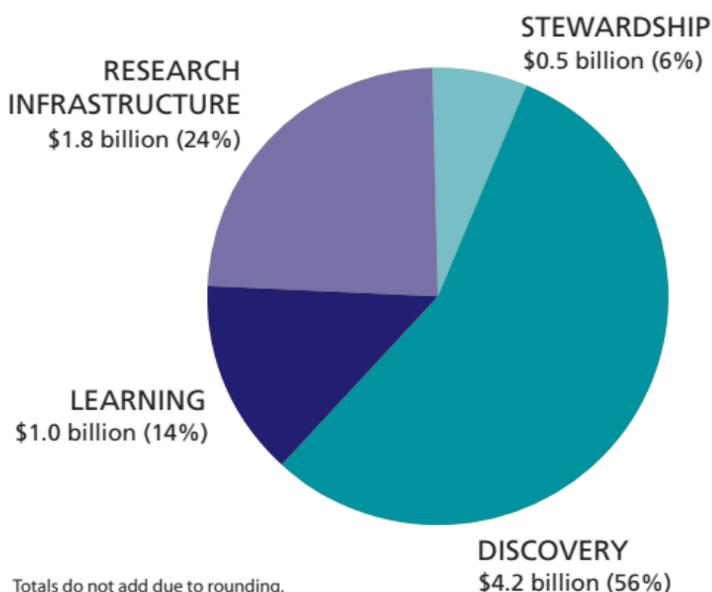
Learning.

FY 2011 BUDGET REQUEST

NSF Budget by Appropriation (dollars in millions)

	FY 2010 Estimate	FY 2011 Request	Change (FY 2011/ FY 2010)
Research and Related Activities	\$ 5,563.92	\$ 6,018.83	\$ 454.91 (8.2%)
Education and Human Resources	872.76	892.00	19.24 (2.2%)
Major Research Equipment and Facilities Construction	117.29	165.19	47.90 (40.8%)
Agency Operations and Award Management	300.00	329.19	29.19 (9.7%)
National Science Board	4.54	4.84	0.30 (6.6%)
Office of Inspector General	14.00	14.35	0.35 (2.5%)
TOTAL	\$ 6,872.51	\$ 7,424.40	\$ 551.89 (8.0%)

NSF FY 2011 Budget Request by Strategic Goal—\$7.4 Billion



Research Infrastructure.

Administration Priority Programs

- Graduate Research Fellowships: \$158 million
- Faculty Early Career Development program (CAREER): \$209 million
- Climate Change Education: \$10 million
- Advanced Technological Education: \$64 million

FY 2011 Investment Priorities

- Science, Engineering, and Education for Sustainability (SEES): \$766 million
- Cyberlearning Transforming Education (CTE): \$41 million
- Comprehensive Broadening Participation of Undergraduates in STEM: \$103 million
- National Ecological Observatory Network (NEON): \$35 million
- Stewardship:
 - Assessment Capabilities: \$1 million
 - Acquisition Workforce: \$2 million

Discovery: Foster research that will advance the frontiers of knowledge, emphasizing areas of greatest opportunity and potential benefit and establishing the Nation as a global leader in fundamental and transformational science and engineering.

Learning: Cultivate a world-class, broadly inclusive science and engineering workforce and expand the scientific literacy of all citizens.

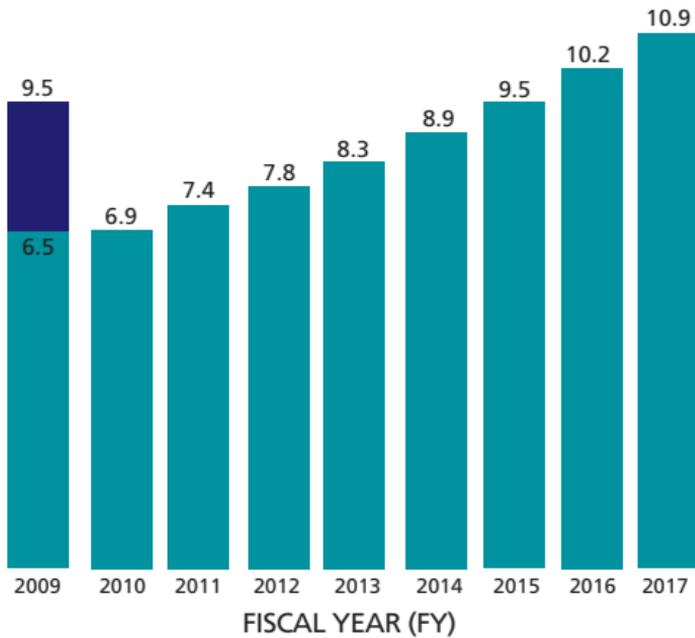
Research Infrastructure: Build the Nation's research capability through critical investments in advanced instrumentation, facilities, cyberinfrastructure, and experimental tools.

Stewardship: Support excellence in science and engineering research and education through a capable and responsive organization.

Stewardship.

Total NSF Funding: President's Plan for Science and Innovation, FY 2009–FY 2017

(dollars in billions)



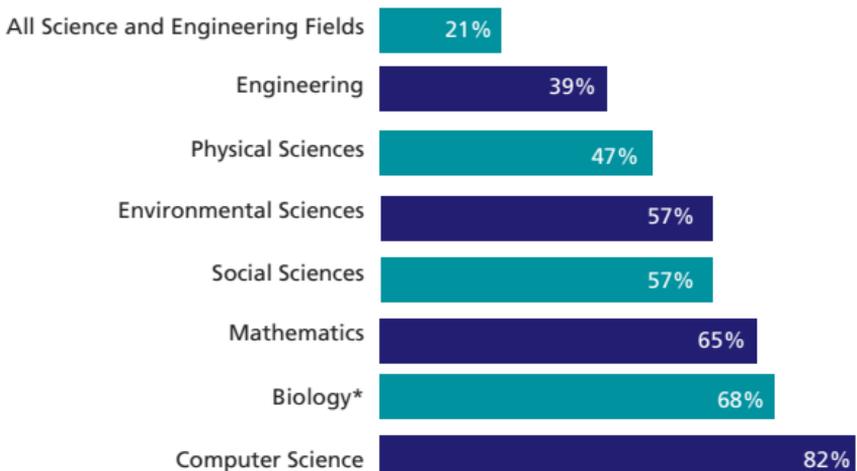
■ Recovery Act funding of \$3.0 billion increased NSF's FY 2009 total appropriation to \$9.5 billion.

NSF's contribution to the National Innovation Strategy

- Restore American leadership in fundamental research.
- Educate the next generation with 21st century knowledge and skills while creating a world-class workforce.
- Support research for next-generation information and communications technology and cybersecurity.
- Encourage innovation-based entrepreneurship, and create competitive communities by promoting regional innovation clusters.

NSF Support of Academic Basic Research in Selected Fields

(as a percentage of total federal support)



*Excludes the National Institutes of Health.

Source: NSF Survey of Federal Funds for Research and Development.

AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

NSF Program/Activity (dollars in millions)	Funds Received	Funds Obligated (as of 9/30/09)
Research & Related Activities (R&RA)		
Core Research, Facilities, and Infrastructure Investments	2,000	1,963
Major Research Instrumentation	300	100
Academic Research Infrastructure	200	0
Total, R&RA	\$2,500	\$2,063
Education & Human Resources (EHR)		
Robert Noyce Scholarship Program	60	60
Math and Science Partnership Program	25	25
Science Masters' Program	15	0
Total, EHR	\$100	\$85
Major Research Equipment and Facilities Construction (MREFC)		
Alaska Region Research Vessel	148	148
Advanced Technology Solar Telescope	146	0
Ocean Observatories Initiative	106	106
Total, MREFC	\$400	\$254
TOTAL	\$3,000	\$2,402 (80%)
Note: The Office of Inspector General received \$2 million for oversight activities.		

ABOUT THE COVER

Researchers Yonggang Huang at Northwestern University and John Rogers at the University of Illinois at Urbana-Champaign have developed circuits that can stretch, bend, and even twist! In the past there have been limits for the use of electronic components—which have been flat and unbendable—due to the fact they are made primarily of silicon, which is brittle and inflexible. Bending or stretching would make the component useless. Now, Huang and Rogers, improving on past work, have developed a process to produce stretchable electronics, increasing the stretching range by as much as 140 percent and allowing users to subject circuits to extreme twisting. Potential uses include flexible sensors, transmitters, and new photovoltaic and microfluidic devices, as well as areas of medicine and athletics. Huang and Rogers are also looking into possible application of their technology in solar panels.

Credit: John Rogers, University of Illinois

DISCOVERY



Credit: © 2009 Tim White and Gen Suwa; rendered by Primary Pictures

In a large collaborative effort, scientists discovered a female skeleton, *Ardipithecus ramidus*. Nicknamed *Ardi*, the female skeleton is 4.4 million years old—1.2 million years older than “Lucy,” the fossil previously recognized as the earliest hominid skeleton ever found. *Ardi* represents a new kind of hominin—the family that includes humans and our ancestors but does not include ancestors of other living apes. *Ardi*’s anatomy is unusual and is not similar to living apes or later hominins, including *Lucy*. Her bones indicate that she walked upright while still living in the woodland, suggesting that our ancestors started walking upright on branches. The discovery of *Ardi* was named the “Breakthrough of the Year” by the journal *Science*.

LEARNING



Credit: Summer Research Program for Secondary School Science Teachers, Columbia University

Samuel Silverstein and his colleagues at Columbia University found that research experiences for science teachers can have a direct impact on the achievement of their students, significantly increasing student performance on state assessment tests. Silverstein is the founder and director of Columbia University’s Summer Research Program for Secondary School Science Teachers (CUSR), a program that gives middle and high school science teachers from New York City an opportunity to work on research projects at Columbia University. Silverstein found that students of teachers who had participated in CUSR for more than 2 years scored 10 percentage points higher on New York State’s Science Regents examinations as compared to students whose teachers had not participated.

RESEARCH INFRASTRUCTURE



Credit: NRAO/AUI/NSF

Astronomers using NSF’s Very Large Array (VLA) radio telescope have gained insight into the nature of the most distant object ever observed in the universe—a gigantic stellar explosion known as a gamma ray burst (GRB). The explosion was first detected on April 23, 2009, by NASA’s Swift satellite, and scientists soon realized that it was more than 13 billion light-years from Earth. It represents an event that occurred 630 million years after the Big Bang, when the Universe was only four percent of its current age of 13.7 billion years. This explosion provided an unprecedented look at an era when the Universe was very young and undergoing drastic changes. The scientists concluded that the explosion was more energetic than most GRBs, was a nearly-spherical blast, and that it expanded into a tenuous and relatively uniform gaseous medium surrounding the star. The VLA is one of the world’s premier astronomical radio observatories, consisting of 27 radio antennas in a Y-shaped configuration.

NSF by the Numbers

\$7.4 billion	FY 2011 Budget Request
2,000	Colleges, universities, and other institutions that received NSF funding in FY 2009
45,000	Proposals evaluated in FY 2009 through a competitive merit review process
14,600	Competitive awards funded in FY 2009
239,000	Proposal reviews conducted in FY 2009
241,000	People involved in NSF-supported programs and activities in FY 2009 (researchers, postdoctoral fellows, trainees, teachers, and students)
42,000	Students supported by NSF Graduate Research Fellowships since 1952

For more information:

- *NSF's FY 2011 Budget Request*
www.nsf.gov/about/budget
- *Research and Education Results Supported by NSF*
www.nsf.gov/discoveries
- *NSF's Budget and Performance website*
www.nsf.gov/about/performance
- *American Recovery and Reinvestment Act of 2009*
www.nsf.gov/recovery
www.Recovery.gov
- *NSF Investing in America's Future; Strategic Plan FY 2006–2011*
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf0648
- *Stretchable and Twistable Electronics*
www.nsf.gov/news/mmg/mmg_disp.cfm?med_id=65335&from=mmg
- *Ethiopian Desert Yields Oldest Hominid Skeleton*
www.nsf.gov/news/news_summ.jsp?cntn_id=115709
- *Teaching the Teachers*
www.nsf.gov/news/news_summ.jsp?cntn_id=115775
- *Blast From the Past Offer Clues About Early Universe*
www.nsf.gov/news/news_summ.jsp?cntn_id=115875



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