



National Science Foundation

WHERE DISCOVERIES BEGIN



The National Science Foundation is more than an agency of government or a funding mechanism for science and engineering. The work of NSF is a sacred trust that every generation of Americans makes to those of the next generation, that we will build on the body of knowledge we inherit and continue to push forward the frontiers of science. We never lose sight of NSF's obligation to "explore the unexplored" and inspire all of humanity with the wonders of discovery and the thrill of innovation. As the only Federal agency dedicated to the support of basic research and education in all fields of science and engineering, NSF has empowered discoveries across a broad spectrum of scientific inquiry for more than six decades. The result is fundamental scientific research that has had a profound impact on our nation's innovation ecosystem and kept our nation at the very forefront of the world's science-and-engineering enterprise.

Dr. France A. Córdova
Director, National Science Foundation

Unlocking the Secrets of Science

The National Science Foundation invests in fundamental research conducted by the brightest minds and pursues ideas that can change our lives. Advised by the research community, NSF identifies unique approaches to looking at a question or studying an idea, and excites the next generation of scientists and engineers. NSF is unique in supporting all stages of research and all ages, with a portfolio ranging from the subatomic to the intergalactic scale. Often the long-term return on NSF investments leads to new technologies, new ways to understand our world, new insights into the human condition and new products and services that transform our economy. And, with an eye to inspiring the next generation workforce, NSF plays a vital role in keeping the United States at the competitive forefront of discovery and innovation.

NSF's unique mission is as broad as science itself. The agency supports research in biological science; computer and information science; education and human resources; engineering; geoscience; mathematical and physical science; and social, behavioral and economic science; as well as interdisciplinary research among these fields.



NSF Director France Córdova tries out one of Colorado State University's hands-on exhibits during the 2014 USA Science and Engineering Festival.

NSF at a Glance

\$7.3 billion

FY 2015 Appropriation

24 percent

NSF's share of total federal support for basic research conducted at academic institutions

11,000

Competitive awards funded by NSF

23 percent

Funding rate of proposals submitted to NSF

48,100

Proposals evaluated through competitive merit review

225,800

Number of proposal reviews

35,000

Number of experts who participate in the merit review process

1,826

Colleges, universities and other institutions in all U.S. states and territories that receive NSF funding

320,900

Number of people NSF supports directly (researchers, postdoctoral fellows, trainees, teachers and students)

214

Number of Nobel Laureates supported by NSF

94 percent

Proportion of NSF funding allocated through grants and cooperative agreements

\$180,500

Average annual size of NSF competitive award

3.0 years

Average duration of NSF competitive award

Figures represent FY 2014 actuals except where noted.



The Cosmic Web (cover image)

(Segment of) 1st place Informational Posters & Graphics, 2011 International Science & Engineering Visualization Challenge. Galaxies don't grow out of nothing. Instead, their formation is decided by underlying but invisible accumulations of dark matter. Scientists suspect that this theoretical substance gives rise to most of the gravity in the universe. In regions where dark matter is dense, galaxies begin to form, often grouping together in clusters or long walls.

Our Commitment to Meeting National Needs

Every scientific discovery travels its own path from inspiration to success. Such breakthroughs have expanded our understanding of the world in which we live, led to life-saving medical advances, enhanced our national security, improved our everyday lives and yielded insights into the creation of the universe. The simple truth about fundamental scientific research is that before these discoveries were found, no one knew they were there. Such research takes time, inspiration, hard work--and timely funding support. NSF provides resources that help researchers carry out their vital work.

Biodiversity is a Disease Defender

Why should we care about biodiversity? One reason is that plant and animal extinctions are bad for your health. Infectious diseases such as West Nile virus and Lyme disease, which were contracted by over 35,000 Americans in 2012, are transmitted by mosquitoes and ticks. Intact ecosystems support more predators that prey on disease carriers. Hence, humans are less likely to be exposed to disease.

Self-driving Cars

The development of real-time sensors, smart algorithms and verification tools are enabling self-driving cars to effectively sense their surroundings and act in complex, dynamic environments. The deployment of autonomous vehicles could prevent thousands of automobile-related fatalities and injuries resulting from the almost 11 million traffic collisions occurring in the U.S. each year.

Building a More Diverse STEM Workforce

The National Girls Collaborative Project informs girls about STEM careers and encourages their pursuit. Based in the state of Washington, it supports activities and resources in 27 locations across 36 states. Nearly 3,000 organizations serve about 5.6 million girls, including the most demographically underrepresented groups in STEM (e.g., Latinas, African Americans and Native Americans). The project exposes practitioners to new research on gender and STEM to support engaging and inspiring girls in STEM subjects.

Let There Be Sight

In 2013, the U.S. Food and Drug Administration granted market approval of an artificial retina, the first bionic eye approved for U.S. patents. The prosthetic system—developed with early, crucial support from NSF—will allow people with blindness (including the 100,000 people in the U.S. with the inherited, degenerative eye disease retinitis pigmentosa) to locate objects, detect movement, improve orientation and mobility, and discern shapes such as large letters. The artificial retina is manufactured and distributed by Second Sight Medical Products Inc. in California.

Seismic Shaking

Seismic waves, waves of energy created by earthquakes or an explosion, result in thousands of lives lost and billions of dollars of infrastructure damage. Modeling the propagation of seismic waves in and on the Earth allows geoscientists to monitor the reliability of nuclear test bans, improve earthquake models and enhance the understanding of seismic sources. In fact, seismic sensors alerted the U.S. to North Korea's underground nuclear testing.

Fundamental Physics for a Better GPS

Einstein's theories of relativity are fundamental to the current understanding of cosmic phenomena, ranging from black holes to the origin of the universe to the accuracy of global positioning system (GPS) devices. Their use in navigation, disaster relief, defense mapping and more is widely known. Less known is the essential role that relativistic corrections play in the accuracy of GPS devices. Without them, GPS localization would accumulate errors at a rate of 10 km a day.

Robotics Serving Humanity

In 2012, 19 percent of the U.S. population were age 60 or over. This percentage is projected to increase to 27 by 2050. Hence, service robots, which constitute a projected multi-billion-dollar world market, will contribute directly to the quality of life of the nation's older adults. These handy helpers will prolong independent living and decrease the burden on caregivers. Jaemi, a humanoid robot, embodies efforts by U.S. and Korean research collaborators to advance humanoid development. This international team seeks to enable robots to interact in real-time, socialize with humans and handle objects.

Real-time, First-line Emergency Response

Geologists are constantly trying to improve the prediction of natural disasters, but their work would be in vain if not for social scientists' understanding of how people react during an emergency. Scientists designed a computer-based disaster mitigation system to ensure people in the path of impending danger heed emergency instructions. The system utilizes ultra-fast Internet systems to deliver real-time information to emergency workers and residents. The system has already been implemented in Chattanooga, Tenn.



Strategic Goals and Objectives

Goal 1: Transform the Frontiers of Science and Engineering

- Objective 1:* Invest in fundamental research to ensure significant continuing advances across science, engineering and education.
- Objective 2:* Integrate education and research to support development of a diverse STEM workforce with cutting-edge capabilities.
- Objective 3:* Provide world-class research infrastructure to enable major scientific advances.

Goal 2: Stimulate Innovation and Address Societal Needs through Research and Education

- Objective 1:* Strengthen the links between fundamental research and societal needs through investments and partnerships.
- Objective 2:* Build the capacity of the Nation to address societal challenges using a suite of formal, informal and broadly available STEM educational mechanisms.

Goal 3: Excel as a Federal Science Agency

- Objective 1:* Build an increasingly diverse, engaged and high-performing workforce by fostering excellence in recruitment, training, leadership and management of human capital.
- Objective 2:* Use effective methods and innovative solutions to achieve excellence in accomplishing the agency's mission.



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