

Scientific Research

Research in science and engineering is the backbone of America's innovation economy. The federal investment in basic research in the physical sciences and engineering has strengthened national security, improved health care, advanced alternative energy and efficiency technologies, made possible the education of generations of scientists and engineers, and fueled economic growth and American jobs.



Economy/American Jobs Federal investment in scientific research pays huge dividends by boosting America's innovation capacity, strengthening our global competitiveness, and creating high-skill, high-wage jobs.



Education The investment in scientific research at America's universities and national labs not only produces new discoveries and ideas but also trains the next generation of scientists and engineers.



National Security Investments in scientific research lead to advanced technologies for equipping our modern forces and defending the nation, and for providing homeland threat detection capabilities.



Health Many advances in fighting disease are the result of cutting-edge technologies that come from federally funded research in the physical sciences and engineering at our universities and national laboratories.



Energy and Environment Developing alternative energy sources and improving energy efficiency require federal support of basic research. Discoveries will help reduce U.S. dependence on foreign oil as well as improve the environment.



The Task Force on American Innovation is an alliance of America's leading companies, research universities, and scientific societies. America's future relies on investment in ideas and discovery. We advocate for robust and sustained research budgets at the National Science Foundation, the Department of Energy Office of Science, the National Institute of Standards and Technology, and the Department of Defense, as well as the National Aeronautics and Space Administration and other agencies that support basic research. Find the Task Force on American Innovation at www.innovationtaskforce.org, on Twitter at @InnovTaskForce, and on Facebook.

National Science Foundation

The National Science Foundation (NSF) is an independent federal agency that supports fundamental research and education in science and engineering. From aircraft design, pioneering medical tools, and robotics, to climate prediction and discovering how children learn mathematics, NSF has played a key role in funding discoveries that drive the nation's economy, enhance national security, and improve quality of life.

NSF provides more than 20 percent of the federal support for basic research at academic institutions. Because its mission is broad-based, its investments reach faculty and students in most departments, schools, and academic disciplines. Every year, an estimated 200,000 people, from undergraduates to senior faculty, participate directly in NSF research and education programs.

The agency also supports high-risk research and novel collaborations that could deliver exceptionally high rewards in the future. NSF ensures that all research is fully integrated with education to train tomorrow's top scientists and engineers. For example, Google emerged from work on search engines by an NSF graduate research fellow at Stanford University.

Improving STEM education has also been a key mission for NSF throughout its existence. NSF programs from K-12 through the postgraduate level seek not only to prepare the next generation STEM workforce but also to improve scientific knowledge throughout society.

WHAT NSF RESEARCH HAS GIVEN US:



WEB BROWSERS

Made it possible to "surf" — find, retrieve, and view information on — the World Wide Web.



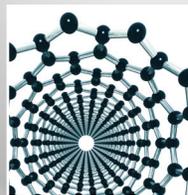
DOPPLER RADAR

Enables meteorologists to predict weather and the police to catch speeders.

Photo courtesy of The Weather Channel Companies



BARCODES – Today, we scan barcodes to do everything from checking out at the store to boarding an airplane.

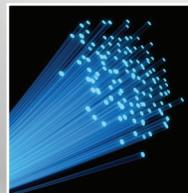


NANOTECHNOLOGY

Manipulating matter on an atomic or molecular scale is leading to the creation of new materials and a host of other applications.



SPEECH RECOGNITION – Enables our cellphones and automobile navigational tools to understand our commands.



FIBER OPTICS

Light-transmitting glass fiber speeds your email or your tweet around the globe.



TASK FORCE ON AMERICAN INNOVATION

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Department of Energy Office of Science

The Office of Science maintains the nation's scientific infrastructure and ensures U.S. world leadership across a broad range of scientific disciplines.

The agency supports the work of thousands of scientists at the nation's universities who conduct research in support of DOE's mission. These researchers often utilize scientific user facilities overseen by the Office of Science and based at the DOE National Laboratories, which in turn employ thousands of additional scientists.

The Office of Science's research investments have yielded a wealth of dividends, including significant technological innovations, medical and health advances, and new intellectual capital.

For example, research supported by the agency contributed to the development of the Internet; magnetic resonance imaging (MRI) and medical isotopes; composite materials; and X-ray diagnostics of computer chips and other high-tech materials.

Additionally, the investments have yielded numerous Nobel Prizes, including for the discovery of new forms of carbon and the historic discovery of quarks and leptons. It has also improved computer models for understanding global climate change.

The Office of Science is funding polymer and nanoscience research aimed at making lithium ion batteries for hybrid vehicles safer and longer-lasting. It is also helping to develop the next generation of biofuels.

WHAT DOE'S BASIC RESEARCH HAS GIVEN US:



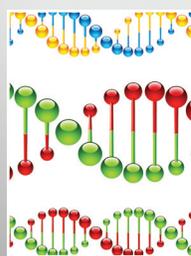
ADVANCED VEHICLE & SOLAR TECHNOLOGIES – Enabled the development of lithium ion batteries for electric and plug-in hybrid vehicles.



BIOFUELS
Biofuels, made from switchgrass, are an important piece of the puzzle for our energy future.



MAGNETIC RESONANCE IMAGING (MRI) – in conjunction with NSF and NIH - Enables doctors to improve the detection and diagnosis of medical conditions through the examination of internal structures.



DNA SEQUENCING & COMPUTATIONAL TECHNOLOGIES
Made possible the unraveling of the human genetic code and the publishing of a complete draft of the DNA sequence of the human genome in 2001.



ADVANCED SENSORS
Help law enforcement personnel detect trace quantities of nuclear, chemical, and biological agents and explosives.



DOD Research: Innovations That Support Our Forces Around the Globe

A HEMCON BANDAGE: The HemCon bandage stops hemorrhaging within minutes. Research and development funded by the Army and performed by the U.S. Army Medical Research and Material Command.

B INTERCEPTOR BODY ARMOR: Flexible, lightweight, highly ballistic-resistant body armor system that protects soldiers in combat. Materials and engineering design research sponsored by the Marine Corps, Army, and DARPA.

C JOINT PRECISION AIR DROP SYSTEM: Improved air delivery drops food and equipment closer to soldiers, increases survivability of aircraft personnel and critical supplies, and makes humanitarian relief more efficient. Joint Army/Air Force research.

D LASER DESIGNATOR: Laser sights increase precision of weapons in the field. Laser research started at Bell Labs in the 1950s and later sponsored by the Army and Air Force.

LUMINESCENT POLYMERS FOR EXPLOSIVE SENSING: DOD-sponsored research has identified nanotechnologies that detect hidden improvised explosive devices (IEDs).

E MEAL, READY-to-EAT: Advanced technologies protect food rations from deteriorating in extreme environments, enhance soldiers' physical endurance, and help detect food contaminants. Army-sponsored research at Natick Soldier Research, Development and Engineering Center.

F NIGHT VISION GOGGLES: Photoelectric effect allows soldiers to see images in very low light. Current night vision technology is result of DOD research.

G SOLDIER PERSONAL DIGITAL ASSISTANT: Soldiers receive situational awareness and other information using:

- **GPS:** Basic research funded by Air Force, Navy, and AEC (now DOE) led to global positioning system, which gives a soldier's specific location anywhere in the world.
- **WEARABLE SOLDIER RADIO TERMINAL:** provides voice communications and links soldiers' personal digital assistants to FalconView software, which networks and maps soldiers on the battlefield. Research funded by several DOD offices.
- **LITHIUM PRIMARY BATTERIES:** lighter, longer-lasting power source for soldiers, built on basic research funded by DOE and applied research funded by Army and DARPA.

H SOLDIER TRAINING: Gaming technology and simulation of battlefield environments prepare soldiers for deployment and provide theater mission training. Underlying technologies developed from Army-funded basic research.

I TRANSLATION DEVICES: Highly accurate voice recognition technology allows soldiers to generate and interpret speech in other languages. Original technology resulted from DARPA-sponsored research and improved by other DOD agencies.

Department of Defense

Scientific and engineering research funded by the Department of Defense (DOD) has contributed significantly to our nation's economic and national security. It has helped make America's military the best-equipped and most effective in the world, and civilian applications of technologies intended originally for military purposes have become staples of the nation's economy and modern life.

WHAT DOD BASIC RESEARCH HAS GIVEN US:



THE INTERNET

Created by Defense researchers, precursor to the technology that changed communications forever.



LASERS

Fundamental to products ranging from DVD players to bar code scanners to guided missiles.



GLOBAL POSITIONING SYSTEMS

Essential not only to military weaponry but to commercial products like GPS navigation devices and the iPad.



COMPUTER AIDED DESIGN

Has eliminated the need for engineering hand-drafting.



THE MOUSE

The way most people operate desktop computers.

Past DOD investments in scientific research have led to such innovations as advanced cryptology; radar; lasers; fiber optics; satellite and global positioning system (GPS) navigation; DARPA Net, the predecessor to the Internet; precision guidance technologies; advanced composite materials; and stealth technology. DOD research also underpins cutting-edge medical treatments and technologies developed for the battlefield but applicable in civilian life.

An example of research that contributes to defense efforts is Army-sponsored research at the Massachusetts Institute of Technology that is using the technology nature provides to protect ocean creatures like sea snails to design better body armor for soldiers and police officers.

DOD supports academic disciplines vital to national security. It is the leading federal sponsor of university engineering research.

National Institute of Standards and Technology

The mission of the National Institute of Standards and Technology (NIST) is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life. NIST labs work with industry and academia to address these research challenges. NIST scientists have received three Nobel Prizes in the past 11 years.

NIST manages some of the world's most specialized measurement facilities—such as the Center for Neutron Research, where cutting-edge research is done on new and improved materials, advanced fuel cells, and biotechnology. NIST's Advanced Measurement Laboratory offers American researchers unparalleled opportunities for making the most sensitive and reliable measurements.

NIST's Center for Nanoscale Science and Technology supports all phases of nanotechnology development, from discovery to production, and involves multidisciplinary teams from across federal agencies, industry, and academia. Its work in nanoelectronics is very significant for future advances in information technology, communications, medicine, energy, and security. Progress will require advances in measurement capabilities at ever smaller dimensions. NIST can help the U.S. lead the way in nanoelectronics as the nation has led in microelectronics for the past 50 years.

WHAT NIST BASIC RESEARCH HAS GIVEN US:



THE ATOMIC CLOCK

The most accurate clock currently available, key to international timekeeping, the broadcast industry, and GPS systems.



SYNTHETIC RUBBER

A manmade rubber that is extraordinarily elastic yet can return to its previous shape, with important military, rocketry, printing, and textile applications.



CLOSED CAPTIONING

The familiar display of text on a computer or television screen.



DATA ENCRYPTION STANDARDS FOR FINANCIAL TRANSACTIONS

Essential to the modern global economy.



STANDARDS FOR RADIATION DETECTORS AT U.S. PORTS OF ENTRY

Vital to homeland security.



TASK FORCE ON AMERICAN INNOVATION

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“ Science and engineering hold the key to solving the challenges facing our country in areas like energy, health care, and national security. The federal government’s investment in basic research is critical to address these challenges and attract young innovators to science and engineering. Research conducted at universities and national labs underpins the new innovations that drive economic growth.”

Richard K. Templeton
President, Chairman, and CEO Texas Instruments
Chair, Task Force on American Innovation

Here are useful Web links for science and research news and policy.

SCIENCE NEWS

CNN Science

<http://www.cnn.com/TECH/science/archive>

Fox News SciTech

<http://www.foxnews.com/scitech/index.html>

Futurity - Research News

<http://www.futurity.org>

Reuters Science

<http://www.reuters.com/news/science>

Science 360

<http://news.science360.gov/files>

Science Daily

<http://www.sciencedaily.com>

Science News

<http://www.sciencenews.org>

Science Works for US

<http://www.scienceworksforus.org>

Space News

<http://www.spacenews.com>

Washington Post Science

<http://www.washingtonpost.com/national/health-science>

USA Today Science

<http://www.usatoday.com/tech/science/index>

New York Times Science

<http://www.nytimes.com/pages/science/index.html>

LA Times Science

<http://www.latimes.com/news/science>

FEDERAL SCIENCE AGENCIES

Defense Advanced Research Projects Agency

<http://www.darpa.mil>

U.S. Air Force Office of Scientific Research

<http://www.wpafb.af.mil/afri/afosr>

U.S. Army Research Office

<http://www.arl.army.mil/www/default.cfm?Action=29&Page=29>

U.S. Office of Naval Research

<http://www.onr.navy.mil/en/Media-Center.aspx>

Department of Energy Office of Science

<http://science.energy.gov>

National Aeronautics and Space Administration

<http://www.nasa.gov>

National Institute of Standards and Technology

<http://www.nist.gov/index.html>

National Science Foundation

<http://www.nsf.gov>

Office of Science and Technology Policy

<http://www.whitehouse.gov/administration/eop/ostp>

FEDERAL SCIENCE AGENCY NEWS LINKS

Defense Advanced Research Projects Agency

<http://www.darpa.mil/NewsEvents/Releases.aspx>

U.S. Army Research Office

<http://www.arl.army.mil/www/default.cfm?page=49>

U.S. Office of Naval Research

<http://www.onr.navy.mil/en/Media-Center/Press-Releases.aspx>

Department of Energy Office of Science

<http://www.eurekalert.org/doi>

National Aeronautics and Space Administration

<http://www.nasa.gov/news/index.html>

National Science Foundation

<http://www.nsf.gov/news>

CONGRESSIONAL COMMITTEES AND CAUCUSES

House Appropriations Committee

<http://appropriations.house.gov>

House Armed Services Committee

<http://armedservices.house.gov>

Energy and Commerce Committee

<http://energycommerce.house.gov>

House Science & Technology Committee

<http://science.house.gov>

Senate Appropriations Committee

<http://www.appropriations.senate.gov>

Senate Armed Services Committee

<http://armed-services.senate.gov>

Senate Energy & Natural Resources Committee

<http://www.energy.senate.gov/public>

Senate Commerce, Science & Transportation Committee

<http://commerce.senate.gov/public>

House STEM Education Caucus

<http://stemedcaucus2.org>

House Research & Development Caucus

<http://www.researchcaucus.org>

CONGRESSIONAL NEWS LINKS

House Armed Services Committee

<http://armedservices.house.gov/index.cfm/news>

House CJS Appropriations Subcommittee

<http://appropriations.house.gov/Subcommittees/Subcommittee/?IssueID=34794>

House E&W Appropriations Subcommittee

<http://appropriations.house.gov/Subcommittees/Subcommittee/?IssueID=34796>

House Energy & Commerce Committee

<http://energycommerce.house.gov>

House Science & Technology Committee

<http://science.house.gov/press-releases>

Senate Armed Services Committee

<http://armed-services.senate.gov/press.htm>

Senate CJS Appropriations Subcommittee

<http://www.appropriations.senate.gov/sc-commerce.cfm>

Senate E&W Appropriations Subcommittee

<http://www.appropriations.senate.gov/sc-energy.cfm>

Senate Energy & Natural Resources Committee

<http://www.energy.senate.gov/public/index.cfm?FuseAction=PressReleases.List&IsRecent=True&Party=0>

Senate Science & Space Subcommittee

<http://commerce.senate.gov/public/index.cfm?p=ScienceandSpace>



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