FY 2012 Performance and Financial Highlights

Who We Are and What We Do

- The National Science Foundation (NSF) is the only federal agency dedicated to advancing non-biomedical research and education in science and engineering across all fields and disciplines and at all educational levels.

- NSF supports research and workforce development programs that help drive future economic growth, global competitiveness, and the creation of high-wage jobs for American workers.

- NSF seeks high-risk, potentially transformative projects that will generate path-breaking discoveries and new technologies.

- NSF integrates research and education to support the development of a world-class scientific and engineering workforce.

- NSF funds advanced instrumentation and facilities that enable state-of-the-art research as well as Arctic and Antarctic research, science operations, and other related activities for the U.S. polar research program.

- NSF supports cooperative research between universities and industry as well as U.S. participation in international scientific efforts.

NSF BY THE NUMBERS: FY 2012	
$7.0 billion	Appropriations (does not include mandatory accounts)
1,895	Colleges, universities, and other institutions receiving NSF funding
48,600	Proposals evaluated through a competitive merit review process
11,500	Competitive awards funded
236,000	Proposal reviews conducted
319,000	Estimated number of people NSF supports directly (researchers, postdoctoral fellows, trainees, teachers, and students)
45,800	Students supported by NSF Graduate Research Fellowships since 1952

From the Director

I am pleased to present the NSF *Performance and Financial Highlights* report for fiscal year (FY) 2012. In looking back at the many achievements of the past year, I am proud that we were able to address national priorities and support core research objectives. We made substantial progress and established major new efforts in areas such as international collaboration, interdisciplinary research, innovation, and infrastructure. In addition, we helped bring about a number of ground-breaking scientific discoveries, and we received broad national and international recognition for NSF's leadership role in fostering science and engineering research and education.

As indicated in our performance discussion, we achieved 15 of 18 annual performance goals, including significant progress toward the agency's three FY 2012–FY 2013 priority goals. NSF's *Annual Performance Report*, which will be included in the agency's upcoming *FY 2014 Budget Request to Congress*, will include a comprehensive discussion of our progress. As in past years, all NSF performance information has been verified and validated as complete and reliable by an independent, external consultant using guidelines from the Government Accountability Office.

Looking ahead, fiscal challenges will shape much of the national agenda in 2013. As responsible stewards of the public trust, we will seek opportunities to leverage our resources for maximum benefit and impact. At the same time, we will continue to make long-term investments in the people, research, and infrastructure needed to advance the progress of science and help secure our nation's health, security, and prosperity.
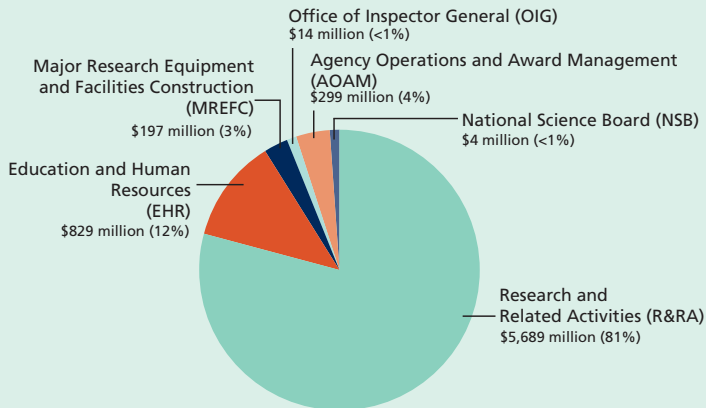
Thank you for your interest in NSF.

Subra Suresh
February 15, 2013
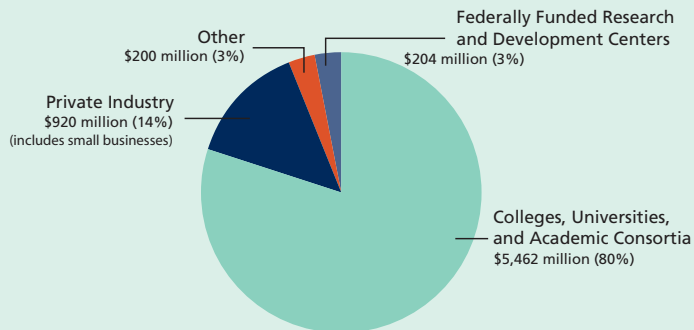
Following the Money

WHERE IT COMES FROM
FY 2012 Appropriations by Account—$7,033 million

Office of Inspector General (OIG)
$14 million (<1%)

Agency Operations and Award Management (AOAM)
$299 million (4%)

Major Research Equipment and Facilities Construction (MREFC)
$197 million (3%)

National Science Board (NSB)
$4 million (<1%)

Education and Human Resources (EHR)
$829 million (12%)

Research and Related Activities (R&RA)
$5,689 million (81%)

Note: Major Research Equipment and Facilities Construction includes a transfer of $30 million from the Research and Related Activities account, as authorized by P.L. 112-55, *The Consolidated and Further Continuing Appropriations Act, 2012.* Totals may not add due to rounding.
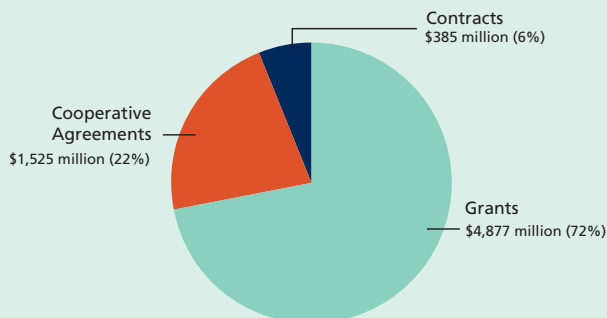
WHERE IT GOES
INSTITUTIONS FUNDED BY NSF
FY 2012 Obligations for Research and Education Programs—$6,787 million

Other
$200 million (3%)

Federally Funded Research and Development Centers
$204 million (3%)

Private Industry
$920 million (14%)
(includes small businesses)

Colleges, Universities, and Academic Consortia
$5,462 million (80%)

Notes: NSF Research and Education Programs include Research & Related Activities, Education & Human Resources, and Major Research Equipment & Facilities Construction appropriations. Other institutions funded include federal, state, and local governments; nonprofit organizations; and international organizations. Totals may not add due to rounding.

HOW IT GETS THERE
NSF AWARD MECHANISMS
FY 2012 Obligations for Research and Education Programs—$6,787 million

Contracts
$385 million (6%)

Cooperative Agreements
$1,525 million (22%)

Grants
$4,877 million (72%)

Notes: NSF Research and Education Programs include Research & Related Activities, Education & Human Resources, and Major Research Equipment & Facilities Construction appropriations.

- NSF is funded primarily through six congressional appropriations, which totaled $7,033 million in FY 2012. R&RA, EHR, and MREFC fund the agency's programmatic activities and account for 95 percent of NSF's total appropriations. The AOAM appropriation provides funds to administer and manage those programmatic activities. Separate appropriations are provided to support the activities of the OIG and NSB.
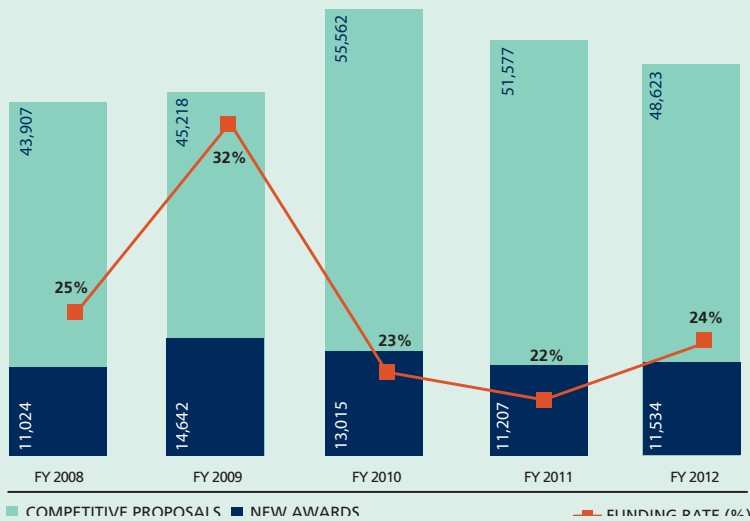
- In FY 2012, 89 percent of research funding was allocated based on competitive merit review. Nearly 38,000 members of the science and engineering community participated in the merit review process as panelists and proposal reviewers. Awards were made to 1,895 institutions in 50 states, the District of Columbia, and 3 U.S. territories. These institutions employ America's leading scientists, engineers, and educators and train the leading-edge innovators of tomorrow.

- Eighty percent of NSF awards were to academic institutions, including colleges, universities, and academic consortia. Awards were also provided to federally funded research and development centers and private industry, including small businesses. Other recipients include federal, state, and local governments; nonprofit organizations; and international organizations. A small number of awards are for research in collaboration with other countries, which add value to the U.S. scientific enterprise.
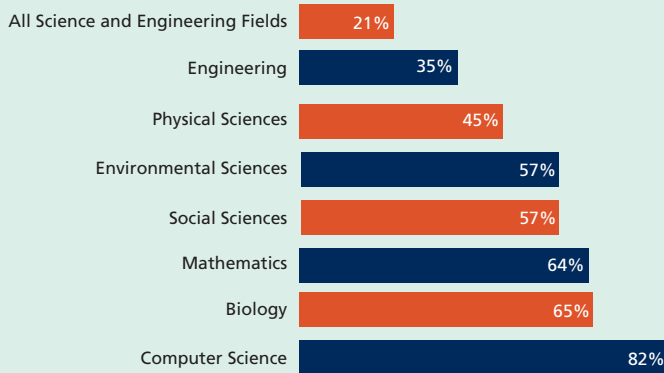
- Most NSF awards (94 percent) were funded through grants or cooperative agreements. Grants can be funded either as standard awards, in which funding for the full duration of the project is provided in a single fiscal year, or as continuing awards, in which funding for a multi-year project is provided in increments. Cooperative agreements are used when the project requires substantial agency involvement (e.g., research centers, multi-use facilities). Contracts are used to acquire products, services, and studies (e.g., program evaluations) required primarily for NSF or other government use.

HOW IT'S SPENT

NUMBER OF NSF COMPETITIVE PROPOSALS, NEW AWARDS, AND FUNDING RATES

Bar chart showing competitive proposals, new awards, and funding rates:
- FY 2008: Competitive Proposals 43,907; New Awards 11,024; Funding Rate 25%
- FY 2009: Competitive Proposals 45,218; New Awards 14,642; Funding Rate 32%
- FY 2010: Competitive Proposals 55,562; New Awards 13,015; Funding Rate 23%
- FY 2011: Competitive Proposals 51,577; New Awards 11,207; Funding Rate 22%
- FY 2012: Competitive Proposals 48,623; New Awards 11,534; Funding Rate 24%

■ COMPETITIVE PROPOSALS ■ NEW AWARDS ▬■ FUNDING RATE (%)

NSF SUPPORT OF ACADEMIC BASIC RESEARCH IN SELECTED FIELDS
(as a percentage of total federal support)

- All Science and Engineering Fields: 21%
- Engineering: 35%
- Physical Sciences: 45%
- Environmental Sciences: 57%
- Social Sciences: 57%
- Mathematics: 64%
- Biology: 65%
- Computer Science: 82%

Note: Biology includes Biological Sciences and Environmental Biology; excludes NIH.

Source: NSF/National Center for Science and Engineering Statistics, Survey of Federal Funds for Research & Development, FY 2010

- In FY 2012, the number of proposals competitively reviewed by NSF decreased 6 percent, to 48,623. This decrease may reflect efforts undertaken by directorates to manage workload issues, such as instituting a pre-proposal step for solicitations and a single submission window.

- The number of new awards increased 3 percent, to 11,534. The increase in new awards coupled with a decrease in the number of competitively reviewed proposals resulted in an increased funding rate, from 22 percent in FY 2011 to 24 percent in FY 2012.

- It is estimated that in FY 2012, 319,000 people were directly involved in NSF programs and activities, receiving salaries, stipends, or participant support. Moreover, NSF programs indirectly impact millions of people. These programs reach K-12 students and teachers, the general public, and researchers through activities including workshops; informal science activities such as museums, television, videos, and journals; outreach efforts; and dissemination of improved curriculum and teaching methods.

- NSF accounts for 21 percent of the total federal budget for basic research conducted at U.S. colleges and universities, and this share increases to 58 percent when medical research supported by the National Institutes of Health is excluded. In many fields NSF is the primary source of federal academic support.

FY 2012 FINANCIAL MANAGEMENT PERFORMANCE RESULTS

	RESULTS
Financial Statement Audit* • Unqualified opinion (15th consecutive "clean" opinion) • Material weaknesses	Yes None
Management Assurances • Effective internal control over financial reporting (FMFIA §2) • Effective internal control over operations (FMFIA §2) • Conformance with financial management system requirements (FMFIA §4) • Substantial compliance with FFMIA system requirements, accounting standards, and U.S. General Ledger at transaction level	Yes Yes Yes Yes
Timely financial reporting (Treasury/Financial Management Service Quarterly Scorecard)	Yes
Improper Payments Elimination and Recovery Act of 2010	Compliant
Number of grant payments processed in FY 2012	28,016

*NSF's FY 2012 Independent Auditor's Report can be found in NSF's *FY 2012 Agency Financial Report*.
FMFIA: Federal Managers Financial Integrity Act of 1982
FFMIA: Federal Financial Management Improvement Act of 1996

How We Are Doing: Performance Results

In FY 2012, NSF tracked progress toward three strategic goals and three priority goals. All program activities within the agency were covered by the 18 targets used to monitor the three strategic goals. For more information about priority goals, refer to www.goals.performance.gov/agency/nsf. NSF's *FY 2012 Annual Performance Report* will provide a fuller discussion of all the agency's performance measures, including descriptions of the metrics, methodologies, results, and trends, along with a list of relevant external reviews.

PRIORITY GOAL	STATUS/FY 2012 MILESTONES ACHIEVED
Undergraduate Programs: By September 30, 2013, 80 percent of institutions funded through NSF undergraduate programs will document the extent of use of proven instructional practices.	**On Track for Achievement:** In FY 2012, a call for proposals was put out for projects to measure the use of evidence-based instructional practices in undergraduate courses at academic institutions. Thirty awards were made to institutions of higher education to develop mechanisms for measurement. Other activities undertaken in FY 2012 included soliciting information from the field, an analysis to determine the number of academic institutions funded by NSF undergraduate programs, and planning activities for multiple mechanisms for data collection in FY 2013.
Innovation Corps (I-Corps): By September 30, 2013, 80 percent of teams participating in the Innovation Corps program will have tested the commercial viability of their product or service.	**On Track for Achievement:** In FY 2012, a total of 100 teams were accepted into the 6-month program. The completion rate was 93 percent, well above the 80 percent target. Other activities undertaken in FY 2012: stakeholder feedback meetings, held to monitor and improve processes; and the initiation of two additional I-Corps options, I-Corps Nodes and I-Corps Sites, to broaden the program to larger numbers of teams and to offer the Entrepreneurial Immersion curriculum at more venues.
Access to Digital Products: By September 30, 2013, NSF will have established policies for public access to high-value data and software in at least two data-intensive scientific domains.	**On Track for Achievement:** In FY 2012, a working group identified scientific domains in which access policies have already been implemented and determined that many NSF-funded large facilities, which represent their scientific domains, already encourage their communities to make data and software available. FY 2013 activities will shift the focus from large facilities to other types of NSF investments.

STRATEGIC GOAL		GOAL	FY 2012–FY 2013 PERFORMANCE GOAL*	RESULTS
	Transform the Frontiers	1	T-1.1 **INSPIRE.** Strengthen support of unusually novel, potentially transformative, interdisciplinary research.	Not Achieved
		2	T-2.1 **Priority Goal, Undergraduate Programs.** Develop a diverse and highly qualified science and technology workforce.	Achieved**
		3	T-2.2 **Career-Life Balance.** Promote Career-Life Balance policies and practices that support more fully utilizing the talents of individuals in all sectors of the American population.	Achieved
		4	T-3.1 **International Implications.** Increase proportion of new NSF solicitations, announcements, and Dear Colleague Letters that have international implications.	Not Achieved
		5	T-4.1 **Construction Project Monitoring.** For all MREFC facilities under construction, keep negative cost and schedule variance at or below 10 percent.	Not Achieved
		6	T-4.2 **Priority Goal, Access to Digital Products.** Increase opportunities for research and education through public access to high-value digital products of NSF-funded research.	Achieved**
	Innovate for Society	7	I-1.1 **Priority Goal, Innovation Corps.** Increase the number of entrepreneurs emerging from university laboratories.	Achieved**
		8	I-1.2 **Industrial Innovation and Partnerships.** Identify the number and types of partnerships entered into by Industrial Innovation and Partnerships Division grantees.	Achieved
		9	I-2.1 **Public Understanding and Communication.** Establish a common set of evidentiary standards for programs and activities across the agency that fund public understanding and communication of science and engineering activities.	Achieved
		10	I-2.2 **K-12 Scale-up.** Establish a common set of evidentiary standards for programs across the agency that fund activities with K-12 components.	Achieved
		11	I-3.1 **Innovative Learning Systems.** Integrate common language about, or goals for, innovative learning research into programs across the agency that fund innovative learning tools, structures, and systems.	Achieved
	Perform as a Model Organization	12	M-1.1 **Model EEO Agency.** Perform activities necessary to attain essential elements of a model EEO agency as defined by the Equal Employment Opportunity Commission, and contribute to the drafting of NSF's first Diversity and Inclusion Strategic Plan.	Achieved
		13	M-1.2 **IPA Performance Plans.** Include assignees on temporary appointment to NSF under the Intergovernmental Personnel Act (IPAs) under an NSF performance management system.	Achieved
		14	M-1.3 **Performance Management System.** Use findings from assessments to guide improvement of NSF's employee performance management systems.	Achieved
		15	M-2.1 **Assess Developmental Needs.** Enhance NSF capabilities to provide training of staff for their current positions.	Achieved
		16	M-3.1 **Financial System Modernization.** Upgrade NSF's financial system.	Achieved
		17	M-3.2 **Time To Decision.** Inform applicants whether their proposals have been declined or recommended for funding within 6 months of deadline, target date, or receipt date, whichever is later.	Achieved
		18	M-3.3 **Virtual Panels.** Expand the use of virtual merit review panels.	Achieved

INSPIRE: Integrated NSF Support Promoting Interdisciplinary Research and Education, EEO: Equal Employment Opportunity.
*More detailed information about the goals and results can be found in NSF's *FY 2012 Annual Performance Report*.
**All milestones for FY 2012 were achieved. This is an ongoing goal; final results will be determined in FY 2013.

Management Challenges

For FY 2012, the NSF Office of Inspector General (OIG) identified seven management and performance challenges, several repeated from the prior year: Ensuring proper stewardship of Recovery Act funds, improving grant administration, strengthening contract administration, implementing improvements in workforce management and the workforce environment, encouraging the ethical conduct of research, effectively managing large facilities and instruments, and managing programs and resources in times of budget austerity. Two emerging challenges were also identified: Transitioning to cloud computing and the trusted Internet connection, and planning for the next NSF headquarters. The OIG's memorandum on FY 2012 Management Challenges can be found in NFS's *FY 2011 Agency Financial Report* (www.nsf.gov/publications/pub_summ. jsp?ods_key=nsf12001&org=NSF). Management's report on the significant activities undertaken in FY 2012 to address these challenges can be found in NSF's *FY 2012 Agency Financial Report* (Appendix 3B).

For more information

NSF Budget and Performance website
www.nsf.gov/about/performance

Empowering the Nation Through Discovery and Innovation: NSF Strategic Plan for Fiscal Years 2011-2016
www.nsf.gov/news/strategicplan/index.jsp

NSF FY 2012 Agency Financial Report
www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf13002

Annual Performance Report
www.nsf.gov/about/performance (see Budget Request to Congress, *Performance* chapter)
www.goals.performance.gov/agency/nsf

Report to the NSB on NSF's Merit Review Process, FY 2011
www.nsf.gov/nsb/publications/2012/nsb1228.pdf

NSF Research and Education Highlights and Discoveries
www.nsf.gov/discoveries

NSF FY 2012 Progress Report on OIG Management Challenges
www.nsf.gov/publications/pub_summ.jsp?ods_key=afr (see Appendix 3B)

2012 NSF Global Summit
www.nsf.gov/news/news_summ.jsp?cntn_id=124178

Higgs Boson
www.nsf.gov/news/special_reports/science_nation/higgsboson.jsp

Students in Technology Transfer and Research (STTAR)
www.ndepscor.nodak.edu/index.htm

Multicolored Beam Tightly Focused by Tabletop Laser
http://www.nsf.gov/news/news_summ.jsp?cntn_id=124373

Cover image: Microbe vs. Mineral – Life and Death Struggle in the Desert

Credit: Michael P. Zach, University of Wisconsin–Stevens Point
www.nsf.gov/news/mmg/mmg_disp.cfm?med_id=73084&from=img

FY 2012 NSF Senior Management

Office of the Director
Subra Suresh, Director

Office of the Deputy Director
Cora B. Marrett, Deputy Director

National Science Board
Dan E. Arvizu, Chair
Kelvin K. Droegemeier, Vice Chair
Michael L. Van Woert, Executive Officer

Directorate for Biological Sciences
John C. Wingfield, Assistant Director

Directorate for Computer and Information Science and Engineering
Farnam Jahanian, Assistant Director

Directorate for Education and Human Resources
Joan Ferrini-Mundy, Assistant Director

Directorate for Engineering
Thomas W. Peterson, Assistant Director

Directorate for Geosciences
Timothy L. Killeen, Assistant Director

Directorate for Mathematical and Physical Sciences
H. Edward Seidel, Assistant Director

Directorate for Social, Behavioral and Economic Sciences
Myron P. Gutmann, Assistant Director

Office of Cyberinfrastructure
Alan Blatecky, Office Head

Office of Integrative Activities
Clifford A. Gabriel, Office Head (Acting)

Office of International Science and Engineering
Machi Dilworth, Office Head

Office of Polar Programs
Kelly Falkner, Office Head (Acting)

Office of Diversity and Inclusion
Claudia J. Postell, Office Head

Office of the General Counsel
Lawrence Rudolph, General Counsel

Office of Inspector General
Allison C. Lerner, Inspector General

Office of Legislative and Public Affairs
Judith Gan, Office Head

Office of Budget, Finance and Award Management
Martha A. Rubenstein, Office Head

Office of Information and Resource Management
Eugene Hubbard, Office Head

NSF Officers

Chief Financial Officer
Martha A. Rubenstein (Office of Budget, Finance and Award Management)

Chief Human Capital Officer
Eugene Hubbard (Office of Information and Resource Management)

Chief Technology Officer
José Muñoz

Chief Information Officer
Amy Northcutt (Office of Information and Resource Management)

NSF Affirmative Action Officer
Claudia J. Postell (Office of Diversity and Inclusion)

National Science Board Members in FY 2012

Dan E. Arvizu, *Chair*[1]
National Renewable Energy Laboratory

Kelvin K. Droegemeier, *Vice Chair*[1]
University of Oklahoma

Mark R. Abbott
Oregon State University

Bonnie Bassler
Princeton University

Camilla P. Benbow
Vanderbilt University

Ray M. Bowen
Texas A&M University

John T. Bruer
James S. McDonnell Foundation

France A. Córdova
Purdue University

Patricia D. Galloway
Pegasus Global Holdings, Inc.

José-Marie Griffiths
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Esin Gulari
Clemson University

Alan I. Leshner
American Association for the Advancement of Science

W. Carl Lineberger
University of Colorado

G.P. "Bud" Peterson
Georgia Institute of Technology

Douglas D. Randall
University of Missouri

Arthur K. Reilly
Cisco Systems, Inc.

Anneila I. Sargent
California Institute of Technology

Diane L. Souvaine
Tufts University

Arnold F. Stancell
Georgia Institute of Technology

Claude M. Steele
Stanford University

Thomas N. Taylor
University of Kansas

Richard F. Thompson
University of Southern California

Robert J. Zimmer
University of Chicago

Subra Suresh
Member, *ex officio*
Director, National Science Foundation

Michael L. Van Woert
Executive Officer and Director, National Science Board Office

[1]Effective May 2012.

Research and Education Highlights

Credit: STTAR/Nodak Electric Cooperative

The Students in Technology Transfer and Research (STTAR) program gives college students in North Dakota the opportunity to use their academic training and experience to solve science and technology challenges faced by North Dakota businesses. Students gain hands-on experience that furthers their education beyond the classroom. Companies not only receive assistance from up-to-date technology skills and new perspectives, but often use the program as a hiring tool for more qualified employees. At Nodak Electric Cooperative, an active STTAR participant, former STTAR students train new student hires in the Environmental Systems Research Institute's geographic information system mapping system and iPad map books to equip them with skills to design new lines and stake new services in the field. The STTAR program shares the cost of student salaries with the companies.
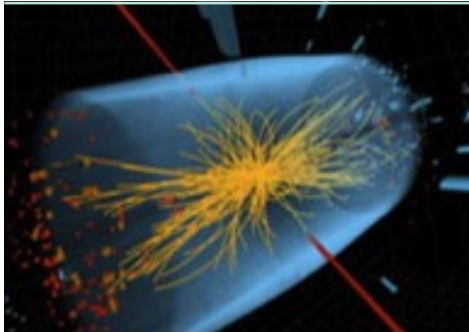

Image is a rendering of a typical candidate event from the Compact Muon Solenoid (CMS) Experiment in the search for the Higgs boson. *Credit:* CERN/CMS collaboration 2011.

In July 2012, physicists working on experiments at the Large Hadron Collider (LHC) at the CERN laboratory announced the discovery of a new particle that future analysis may show to be the long-sought Higgs boson, the missing piece in the Standard Model of particle physics. If the particle is confirmed to be the Higgs boson, this represents a keystone in our knowledge of the elementary forces and particles that exist in our universe. NSF supports approximately 400 scientists at U.S. universities, including students, postdoctoral fellows, and faculty members who helped to design, build, and operate the particle detectors and participated in these LHC experiments. The discovery of the Higgs boson has been named Breakthrough of the Year by *Science* magazine.
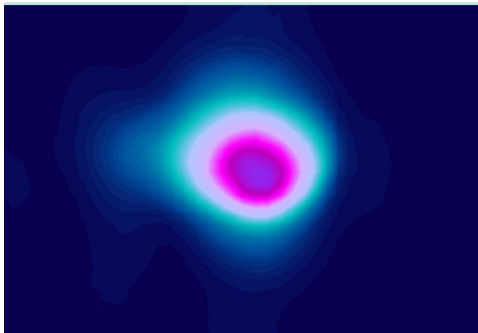

Image of a coherent, laser-like x-ray beam as it hits a surface. *Credit:* Tenio Popmintchev, JILA, and University of Colorado-Boulder

Researchers supported by NSF have produced a laser-like, directed beam of light that simultaneously streams ultraviolet, x-ray and in-between wavelengths. The new technology is the first to produce a coherent beam that includes x-rays in a tabletop-sized system. Intense pulses of infrared light—each just a few optical cycles in duration—were focused into a high-pressure gas cell, which converted part of the original laser energy into a coherent continuum of light that extends into the x-ray region of the electromagnetic spectrum. The x-ray burst has extremely shorter wavelengths that will make it possible to probe the tiniest, fastest physical processes in nature, such as the dance of electrons and ions in molecules as they undergo chemical reactions.

Members of the Global Research Council gather at NSF headquarters in May 2012 for its inaugural meeting. *Credit:* Sandy Schaeffer

Representatives from 44 nations participating in a Global Summit on Merit Review at NSF on May 14–15, 2012, released a set of merit review principles and established a Global Research Council. The merit review principles, crafted by summit leaders, include expert assessment, impartiality, confidentiality, and other factors deemed important to a rigorous and transparent system for evaluating proposals for research funding. Participants included the heads of research councils and agencies from the Group of 20 (G20) and Organisation for Economic Co-operation and Development (OECD) countries, which are typically research intensive, as well as countries with emerging scientific enterprises. The latter included nations in the U.S. State Department's Science Envoys program. The merit review process, as practiced by NSF and other leading funding agencies, is widely recognized as an essential tool for selecting the most promising proposals for scientific research. The summit participants identified what they believe are the best practices and standards for both national institutions and multinational cooperation.