



National Science Foundation  
WHERE DISCOVERIES BEGIN



August 2011

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## NSF AT WORK

### NSF Program Supports Innovation in Emergency Response

Rochester Institute of Technology (RIT) and the University at Buffalo (UB) have joined together in a NSF Partnership for Innovation (PFI) program (award number **0917839**) dedicated to innovation in disaster management. They created the **Information Products Laboratory for Emergency Response (IPLER)** as a technology, policy and business development incubator to facilitate interaction and innovation among university researchers, private sector service and product providers, and public sector emergency response decision makers.

One of IPLER's major accomplishments is its emergency response role following the January 2010 earthquake in Haiti. Supported by additional funding from the World Bank, IPLER collaborated with several industry partners, including ImageCat, Inc. and Kucera International, to collect imagery and topography data for more 250 square miles in and around Port-au-Prince. Data from this response effort are in the public domain for response and research purposes. More than 100 terabytes of data have been downloaded by groups ranging from the National Geospatial Intelligence Agency, the U.S. Army, U.S. Geological Survey, Google, and the United Nations, to Purdue University and Massachusetts Institute of Technology. The data, which traditionally have not been available at the field level for operating agencies immediately after a disaster, have been shared by many international organizations as well. RIT and UB also received a NSF Rapid Response Research, or "RAPID", grant (award number **1034639**) to build a target detection tool for post-earthquake Haiti disaster management as well as future earthquakes and tsunamis.



The earthquake that struck Haiti in 2010 destroyed the National Palace in Port-au-Prince. This image combines high-resolution imagery and structural measurements, and uses laser pulses to make 3-dimensional elevation measurements. Credit: Rochester Institute of Technology

IPLER scientists also participated in image-processing of the Fukushima nuclear power plant following the March 2011 earthquake and tsunami that devastated Japan. Other activities include flood plain mapping in partnership with the Seneca Nation, a collaboration with the U.N. Foundation on broadening international emergency response efforts, and the development of a masters-level training program in environmental forecasting and disaster preparedness and response.

For more information about IPLER, read a special report from RIT [online](#).

### Collaboration Opportunities Spur Patents and Inventions



Credit: Darren Hester

A recent study published in the journal *Research Policy* reviewed the activity of NSF Engineering Research Centers to determine the factors that drive invention disclosures and patent applications. Researchers found that an organizational climate that encourages interdisciplinary collaboration and actively supports commercialization has a direct impact on the development of new inventions and patents. This study was supported by NSF (award number **0345195**). Read more information about this work [online](#).

## NSF and USAID Launch International Interagency Program

On Thursday, July 7, NSF and the United States Agency for International Development (USAID) launched a joint initiative to address global development challenges and renewed a Memorandum of Understanding (MOU) that provides a framework for collaboration between the two agencies. The MOU leverages each agency's respective strengths, experiences, technologies, methodologies and investments in order to facilitate science and technology collaboration in and with developing countries.

NSF Director Subra Suresh, USAID Administrator Rajiv Shah and White House Office of Science and Technology Policy Director John P. Holdren spoke at an event held at NSF to announce the innovative alliance.

The Partnerships for Enhanced Engagement in Research (PEER) program is an initiative that supports and builds scientific and technical capacity in the developing world. PEER capitalizes on competitively awarded grants made to developing countries' scientists by facilitating collaboration with NSF-funded scientists in U.S. institutions. Initial research focus areas include water, renewable energy, food security, climate change and disaster mitigation.

Six USAID-funded pilot projects linked to NSF investments laid the groundwork for the current PEER program. The pilot projects explored research challenges related to ecosystems, climate change, seismology, hydrology and biodiversity in Tanzania, Bangladesh, Mali, Kenya and Burkina Faso. Learn more about these pilot projects in this [video slideshow](#). More details on PEER are available in the [press release](#), and a video from the PEER launch event can also be viewed [online](#).



USAID Administrator Rajiv Shah and NSF Director Subra Suresh. Credit: Sandy Schaeffer for NSF

## DID YOU KNOW?

### Research Space Increases in Academic Institutions

Research-performing colleges and universities saw their science and engineering (S&E) research space increase by 4 percent between fiscal year (FY) 2007 and FY 2009, according to the National Center for Science and Engineering Statistics at NSF. This increase is almost three times the amount of growth found between FY 2005 and FY 2007 (1.5 percent). This is a change from the past two survey cycles that were marked by slowing growth in research space.

Not all S&E fields saw similar growth in research space. Between FY 2007 and FY 2009, biological and biomedical sciences saw the greatest increase in S&E research space (12 percent), followed by computer and information sciences (8 percent). On the other hand, four S&E fields--social sciences, physical sciences, mathematics and statistics, and health and clinical sciences--experienced declines in the amount of space available for research.

For more information, read the full [InfoBrief](#) online.

## FACES OF NSF RESEARCH

### Citizen Science Programs Bring Climate Change Questions Home

Communicating Climate Change (C3), an NSF-supported project of the Association of Science-



Rick Bonney and Jennifer Shirk of the Cornell Lab of Ornithology. Credit: Courtesy of Jennifer Shirk, Cornell Lab of Ornithology

Technology Centers, helps people observe and understand local impacts of climate change. To do so, C3 has enlisted the expertise of the Cornell Laboratory of Ornithology (CLO), a leader in the growing field of citizen science. Rick Bonney, co-founder of CLO's Citizen Science program and director of program development and evaluation, and Jennifer Shirk, doctoral student in Cornell's Department of Natural Resources and CLO project leader for the Citizen Science Toolkit, are working with a dozen science centers around the U.S. to develop partnerships between professional scientists and the public to investigate local impacts of climate change.

At each science center, the first challenge was to identify a locally meaningful indicator of climate change. As the C3 citizen science liaison, Shirk helps staff members develop workable partnerships with national projects that can be adopted and modified locally, and connects science centers to researchers and resources. In one case where no existing project addressed a local concern, she connected staff at the Museum of Discovery and Science in Florida with local researchers at Nova Southeastern University to develop a project measuring the impact of climate change on local populations of nesting sea turtles. Volunteers now collect important data about the temperature of sea turtle nests that will help document the degree to which beaches are warming and impacting temperature-sensitive nests.

Through the **C3 citizen science projects**, Bonney and Shirk are also advancing citizen science by identifying the barriers to creating meaningful citizen science experiences through science centers. For Shirk, who has experience with citizen science projects as a volunteer, educator and scientist, the most exciting aspects of the C3 project are the new connections it has created. Not only has the project connected researchers, volunteers and science center staff with each other, but it has also helped individuals connect their personal observations to the large-scale scientific phenomenon of climate change, bringing participants to a more engaged understanding of climate change and its effects.

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## NSF IN THE NEWS

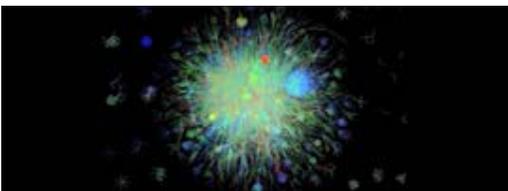
**To Tug Hearts, Music First Must Tickle the Neurons** (*New York Times*) Research demonstrates the importance of music in human development, communication and cognition, and as a potential therapeutic tool. Three researchers supported by NSF's Directorate of Social, Behavioral and Economic Sciences are profiled.

**Alabama Tornado Team Scours Paths of Killer Storms** (*Los Angeles Times*) NSF-supported scientists at the University of Alabama-Huntsville study one of the most severe tornado outbreaks in U.S. history. Gathering data from diverse sources--including radar records, satellite images, survivor interviews and eyewitness video--the team hopes to understand storm development and improve forecasts.

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## THE RIPPLE EFFECT

### Visualization Challenge Accepting Entries Online



This map of links between the genes of the mustard plant *Arabidopsis thaliana* won an Honorable Mention in the 2010 SciVis Challenge. Credit: Insuk Lee, Michael Ahn, Edward Marcotte, Seung

NSF and the journal *Science* created the International Science & Engineering Visualization ("SciVis") Challenge to celebrate and encourage the visual communication of science for educational and journalistic purposes. The 2011 contest is now accepting entries, and for the first time in the history of the competition, participants can submit entries online.

Judges appointed by NSF and *Science* will select winners in each of five categories: photography, illustrations, informational posters and graphics, interactive games, and videos. The winning entries will appear in a special section in both the print edition of *Science* and on the *Science* and

### Learning360 Facebook Page Connects NSF Resources With Educators

In early June, NSF's Office of Legislative and Public Affairs launched **NSF Learning360**, a new Facebook page targeted to teachers. The page features NSF-generated content created with K-12 classrooms and students in mind, but fun for learners of all ages. Posts highlight original video series such as *Green Revolution* and *Profiles of Scientists and Engineers*, as well as video series created with partner NBC Learn, such as *Chemistry Now* and *Science of NFL Football*. Daily posts also feature information on how to use NSF resources to expose students to current events in science and engineering through services such as the **Science360 News Service** or **Science Nation** weekly news videos.



Credit: NSF

The page will also be used as a mechanism for announcing opportunities available to teachers through NSF, such as nominations for the Presidential Awards for Excellence in Mathematics and Science Teaching, or Research Experiences for Teachers.

Fans who "like" **the page** will receive updates in their Facebook news feed. Users who prefer to receive posts via email can sign up for a daily digest using **Feedburner**.

### House Appropriations Committee Maintains NSF Funding Levels



Credit: Architect of the Capitol

On Wednesday, July 13, the U.S. House of Representatives Committee on Appropriations marked up the fiscal year (FY) 2012 Commerce, Justice, Science, and Related Agencies Appropriations Bill and provided \$6.9 billion for NSF. The Committee held NSF's budget flat relative to the FY 2011 enacted level, but changed the appropriated levels for three of NSF's six accounts.

The Research and Related Activities account received \$5.6 billion, roughly a 1 percent (\$43 million) increase over the FY 2011 enacted level and a 10 percent (\$647 million) decrease below President Obama's budget request. The Education and Human Resources account is funded at \$835 million, a decrease of 3 percent (\$26 million) compared to the FY 2011 enacted level, and 8 percent (\$77 million) below the President's request. The Major Research Equipment and Facilities Construction account is funded at \$100 million; nearly 15 percent (\$17 million) below the FY 2011 enacted level and 55 percent (\$125 million) below the President's request.

The account levels for Agency Operations and Award Management, National Science Board, and the Office of the Inspector General all equal the FY 2011 enacted levels.

These figures do not reflect a 0.1 percent across-the-board rescission that was adopted during the markup.

### Multimedia Stories Show How Engineers Shape the Future

A new NSF special report highlights the work of a creative group of researchers--engineers who are investigating new phenomena, devising new capabilities and designing new technologies. Through a series of multimedia stories, "**Engineers of the New Millennium**" explores how engineers shape the future of robotics, water usage and energy development. Research projects range from creating teams of reconnaissance robots for security and rescue agencies to making fuel from algae.

The researchers describe how innovations like these can help the nation overcome major challenges, launch whole industries, and help people enjoy happier and healthier lives.



Light-emitting diodes. Credit: IEEE Spectrum

The multimedia content of "Engineers of the New Millennium," which includes audio slideshows, videos and additional resources, is based on the radio series of the

same name. Shows in the radio series were created through a partnership between NSF and IEEE Spectrum Radio that began in 2008 and continues today.

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*The National Science Foundation (NSF) is an independent federal agency that supports fundamental research and education across all fields of science and engineering. In fiscal year (FY) 2011, its budget is about \$6.9 billion. NSF funds reach all 50 states through grants to nearly 2,000 universities and institutions. Each year, NSF receives over 45,000 competitive requests for funding, and makes over 11,500 new funding awards. NSF also awards over \$400 million in professional and service contracts yearly. Contact **NSF's Office of Legislative and Public Affairs** for more information or for permission to reuse newsletter*

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