



National Science Foundation  
WHERE DISCOVERIES BEGIN



September 2011

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## NSF AT WORK

### Population Studies Inform Disaster Recovery Decisions

Natural disasters take lives and destroy communities every year. Recovery efforts continue long after a disaster's initial impact, particularly in relation to restoring health care services and resource access. With support from NSF's Human and Social Dynamics program (award number **0527763**), Elizabeth Frankenberg, a professor of public policy and sociology at Duke University, investigated how family investments in health care fluctuate during post-disaster economic instability and how government and community resources can affect those investments. Frankenberg and colleagues found that the extent to which a community has access to health services, both public and private, can lessen the impact of changes in the local and national economy after a disaster.



Debris at Sirombu, Nias Island, off the southern coast of Sumatra, following the 2004 tsunami. Credit: Photo by Kerry Sieh, Tectonics Observatory, Caltech.

Frankenberg was invited to share her research at a July 18 congressional briefing titled "The Demography of Disasters: Informing Recovery Decisions." She presented findings on Indonesia's immediate, medium-term and longer-term economic and health consequences for northern Sumatra in the aftermath of the 2004 Sumatra tsunami. Frankenberg was joined by colleagues Russ Paulsen from the American Red Cross and Mark VanLandingham from Tulane University who presented their findings on how disasters can impact the size, makeup and well-being of disaster-affected families and communities. Assistance programs like the Red Cross use this research data to understand a community's short-term and long-term recovery needs.

Watch the congressional briefing in this [webcast](#).

### Technology Transforms Glass into Transparent Motion Displays



Credit: Ted Sun, Sun Innovations Inc.

With the support of NSF (award number **0923749**), researchers at **Sun Innovations, Inc.**, have developed an enhanced transparent display technology--also known as a fluorescent emissive projection system--that turns an entire glass window or windshield into a motion display panel without affecting the view through the glass. This image shows a full windshield display that is viewable from any angle. Read more

about this technology at [LiveScience.com](#).

## Citizen Scientists Find Lost Ladybugs

Farmers and gardeners across the country know that the more ladybugs there are, the better. But how many ladybugs are out there? Conducting a comprehensive census of the ladybug population across North America is a challenging task. With support from NSF's Informal Science Education program, John Losey, professor of entomology at Cornell University, is taking on this challenge by enlisting over 4,000 citizen scientist volunteers. Losey leads the Lost Ladybug Project with dual goals of documenting the population and distribution of North America's ladybugs and promoting scientific confidence and competence in children. The project team members cooperate with teachers, parents and volunteer organizations, such as the 4-H Club, to help children catch and photograph ladybugs. The photos are then submitted to the **Lost Ladybug Project website** for analysis by Losey's team. Thus far, more than 11,000 pictures have been submitted from all 50 states; Washington, D.C.; Puerto Rico; Mexico and Canada.



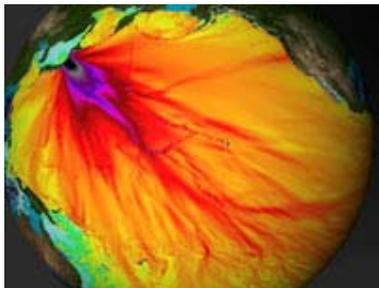
Credit:  
markiteightdude,  
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Starting in the 1970s, scientists noticed that native ladybug species were disappearing. Ladybugs are crucial to agricultural production because they prey on aphids, which feed on food and fiber crops. Understanding the decline of the ladybug population may help prevent further decline and in turn increase agricultural efficiency.

The Lost Ladybug Project was established in 2000 and was originally based in New York State. In 2008, Losey received NSF funding (award number **0741738**) to expand the project and improve outreach to children from Native American, rural, farming and disadvantaged communities. The project has been covered by many news outlets including, most recently, the **PBS News Hour**.

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## NSF Funds Disaster Response Research with RAPID Awards



Colors in this image depict peak wave heights of the tsunami that hit Japan on March 11, 2011. Credit: NOAA

NSF issued a Dear Colleague Letter (**NSF 11-045**) calling for proposals following the earthquakes in Christchurch, New Zealand, and Tohoku, Japan, in early 2011. The scientific community not only realized the catastrophic nature of these events, but also the importance of collecting data that could be applied to better disaster response in the future. Following this call for proposals, NSF funded 42 projects totaling \$2.56 million.

Some of these projects provided on-site aid as well as data collection. For example, the Tohoku quake damage involved nuclear power plants, necessitating the use of unmanned instruments for reconnaissance and recovery. A suite of previously developed robotic inspection tools with advanced locomotive and sensory functions were dispatched by Nikolaos Papanikolopoulos of the Center for Distributed Robotics at the University of Minnesota (award number **1138020**). The scope of this project went beyond simply providing immediate support; the tools' unique capacity to collect data will be used to advance the field of intelligent systems.

Other projects are investigating lesser-understood aspects of earthquake damage and response. For example, the Tohoku earthquake not only produced tsunamis and widespread flooding, but it also caused more fires than any earthquake in recorded history, according to NSF Principal Investigator Rachel Davidson of the Disaster Research Center at the University of Delaware, who is partnering with Japanese researchers to collect extensive data on the largely ignored issue of earthquake-induced fires (award number **1138675**). Such a comprehensive database is expected to revolutionize the way the ignition, spread, and suppression of fires are approached.

In addition to earthquake engineering and disaster response, other projects cover topics such as civil and structural engineering, geology, oceanography, communication systems and community behavior.

## Community Colleges Play an Important Role in Educating Science, Engineering and Health Graduates

A new InfoBrief from the National Center for Science and Engineering Statistics at NSF shows that community colleges play an important role in the education of science, engineering and health (SEH) graduates.

The report found that approximately half of the people who earned an SEH degree during the 2001 to 2007 academic years had attended community college at some point in their studies (approximately 50 percent of bachelor's degree recipients and just under 45 percent of master's degree recipients). During this period, the percentage of SEH graduates who had earned an associate's degree also remained steady, at 28 percent for both bachelor's and master's degree recipients.

Community college attendance among these graduates was driven largely by a desire to earn credits toward a bachelor's degree, followed by financial reasons and then by a desire to gain further skills or knowledge in an academic or occupational field.

The trends and other findings presented in this InfoBrief are from the NSF National Survey of Recent College Graduates, and the full InfoBrief is available **online**.

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## FACES OF NSF RESEARCH

### NSF Grantees Named as PopTech Science and Public Leadership Fellows

**PopTech** is a nonprofit network of innovation experts with roots in an annual influential technology conference held in Camden, Maine. Each year PopTech selects a small number of high-potential, early- and mid-career scientists as Science and Public Leadership Fellows. Fellows work in areas of critical importance to the nation and the planet, such as energy, food, water, public health, climate change and national security. The fellows receive year long training in communications, public engagement and leadership. The following 2011 fellows are also NSF grantees: **Iain D. Couzin, Milton Garcés, Katherine J. Kuchenbecker, Shaily Mahendra, Jessika Trancik, Adrien Treuille.**



2011 PopTech Science and Public Leadership Fellows. Credit: Peter Durand/PopTech, **Creative Commons Attribution License**

The purpose of the PopTech Fellows program is to "bolster the role of science in the public sphere" by cultivating public trust and visibility among a corps of young leaders in science. Because of PopTech training experiences, these scientists can "provide leadership, explore new collaborative approaches, and engage with the public on a variety of issues of critical importance to the nation and the planet," according to the program's impact description. The hope is that public literacy and acceptance of science will improve and that PopTech will create role models for young people and new, multidisciplinary opportunities for collaborating scientists. Visit the fellows' individual profiles for more information about their research. Or, for more information on the program and the entire 2011 class, visit the PopTech Science Fellows **website**.

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## NSF IN THE NEWS

**This Robot Can Run - It's the Fastest One Ever** (*MSNBC*) Robots have a relatively easy time rolling, swimming, and flying, but walking on two legs has posed a challenge. However, a new robot with knees is closing in on humans' bipedal mastery. This research was funded in part by NSF.

**Science Festival to Showcase Bay Area Innovation** (*San Francisco Chronicle*) With NSF support, a coalition of universities, museums, observatories and medical and high tech industries in the San Francisco Bay area have organized the first-ever Bay Area Science Festival for the fall of 2011 to showcase the region's achievements and to inspire children to consider science

careers.

**The Military Goes Green** (*Charlotte Observer*) "Earth - The Operator's Manual," a new PBS series funded by NSF, explores how the U.S. military is improving its energy usage. The show host visits new solar-cooled tents in Afghanistan and explains how such energy efficiencies at military bases in the Middle East can save lives as well as money.

## THE RIPPLE EFFECT

### I-Corps to Strengthen the Impact of NSF Discoveries



NSF has launched a new effort to help turn scientific and engineering discoveries into useful technologies, products and processes. The **NSF Innovation Corps (I-Corps) program**, a public-private partnership, will connect NSF-funded scientific research with the entrepreneurial and business communities to help strengthen the national innovation

ecosystem.

Members of the private sector will provide critical support to this effort by sharing their knowledge and experience. These technology developers, venture capitalists, and others from industry will act as I-Corps mentors. Additional resources and expertise will be provided by the Deshpande Foundation and the Kauffman Foundation.

Each I-Corps team will systematically identify and address knowledge gaps to ascertain the technology disposition of their idea. Academic researchers and students participating in I-Corps will have an opportunity to learn firsthand about technological innovation and entrepreneurship and to fulfill the promise of their discoveries. The NSF I-Corps program will initially support up to 100 projects per year with \$50,000 each.

### Summer Interns Gain Work Experience

Summers at NSF come alive with an influx of young people who take part in NSF's Summer Scholars Internship Program (SSIP). Undergraduate and graduate students are sponsored by a variety of organizations and institutions, including the **Hispanic Association of Colleges and Universities (HACU)**, **Quality Education for Minorities Network (QEM)**, **Washington Internships for Native Americans**



Credit: NSF

(WINS) and individual university sponsors. A spectrum of projects were undertaken this summer by the interns: QEM intern Jeremi London analyzed cyberlearning trends in the Division of Undergraduate Research; University of Virginia-sponsored intern Sara Persily in the Office of International Science and Engineering and HACU intern Michael Bueno in the Division of Molecular and Cellular Biosciences studied support for international collaborations by NSF-funded scientists; Samantha Pikula and Kendra Haag, both WINS scholars, analyzed outreach and special solicitation outcomes for the Division of Molecular and Cellular Biosciences; Tina Munjal and Rahul Rekhi, interns sponsored by Rice University, wrote opinion pieces on scientific metrics as well as other projects for the Office of Legislative and Public Affairs.

Interested students may contact the individual sponsoring programs for more information.

### "Changing Planet" Town Hall Highlights Future of Water Resources



Credit: Courtesy of NBC News-NBC Learn

Former New Mexico Governor Bill Richardson joined climate scientist Heidi Cullen and regional water policy experts on stage at Arizona State University on August 25 for a town hall on the changing patterns of freshwater resources, the impact of climate change, and potential solutions for more sustainable water resources. This was the third and final "Changing Planet" town hall produced by NSF, in partnership with *NBC News* and *DISCOVER* magazine, each one featuring a panel of scientists, representatives of industry and non-profits, and public officials. At Yale University in January, panelists discussed the impacts of climate change on

our lives, and a panel at George Washington University (GWU) in April previewed a future with clean energy and green jobs.

The "Changing Planet" town halls were designed to inform the public and promote a dialogue about climate change science and impacts as well as solutions. The events, hosted by *NBC News* personalities and filmed before a live audience of primarily university and high school students, were taped for later airing on The Weather Channel. The Yale event, moderated by former anchor Tom Brokaw, and the GWU show, moderated by environmental reporter Anne Thompson, were shown on TV multiple times and averaged 100,000 viewers per show.

"Changing Planet" town halls: left: "The Impact on Lives and Values" (Yale University), right: "Clean Energy, Green Jobs and Global Competition" (George Washington University). Credit: Videos produced by NBC Learn

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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 images. Editor: Nicole J. Garbarini. Contributors: Cecile Gonzalez, Christine Hamel, Amber Jones, Christina Jones, Michael Kim, Stephen Ross, Bernadine Okoro, Marcelo Vinces.*

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