



NSF AT WORK

DID YOU KNOW?

FACES OF NSF RESEARCH

NSF IN THE NEWS

NSF P

NSF AT WORK

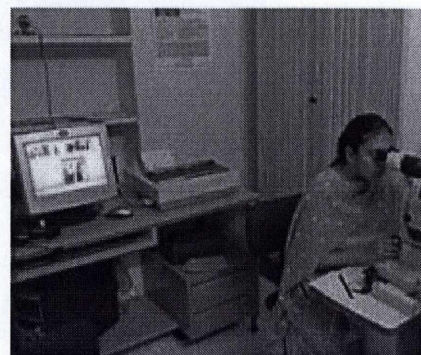
New Wi-Fi Network Brings Eye Care to Thousands in India

Researchers at the University of California, Berkeley, have developed a new technology for low-cost rural connectivity. As a result, thousands of residents from rural villages in India are receiving quality eye care for the first time.

Based on "Wi-Fi" wireless networks, the new technology allows eye specialists to examine patients in five remote clinics via a high-quality videoconference using simple, inexpensive software and hardware. The system provides villages with a high-bandwidth connection to computer networks in cities as far as 50 miles away.

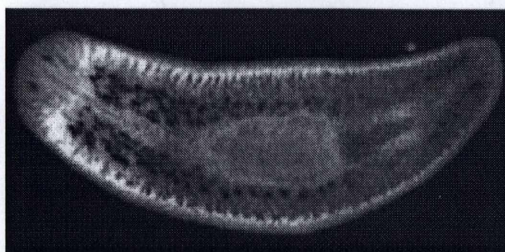
The researchers implemented the Technology and Infrastructure for Emerging Regions (TIER) pilot program in 2005. Because of the initial success, TIER will soon expand to include five hospitals linked to 50 clinics that will annually serve an expected half a million patients in the southern Indian state of Tamil Nadu. The research may also have application in other developing countries as well as in rural areas of the U.S.

Much of this work was developed in conjunction with Intel via its research lab in Berkeley. Funding for computer science research came primarily from NSF. For more, see the UC Berkeley News' [press release](#).



A nurse and doctor from Aravind Eye Hospital examine a patient at the Periakulum rural vision clinic via a videoconference. The clinic is usually staffed by a single nurse who is connected to a network designed by researchers at UC Berkeley via a teleconference with an eye specialist in Berkeley, 50 miles away. Credit: Aravind Eye Hospital.

No Matter How You Slice It: the Flatworm's Regenerative Gene is Revealed



Freshwater flatworms, called planaria, possess extraordinary regenerative capabilities by virtue of a population of stem cells they maintain throughout their lives. Researchers recently identified a key gene that maintains planarian stem cells. Credit: Ricardo Zayas and Phillip Newmark, University of Illinois, Urbana-Champaign.

Phillip Newmark and his colleagues at the University of Urbana-Champaign have identified a gene in planarian flatworms renowned for their regenerative abilities--the maintenance of their stem cells. Because planarian stem cells share characteristics with those of humans, the work will aid scientists to understand how stem cells can be used to completely regenerate tissues and organs.

Planaria are popular for introductory biology experiments because if they are chopped in half, two worms grow back. In fact, only 1/279th of a planarian is needed to regenerate a complete worm. Scientists studied the planaria's ability to regenerate with a cutting-edge technique called "RNA interference," which stops a particular gene from producing its protein. Without the protein, the planaria's stem cell population is depleted and they lost the ability to regenerate. Now researchers

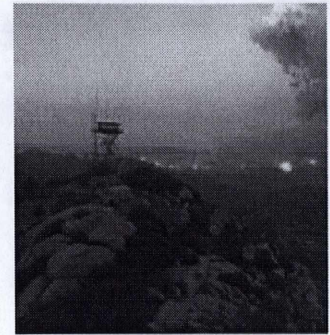
gene plays a similar role in stem cells from other organism

Newmark's research is supported by NSF's CAREER program, which is designed to support the development of those researcher-educators who are deemed most likely to become the academic 21st century. Read NSF's press release, "[Flatworms at Forefront of Regeneration Research](#)" for mo

Communications Lifeline Critical to Battling California Wildfires

When an abandoned campfire in Cleveland National Forest erupted into a 7,000-acre wildfire, communications expert Hans-Werner Braun and his collaborators from the NSF-supported High Performance Wireless Research and Education Network (HPWREN) came to the rescue. The team was recruited by the California Department of Forestry and Fire Protection to assist with battling the blaze, known as "Horse Fire," that was threatening the San Diego, Calif. area.

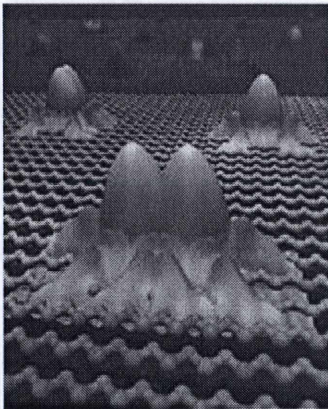
The HPWREN team set up computer hardware to allow firefighters in remote locations to communicate via a wireless link from the incident command post to the Internet. The critical lifeline, using Voice-over-IP technology, allowed firefighters at the scene to coordinate with reinforcements and resources miles away. The HPWREN team will remain on call throughout the fire season.



An HPWREN automated digi Lyons Peak captured an im. 2006, that shows the extent Credit: HPWREN.

The HPWREN collaboration involves researchers from the San Diego Supercomputer Center, Scripps Institution of Oceanography and San Diego State University. For more information on "Horse Fire" see "[Communications Team Erects Lifeline for Firefighters Battling California Wildfires](#)." More on HPWREN available in NSF's [Special Report on Disasters](#).

Scientists Tailor Semiconductors at the Atomic Scale



In a stride that could hasten the development of computer chips that both calculate and store data, scientists have turned semiconductors into magnets by the precise placement of metal atoms within a material from which chips are made. Credit: A. Yazdani, Princeton University.

A team of scientists has turned semiconductors into magnets replacing individual metal atoms in the material used to make cc. The ability to manipulate semiconductors at the atomic level could revolutionize computers.

Computers use two different kinds of technology to calculate and store data. Semiconductor chips do the calculating, while data storage has been accomplished with magnetic materials within floppy disks or hard drives. By combining these two functions into a single device, the size and power requirements of computer hardware could be significantly reduced, a major goal of the industry.

The researchers used a scanning tunneling microscope to move individual atoms on the chip material to give it magnetic properties. They will conduct further experiments to see how additional atomic maneuvers affect the overall performance.

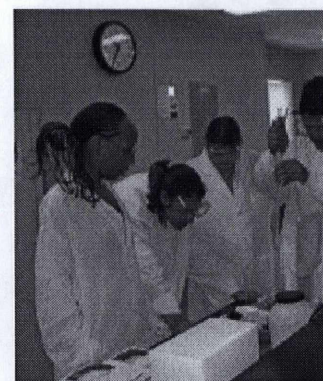
The team, composed of researchers from Princeton University, the University of Illinois at Urbana-Champaign and the University of Iowa, was supported by the U.S. Army Research Office. See Princeton University's "[Scientists Build 'Magnetic Semiconductors' One Atom at a Time](#)" for more information.

DID YOU KNOW?

Since its inception, the Louis Stokes Alliances for Minority Participation (LSAMP) program has been developing strategies to increase the quality and quantity of minority students who successfully complete bachelor's degrees in science, technology, engineering and mathematics (STEM) and also matriculate students into STEM graduate programs.

Since its inception in 1991, minority enrollment in STEM majors at LSAMP-participating institutions increased from 35,670 to more than 205,000 in 2003. To date, the 34 LSAMP Alliances have produced over 24,000 STEM graduates with bachelor's degrees.

NSF's Directorate for Education and Human Resources-Division of Human Resource Development manages the [LSAMP program](#). For more on the evaluation of LSAMP, visit the [Urban Institute Web site](#).

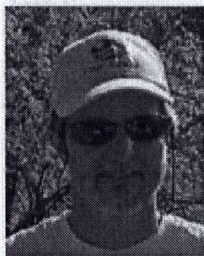


*Students at the University of
Pembroke conduct a research
part of the NSF-supported
Alliances for Minority Partici
Credit: LSAMP, University of
Pembroke.*

[\(back to top\)](#)

FACES OF NSF RESEARCH

Same Face, New Place -- Collins Sustains NSF Ideals for the Long-Term



*In 1992, Dr. Scott Collins came to NSF as a program director in ecological s
2003, he left his NSF position to head the University of New Mexico's Seville
Term Ecological Research Project (LTER). He departed NSF with a deep resp
the NSF proposal review process and the care with which reviewers and par
evaluate proposals. Now planted firmly back in research, Collins is studying
other things--plant community dynamics and fire ecology in the desert. We
asked Collins to see if his time at NSF had long-term impacts on his researc*

NSF: What was the most important insight you gained at NSF? **Collins:** While working at I opportunity to interact with scientists from a very broad array of disciplines outside ecology. TI helped me understand important connections between subdisciplines within ecology, as well as t of collaboration among disciplines. I also gained a better understanding of how the federal gove and the role federal agencies play in shaping science and science policy.

NSF: What is the next "big thing" on the horizon for ecology? **Collins:** A few things real desire to develop genuine long-term research collaborations with social scientists, includin anthropologists, sociologists, geographers, political scientists, etc. Second, we are just beginni emergence of 'ecological genomics,' which will unify disparate groups within the biological scienc technology continues to develop, sensors and sensor networks are going to play a huge rol research. This will require strong collaborations between ecologists and engineers, mathe computer scientists.

NSF: What research project at the Sevilleta LTER do you foresee having an immedia ecological research? **Collins:** Water is everything in the desert southwest. Climate chang notoriously bad at predicting regional changes in precipitation, but they all seem to suggest that c become more variable. We have three experiments at the Sevilleta that manipulate different asp variability in combination with other drivers, for example, temperature or nitrogen pollution. We :

the future' in our region to better understand the consequences of global change on arid-land ecos

NSF: What has been the highlight of your professional career? Collins: I learned early on at NSF that my job was to help make other people successful. That was our operating philosophy. I use that same philosophy here at UNM through working with students and through the Sevilleta LTER program.

*"Huma
environme
having a
impact o
systems. Y
relies on t
solve p*

NSF: What advice would you give to young researchers who are interested in pursuing the same or similar paths? Collins: As I said to a former UNM student heading off to a tenure track job, 'just do it because you love it.'

[\(back to top\)](#)

NSF IN THE NEWS

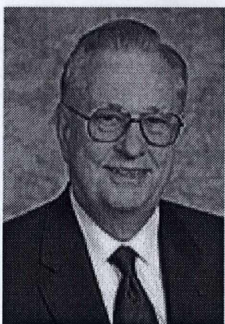
Georgia Tech Develops a 'SWAN' Suit -- *United Press International (08/15/06)* -- Researchers at Georgia Tech are developing the System for Wearable Audio Navigation suit -- consisting of a small laptop, a proprietary chip, and bone-conduction headphones -- designed to guide the blind as well as firefighters and soldiers whose vision is obscured. The effort is supported by a \$600,000 National Science Foundation grant.

Agencies Still in the Red on Financial Performance -- *Federal Computer Week (08/14/06)* -- Financial performance remains one of the weaknesses of federal agencies under the Office of Management and Budget's quarterly Executive Branch Management Scorecard. The National Science Foundation is an exception, consistently earning the highest mark, green, in the category.

Taking the Nanopulse -- *Nano by the Numbers* -- *Industry Week (08/09/06)* -- The 2005 National Science Foundation Manufacturing Sciences Survey of Nanotechnology in the U.S. Manufacturing Industry funded by the National Science Foundation asked 600 industry executives about nanotech trends. What's new? To begin with, there's a rise in urgency about nanotechnology in the two years since the last report. A majority of respondents now say nanomanufacturing is a high priority for them.

[\(back to top\)](#)

NSF PERSPECTIVES



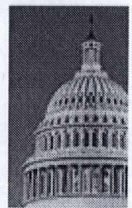
Excerpts from Dr. Arden L. Bement Jr.'s remarks

before the
**Education, Early Childhood and
Workforce Committee**

at the
National Governor's Meeting

As delivered on Aug. 6, 2006

NSF's Bill Watch



H.R. 5356	Research for Competitiveness Act
Sponsor	Rep. Michael T. McCaul [T] (introduced 5/11/2006)
Latest Action	6/22/2006: Placed on Union Calendar, H. Rept. 294

Authorizes NSF to allocate at least 3.5 percent of the total amount of the Department's and Related Activities funding to early-career awards. Also authorizes industry matching support of high-risk, high-return research.

H.R. 5358	Science and Mathematics Education Incentives Act
	Rep. John "Joe" Schwarz [R]

Today, the world is too small and too connected not to collaborate. NSF wants to partner with you to attract, educate, and train future scientists and engineers.

Students should be continuously educated to the variety of career options that STEM education opens to them and the relevance of their studies to society. They deserve an answer to the question, "Why do I need to learn this stuff?"

We must commit to our teachers if we expect them to commit to our children. Teachers are underpaid and overworked with responsibilities that have nothing to do with teaching. Worse yet, many do not have a quality education in the STEM subject they are teaching.

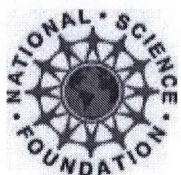
At NSF, we are ready to work with all parties to build a stronger S&E workforce to keep the U.S. at the head of the pack. Although our different sectors have unique roles, we must work together to achieve this common goal.

NSF's "Top Gun" Speaks to "The GrantDoctor" on Frontier Science

"If we at NSF stop short in our pursuit of high-risk endeavors, it seems to me that we leave an absolute vacuum. In a science and technology-based world, to divert our focus from the frontier is to put the nation at peril," said NSF Director Arden L. Bement, Jr.

Bement offered up NSF's SGER (Small Grants for Exploratory Research) as a vehicle to procure support of ambitious frontier science. "Doing research at the frontier is not new for NSF. This is a reaffirmation of what NSF has been doing since its founding," continued Bement. See the Grant Doctor's full story "[No More Boring Science](#)" from *Science* (08/11/06) for more.

[\(back to top\)](#)



The National Science Foundation (NSF) is an independent federal agency that supports fundamental research across all fields of science with an annual budget of nearly \$5.58 billion. NSF funding reaches all 50 states roughly 1,700 universities and institutions. Each year, NSF receives about 40,000 competitive requests and makes about 10,000 new funding awards. The NSF also awards over \$400 million in professional and public service awards annually. Contact [NSF's Office of Legislative and Public Affairs](#) for more information, to unsubscribe, or for press releases and newsletter images.

Sponsor	(introduced 5/11/2006)
Latest Action	6/22/2006: Placed on Uni-293
Authorizes funds for the Robert N. Dornier Scholarship Program and increases scholarship funding for the National Science Foundation and University Partnerships Program; Centers for Advanced Study and Math Education; Centers for Education; and the STEM Talent Expansion Program.	
S. 2802	American Innovation and Competitiveness Act
Sponsor	Sen. John Ensign [NV] (introduced 5/15/2006)
Latest Action	7/19/2006: Reported out of Science, and Transportation and placed on Senate Legislation No. 524
Authorizes NSF appropriations, which increase to \$11.42 billion from FY 2007 to FY 2012; funding for an additional 1,250 GK-12 programs, 1,250 IGERT traineeships, and for pilot science Master's degree programs.	
S. 2198	PACE-Education Act
Sponsor	Sen. Pete Domenici [NM] (introduced 1/26/2006)
Latest Action	3/1/2006: Senate Committee on Education, Labor, and Pension Subcommittees on Education and Childhood Development held
Authorizes funds to recruit and train 10,000 teachers via scholarships, and for the development of teachers. Authorizes funding for research grants, Advanced Research Instruments, and Related Activities for NSF's Research and Related Activities	