

NSF AT WORK

Hurricane Seasons Are Becoming More Active



Satellite image of an Atlantic hurricane. Credit: National Oceanic and Atmospheric Administration

For many Americans who live on the Atlantic coast, Andrew, Ivan and Katrina are more than just names—they are reminders of the devastating impact of cyclonic activity in the region during hurricane season. New results of a study funded by the U.S. National Science Foundation (NSF) and the Bermuda Institute for Ocean Sciences show the frequency and strength of these powerful storms has grown in recent decades.

"We are at levels now that are about as high as anything we have seen in the past 1,000 years," said Michael Mann, director of the Earth System Science Center at Pennsylvania State University and lead author of the paper that appeared in the August 13, 2009, issue of *Nature*. Mann and his collaborators examined sediment samples from across the North Atlantic coast and statistical models of historic hurricane activities.

Their analysis allowed them to measure the severity of hurricane seasons over the past 1,500 years. The sediment samples match up relatively well with the computer models, both of which show a period of high activity around A.D. 1000, followed by a lull in activity. This medieval peak rivals and possibly exceeds the level of activity seen in recent decades.

The study also adds validity to the theory that two factors fuel higher hurricane activity, namely the La Niña effect, in which unusually cold water settles over the equatorial Pacific Ocean, while high surface temperatures occur in the Atlantic. If climate change continues to warm ocean waters, Mann said, it could lead to more active hurricane seasons. This hurricane season, so far, is lighter than usual, Mann said, because of the El Niño effect, which is believed to have the opposite effect of La Niña patterns. Read more about the work and view a media briefing with Dr. Mann [here](#).

West Nile Virus May Hold Key to Understanding Global Disease Spread

The southwest suburbs of Chicago may hold the secret to understanding the spread of West Nile virus, which has infected thousands since it appeared in North America in 1999. [Research](#) jointly funded by NSF and the National Institutes of Health (NIH) has now shown that the suitability of the environment for both mosquito breeding and transmission to birds is the key to understanding the spread of the virus.



The Northern House Mosquito, associated with West Nile Virus. Credit: Gabe L. Hamer

Tony Goldberg, epidemiologist and professor at the University of Wisconsin-Madison's School of Veterinary Medicine is exploring the ecological factors in Chicago that contribute to West Nile transmission. "There are few other cities with such good conditions for the virus to persist," he says.

Studying West Nile is crucial to understanding the development and spread of disease in today's world since West Nile "is a textbook example of globalization of disease," says Goldberg.

Goldberg explains that the reason West Nile virus is so prevalent in Chicago lies in the suitability of its environment for both mosquito breeding and transmission to key avian species, especially the American robin. In addition, the coincidence in timing of mosquito and robin breeding creates ideal conditions for this host and parasite relationship to flourish. Read more about this work [here](#).

Award-Winning Innovation From NSF Investments



Sinmat worker demonstrating new method. Credit: Sinmat

Each year, *R&D Magazine* names the most technologically significant new products to the [R&D 100](#). This year, three technologies developed with NSF support were chosen for this recognition.

- [Advanced Diamond Technologies, Inc.](#), was recognized for a new type of atomic force microscopy probe used to image and manipulate small objects. The company developed the probe [with NSF support](#) in collaboration with the University of Pennsylvania and the University of Wisconsin-Madison.
- Also recognized were new additives from [Hybrid Plastics, Inc.](#), a Mississippi company, that increase the flow of thermoplastic polymers. Because these flow-aids are stable at high temperatures they enable faster processing and use less material and energy. Hybrid Plastics developed the aids [with support from NSF](#) and in collaboration with the University of Southern Mississippi.
- Making copper interconnects for semiconductors requires numerous high-precision steps and expensive equipment that add to chip manufacturing costs. With [support from NSF](#) Florida-based [Sinmat, Inc.](#), has developed a method that even works on fragile materials. Sinmat's technique allows chip manufacturers to increase yields while decreasing costs.

Science Teachers Report to the Offices of NSF

From the halls of school to the halls of government, a group of mathematics and science teachers has spent the past year gaining a national perspective on science, technology, engineering and mathematics (STEM) education. As part of the [Albert Einstein Distinguished Educator Fellowship program](#), nine teachers came to NSF, where their work took them to locations as diverse as [Greenland](#), Costa Rica and Panama, while involving them in the process behind NSF's support of cutting edge research and science education projects.

Anthonette Pena, who teaches eighth-grade science in Palm Beach County, Fla., says her work at NSF has made her think more critically about new mandates—including a proposal to change the way instruction is delivered in her district. "My first thought was, is there research to back this up?" said Pena. "I wouldn't have asked this question before I came to NSF."

Mark Hannum, a mathematics and physics teacher from Banneker High School in Washington, D.C., has found the Einstein Fellows program to fit in well with NSF culture. "If you look at NSF and the system with 'rotators' [scientists and engineers who spend 2-3 years at the agency], NSF wants ground-level expertise from researchers. In the same way with the Einstein Fellows, NSF wants ground-level experience from teachers—bringing recent real-world insights from the classroom." On September 1st, [a new group of Fellows](#) joins returning NSF Fellows Hannum, Pena, Kera Johnson and Sarah Yue.



2008-09 NSF Einstein Fellows. Credit: Triangle Coalition

DID YOU KNOW?

On July 29, 2009, in Stockholm, Sweden, the Internet Society awarded its 2009 Jonathan B. Postel Service Award to CSNET (the Computer Science Network), an NSF-supported research networking effort that developed the critical bridge from ARPANET to the modern Internet. The award recognizes the work of the investigators who designed and built CSNET as well as that of the NSF program officer in charge of the project, the late Kent Curtis.

CSNET began when NSF awarded a five-year grant to connect more than 165 academic, government and industrial research groups across the United States. CSNET's acceptance and success led to the establishment of NSFNET, which brought open networking to an even larger community and led to the eventual emergence of the modern Internet. The award was accepted on behalf of the CSNET team by David Crocker who, at the time, was a graduate student on the project.

FACES OF NSF RESEARCH

President Announces Winners of Early Career Awards in Science and Engineering

On July 12, 2009, President Obama named 100 beginning researchers as recipients of the 2008 Presidential Early Career Awards for Scientists and Engineers (PECASE), the highest honor bestowed by the U. S. government on young professionals in the early stages of their independent research careers. The recipients of the PECASE awards will be honored this fall at a White House ceremony.



Twenty of the 2008 winners were [nominated by NSF](#) and were selected from a pool of 455 grant recipients of NSF's Faculty Early Career Development (CAREER) program. More than 2500 proposals were reviewed for these awards. The NSF-nominated PECASE awardees are:

- Maria M. Calbi, Department of Physics, Southern Illinois University at Carbondale
- Amy B. Cerato, School of Civil Engineering, University of Oklahoma
- Ioannis Chasiotis, Department of Aerospace Engineering, University of Illinois at Urbana-Champaign
- Monica F. Cox, Department of Engineering Education, Purdue University
- Cameron R. Currie, Department of Bacteriology, University of Wisconsin-Madison
- Joel L. Dawson, Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology
- Jimmy de la Torre, Department of Educational Psychology, Rutgers University
- Roland Fryer, Department of Economics, Harvard University
- Sean Hallgren, Department of Computer Science and Engineering, Pennsylvania State University
- John M. Herbert, Department of Chemistry, The Ohio State University
- Steven D. Jacobsen, Department of Earth and Planetary Sciences, Northwestern University
- Charles R. Keeton II, Department of Physics and Astronomy, Rutgers University - New Brunswick
- Chun Ning (Jeanie) Lau, Department of Physics, University of California – Riverside
- Hao Lin, Department of Aerospace Engineering, Rutgers University
- Harmit S. Malik, Fred Hutchinson Cancer Research Center
- Rada Mihacea, Department of Computer Science and Engineering, University of North Texas
- Scott R. Sheffield, Department of Mathematics, Massachusetts Institute of Technology
- Zuzanna Siwy, Department of Physics and Astronomy, University of California - Irvine
- Adam Smith, Department of Computer Science and Engineering, Pennsylvania State University
- Joy K. Ward, Department of Ecology and Evolutionary Biology, University of Kansas

NSF IN THE NEWS

[Scientists Spot Massive Methane Rainstorm Over Titan](#) (*Christian Science Monitor, MSNBC, New Scientist and others*) Astronomers have discovered a storm system on Saturn's moon, Titan, that is the size of India. The work was partially funded by NSF.

[Work on Cheyenne Supercomputer to Begin in Spring](#) (*Local 8 News, Idaho & Wyoming*) Construction on a climate-modeling supercomputing facility near Cheyenne is expected to begin next spring. The National Center for Atmospheric Research plans to use the supercomputer to model the climate. The National Science Foundation is supplying much of the funding for the \$80 million facility.

[New Cancer Drug Delivery System is Effective and Reversible](#) (*Innovations Report*) University of Illinois researchers report that they have assembled a new cancer drug delivery system that, in cell culture, kills tumor cells while sparing healthy cells. Its actions are reversible, decreasing the possibility of drug side-effects. The system was developed as part of a collaboration funded by NSF.

THE RIPPLE EFFECT

NSF Selects New Directorate Head

The National Science Foundation (NSF) has selected University of Michigan historian [Myron Gutmann](#), director of the Inter-University Consortium for Political and Social Research, to head its directorate for Social, Behavioral and Economic Sciences (SBE). The directorate supports research that builds fundamental knowledge of human behavior, interaction, social and economic systems, and organizations and institutions.



Myron Gutmann; Credit: Steve Kucma photography

Gutmann, who specializes in historical demography and population-environment relationships with a focus on Europe and the Americas, begins his position on Nov. 2, 2009.

Capitol Hill Briefings Focus on Renewable Energy Technologies

On July 16, in the second of four Capitol Hill briefings about renewable energy technology, top energy experts discussed technological barriers and suggested policy recommendations for the development of renewable energy storage, an important component of clean power utilization. The briefings are jointly hosted by NSF, Discover magazine, the American Society of Mechanical Engineers (ASME) and the public policy committee of the Institute of Electrical and Electronics Engineers (IEEE-USA).

Guest speakers Dan Nocera of the Massachusetts Institute of Technology and Ralph Massiello, senior vice president and innovation manager at business consulting company KEMA, Inc. told a group of about 80 people that hydrogen would become the nation's next primary energy source. But, in the meantime, they said, other technologies, including batteries and compressed air energy storage, will need to serve as a bridge while hydrogen technology is developed.

The two made the remarks as part of the "Road to the New Energy Economy" briefing series. The next briefing on "Increasing Efficiency" will be held on Sept. 17 and a final session on "Transitional Technologies" will take place on Oct. 15. Both briefings are scheduled in room B-338 of the Rayburn House Office Building in Washington, D.C., from 12:00 - 2:00 p.m. For more information including video of the July 16 event click [here](#).

NSF Staff Member Receives Honor from Guam Legislature

John Cruickshank, a senior program analyst at NSF, was recently presented with a congressional proclamation from the government of Guam for his work on behalf of NSF aimed both at promoting science education and research and increasing the participation by Pacific Islanders in scientific endeavors.



John Cruickshank, holding the congressional proclamation honoring him "for his advocacy for Guam and Micronesia." Credit: Raima Larter

The resolution was presented to Cruickshank on July 17, 2009 in Guam's capital city of Agana. Cruickshank accepted the award from Senator Tina Muna Barnes in a congressional ceremony attended by approximately 2,000 people.

The resolution honors "Mr. John Cruickshank for his outstanding service to our island community and the Pacific region." Cruickshank's acceptance speech was delivered in Guam's native language, known as Chamorro.



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 2009, its budget is \$9.5 billion, which includes \$3.0 billion provided through the American Recovery and Reinvestment Act. NSF funds reach all 50 states through grants to over 1,900 universities and institutions. Each year, NSF receives about 44,400 competitive requests for funding, and makes over 11,500 new funding awards. NSF also awards over \$400 million in professional and service contracts yearly. NSF expects to make an additional 3,000 awards with the Recovery Act funds. Contact [NSF's Office of Legislative and Public Affairs](#) for more information, to unsubscribe or for permission to reuse newsletter images.