

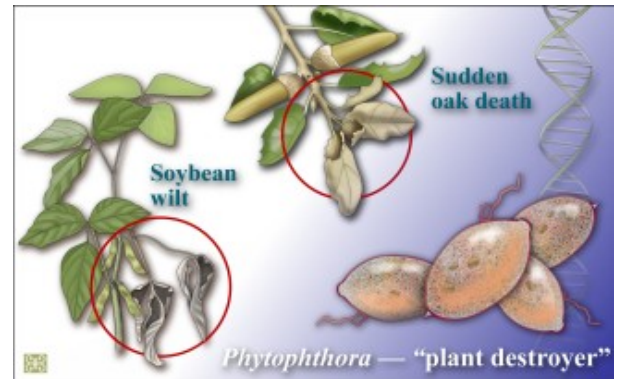
NSF AT WORK

Genome Info from "Plant Destroyers" Could Save Trees, Beans and Chocolate

An international team of scientists published the first two genome sequences from a destructive group of plant pathogens called *Phytophthora*--a name that literally means "plant destroyer." The more than 80 species of fungus-like *Phytophthora* attack a broad range of plants and together cost the agriculture, forestry and nursery industries hundreds of billions of dollars each year.

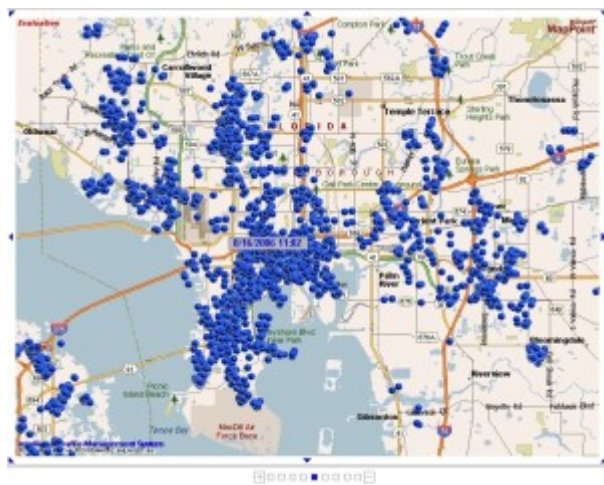
Although similar to fungi, most fungicides are ineffective at controlling *Phytophthora*. The information gained from studying the genomic sequences of *P. ramorum* and *P. sojae* will help scientists devise strategies to combat not only these two species, but also other disease-causing *Phytophthora*.

P. sojae, an endemic pathogen of soybeans, is responsible for \$1 billion to \$2 billion in losses worldwide each year. *P. ramorum* is associated with sudden oak death, a disease that has devastated the nursery industry and oak ecosystems in California, Oregon and Washington state. More than 1 million native oak and tanoak trees have been lost to the disease. See NSF's [press release](#) for more on diseases caused by this plant pathogen.



Scientists have sequenced the genomes from two species of *Phytophthora*, a group of plant pathogens that attacks a broad range of plants including soybeans, oak trees, and a number of other agriculturally important plants. *Phytophthora* also destroys an estimated 450,000 tons of cocoa beans with a resulting \$400-million loss in chocolate production each year. Credit: Zina Deretsky, NSF.

New Technology Uses Cell Phone Positioning Data to Report on Traffic



The IntelliOne Roadway Speed Measurement System uses cell phone signals to map roadway speeds for all highways and surface streets where mobile phone coverage exists. The blue dots represent a snapshot of all active mobile phones from a single carrier's network in Tampa, Fla. Credit: IntelliOne Technologies Corporation.

Engineers have developed a system for taking anonymous cell phone location information and turning it into an illuminated traffic map that identifies congestion in real-time. The system takes advantage of the steady stream of positioning cues--untraced signals all cell phones produce whether in use or not--as they seek towers, and uses the positioning cues to produce average speeds and travel times for all roads with cellular coverage.

Developed by IntelliOne of Atlanta, Ga., the TrafficAid system could help guide drivers around tie-ups and also alert emergency responders on accidents and the progress of emergency evacuations by pinpointing clusters of cell phones. It is the first traffic-solution technology that monitors patterns on rural roads and city streets as easily as on highways.

Creation and development of TrafficAid was supported in part by a grant from NSF's Small Business Innovation Research program, which directly supports businesses and their partners in academia. Read NSF's "[Real-Time Traffic Routing from the Comfort of Your Car](#)" for more details on IntelliOne's accuracy.

High-Flying Balloons Track Hurricane Formation

In order to find out how some of the most dangerous hurricanes form, U.S. and French researchers are launching large, specialized balloons carrying nearly 300 instruments over wide swaths of Africa and the Atlantic Ocean. The eastern tropical Atlantic Ocean is out of range for U.S. hurricane-hunter aircraft, and forecasters have little skill predicting which systems brewing there will develop into hurricanes.

The first launch of a balloon with its instruments, called a driftsonde, took place at Zinder, Niger, on Aug. 28. In total, eight driftsondes will be released from Zinder during the peak period of hurricane formation over the tropical Atlantic. Data from the driftsondes will help characterize conditions that either foster or suppress hurricane formation. Researchers at the National Center for Atmospheric Research (NCAR) and the French space agency, the Centre National d'Etudes Spatiales, developed the driftsondes.

The research is funded by NSF, NCAR's primary sponsor, and the National Oceanic and Atmospheric Administration. See NSF's "[High-Flying Balloons Track Hurricane Formation](#)" for more on driftsondes.



A hurricane-tracking driftsonde shimmers during a sunrise test. Credit: NCAR.

National Science Foundation Special Report: The Secret Lives of Wild Animals

NSF-supported scientists are developing innovative tracking and information-management technologies to unobtrusively follow the movements of wild animals. Multidisciplinary teams of biologists, computer scientists, and engineers are observing and tracking animals in their natural environment to learn exactly how animals spend their minutes, days and years.

Explore the latest animal tracking technologies, learn animal facts, and watch video clips of NSF-supported research at work in our newest special report.



Just how small do tracking sensors have to be to fit on a dragonfly? Find out as researchers use them to track Green Darner dragonflies during their annual migration.



Why did the deer "cross the road"? See what researchers are learning about deer movement through the eyes of "deercam."



How can zebras be "stars" and striped at the same time? Check them out as they show off their tracking collars that researchers are using to learn about safeguarding zebra habitat.



[Click here to make tracks to "The Secret Lives of Wild Animals."](#)

Image: Nicolle Rager Fuller, NSF.

DID YOU KNOW?

Twenty years ago this month, a team of scientists--put together by NSF, NOAA and NASA--were on the ice in Antarctica studying the hole in the stratospheric ozone layer over the southernmost continent.

Their observations were the first definitive demonstration that humans are capable of affecting the entire global climate system and led to the Montreal Protocol, the first treaty to address the Earth's environment. This treaty--which was ratified by 29 countries and the European Economic Community in 1989--was the first to address the Earth's environment.



Twenty years ago, scientists reported that the human production of chemical chlorofluorocarbons (CFCs) caused the ozone hole over Antarctica, which is visible from space through the hole. Credit: NASA.

New Science and Technology Center Opens Windows for Coastal Ecosystem Research



In a recent interview with Dr. Antonio Baptista, we were not surprised to learn of his favorite quote, "A rising tide lifts all the boats." This metaphor, after all, captures his vision for the newly debuted, NSF-supported Science and Technology Center for Coastal Margin Observation and Prediction (CMOP), which he heads. Baptista, an engineer from Angola, professes that the beautiful beaches of his native country helped inspire his present research endeavors in coastal margins and river-to-ocean ecosystems. Baptista has also successfully merged the organizational skills and thought process of his engineering training with his fascination for microbes. He can barely wait to take a peek into microbial communities in order to understand their role in river-to-ocean ecosystems—only one of the bright new windows that CMOP opens.

NSF: What would you consider the next grand research challenges for CMOP researchers? Baptista: Understanding the role of microbes in coastal margins, under varying influences of climate, ocean and humans, has to be the next big umbrella for CMOP.

NSF: What do you hope CMOP will accomplish over the long-term? Baptista: The center will study coastal margins and enable a transformative understanding of river-to-ocean ecosystems. We expect to build effective paradigms for integrated research, education and knowledge transfer—and we hope to export their elements across the entire coastal margin community. We want a future in which observation and prediction are used as commonly for the sustainable development of coastal margins as they are for weather forecasting.

NSF: How do you foresee CMOP helping to educate the public? Baptista: A clearly important objective is to help the public recognize the benefits of ocean research. We will use a range of approaches, such as talking at rotary club-like settings, which has proven in the past to be effective. Giving the public access to ocean data in a friendly, yet pervasive way, is another approach. We expect to strategically place throughout the Pacific Northwest "Today's Ocean" interactive kiosks. "Today's Ocean" will also be an integral part of our Web site.

NSF: What's the biggest challenge that "coastal margin" scientists have to overcome in the next century? Baptista: We clearly need to understand the influence of climate on coastal margins, the role of coastal margins in global elemental cycles, and the impact of human activities. We need to realize that we are observing to understand, understanding to predict, and predicting to enable society to make wise decisions on management, development and preservation of river-to-ocean ecosystems and resources.

NSF: What's your favorite creature of the ocean? Baptista: For early Portuguese sailors, mermaids were creatures of wonder, and many never gave up hope of eventually seeing one. Maybe because of my Portuguese ancestry, my favorite water creatures have always been those that I have not--but hope to one day--see.

"Ultimately, we will only be successful if, while we advance science and technology, we also enable society to critically use the scientific knowledge we develop for the greater good. While no single recipe exists for appropriate education, I strongly believe that a foundation in science, engineering, and math is an essential component."

NSF IN THE NEWS

[Tiny Is the Next Big Thing](#) -- *Fort Worth Star-Telegram* (09/17/06) -- The NSF expects about \$1 trillion worth of nanotechnology-enabled products to be on the market by 2015.

[Supercomputing Partnerships Produce Success, Studies Show](#) -- *Federal Computer Week* (09/08/06) -- Ninety-three percent of respondents to a survey administered last winter that focused on the experiences of 40 companies in partnerships with the NSF at the National Center for Supercomputing Applications, the Pittsburgh Supercomputing Center, the San Diego Supercomputing Center, and the Texas Advanced Computing Center said the partnerships advanced their research and development efforts, and upwards of half reported that their collaborations had led to a breakthrough or revealed something new.

[European Science: Basic Science Agency Gets a Tag-Team Leadership](#) -- *Science* (09/08/06) -- Two leaders have been chosen as successive heads of the new European Research Council, a sort of National Science Foundation for all of Europe. The NSF's peer-review system is especially praised as worthy of emulation.



Excerpts from
"Change Happens: Globalization and Technology Policy"

by
NSF Director Arden L. Bement, Jr.

as delivered at
**University of Akron's Symposium:
 Impact of Globalization
 on Technology Policy**

August 11, 2006

"Research networks today are crisscrossing the globe, eclipsing geographic, disciplinary, and time barriers. In short, we are now confronted with the *globalization* of science and engineering."

"We intend to strengthen our international outreach by expanding opportunities for international collaboration in research and education whenever and wherever possible. That also means bringing a global, collaborative perspective to every level of education, from kindergarten to post-doc, as well as teaching the skills necessary to thrive in a diverse, globally comprehensive environment."

"We should always remember the larger context. That context is a world in which we hope to identify common problems and forge common solutions. The promise of globalization in the broadest sense is a world empowered by education, made safer, healthier and more secure through technology, and enlightened by knowledge in the service of society."

Visit [NSF's Office of the Director](#) to read this and other speeches by Dr. Bement.

**NSF Director:
 A Regular Witness at
 Congressional
 Hearings
 in September**



In less than a week's time, Dr. Arden L. Bement, Jr., testified before five Congressional committees at a record four hearings, which covered the upcoming International Polar Year; the current state of icebreaking for polar research; and the environmental, health and safety impacts of nanotechnology research. *Read the full versions of his testimony for more information on these NSF priorities.*

Testimony before the House Committee on Science Subcommittee on Research on [International Polar Year](#) (09.20.06)

Testimony before the House Committee on Science on the [Environmental, Health and Safety Impacts of Nanotechnology Research](#) (09.21.06)

Testimony before the House Committee on Transportation & Infrastructure's Subcommittee on Coast Guard and Maritime Transportation on the [National Academy of Sciences report on Federal Icebreaking Missions](#) (09.26.06)

Testimony before the Senate Committee on Commerce, Science and Transportation and Senate Committee on Foreign Relations on [International Polar Year](#) (09.26.06)

BOOMERANG Researchers Win Balzan Award for Cosmology Research

Two researchers that led the NSF- and NASA-funded scientific balloon mission in Antarctica, [the BOOMERANG project](#), have been awarded the 2006 Balzan Prize in Astrophysics. Andrew Lange, from the California Institute of Technology, and Paolo de Bernardis, from the Università di Roma La Sapienza, received the award from the International Balzan Foundation "for their contributions to cosmology, in particular the BOOMERANG Antarctic balloon experiment." The two halved the prize worth one million Swiss francs (\$810,000 US).

BOOMERANG, a balloon-borne telescope, obtained images of the universe long before the first stars formed. The images revealed that the geometry of the universe is flat, and provided compelling evidence that 95 percent of the universe consists of exotic forms of matter and energy that remain largely a mystery.



With Mt. Erebus, a dormant volcano in the background, the BOOMERANG telescope is readied for launch on its 10-day flight around Antarctica. Credit: BOOMERANG/NASA/NSF.



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