



December 13, 2017

01

NSF's Big Ideas

In the nearly seven decades since it was founded, the National Science Foundation (NSF) has played a critical role in establishing U.S. leadership in science and engineering (S&E), creating innovations that drive the nation's economy and educating the next generation of scientists and engineers. In 2016, NSF unveiled a set of "Big Ideas" -- 10 bold, long-term research and process ideas that identify areas for future investment at the frontiers of S&E. The Big Ideas represent unique opportunities to position the nation at the cutting edge -- Find out more about NSF's Big Ideas in this NSF [Special Report](#).



02

Bioengineered organs

More than 120,000 people are on the U.S. organ transplant waiting list. Miromatrix Medical, a small business funded by NSF, has developed a technology to create bioengineered organs for human transplant. Find out more in this NSF [Impact](#).



03

Futures of the scientific imagination

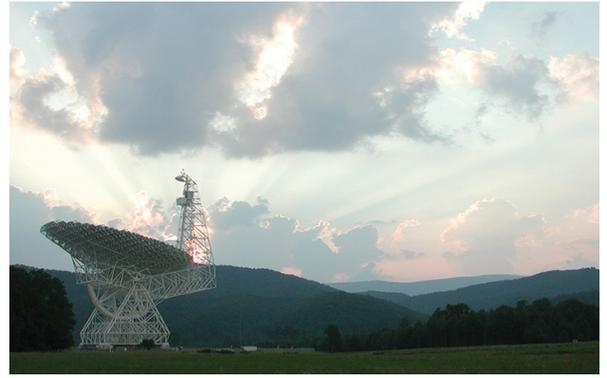
Some of the greatest ideas in S&E started out as sketches on paper napkins and notebook margins. Some call these sketches science fiction. At NSF, they are seen as possible futures. Fantastical thinking, grounded in real, NSF-funded S&E research, helps shape tomorrow's technologies. Imagination, science and technology together will inevitably change lives. Sharing a family meal across continents, surpassing the limits of our bodies, growing communities within tree-like buildings -- these are all imaginary scenarios rooted in today's fundamental research. In three, four or five decades, NSF researchers help to make them real. Future technologies are bound only by our imaginations. Find out more about these scenarios in this NSF [Special Report](#).



04

Green Bank Observatory

Last month, NSF published a [Draft Environmental Impact Statement](#) (DEIS) for Green Bank Observatory in Green Bank, West Virginia. The agency-preferred path forward involves collaboration with interested parties for continued science- and education-focused operations with reduced NSF funding. Green Bank Observatory conducts valuable science and education activities, and NSF has funded the facility and its research and education efforts for more than half a century. At the same time, NSF relies on the scientific community to provide input on its priorities. That community has recommended NSF divestment from the observatory, as well as from other observatories currently under similar review, in response to a constrained budgetary environment. Find out more information in this NSF [Press Statement](#).



05

Blast from the past: observing the Great American Eclipse

In a first of its kind, citizen scientists and researchers created a 90-minute, time-lapse video of the sun's inner corona. The Citizen CATE (Continental-America Telescopic Eclipse) Experiment captured images of the inner solar corona using a network of more than 60 telescopes operated by citizen scientists, high school groups and universities. CATE produced a scientifically unique dataset: high-resolution, rapid cadence white light images of the inner corona for 90 minutes. Find out more about the sun's corona and the Citizen CATE Experiment in this NSF [video](#) and this NSF [News Release](#).



06

Songs of the red rocks

It starts out as a rumble, like something heard underwater. It rises and falls in waves that pass one after another. But it couldn't be farther from the sea. NSF-funded geologist Jeff Moore of the University of Utah uses seismic vibration recordings to study the structural stability of the ever-transient red rock arches. This research has important implications for the conservation and management of the nation's natural resources as well as impacts of human visitation. Find out more in this NSF [Discovery story](#).



07

A series of fortunate events

Volcanism is sometimes like food poisoning, where the Earth spews forth unstable material. New research from Michigan Technological University, the University of Wisconsin Oshkosh and ETH Zurich shows that a significant pulse of volatile carbon was released from the Earth's mantle around 500 million years ago. But why? Find out more in this [NSF News from the Field](#) story.



08

IceCube stops neutrinos

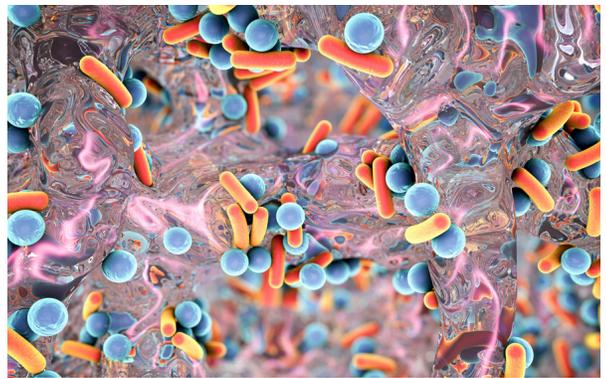
An interdisciplinary team of researchers using the IceCube Neutrino Observatory in Antarctica has measured how certain high-energy neutrinos are absorbed by the Earth, as opposed to passing through matter as most neutrinos do. Neutrinos are subatomic particles, most of which pass through anything and everything, only very rarely interacting with matter. The finding could help expand scientists' understanding of the fundamental forces of the universe. Find out more about neutrinos and the IceCube Neutrino Observatory in this NSF [News Release](#).



09

Managing antibiotics, not enough to reverse resistance

Researchers at Duke University have discovered that reducing the use of antibiotics will not be enough to reverse the growing prevalence of antibiotic resistance because bacteria are able to share the ability to fight antibiotics by swapping genes between species. The researchers also show, however, that there are ways to disrupt the gene-sharing process and perhaps reverse antibiotic resistance. Read more in this [NSF News from the Field](#) story.



10

Census Bureau adopts new mapping tool

The U.S. Census Bureau's Census Explorer is an online, interactive mapping tool that enables members of the media and public to visualize census data. The web-based platform was developed by an NSF-funded researcher to help undergraduate sociology students. Within the first few months of the tool's launch, more than 100,000 users had created 4 million data maps. Find out more in this NSF [Impact](#).

