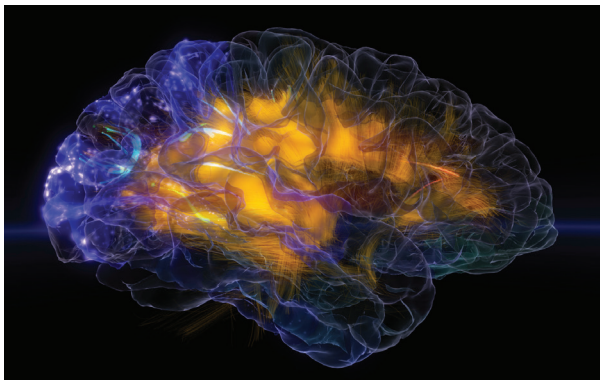
Quick Reads From NSF.gov

December 9, 2019

01

NSF awards 12 grants totaling $17 million to advance understanding of the brain



NSF has awarded $17 million to support 12 projects under its Integrative Strategies for Understanding Neural and Cognitive Systems program, which supports innovative, boundary-crossing efforts to push forward the frontiers of brain science. This cross-directorate program is one element of NSF's broader effort directed at Understanding the Brain, a multi-year activity that includes NSF's participation in the Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative. This year's 12 funded projects will advance foundational research in four focus areas: neuroengineering and brain-inspired concepts and designs; individuality and variation; cognitive and neural processes in realistic, complex environments; and data-intensive neuroscience and cognitive science. Find out more in this NSF Announcement.

02

In wake of wildfires and earthquakes, hurricanes and floods, NSF awards $19 million in natural hazards research grants

Natural disasters can't be stopped. But researchers supported by NSF are working to find ways to minimize their impact. Through NSF's Prediction of and Resilience against Extreme Events (PREEVENTS) program, the agency supports researchers studying hurricanes, floods, wildfires, earthquakes, coastal erosion, severe thunderstorms and tornadoes, volcanoes, space weather disruption of the power grid, and other natural hazards. "NSF's support for basic research on natural hazards will help the American people and those around the world better prepare for and respond to disasters," said Justin Lawrence, lead program director for the 2019 PREEVENTS grants. Read more in this NSF Announcement.

03

National security, brought to you by NSF

World War II brought tremendous leaps forward in technology that were required for the war effort, including advances in radar, the mass production of penicillin and atomic weapons, for example. While NSF's history begins with the end of World War II, our mission still reflects the role that scientific innovation continues to play in national security. NSF continues to foster a collaborative research environment that enables breakthroughs across scientific fields, including breakthroughs that protect communities, support veterans and warfighters, and enhance U.S. leadership from outer space to cyberspace. Learn more in this month's #BroughtToYouByNSF campaign in this NSF Special Report.

04

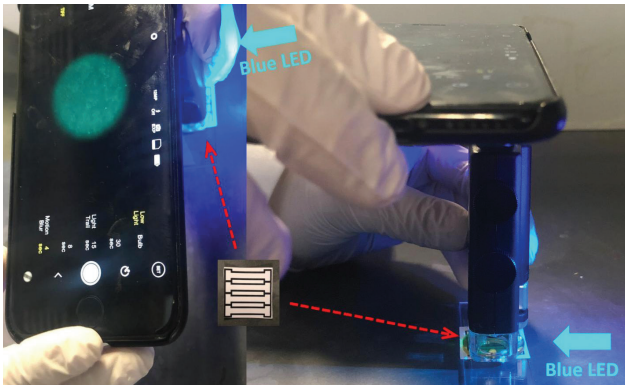
Browser tool aims to help researchers ID malicious websites, code

Researchers at North Carolina State University have developed an open-source tool that allows users to track and record the behavior of JavaScript programs without alerting the websites that run those programs. The tool, called VisibleV8, runs in the Chrome browser and is designed to detect malicious programs that are capable of evading existing malware detection systems. Find out more in this NSF Research News.

05

Using a smartphone to detect norovirus

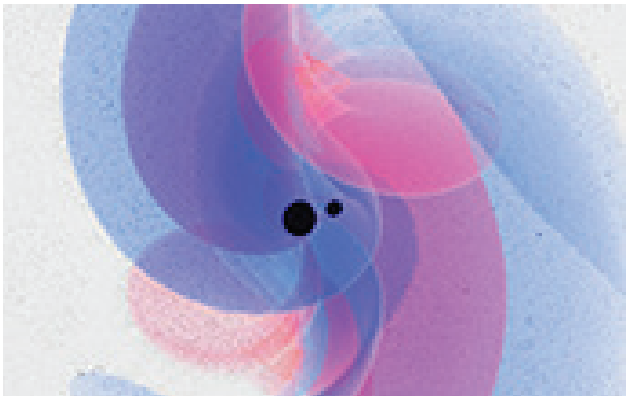
A little bit of norovirus -- the highly infectious microbe that causes about 20 million cases of food poisoning in the United States each year -- goes a long way. Just 10 particles of the virus can cause illness in humans. With support from NSF through its Water and Environmental Technology Center, a team of University of Arizona researchers has created a simple, portable and inexpensive method for detecting extremely low levels of norovirus. Find out more in this NSF Research News.



06

Observing 'black hole symphony' using gravitational wave astronomy

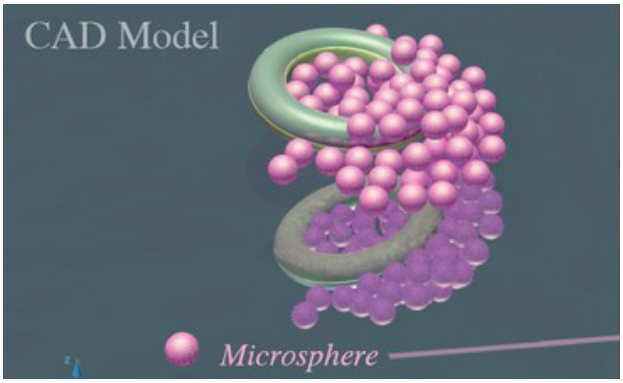
Shrouded in mystery since their discovery, black holes continue to be mind-boggling enigmas in our universe. Limitations in observation technologies have kept scientists from grasping a more complete picture of black holes. One of the largest gaps lies in a certain type of black hole: intermediate-mass black holes that fall between supermassive (at least a million times greater than our sun) and stellar (smaller, though still five to 50 times greater than the mass of our sun) black holes. Find out more in this NSF Research News.



07

Tiny swimming 'doughnuts' deliver the biomedical goods

Bacteria and other swimming microorganisms evolved to thrive in challenging environments. But it's difficult to harness these microorganisms' abilities for biomedical purposes, so NSF-funded researchers are now manufacturing artificial microswimmers called tori that would fit the bill. The microscopic, 3D-printed, doughnut-shaped tori are coated with nickel and platinum and bridge the gap between biological and synthetic swimmers. Find out more in this NSF Research News.



08

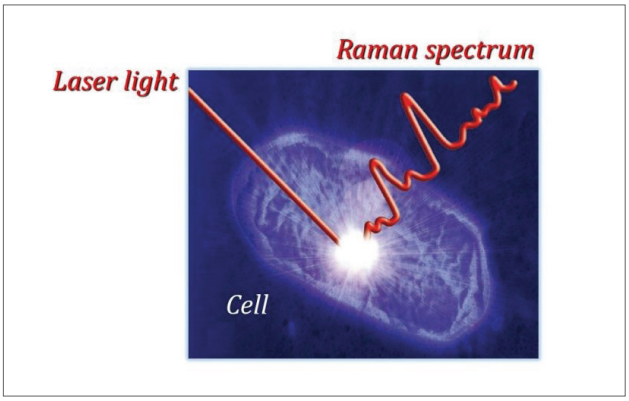
Study reveals surprising amount of gene flow among butterfly species

Scientists know that shared parts of DNA create color patterns in some passion vine butterflies. The patterns help the butterflies ward off predators. Now, a new study provides evidence that the process of sharing DNA may be far more common than thought, offering a potential clue to how biodiversity unfolded. Find out more in this NSF Research News.

09

Cell chemistry illuminated by laser light

Raman microspectroscopy is a laboratory technique used to produce molecular fingerprints of materials and biological specimens. However, to date, fluorescence has interfered with effective application of this technique and limited its use. The fluorescence may result from the compound analyzed or from fluorescent impurities in the sample. Now, researchers at Stony Brook University and colleagues have devised a photochemical technique that suppresses fluorescence in sample preparation. The technique may open the door to more efficient and highly resolved investigations of chemical distributions in individual cells. Read more in this NSF Research News.



10

Reframing the dangers Antarctica's meltwater ponds pose to ice shelves and sea level

Dangers to ancient Antarctic ice indicate a future of rapidly rising seas, but a new study, led by researchers at Georgia Tech and supported in part by NSF, may relieve one nagging fear. Meltwater ponds fracturing the ice below them may not cause protracted chain reactions that unexpectedly collapse floating ice shelves. For the study, researchers modeled fracture chain reactions and water amounts necessary to repeat a rare, epic collapse like the 2002 shattering of the iconic shelf "Larsen B." They found that pooled meltwater does fracture ice; however, ensuing chain reactions appear short-ranged. Find out more in this NSF Research News.

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