



January 31, 2018

01

State of US science enterprise report shows US leads in S&E as China rapidly advances

According to NSF's *Science and Engineering Indicators 2018* report, released Jan. 18, the United States is the global leader in science and technology (S&T). However, the U.S. global share of S&T activities is declining as other nations -- especially China -- continue to rise. The National Science Board (NSB) is the governing body of NSF and publishes the congressionally mandated report on the state of the U.S. science and engineering (S&E) enterprise every two years. The complete report is [available online](#). "NSF's *Science and Engineering Indicators* is the highest-quality and most comprehensive source of information on how the U.S. scientific and engineering enterprise is performing domestically and internationally," said NSF Director France Córdova. Learn more about the *Science and Engineering Indicators* report in this NSF [News Release](#).



02

NSF makes first awards through Hispanic-Serving Institutions program

NSF has issued the first awards through its Improving Undergraduate STEM Education: Hispanic-Serving Institutions (HSI) program, which is designed to enhance undergraduate education in science, technology, engineering and mathematics (STEM) at HSIs. Established in 2017, the HSI program is the result of NSF's work with the HSI community and lawmakers to find ways to bolster the quality of undergraduate STEM education. The program also seeks to build STEM capacity at HSIs that typically do not receive high levels of NSF funding. Learn more about this award and program in this NSF [News Release](#).



03

CyberCorps: Scholarship for Service recognizes first hall of fame recipients

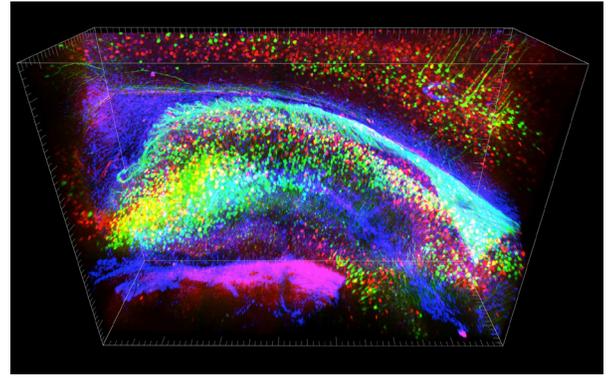
NSF's [CyberCorps: Scholarships for Service](#) program (SFS) helps generate more cybersecurity professionals. This month, the SFS program announced its inaugural class of SFS Hall of Fame recipients, recognized for making outstanding contributions to cybersecurity. The SFS Hall of Fame received nominations from more than 60 universities. The three members of the first class are Josiah Dykstra, Mischel Kwon and Steven Hernandez. NSF established the SFS program in 2000 to provide scholarships to students studying cybersecurity and to increase the U.S. higher education enterprise's ability to produce cybersecurity professionals. To date, more than 3,300 students have received scholarships and committed to work for federal, state, local or tribal government organizations in positions related to cybersecurity. Learn more about the program and Hall of Fame recipients in this NSF [New Release](#).



04

NSF-funded scientists develop a technique called CLARITY

Until recently, the composition of brain tissue limited researchers' insights into the brain's neural circuitry and function. NSF-funded scientists developed a technique called CLARITY to chemically dissolve opaque elements and replace them with a hydrogel, essentially rendering the brain transparent. When used with fluorescent markers, CLARITY lets researchers precisely reconstruct the brain's neural circuitry in 3-D and analyze how changes to the brain may underlie certain disorders such as autism or depression. The technique has been hailed as a breakthrough in neuroscience. Learn more in this NSF [Impact](#).



05

Blame it on the rain: Study ties phosphorus loading in lakes to extreme precipitation events

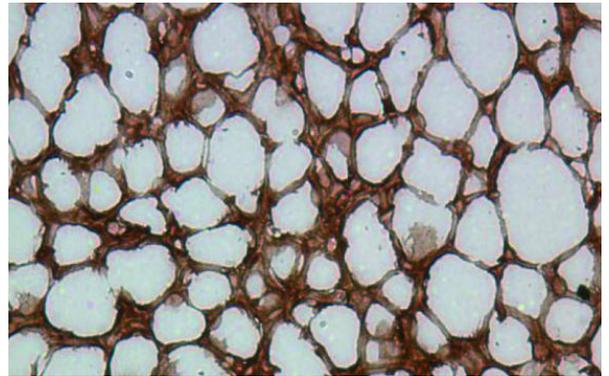
While April showers might bring May flowers, they also contribute to toxic algae blooms, dead zones and declining water quality in U.S. lakes, reservoirs and coastal waters, a new study shows. In the Midwest, the problem is largely due to phosphorus, a key element in fertilizers that is carried off the land and into the water, where it grows algae as easily as it grows corn and soybeans. Learn more about phosphorus loading affecting lakes in this NSF [Discovery](#) story.



06

Enzyme shown to regulate inflammation and metabolism in fat tissue

The human body has two primary kinds of fat: white fat, which stores excess calories and is associated with obesity; and brown fat, which burns calories in order to produce heat and has garnered interest as a potential means of combating obesity. New, NSF-funded research in mice and humans suggests that an enzyme called SNRK suppresses inflammation in obesity-related "white fat," while increasing metabolism in heat-producing "brown fat," making SNRK an intriguing target in the battle against obesity. Find out more in this NSF [News From the Field](#) item.



07

Ancient sharks likely more diverse than previously thought

Sharks have a reputation as ravenous hunters and apex predators, but new analysis of fossil records shows that some of the earliest sharks might have been filter feeders, taking in water through their mouths and catching food particles -- think less great white and more anchovy, another filter feeder. This NSF-supported research pushes the date for the last common ancestor between sharks and other types of jawed vertebrates back to 440 million years ago -- more than 17 million years older than the previous estimate. What did it look like? Find out more in this NSF [Discovery](#) story.



08

Researchers outline the interconnected benefits of urban agriculture

A team funded by NSF and led by Arizona State University (ASU) and Google researchers has assessed the value of urban agriculture and quantified its benefits at a global scale. The researchers report their findings in a paper published in the current issue of the American Geophysical Union journal *Earth's Future*. "For the first time, we have a data-driven approach that quantifies the ecosystem benefits from urban agriculture," said Matei Georgescu, a geographer at ASU and corresponding author of the paper. "Our estimates of ecosystem benefits show the potential for millions of tons of food production, thousands of tons of nitrogen sequestration, billions of kilowatt hours of energy savings, and billions of cubic meters of avoided storm runoff." Read more about the benefits of urban agriculture in this NSF [Discovery](#) story.



09

Winter road salt, fertilizers turning North American waterways increasingly saltier

A new study led by NSF-funded researchers is the first to assess long-term changes in freshwater salinity and pH -- a measure of how acidic or alkaline something is -- at the continental scale. Findings show a need for better regulation of road salt, fertilizers and other salty compounds. Salty, alkaline freshwater can create big problems for drinking water supplies, urban infrastructure and natural ecosystems. For example, the well-documented water crisis in Flint, Michigan, occurred when the city switched its primary water source to the Flint River in 2014. The river's high-salt load combined with chemical treatments made the water corrosive and caused lead to leach from water pipes. Learn more about this NSF-funded study in this NSF [News Release](#).



10

Worldwide importance of honeybees for natural habitats captured in new report

An unprecedented NSF-funded study integrating data from around the globe has shown that honeybees are the world's most important single species of pollinator in natural ecosystems and a key contributor to natural ecosystem functions. Led by biologists at the University of California, San Diego, this is the first quantitative analysis of its kind. The results clearly identify the honeybee (*Apis mellifera*) as the single most frequent visitor to flowers of naturally occurring (non-crop) plants worldwide. Honeybees were recorded in 89 percent of the pollination networks in the honeybee's native range and in 61 percent in regions where honeybees have been introduced by humans. Find out more in this NSF [News From the Field](#) item.



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