

## U.S. SCIENCE POLICY

# Bill would supersize NSF's budget—and role

Legislation calls for \$100 billion increase, new technology directorate, and new name

By Jeffrey Mervis

**T**he National Science Foundation (NSF) would get a huge infusion of cash, as well as a new name and new responsibilities for keeping the United States on top in technological innovation, under bipartisan bills introduced late last month in both chambers of Congress. But some science policy veterans are questioning whether a basic research agency should also be expected to spearhead the development of new technologies.

The Endless Frontier Act (S. 3832 and H.R. 6978) would create a technology directorate at NSF with a budget that could grow to \$35 billion by 2024—more than four times the agency's existing \$8 billion budget. That would bring NSF to rough parity with the National Institutes of Health, whose \$41 billion budget makes it by far the government's biggest funder of basic research.

The bill would authorize spending \$110 billion over 5 years, with \$100 billion for NSF (see chart, right) and \$10 billion for the Department of Commerce to set up a dozen or so regional technology hubs to promote innovation in areas not currently tech hot spots. NSF would also get a second deputy director to oversee all technology activities and a new name: the National Science and Technology Foundation.

The funding levels are aspirational; Congress would still have to appropriate the money even if the bill were adopted. But academic leaders view the legislation as a huge vote of confidence in NSF, which turned 70 this year. "These funds—which complement, not supplant, existing resources, an important condition—build on the NSF's strengths and would fill gaps in our research enterprise," says Rafael Reif, president of the Massachusetts Institute of Technology.

The legislation addresses the chronic underfunding of NSF, says Neal Lane, who spent 5 years as NSF director before becoming science adviser to former President Bill Clinton. "NSF gets enough good ideas to justify" a much larger budget, he says. "This bill makes clear that it's time for such bold action."

But Arden Bement, who led NSF under former President George W. Bush, says other federal agencies already have the mission of supporting applied technology and development. And no federal agency,

he adds, will ever have enough resources to substitute for what industry spends on commercializing innovation.

The bill's name invokes the title of the seminal 1945 report by presidential science adviser Vannevar Bush that made the case for federal support of academic research and led to NSF's creation in 1950. But the Stay Ahead of China Act might be a more accurate moniker, based on what lawmakers say they hope it will accomplish.

"China and others are stealing American intellectual property and aggressively in-

vesting in research and commercialization to dominate the known technology fields of the future," the four co-sponsors—Senators Charles Schumer (D-NY) and Todd Young (R-IN) and Representatives Ro Khanna (D-CA) and Mike Gallagher (R-WI)—say in the preface to their bills. "The country that wins the race in key technologies—such as artificial intelligence, quantum computing, advanced communications, and advanced manufacturing—will be the superpower of the future," they add.

## Dividing up the tech dollars

Lawmakers have proposed spending \$110 billion over 5 years to boost U.S. innovation. The Commerce Department would receive \$10 billion to establish up to 15 regional technology hubs with industry partners, whereas the National Science Foundation (NSF) would get \$100 billion, distributed across these six categories:

University-based technology centers	35%	For basic research, prototyping, and support of regional hubs
NSF priorities	20%	Allocated as needed within NSF and to other U.S. agencies
Education and training	15%	For scholarships, fellowships, and traineeships
Research, including social and ethical concerns	15%	Money channeled through various NSF programs
Testbeds and fabrication	10%	Support for facilities and processes to shorten time to market
Fostering entrepreneurship	5%	Strengthening the innovation enterprise in academia

he adds, will ever have enough resources to substitute for what industry spends on commercializing innovation.

The legislation calls on NSF to fund an unspecified number of university-based

technology centers in those and other fields. The centers would be an order of magnitude bigger than NSF's existing engineering and science centers, which have annual budgets of up to \$5 million. Partnering with industry scientists, the centers would both carry out fundamental research and develop prototypes of high-tech products and processes. NSF would also receive billions to expand its six science directorates, boost investment in education and training, and set up facilities to test new technologies.

The legislation could significantly alter how NSF operates, with the Defense Advanced Research Projects Agency (DARPA) as a model. It allows NSF to adopt DARPA practices, including fixed-term appointments of experts from the private sector and a focus on tangible, deadline-driven results. "The new [technology] directorate can run like DARPA if NSF wants it to," says one university lobbyist familiar with Schumer's thinking.

Because NSF currently gives grantees freedom to pursue curiosity-driven research, adopting a DARPA-like model "would be a huge cultural shift," says Joel Parriott, director of public policy for the American Astronomical Society and a former White House budget official whose portfolio included NSF. "It's also not clear how the technology directorate could operate so differently from the rest of the agency."

The bill's prospects this year are iffy in a Congress consumed by the coronavirus pandemic and with scant time to legislate before the fall elections. One option is attaching it to a reauthorization of defense programs that is seen as must-pass legislation. But in the meantime, David Hart, a science policy expert at George Mason University, says its "symbolic value" shouldn't be ignored.

"It's a bipartisan statement that the country is underinvesting in key technologies," Hart says. "I'm not sold on doing all of this at NSF. But we, as a nation, have to come up with new ways to fund technology. This is certainly a breath-taking proposal."

Bement disagrees. "Action on this bill should be tabled for another day," he says. Instead, he suggests Congress first "determine whether the system is broken and, if so, in what ways." ■