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President Donald Trump GAGE SKIDMORE/FLICKR (CC BY-SA 2.0)

# What's in Trump's 2018 budget request for science?

By **Science News Staff** | May. 23, 2017 , 12:45 PM

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    will be scouring today's budget documents for fresh details. Come back to our rolling coverage for analysis and reaction.

## NIH spending slashed by 22%, overhead payments squeezed

As expected, the National Institutes of Health's (NIH's) budget would be slashed to \$26.9 billion in the full Trump 2018 budget request. That is \$7.7 billion less than NIH's final 2017 budget of \$34.6 billion, or a 22% cut.

In a **widely anticipated move** that has already raised alarm bells at research institutes, a White House **budget document** states that "significant reductions" will come from slashing the overhead payments that NIH now pays to universities on top of the direct research costs for a project. These so-called indirect costs, which are paid at rates now negotiated between individual institutions and the government, currently comprise about 30% of NIH's total grant funding. The variable indirect cost rates would be replaced with a uniform rate of 10% of total research costs for all NIH grants to reduce paperwork and "the risk for fraud and abuse," states a **budget document** for the Department of Health and Human Services (HHS).

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A 10% cap would bring NIH's indirect costs rate "more in line" with the rate paid by private foundations such as the Bill & Melinda Gates Foundation, the overall budget document notes. NIH will also work to reduce regulatory burdens on grantees.


As in the "skinny" budget **released earlier**, the full NIH budget proposal eliminates the Fogarty International Center, which has a \$72 million budget this year. But \$25 million would be set aside for other institutes to fund some of the center's global health research and training.

In another structural change, the Agency for Healthcare Research and Quality, which received \$324 million in direct funding this year, would be folded into NIH. It would become a new National Institute for Research on Safety and Quality funded at \$272 million from NIH's budget, with an additional \$107 million from an existing trust fund for patient-centered outcomes research.

One bright spot is that the proposal includes funding mandated by the 21st Century Cures Act for the Obama administration's cancer moonshot, Brain Research through Advancing Innovative Neurotechnologies neuroscience initiative and Precision Medicine Initiative's planned 1-million-

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 HHS did not hold a budget press briefing where HHS officials usually answer reporters' questions about the proposal. At a House of Representatives **hearing** last week, one Democrat said the cuts would mean 5000 to 8000 fewer research grants in 2018.

United for Medical Research, a Washington, D.C.-based coalition that represents many biomedical research advocacy groups, decried the "drastic cuts" to NIH and called them "a significant blow to medical research." Tannaz Rasouli, senior director of public policy and outreach for the Association of American Medical Colleges in Washington, D.C., says her group is also concerned that the plan to "dismantle" the Agency for Healthcare and Research Quality then "rebuild it from scratch" could disrupt research. Any restructuring would likely require involvement from Congress, she notes.

Both Republicans and Democrats on the committees overseeing NIH's budget have already called Trump's proposed cuts to NIH a nonstarter. "Thank goodness we don't expect Congress to take this budget seriously," says Jennifer Zeitzer, director of legislative relations for the Federation of American Societies for Experimental Biology in Bethesda, Maryland. —*Jocelyn Kaiser*

## NASA cuts put carbon monitoring effort in crosshairs

The request for NASA would kill off a research program necessary for establishing effective carbon monitoring in the United States and other countries, potentially jeopardizing the type of carbon accounting necessary to carry out the Paris climate agreement.

NASA's Carbon Monitoring System (CMS) was begun by congressional mandate in 2010 to develop methods for assessing the greenhouse gas emissions from forests and other natural carbon stocks. Although much of the work the \$10 million NASA program supports is focused on the United States, it also supports pilot technologies for eventual use in countries such as Colombia, Cambodia, Mexico, and Peru.

"These countries rely on this collaboration in order to monitor the forests better," says Pontus Olofsson, a physical geographer at Boston University who has worked on two CMS grants, including a project that tracks tropical forests through time, estimating carbon emissions down to the pixel. "It would be devastating not only for us but also these partner countries."

The science program currently supports a wide area of research, including airborne measures of Alaska's interior forests, prototype methane monitors for California regulators, satellite-based assessments of farming emissions, and studies of forest fires in the Amazon basin.

Cutting this research would not just cause short-term troubles. It would be a long-lasting setback to

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when commitments can be verification. The country needs to start building this capability if we are to be ready to manage the global climate problem."

The cut appears to be part of a pattern, Olofsson adds. The request also calls for cuts in international climate programs such as SilvaCarbon, a forest assistance program supported by the U.S. Geological Survey and the U.S. Forest Service, and they are all links in a chain that is working toward providing effective measures of human-caused carbon dioxide emissions. SilvaCarbon, for example, relies on the NASA pilot projects for its collaborations, Olofsson says. "If you take out one piece, it's kind of hard for things to function."

The shuttered effort would be part of \$59 million in proposed cuts to earth science research grants at the agency, alongside a plan to end five space-based projects: four missions that the agency detailed in March and the elimination of the troubled Radiation Budget Instrument, a tool that was set to fly on the Joint Polar Satellite System-2 (JPSS-2) weather satellite to measure the incoming and outgoing energy of the planet. Overall, the budget of NASA's earth science program would drop 8.9% from enacted 2017 levels, from \$1.921 billion to \$1.754 billion.

The full budget request otherwise closely matches the "skinny" budget proposed in March. Overall, the Office of Science would drop 1% from enacted 2017 levels, to \$5.712 billion. Heliophysics would see its budget unchanged, whereas astrophysics would see a boost of 9%, from \$750 million to \$817 million. Planetary science, already a winner in the 2017 budget deal, would see its budget rise even higher, to \$1.930 billion.

Robert Lightfoot, NASA's acting director in Washington, D.C., was upbeat in selling the proposal in a webcast, as befitting someone leading an agency that received \$19.1 billion in proposed financing, a mere 2.8% drop from 2017 levels. "What this budget tells us to do is keep going," he said. "Keep doing what we're doing."

The proposed budget also retains plans to eliminate the agency's education office which, it says, "lacks sufficient outcome measures to assess the effectiveness of its programs." Congress has rejected past efforts to restructure that program. —*Paul Voosen*

## At DOE, big cuts at user facilities and a mixed message on ITER

The Trump administration would take an ax to the Department of Energy's (DOE's) Office of Science, the single largest funder of the physical sciences in the United States.

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the 'in get ar, fr a done deal; Congress still has to come up with its own spending plan for the next fiscal year, which begins 1 October. But even if it doesn't pass, the budget sends a troubling message, says one official at a DOE national laboratory who asked not to be named to avoid repercussions for the lab. "Basically, it says [science] is not important," the official says. "It says, 'We don't care if we have a leadership role in science and technology, we've got other priorities.'"

The Office of Science funds six research programs, and under the proposed budget all but one would take a significant cut.

Basic energy sciences (BES) funds research in chemistry, materials sciences, and condensed matter physics, and supports DOE's synchrotron light sources, neutron sources, and other user facilities. Long the rising star in the DOE portfolio, BES would see its budget fall 16.9% to \$1.555 billion. And BES would lose several of its user facilities. For example, two of five nanoscience centers at the office's 10 national labs would close and the Stanford Synchrotron-Radiation Lightsource would run for 3 months and then be mothballed. All of BES's user facilities would see their budgets cut by 6% to 10%.

Similarly, the high energy physics program would receive a cut of 18.4% to \$673 million. There, the cuts would largely come at the expense of research funding and the operations of existing facilities. For example, the administration would shave \$20 million simply by running the accelerator complex at Fermi National Accelerator Laboratory for 1800 hours in fiscal year 2018 instead of the 5983 hours it ran in 2016 or the 4800 hours that DOE considers optimal.

Nuclear physics would see its budget fall 19.1% to \$503 million. Physicists in that program would be able to run their two major facilities, the Relativistic Heavy Ion Collider at Brookhaven National Laboratory in Upton, New York, and the Continuous Beam Electron Facility at the Thomas Jefferson National Accelerator Facility in Newport News, Virginia, for just 10 weeks apiece. The budget would also cut funding for construction of the facility for the \$730 million Rare Isotope Beams at Michigan State in East Lansing. The project is already 70% done, but DOE would "rebaseline" it, delaying its completion and, inevitably, increasing the total cost.

Fusion energy sciences would be cut by 18.4% to \$310 million. Nevertheless, the administration seems ready to stay with ITER, the international fusion experiment under construction near Cadarache in France, as it allots \$63 million for the project. That's far less than U.S. researchers need to stay on schedule for building their parts of the great machine and would effectively kill the U.S. project, the lab official says: "The words don't say, 'Withdraw from ITER,' but for all practical purposes, the numbers do."

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sciences (EERE), which funds research such as atmospheric monitoring and modeling. And EERE would suffer a cut of 61% to \$123.6 million.

Among the DOE science programs, the one winner under the Trump budget would be the Advanced Scientific Computing Research (ASCR) program, which would receive an 11.6% boost to \$722 million. But even there, the picture is complicated. Spending on computing research would actually fall, whereas ASCR would put \$197 million toward DOE's exascale computing project—an effort to develop supercomputers that can execute 1 billion billion operations per second. Of course, with all the other cuts in DOE's science programs, it's not clear what all that extra computing power would be used to do.

## NOAA details cuts to climate research in glowing terms

The request for the National Oceanic and Atmospheric Administration (NOAA) would drastically cut into the agency's climate research, shuttering a host of labs and programs. The agency released a detailed guide to these proposed cuts today—and described the programs on the chopping block in glowing terms that seemed to emphasize their value even as it proposed their elimination.

NOAA's Office of Oceanic and Atmospheric Research (OAR), one of the agency's primary research arms, would see its budget drop by 22%, from \$514 million to \$400 million, under the proposal. Despite these cuts, the proposal reads, the office would continue to "provide robust science that is instrumental to preventing the loss of human life, managing natural resources, and maintaining a strong economy."






OAR's climate-focused program would see a cut of \$31 million, with \$21 million of it taken from support for competitive research grants. Cuts would also terminate "Arctic research focused on improvements to sea ice modeling and predictions that support the safety of fishermen, commercial shippers, cruise ships, and local communities," the agency notes.

The proposal would also eliminate the Air Resources Laboratory in Silver Spring, Maryland, ending its "research on air chemistry, mercury deposition, and atmospheric dispersion of harmful materials." Development of an atmospheric model that "has emergency response applications, including tracking mercury deposition and anthrax bioterrorism," would also end, it noted.

The agency would also kill Vortex-Southeast, a \$5 million "program used to detect, respond to, and warn against tornadoes in the Southeastern United States." And it would eliminate the \$1.9 million genomics program at the Atlantic Oceanographic and Meteorological Laboratory, which "supports coral monitoring and restoration, fisheries assessments for species such as Bluefin tuna larvae."

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 'd save another \$5 million by terminating "all development, testing, and implementation of experimental products to extend operational weather outlooks ... from 16 days to 30 days"—a priority of the recent weather bill passed by Congress.

All of these cuts, along with those detailed earlier in the administration's "skinny" budget, are likely to face a skeptical Congress that, in signing the recent government-financing deal for 2017, actually boosted the budget of OAR by 6.7%, and strongly supported most of the agency's other programs.

Indeed, the only coherence between the administration and Congress could be cuts to NOAA's satellite branch, the National Environmental Satellite, Data, and Information Service (NESDIS). The Trump proposal would drop the NESDIS budget by 17%, including an already planned cut of \$318 million to the GOES-R geostationary satellite program. NOAA's two JPSS polar weather satellites would see small cuts, whereas the two polar satellites planned to follow in their wake—called the Polar Follow On—would face a cut of \$189 million this year as NOAA rethinks the satellites' futures in the face of competition from constellations of small commercial satellites. —*Paul Voosen*

## Basic research takes big hit overall, but would grow at NASA, defense department

The White House wants to cut federal spending on basic research by 13%, or \$4.3 billion, to \$28.9 billion, according to the request.


Historically, the federal government has provided the bulk of the nation's spending on fundamental science, defined as studies undertaken without "specific applications towards processes or products in mind." In recent years, however, **the share of basic research funding provided by the federal government has been slipping**, from roughly 70% in the 1960s and 1970s to an estimated 44% in 2015.

Under the request, just four agencies would see increases in basic research spending. (**There are two caveats.** First, the comparisons are with the 2016 funding levels; the final 2017 budget was enacted in early May, too late for inclusion in the president's request. Second, these numbers are smaller than the agency's overall research budget because of definitional issues.)

- The military's basic science account would get a 6%, \$117 million boost to \$2.24 billion. The Department of Defense is a major funding of academic basic research in mathematics, computer science, and engineering. (When compared with actual 2017 spending, however, it appears the 2018 request represents a 1.7% cut from

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     ee cuts of between 11% and 19%. Some highlights:

- HHS, the parent agency of NIH, would lose \$3.1 billion, a 19% drop to \$12.8 billion. HHS is the nation's single largest funder of basic science, primarily in the biomedical arena.
- DOE's spending would drop by \$690 million, or 15%, to about \$4 billion. DOE is the nation's largest funder of basic research in the physical sciences.
- At NSF, basic science would fall by \$620 million, or 13%, to \$4.3 billion. NSF is a major funding of basic research outside of biomedical science.
- Department of Agriculture spending would fall by \$121 million, or 11%, to \$952 million. —*David Malakoff*

## Reactions: What people are saying about Trump's budget request

Scientific societies and other groups are weighing in on the budget request. Here's a sampling of reactions.

### ITIF: budget should be 'dead on arrival'

"Especially when it comes to areas ranging from scientific and engineering research to workforce education and skills, congressional leaders should declare the proposal 'dead on arrival,'" said Stephen J. Ezell, vice president of the Information Technology and Innovation Foundation (ITIF) in Washington, D.C.

"The United States has suffered for more than a decade from chronic underinvestment in basic science, research and development, and technology commercialization, and from insufficient support for small manufacturers. Further reducing federal investment in these kinds of foundational goods will set back the country even further—undermining economic growth, causing standards of living to stagnate, and putting prosperity at risk for future generations of Americans. Yet the administration's budget calls for a nearly 10 percent cut for non-defense R&D. The administration needs to recognize there is a big difference between wasteful spending and critical investments that ensure the U.S. economy, citizens, and businesses thrive. Targeted federal government programs of the sort the administration is suggesting Congress cut are widely used by even the most conservative Republican governors to help businesses in their states compete."





### AAMC: 'devastating'

Darrell G. Kirch, president and CEO of the Association of American Medical Colleges (AAMC) in Washington, D.C., issued a statement that called the deep cuts to NIH and other health programs "devastating."

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### APS: vulnerable at risk

“This budget, if enacted, would jeopardize our nation’s educational, scientific and health enterprises and limit access to critically needed mental and behavioral health services,” said Antonio E. Puente, president of the American Psychological Society (APS) in Washington, D.C. “These cuts would disproportionately affect people living in poverty, people with serious mental illness and other disabilities, women, children, people living with HIV/AIDS, older adults, ethnic and racial minorities, immigrants, and members of the LGBTQ community.”

### AAAS: how did it come to this?

“I don’t know how we’ve gotten to a stage where anyone would consider anything like this,” said Rush Holt, CEO of AAAS in Washington, D.C. (publisher of *ScienceInsider*), during a teleconference. “Our preliminary numbers show that total research funding would decline by 16.8%,” a hit that would “devastate America’s science and technology enterprise.”

But Holt hopes the bill won’t live long outside of the White House, noting that early responses from members of congress suggest that, once again, Trump has failed to work closely with congress or federal agencies to produce a budget proposal likely to be approved. “It seems that this budget is put together on the basis of ideology and imaginary economics rather than hard facts about ... what research is productive according to the agencies where the research is funded and done,” Holt said. —*Lindzi Wessel*

### Census Project: 'woefully underfunds' preparations for 2020 count

The request for the Census Bureau “woefully underfunds preparations for the national census at a critical phase in the planning,” stakeholders of the Census Project in Washington, D.C., said in a statement. The group includes include state and local governments, business and industry, civil rights and labor groups, housing and child advocates, and research and professional organizations “that support a complete, fair and accurate census.”

Here is the rest of their release:

*“With the delays in recruiting qualified talent to oversee the census planning at both the Census Bureau and the Department of Commerce, we hope Congress will not compound the problem by failing to provide sufficient FY 2018 funding for critical data collection and testing for 2020” said Phil Gresham of the Census Project. The administration budget*

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Observers have been concerned the Trump administration and Congress have minimized the significant challenges the bureau faces at this point in the decennial planning cycle and why Census needs an increase in funds now. "This is a recipe for disaster if we are to achieve a fair and inclusive national count mandated by our Constitution," said Sparks.

The Census Bureau is facing a daunting array of workload challenges between now and the end of the decade, including the 2017 Economic Census, the annual American Community Survey of about 4 million households per year, and end-to-end testing of new designs for the 2020 decennial census, which will feature the first ever online response option.

Congress must approve the FY 2018 appropriations by October 1 this year, on the eve of several key census field tests targeting 700,000 households in Rhode Island, Washington state and West Virginia to finalize operational designs for the 2020 count. Sparks said his group would strongly advocate Congress override the president's request and significantly increase the bureau's funding. "We may be facing an historic disaster unless Congress acts to save the census," Sparks added.

### Science Coalition opposes 'extreme' cuts

The Washington, D.C.–based group said in a statement: "The extreme funding cuts to science agencies and related programs included in the budget released today would harm America's research enterprise and our nation's leadership in scientific discovery. Basic scientific research, conducted at universities in communities across the country, is the smallest slice of the nation's R&D pie, yet it is the critical spark that ignites discovery and innovation in the United States.

"The return on the federal government's investment in research surrounds us. From life changing discoveries to innovations that produce new industries, and from building a STEM workforce to creating new jobs, science-driven innovation has been a powerful driver of the U.S. economy for decades."

### UCAR worried about earth science

"We are concerned that the administration's proposed cuts to research into the Earth system sciences will undermine the continued scientific progress that is so vitally needed to better protect the nation in the future from costly natural disasters," Antonio J. Busalacchi, the president of the University Corporation for Atmospheric Research (UCAR) in Boulder, Colorado, said in a statement. "This would have serious repercussions for the U.S. economy and national security, and for the

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Twitter | LinkedIn | Facebook | Email | [Main](#) the level of funding needed in the fiscal year 2018 budget to support essential Earth system science research.”

### **Lung association: 'Reject this budget'**

“Congress must reject this budget,” said Harold P. Wimmer, National President and CEO of the American Lung Association in Chicago, Illinois, in a statement. “Rather than putting America’s health first, this budget instead puts the health and safety of all Americans—but especially our nation’s most vulnerable, such as lower-income Americans, children and those living with a lung disease like asthma—in jeopardy.”

### **ResearchAmerica: 'heavy-handed'**

“The president’s proposed FY18 budget is an imbalanced, heavy-handed approach to bolstering national defense at the expense of other American priorities, including the research and innovation crucial to national security,” said Mary Woolley, president and CEO of Research!America in Arlington, Virginia. “Instead of weakening our nation with this approach, we urge the 115th Congress to negotiate a bipartisan budget deal that will ensure that both defense and nondefense priorities are sufficiently funded.”

“Steep funding cuts for the federal health agencies are counterproductive at a time when innovative research is moving us closer to identifying solutions for rare diseases, new prevention strategies to protect Americans from deadly and costly conditions, advances in gene therapy, new technologies for understanding the brain, and treatments that harness the ability of our immune system to fight cancer.”






### **UCS: 'wrecking ball'**

“President Trump’s proposed budget takes a wrecking ball to agencies that protect our health, safety and environment,” said Ken Kimmell, president of the Union of Concerned Scientists (UCS) in Cambridge, Massachusetts, in a statement. “His budget would gut the EPA, for example, taking our environmental cops off the beat and allowing those who would seek to pollute to get away with it. I also know from my experience heading a state environmental agency that states have neither the funds nor the staff to pick up the slack when federal enforcement is decimated.”

“His budget would also stall out U.S. technological innovation and scientific research, and the country’s capabilities to respond to extreme weather and national security threats. This is all while driving up the deficit to pay for massive military budget increases we don’t need. The Department of Energy, for example, has an office that’s breaking new ground on advanced energy technologies that

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The      budget request stifles innovation, future economic growth, and job creation,” said Dr. Robert Gropp, co-executive director of The American Institute of Biological Sciences (AIBS) in Washington, D.C. “These deep cuts to scientific research and education programs will negatively impact our ability to improve public health and solve environmental problems for years to come.”

“For years, Congress has demonstrated bipartisan support for investing in science. I encourage them to continue to invest in our nation’s future by rejecting the president’s budget requests for scientific research and education programs. We should be investing in research and science education, which are the keys to opportunity,” Gropp added.

### **Biochemists: science investments would be lowest in 40 years**

The budget, “if enacted, would significantly damage the nation's role as the global leader of research and innovation, and would roll back years of bipartisan support from Congress,” said Benjamin Corb, public affairs director for the American Society for Biochemistry and Molecular Biology in Rockville, Maryland, in a statement. “The president's proposal brings NIH funding to a 17-year low, erasing not only the recent history of increases provided by Congress but also the budget growth of the late 1990s and early 2000s, at which time Congress doubled the NIH's budget. The proposed budget for NSF will reverse the basic research agency’s growth to fiscal year 2007 levels. Overall, the president's budget would bring total federal investments in scientific research spending to a 40-year low.”

“Further, the president's budget, which cuts nondefense discretionary spending while significantly increasing defense spending eliminates the parity between defense and nondefense spending that has been a hallmark of America's recent fiscal policy.”

Posted in: [Science and Policy, Trump administration](#)

doi:10.1126/science.aal1224

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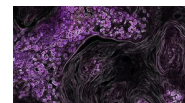
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