SCIENCE UNDER SIEGE



How Trump Is Dismantling America's Scientific Research Machine

By Christopher Flavelle, Irena Hwang, Adam Sella, Alan Blinder, Sheryl Gay Stolberg, Benjamin Mueller and Michael C. Bender

This is the first in a series of articles examining how the Trump administration has upended the pursuit of science.

Oct. 31, 2026

The warning, buried in an obscure government report this summer, was unflinching.

The Defense Department's vaunted network of research laboratories — whose scientists helped develop satellite communication, radar technology, and even the computer mouse — was in trouble.

The labs lost a significant share of their staff last year, largely in response to the Trump administration's efforts to thin the federal work force, the report found. Refilling critical positions was proving difficult due in part to President Trump's demand that new hires be screened for their loyalty to his goals. The report, issued by the Pentagon, pointed to "potentially grave consequences for the future of national defense."

The turmoil inside scientific research has extended beyond the Pentagon. The Energy Department, a key hub of nuclear and quantum research, has lost more than 1,000 scientists and technical staff. The National Science Foundation, for decades a primary backer of long-term, foundational research, has withheld more than $1 billion in funding. And at the National Institutes of Health, the biggest funder of medical research, officials delayed or canceled more than 2,000 grants to biomedical researchers focused on topics such as Alzheimer's, cancer and other diseases.

Under Mr. Trump, the federal government is still spending roughly as much on research — about $200 billion this year — as the administrations that came before. Scientists across the country are still receiving grants; universities are still being funded. But beneath the surface, the system of federally funded science that helped make the United States a global superpower is under intense strain from Trump policies, jeopardizing the nation's advantages in defense, medicine and technology, a New York Times examination has found.

The White House regularly proclaims that it is advancing American interests. Yet its actions are eroding the country's scientific edge as global rivals challenge U.S. dominance in fields that will help define the 21st century, according to interviews with scientists, university leaders, government officials and analysts and a review of documents and budgets.

The damage is the byproduct of three pillars of Mr. Trump's broader agenda.

One is the sweeping job cuts and grant cancellations engineered last year by the so-called Department of Government Efficiency, the Elon Musk-led effort that viewed much of federal spending as wasteful and whose effects are still reverberating across the bureaucracy.

A second is the administration's continued pressure on research universities, in which the White House used funding cuts to push schools into adhering to its demands for ideologically driven policy shifts.

The third is a campaign by Mr. Trump's budget director, Russell T. Vought, to impose more political control over how the government spends money appropriated by Congress, further infusing politics into decisions around scientific research.



Michael Kratsios, Elon Musk and Russell T. Vought have played key roles in shaping the Trump administration's approach to science. New York Times photographs by Eric Lee, Haiyun Jiang and Kenny Holston

If not for the courts curbing the administration's campaign against universities and lawmakers in both parties rejecting cuts to research funding, the impact on science would have been far deeper. Still, the effects of the broader agenda have rippled through nearly every facet of the nation's research machine.

Aspiring scientists have seen their career paths thwarted, with fewer available spots for Ph.D. students. The number of Ph.D. applications from foreign students, typically a significant share of U.S. science programs, shrank by 21 percent this year at leading universities, according to data gathered for the Association of American Universities. Total Ph.D. admissions at those schools have dropped as universities try to make do with less resources.

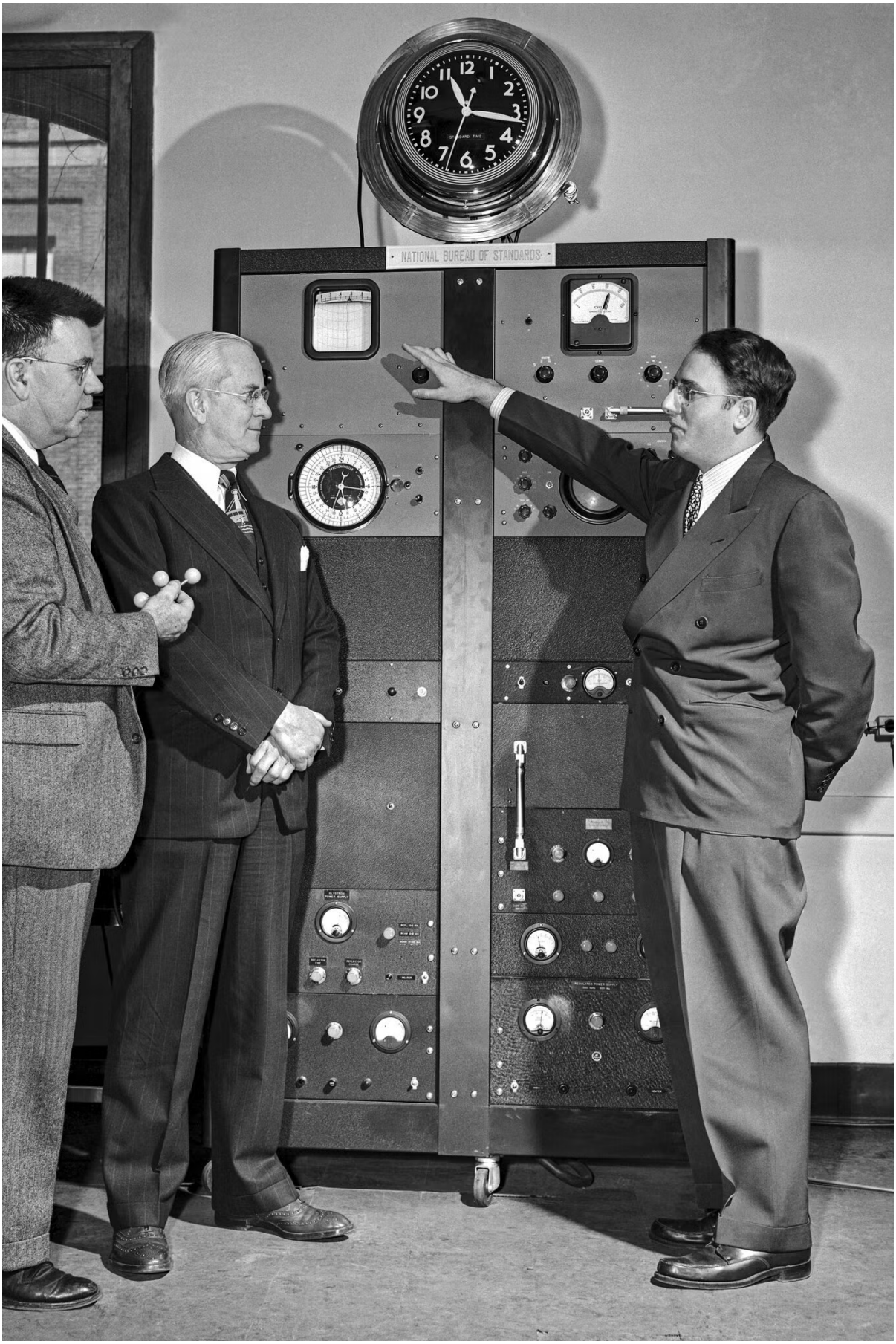
Even the agencies working on topics that Mr. Trump and his aides have called priorities — including national defense, artificial intelligence, quantum computing and nuclear energy — have been depleted.

Taken together, the changes underscore how Mr. Trump's policies have disrupted scientific research beyond the areas the administration has targeted more directly, such as vaccines and climate science, endangering U.S. power and pre-eminence.

By many measures, China is closing the gap with the United States as the world's research leader. Some organizations that rank global universities show China's best schools increasingly displacing American universities at the top. And the impact of Chinese research papers, as measured by citations from other scientists, has caught up with the United States, according to Clarivate, a data and analytics company.

By the time the full consequences of the administration's actions become apparent, experts warn, it could be too late to fix. That's because basic research funded by federal grants often takes decades to mature into the technology, medical treatments and consumer products that change American life.

Federally funded work on atomic clocks starting in the late 1940s, for example, paved the way for GPS technology. In 1976, federally funded research yielded a major discovery about the origins of cancer-causing genes, which led to a Nobel Prize and, two decades later, lifesaving cancer drugs. Some of the early precursors to artificial intelligence date to U.S.-backed research in the 1980s, which used an algorithm to teach neural networks to learn from mistakes.



Harold Lyons, right, explaining the operation of the atomic clock at its unveiling to Edward Condon, left, director of the National Bureau of Standards, and Commerce Secretary Charles Sawyer in January 1949. Bettmann Archive, via Getty Images

"Science is the long game," said Marcia McNutt, who was president of the National Academy of Sciences, the country's top scientific advisory body, until this summer. "By the time we no longer win any Nobel Prizes, we will have lost the capacity to ever recover."

In response to The Times' reporting, officials from the White House, Pentagon and other science agencies disputed that administration policies were hampering science. Rather, said White House spokeswoman Liz Huston, the administration is reinvigorating American science by transforming organizations in need of change.

"President Trump is ushering in a new golden age of American science by modernizing our research institutions, refocusing on ambitious national missions, and fully leveraging super intelligence for scientific discovery," Ms. Huston said in a statement, using Mr. Trump's preferred term for artificial intelligence. "Revitalizing our national scientific enterprise requires supporting the best American scientists and funding the best research based on merit."

The White House said the administration has expanded a number of programs that support young researchers, and noted that the decision to reduce Ph.D. admissions this year was made by the universities themselves. The Association of American Universities said schools' decisions to reduce admissions were largely the result of "federal research funding uncertainties."

The White House also said that most of the scientists who have stopped working for the federal government since Mr. Trump came back to office were not fired, but instead left voluntarily. And it noted that the methodologies for ranking universities, such as comparisons between the United States and China, are limited.

The rest of the world now sees an opportunity.

Australia, for example, announced its "global talent attraction program," calling it "an urgent and unparalleled opportunity to attract the smartest minds leaving the United States." Canada dedicated more than $1 billion to bring in 1,000

international researchers, drawing American leaders in fields such as biochemistry and neuroscience.

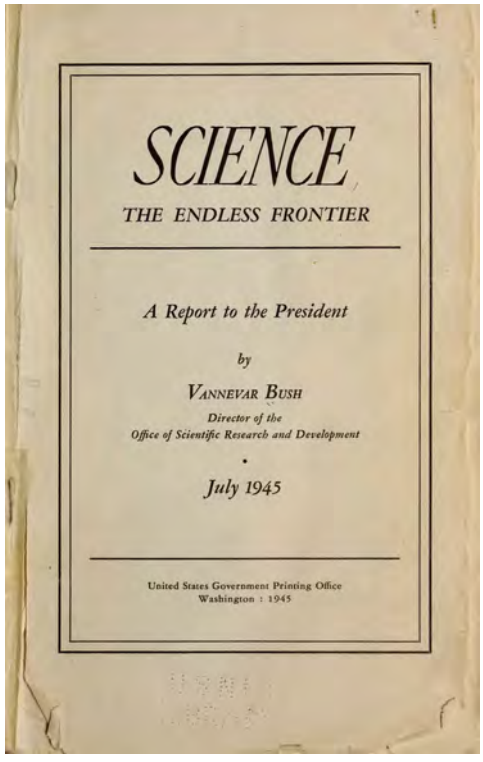
Even China, a country not known for academic freedoms, has been luring researchers away. A winner of last year's Nobel Prize in Chemistry left the University of California, Berkeley, to lead an institute in Beijing using artificial intelligence to accelerate the discovery of new materials — two fields the Trump administration has said it wants to dominate.

A Postwar System Shaken to Its Core



President Harry S. Truman, seated center, congratulating scientists for their work in the Office of Scientific Research and Development, including director Vannevar Bush, rear third from left, author of the landmark report "Science: The Endless Frontier." Byron Rollins/Associated Press

The roots of the United States' science empire can be traced to a landmark 1945 report issued during the Truman administration, "Science: The Endless Frontier." It described a vision, inspired in part by the Manhattan Project that led to the atomic bomb, for how science would power U.S. dominance in the world.


SCIENCE
THE ENDLESS FRONTIER

A Report to the President

by

VANNEVAR BUSH

Director of the
Office of Scientific Research and Development

July 1945

United States Government Printing Office
Washington : 1945

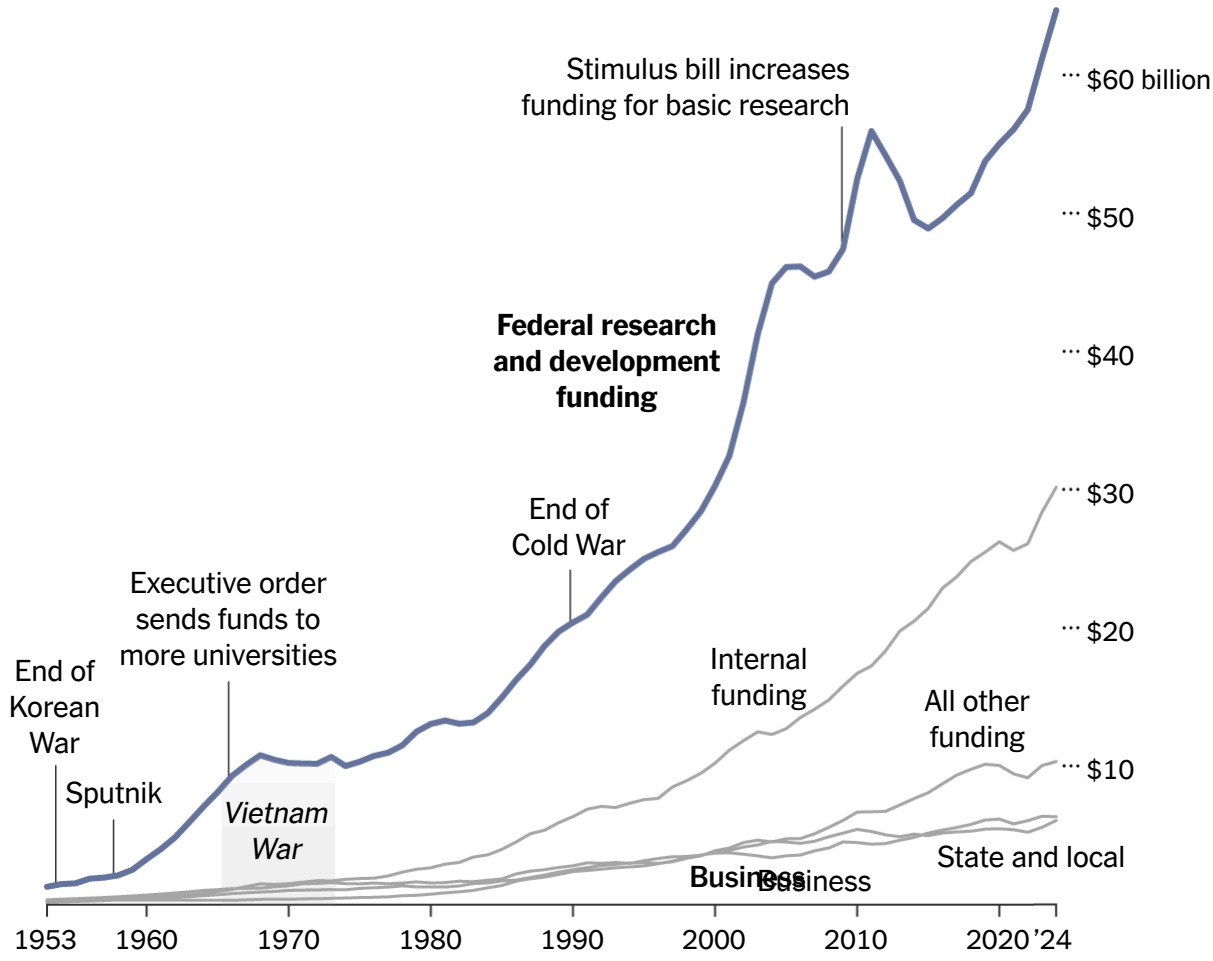
The report laid out a vision for how science would power U.S. dominance in the world.

The federal government went on to establish a network of science agencies with distinct missions. The National Science Foundation supports theoretical or experimental work, which often lays the groundwork for future technologies years or even decades later. The Department of Energy was established to pursue advances related to power generation, as well as managing the nation's nuclear arsenal. NASA, created in response to Soviet advances in space, put a man on the moon. The National Institutes of Health, which traces its roots to 1887, funds biomedical advances.

The federal government also provides tens of billions of dollars each year to the nation's research universities while funding national labs, private industry and other institutions — a system built up over 80 years by presidents and lawmakers from both parties.

For decades, the United States has funded research at top universities

American universities spent $65 billion in federal money in 2024, accounting for more than half of their total research and development spending.



Note: Fiscal year numbers, adjusted for inflation. Numbers after 2009 include research and development funding for non-scientific fields, which represents a small amount of the total. Source: National Center for Science and Engineering Statistics. Arfa Momin/The New York Times

In less than two years, Mr. Trump has shaken that system to the core.

The upheaval began early in the administration.

DOGE engineered staff firings, and encouraged others to resign across the federal bureaucracy. Within a year, N.I.H. staffing had shrunk by one-fifth. The N.S.F.'s ranks were reduced by a third. Even NASA, which shrank less than other science agencies, lost 20 percent of its employees with Ph.D.s. Those who left included its chief scientist, a climate science expert whose job the administration eliminated.

NASA said it will keep recruiting staff as needed. In a statement, Nicky Fox, the associate administrator for NASA's Science Mission Directorate, said the agency is working to get "more science into space for lower cost."



People gathered in March 2025 for a rally in Washington to protest the Trump administration's cuts to scientific research. Eric Lee/The New York Times

DOGE and the White House directed agencies to search for terms in grant descriptions that might reveal science the administration viewed as liberal, including anything that appeared to promote diversity, equity and inclusion.

The cuts cascaded through the country.

Ann D. Cohen, a neuroscientist who co-directs an Alzheimer's research center at the University of Pittsburgh, had been working on a five-year study looking at how people's exposure to stress and health problems earlier in life can affect their odds

of developing the disease.

The research was critical to developing better treatments and health interventions, Dr. Cohen said. "If the triggering event is poor cardiovascular health in midlife, we can actually deploy public health strategies to improve those things, and potentially have an effect on Alzheimer's," she said.

Recruiting people from different backgrounds was difficult, because people who volunteer for scientific studies tend to have higher than average incomes and education levels. So Dr. Cohen and her colleagues recruited from rural Western Pennsylvania, whose residents were more likely to be white and low-income, as well as from Black communities in Pittsburgh.



Ann D. Cohen, a neuroscientist who co-directs an Alzheimer's research center at the University of Pittsburgh, had a grant to study how exposure to stress and health problems can affect people's chances of developing the disease. The N.I.H. terminated the grant in August.
Credit:
Stephanie Strasburg for The New York Times

This past August, the N.I.H. terminated the grant, effective immediately, on the grounds that the project was focused on structural racism — an argument that fundamentally misunderstood the work, Dr. Cohen said.

Emily Hilliard, a spokeswoman for the U.S. Department of Health and Human Services, which includes the N.I.H., did not comment on specific grants. In a statement, she said N.I.H.'s commitment to Alzheimer's research has not decreased.

"N.I.H. is focused on funding innovative projects led by a new generation of health researchers, and on allocating funds for research that will lead to better health for the American people," Ms. Hilliard said.

Some researchers who lost funding acknowledged having framed their projects in the language of D.E.I. But, they argued, that was what the Biden administration had emphasized.

Jessica L. Rosenberg, director of education for the Quantum Science and Engineering Center at George Mason University, had received N.S.F. funding to research ways to encourage more American students to seek careers in quantum technology, an emerging field that has led to innovation by vastly expanding computing power.

The N.S.F. canceled the grant last year, about four months after the project started. Dr. Rosenberg said she suspects the grant was targeted because her application mentioned students from diverse backgrounds.

"That was what we were supposed to be doing at the time," she said in an interview.

Trump administration officials argue that the push to incorporate D.E.I. degraded science, and that scientists who embraced the approach had themselves to blame for losing support.

"We cannot afford for America's scientists to be in the business of scoring points for an ideological agenda," Michael Kratsios, Mr. Trump's science adviser, told a meeting of scientists last year.

A Dilemma for Universities

Mr. Trump and his aides returned to the White House wanting to punish elite schools like Columbia and Harvard, ostensibly for transgressions like tolerating antisemitism.

But when cuts to research funding became the White House's weapon of choice, professors and administrators had to decide whether to fight or acquiesce.

Harvard sued. Other schools negotiated. And even at universities that were not explicitly targeted, researchers made changes in hopes of keeping federal money that was foundational to their work — softening the language in their proposals, narrowing their projects and debating the line between fair-game government oversight and improper political interference.

The cuts fell across disciplines. Projects on epilepsy, Lou Gehrig's disease, tuberculosis and even astronomy outreach and education sputtered. Work on cancer and heart rhythms was imperiled.

The administration ultimately restored billions of dollars in funding, either because of court orders or settlements with universities. But researchers said the interruptions and changing priorities delayed or derailed experiments.

"You can't run a research operation when you have to constantly pivot," said Dorota Grejner-Brzezinska, vice chancellor for research at the University of Wisconsin-Madison, which was swept up in the administration's funding cuts and participated in more than a dozen legal challenges.



Dorota Grejner-Brzezinska on the campus of University of Wisconsin-Madison. Jenn Ackerman for The New York Times

"The current state of affairs is that it's really very hard to plan long term," she added, "and research is a long-term kind of enterprise."

May Mailman, a former White House aide who helped lead the pressure campaign against universities, said the administration wasn't overly concerned about the effects on research. Funds taken away from one university could eventually make their way to other schools whose behavior and ideology the White House approved of, she said. In the meantime, Ms. Mailman said, the administration tried to minimize the disruption to fields of research it supported, including artificial intelligence and some types of energy.

But much of the work coming out of universities, she said, may not have merited the taxpayer money going into it.

"There's a feeling that there is more spent on research than comes out of it — that the system is a little bit broken," Ms. Mailman said.



May Mailman in the Eisenhower Executive Office Building in Washington last year. Haiyun Jiang/The New York Times

The Hunt for Woke

The administration also sought deep funding cuts to federal science agencies. Last year, when Mr. Vought presented the administration's annual budget request to Congress, he called for reducing research funds at the National Institutes of Health by 41 percent; cutting the National Science Foundation by 55 percent; and reducing NASA's budget for science by almost half. No previous administration, from either party, had sought such deep cuts.

Congress rejected those cuts. But Mr. Vought began finding novel ways to slow grants and redirect funds.

One of the offices that Mr. Vought targeted in his budget request was the N.S.F.'s "woke social, behavioral, and economic sciences" — an apparent reference to an N.S.F. division that funded social science. Not long after, the division began reducing its grants.

An N.S.F. spokesman, Michael England, said in a statement that the agency's funding decisions "reflect a strategic alignment of resources in a constrained fiscal environment."

The loss of those funds affected researchers like Priti Shah, chair of the University of Michigan's psychology department. Dr. Shah had applied for a grant to study how people evaluate and make decisions based on scientific information. In the summer of 2025, the N.S.F. told her that her application had been put on hold because of funding issues. It was later rejected entirely.

"It is so important to understand what people assume and what errors they make when they're thinking about science," Dr. Shah said. "People are very poor at reasoning about scientific evidence."

An Innovation Engine 'at Risk of Stalling'



A report released by the Pentagon this summer pointed to "potentially grave consequences for the future of national defense" after its network of research laboratories lost staff last year, largely as a result of the Trump administration's efforts to thin the federal work force. Kenny Holston/The New York Times

The administration's actions also hurt agencies central to its political agenda.

The Defense Department's assessment of science and research capabilities published this summer said changes during the first year of the Trump administration had degraded the department's highly regarded network of research laboratories, due largely to DOGE cuts and obstacles to hiring.

"Without a swift and sustained reversal of these policies," the report warned, the Defense Department's "innovation engine is at risk of stalling."

The labs lost about 14 percent of their staff, the report found. Among those mentioned were the Naval Sea Systems Command, charged with developing ships and weapons; the Air Force Research Laboratory, which helped develop stealth aircraft and laser systems; and the Army's Aviation & Missile Center.

External research laboratories, which are funded by the Pentagon but staffed by civilian researchers and develop technology for use by the military, were also suffering from the administration's policies, the report said.

Much of the work at those labs, some of which are attached to major research universities, is classified, and the report did not disclose specific examples of research that has been affected. But it warned that staff departures inside the labs and among agency employees who coordinated with them "jeopardized the execution of critical defense research." Without key points of contact between the agency and the labs, the report said, efforts that support "time-sensitive, real-world operations are in some cases at a standstill or delayed."

Because the labs aren't financially connected to defense contractors, they play an added important role helping the Pentagon objectively evaluate contractors' claims about new technologies, said Heidi Shyu, who oversaw the Pentagon's research operation as under secretary of defense for research and engineering in the Biden administration.

A Pentagon official acknowledged that, during the first year of the administration, there was a "retraction in the number of scientists and engineers across the research enterprise." But, the official said, the agency has "hired to fulfill the mission and mitigate any impacts from the loss of personnel."

Defense Department funding changes also affected university researchers.

Randall Engle, a psychologist at the Georgia Institute of Technology, was working on ways to help the Navy select air traffic controllers, pilots and other applicants for complex jobs.



Randall Engle, a psychologist at the Georgia Institute of Technology, at his cabin in Ellijay, Ga. Audra Melton for The New York Times

The Navy needs to train roughly 1,000 new air traffic controllers each year, Dr. Engle said, at a cost of about $100,000 per trainee. But because the job requires intense focus in difficult conditions, nearly a quarter of trainees typically fail.

So he received funding to develop diagnostic tests to determine a person's ability to maintain focus.

Dr. Engle tested his new approach at the Navy's air base in Pensacola, Fla., and found that it did a better job identifying people likely to succeed as air traffic controllers. He was in the midst of refining those tests, when the Office of Naval Research told Georgia Tech that the grant was canceled.

Dr. Engle said he believes the grant was canceled simply because it was happening at a university.

"There was no wokeness," Dr. Engle said of his project. "There was no diversity, inclusion."

A New Agenda



Darío Gil, far left, under secretary for science at the Energy Department, Mr. Kratsios, rear center, and Mr. Vought, far right, attending an executive order signing in the Oval Office in June. Kenny Holston/The New York Times

The uncertainty over the future of American science is reflected in the events that have unfolded at the Department of Energy.

The agency is a critical engine for research in the physical sciences, and it houses the Genesis Mission — a marquee Trump administration initiative that officials say will drive discoveries across a range of topics, from quantum computing and

particle accelerators to microchips that can operate in outer space. In an executive order, Mr. Trump called it a "dedicated, coordinated national effort to unleash a new age of AI-accelerated innovation and discovery."

But the Energy Department's central role on a Trump-driven project came with a glaring contradiction: It was also hammered by DOGE.

The agency has lost about one-quarter of its staff since the start of the administration, according to a Times analysis of federal data. And the amount of grant money awarded by its two major science offices dropped by more than one-quarter during the administration's first year, before Genesis began — a reduction of more than half a billion dollars.

Darío Gil, the agency's top science official, rejected the idea that its science mission has suffered, noting that much of the department's work is done by 17 national laboratories, where most staff are not federal employees and so not affected by DOGE's staff-reduction programs. He said the agency is hiring.

"Staffing is always a challenge" Dr. Gil said. "We continue to recruit good people."

He added that the goal of Genesis is to double the productivity of America's science industry within a decade. The program has selected almost 300 projects to fund at universities, private companies, national labs and other research organizations.

"The outcome we seek," Dr. Gil said, "is that this transformation impacts the entire American economy."

In July, just a few weeks after the Pentagon published its warning about defense labs, Mr. Kratsios, the White House science adviser, issued a report of his own.



Mr. Kratsios issued a report proclaiming that the Trump administration was renewing the country's dominance in research and development.

The document emphasized many of the administration's goals: Increasing the role of private industry in federal research. Bypassing the traditional peer-review process for deciding who gets research grants, instead giving individual reviewers the chance "to make bold scientific bets" on researchers of their choosing. Redirecting more money toward younger researchers.

Mr. Kratsios barely mentioned a crucial part of the administration's agenda: a proposed rule issued by the Trump administration this past May, which would require that Mr. Trump's political appointees approve which researchers get funding — taking power away from nonpartisan science officials who have typically been the deciders.

Under the proposal, researchers seeking funds "should commit to complying with administration policies." Officials would screen and reject applications for projects that "promote anti-American values."

The day after Mr. Kratsios released his report, he appeared before the House science committee to discuss it. Some committee members seemed perplexed by his promise to usher in a scientific golden age, given the tumult over the previous year and a half.

"All I see is tarnish and deterioration," said Representative Gabe Amo, Democrat of Rhode Island. "Do you commit to not leaving our scientific apparatus in shambles?"

"I don't think, sir, I would be doing my job if I wanted to leave the scientific enterprise in shambles," Mr. Kratsios responded. "So I will commit to not doing that."

Reporting was contributed by Mark Arsenault, William J. Broad, Kenneth Chang, Carolyn Y. Johnson, Sarah Kliff, Ryan Mac, Katrina Miller, Brad Plumer, Tony Romm and Theodore Schleifer. Research was contributed by Susan C. Beachy, Kitty Bennett, Alain Delaquérière, Georgia Gee, Sheelagh McNeill and Kirsten Noyes.

Christopher Flavelle is a Times reporter covering how President Trump is transforming the federal government.

Irena Hwang is a data reporter at The Times, using computational tools to uncover hidden stories and illuminate the news.

Adam Sella covers breaking news for The Times in Washington.

Alan Blinder is a national correspondent for The Times, covering education.

Sheryl Gay Stolberg is a correspondent based in Washington for The Times, covering Health Secretary Robert F. Kennedy Jr. and President Trump's health agenda.

Benjamin Mueller reports on health and medicine. He was previously a U.K. correspondent in London and a police reporter in New York.

Michael C. Bender is a Times correspondent in Washington.

A version of this article appears in print on , Section A, Page 1 of the New York edition with the headline: Trump Is Risking Edge U.S. Science Has in Research