President Proposes Cuts to Science

The White House released the President’s Budget Request for fiscal year (FY) 2021 on February 10, 2020. The budget once again proposes deep cuts to science programs. The $4.8 trillion budget framework calls for cuts to most federal agencies, including the National Science Foundation (NSF), the National Institutes of Health (NIH), the U.S. Geological Survey (USGS), the National Oceanic and Atmospheric Administration (NOAA), and the Environmental Protection Agency (EPA).

The proposal would provide $1.3 trillion for discretionary programs, including $590 billion for non-defense spending – the source for most scientific research programs. Last year, Congress reached a bipartisan budget deal to raise the overall federal spending caps by $320 billion over FY 2020 and 2021. The agreement set the caps for defense and nondefense discretionary spending in FY 2021 at $741 billion and $635 billion, respectively. While the President’s request of $741 billion for defense spending is in line with the budget deal, the request for nondefense discretionary spending falls $45 billion below the cap.
The Administration has proposed increased investments in technologies that will be “at the forefront of shaping future economies,” including artificial intelligence, quantum information sciences, advanced manufacturing, and biotechnology. The budget describes these technologies as “Industries of the Future.”

Overall federal investments in R&D would decrease by 8.8 percent in FY 2021 to $142.2 billion. Some key items related to science in the budget request include:

- NSF would receive $7.7 billion, a 6.5 percent cut relative to the FY 2020 enacted level. The Research and Related Activities account within NSF, which includes the Biological Sciences Directorate, would be cut 7.8 percent to $6.2 billion.
- The Institute of Museum and Library Services (IMLS) is slated for termination for the fourth year in a row. President Trump has proposed $23 million for its “orderly closure.” Congress provided $252 million (+4 percent) to IMLS in FY 2020.
- A $12.8 billion (-16 percent) budget is proposed for the Department of the Interior. The National Park Service would be funded at $2.8 billion, 17 percent below FY 2020, with $327 million (-4.4 percent) targeted to natural and cultural resource stewardship. The Bureau of Land Management would be trimmed by more than 10 percent to $1.2 billion, and the U.S. Fish and Wildlife Service would receive $1.4 billion (-16 percent). The department’s science agency, the USGS, would see its budget slashed by nearly 24 percent. The Administration has once again proposed restructuring its 7 mission areas into 5 mission areas. Under the proposed structure, the new Ecosystems mission area would receive a nearly 50 percent budget cut. The proposal would terminate the Cooperative Research Units and reduce funding for climate research.
- NIH’s budget would be slashed by 7.2 percent to $38.7 billion in FY 2021.
- NOAA’s budget would shrink by 14 percent to $4.6 billion. The Administration has again proposed eliminating the National Sea Grant College Program.
- The National Institute of Standards and Technology (NIST) would take a 29 percent hit, shrinking its budget to $738 million in FY 2021.
- EPA is slated for a 26.5 percent budget cut in FY 2021. Overall, the agency would receive $6.6 billion, with $485 million targeted to science and technology (-32 percent).
- Funding for the Agricultural Research Service within the U.S. Department of Agriculture (USDA) would be slashed by 12 percent. On the upside, the National Institute of Food and Agriculture (NIFA) would receive a boost of 3 percent, with the Agriculture and Food Research Initiative (AFRI) slated for a 41 percent increase to $600 million.
- The budget request for Smithsonian Institution has not yet been released.

Congressional leaders from both sides of the aisle have rejected the President’s proposal and said that they will adhere to the budget agreement. “We’re going to write our bills according to the agreement that we have with the administration,” said House Speaker Nancy Pelosi (D-CA). Senate Majority Leader Mitch McConnell (R-KY) also indicated that he would stick with the agreed upon spending caps. “What we will be looking at is trying once again to have a relatively regular appropriations process since we have agreed on what the cap is supposed to be for this year,” said McConnell.
**Trump Administration Proposes Cuts at NSF**

The President has proposed a 6.5 percent cut to the National Science Foundation (NSF) in fiscal year (FY) 2021. The science agency is slated to receive $7.7 billion, which is $537 million below the FY 2020 level enacted by Congress.

According to the budget proposal, NSF will continue to invest in its Big Ideas and Convergence Accelerator, providing support for “bold inquiries into the frontiers of science and engineering” in order “to break down the silos of conventional scientific research funded by NSF to embrace the cross-disciplinary and dynamic nature of the science of the future.”

Among the research-focused Big Ideas, Understanding the Rules of Life (URoL), Navigating the New Arctic (NNA), and Windows on the Universe would each receive flat funding of $30 million relative to FY 2019. The agency would allocate $45 million each to Harnessing the Data Revolution (HDR) (+50 percent) and the Future of Work at the Human Technology Frontier (+50 percent). Quantum Leap (QL): Leading the Next Quantum Revolution, would receive $50 million, which is a 67 percent increase relative to FY 2019. NSF INCLUDES, which supports education and career pathways to help broaden participation in science and engineering and build a diverse and skilled American workforce, would receive $18.9 million (-6 percent). Growing Convergence Research at NSF would receive a 3.8 percent cut, while Mid-scale Research Infrastructure would receive a boost of 63 percent compared to FY 2019. For the Convergence Accelerator, the agency would provide a 60 percent boost compared to FY 2019 for a total of $70 million.

Research would be cut by 7.8 percent. The Research and Related Activities account would receive $6.2 billion, $524 million below FY 2020. Most research directorates across the agency would lose funding relative to FY 2019:

- Biological Sciences Directorate (BIO): $705 million (-10.1 percent)
- Geological Sciences Directorate (GEO): $836.6 million (-13.7 percent)
- Computer and Information Science and Engineering Directorate (CISE): $1.06 billion (+7.8 percent)
- Engineering Directorate (ENG): $909.8 million (-8.2 percent)
- Mathematical and Physical Sciences Directorate (MPS): $1.4 billion (-2.8 percent)
- Social, Behavioral and Economic Sciences Directorate (SBE): $246.8 million (-9 percent)
- Office of International Science and Engineering: $44 million (-10.2 percent)
- Office of Polar Programs: $420 million (-14.1 percent)
- Integrative Activities: $539 million (-1.6 percent)
- U.S. Arctic Research Commission: $1.6 million (+8.1 percent)

Within BIO, which provides about 67 percent of federal funding for fundamental non-medical biological research at academic institutions, funding cuts would be allocated to its five divisions accordingly (relative to FY 2019):

- Molecular and Cellular Biosciences: $130.9 million (-9.5 percent)
- Integrative Organismal Systems: $175.8 million (-9.5 percent)
- Environmental Biology: $150.3 million (-2.2 percent)
- Biological Infrastructure (DBI): $158 million (-12.6 percent)
Emerging Frontiers: $89.9 million (-18.5 percent)

The “bioeconomy” has been recognized as a research priority by the White House Office of Science and Technology. The BIO directorate would increase investments to support the bioeconomy to $96 million (+6.7 percent compared to FY 2019) through research funding programs in synthetic biology, genomics, bioinformatics, and biotechnology, and training fellowships to build the U.S. workforce. Other research directorates within NSF will work together with BIO to make investments in the bioeconomy, including CISE ($4.75 million), ENG ($96 million), and MPS ($25 million).

Other major BIO investments include stewardship for URoL, Advanced Manufacturing, Artificial Intelligence, Quantum Information Sciences (QIS), and Understanding the Brain (UtB), which includes the BRAIN initiative. URoL would support multi-disciplinary, team science approaches towards a predictive understanding of how complex traits of an organism emerge from the interaction of its genetic makeup with the environment. In collaboration with the Engineering Directorate, BIO would support Advanced Manufacturing through investments in synthetic biology. Investments in Artificial Intelligence through the Division of Biological Infrastructure would focus on applying machine learning and genetic algorithms in biological research to solve problems such as genome sequence alignment, predicting species range distributions, and predicting protein structure. The directorate would also increase funding for QIS through investments in fundamental research in biophysics to understand quantum phenomena within living systems.

The National Ecological Observatory Network (NEON) would receive a total of $65 million in FY 2021 through DBI, a decrease of 12 percent from FY 2019.

The Education and Human Resources Directorate (EHR) would operate at $931 million, one percent below FY 2020. Within EHR, the Division of Undergraduate Education would see their budget cut by nearly 11 percent, while the Division of Graduate Education would receive an 11 percent boost compared to FY 2019. NSF’s investments in the STEM professional workforce would fall by 8.4 percent relative to FY 2019 to $430 million. EHR would allocate $9 million for bioeconomy through research and workforce development programs.

Support for Major Research Equipment and Facilities Construction (MREFC) would decrease by 5.5 percent to $230 million compared to FY 2020. Agency Operations and Award Management would receive a 2.6 percent boost, while the National Science Board would lose 6.4 percent compared to FY 2020.

The NSF Innovation Corps, which improves researchers’ access to resources that help transfer knowledge to downstream technological applications, would receive $31.4 million, a decrease of 4 percent from FY 2019.

Cross-cutting programs would receive funding cuts all across the board. The Long-Term Ecological Research (LTER) network would receive $28 million, nearly 16 percent below FY 2019. The Research Experiences for Undergraduates program would be slashed by 19.2 percent.
compared to FY 2019. Support for Faculty early career development programs or CAREER grants would be slashed by 30.2 percent compared to FY 2019.

NSF Graduate Research Fellowships would be cut by 3.3 percent compared to FY 2019 to $275 million in FY 2021, while support for NSF’s Research Traineeship program would increase to $62 million (+14.4 percent).

**President Slashes USGS Funding by 24 percent**

Under President Trump’s budget request for fiscal year (FY) 2021, the United States Geological Survey (USGS) would be funded at $971.2 million, a 24 percent cut from the FY 2020 level enacted by Congress.

The budget once again proposes to consolidate the agency’s seven mission areas into five new mission areas to “better address stakeholder priorities.” The five new mission areas would be: Ecosystems, Energy and Mineral Resources, Natural Hazards, Water Resources, and Core Science Systems. Programs formerly under the Environmental Health area would be moved into the Ecosystems mission area and programs formerly under Land Resources would be transferred to Ecosystems and Core Science Systems.

Under the new structure, the Ecosystems mission area would receive $127 million in FY 2021, nearly 50 percent below FY 2020 enacted levels. The plan restructures the Ecosystems account to include programs formerly under Land Resources and Environmental Health mission areas, specifically the National and Regional Climate Adaptation Science Centers, significant portions of Land Change Science, Toxic Substance Hydrology, and Contaminant Biology.

Other mission areas are also slated for budget cuts. Water Resources would be slashed by nearly 23 percent; Natural Hazards would be reduced by 19 percent; and Core Science Systems is facing a 14 percent reduction. Energy and Mineral Resources, however, is looking at a small increase of 1.3 percent. The Science Support accounts at USGS would receive a small cut of 2.7 percent and the Facilities account would be slashed by nearly 30 percent.

The plan proposes reductions for several research programs, including species-specific research, research on contaminants, harmful algal blooms, White-nose syndrome, Coral disease, Asian Carp, habitat research, and water use and quality research. Environmental Health Research as well as research on the Everglades, California Bay Delta, Chesapeake Bay, and Arctic ecosystems would be zeroed out.

Drastic cuts have again been proposed to climate research. The National and Regional Climate Adaptation Science Centers, responsible for developing the science and tools to address the effects of climate change on land, water, wildlife, fish, ecosystems, and communities, have been slated for a 64 percent budget cut. Congress provided a $13 million increase to the program last year.
The request once again proposed the elimination of the Cooperative Research Units (CRUs), which are located on 40 university campuses in 38 states. The CRUs allow USGS to leverage research and technical expertise affiliated with these universities to conduct research, provide technical assistance, and develop scientific workforces through graduate education and mentoring programs. Congress has rejected the Administration’s repeated attempts to shutter this program in the past and provided CRUs with a more than $5 million increase in FY 2020.

**NSB: U.S. Share of Global R&D Investments Declines**

The National Science Board (NSB) has released the “2020 State of U.S. Science and Engineering” report detailing the data, trends, and global position of the U.S. science and engineering (S&E) enterprise. The report is part of the congressionally mandated, biennial “Science and Engineering Indicators,” which provides statistics on the U.S. and global S&E enterprise.

According to the 2020 Indicators, the United States continues to perform the largest share of global research and development (R&D), award the largest number of S&E doctoral degrees, and produce significant shares of scientific publications worldwide. Countries in East and Southeast Asia have heavily invested in research and development and S&E education resulting in an overall increase in S&E activity globally. This has resulted in a decline in the U.S. share of global R&D investments. “Our latest report shows the continued spread of S&E capacity across the globe, which is good for humanity because science is not a zero-sum game,” said NSB Chair Diane Souvaine. “However, it also means that where once the U.S. was the uncontested leader in S&E, we now are playing a less dominant role in many areas.”

In 2017, the U.S. spent $548 billion on R&D, more than any other country. However, between 2000 and 2017, the U.S. global share of R&D declined from 37 to 25 percent. The share of R&D funded by the federal government, which is a significant funder of basic research, has declined since 2000. The federal government funded 57.8 percent of basic research in 2000, while in 2017 it funded 42.3 percent. “Federal support of basic research drives innovation. Only the Federal government can make a strategic, long-term commitment to creating new knowledge that cannot be anticipated to lead to new or improved technologies, goods, or services,” said Dr. Julia Phillips, Chair of NSB’s Science and Engineering Policy Committee.

Globally, R&D expenditures have tripled since 2000, with China accounting for nearly a third of the total growth since 2000. China has directed the majority of its $496 billion R&D spending to experimental development, which aims to produce new products or processes or improve existing ones while basic and applied research aims to create new knowledge. China’s average annual growth rate of domestic R&D expenditures between 2000 and 2017 was 17.3 percent, while the United States’ annual growth rate was 4.3 percent. According to Dr. Phillips, China may have surpassed the U.S. in R&D spending at some point in 2019.

The report found that since 1960, the U.S. S&E workforce has grown faster than the overall workforce; employment in S&E occupations has grown at an average annual rate of 4 percent since 1960, compared to 2 percent for total employment. “By 2026, S&E jobs are predicted to
increase by 13 percent compared with 7 percent growth in the overall workforce,” according to the report. However, women and minorities remain underrepresented in the S&E workforce compared to their overall proportion in the population.

The data show that a considerable proportion of U.S. S&E degrees, particularly doctoral degrees, are conferred to international students. In 2017, 34 percent of all S&E doctoral degrees were awarded to temporary visa holders. Foreign-born workers also account for 30 percent of workers in S&E occupations. More than 50 percent of doctorate holders in engineering, computer science, and mathematics occupations and more than 30 percent of doctorate holders in life science occupations are foreign born. The report draws attention to shifting trends: “The long-term trend of ever-increasing foreign student enrollment in U.S. colleges and universities has changed as the rate of increase has slowed since 2016. Internationally mobile students still pick the U.S. more than any other country for their higher education degrees. But students today have more choices than ever before as nations actively court globally-mobile talent.”

The 2020 S&E Indicators was prepared by the National Science Foundation’s (NSF) National Center for Science and Engineering Statistics (NCSES) under the guidance of the NSB, which is the policymaking and governing body of NSF.

Beginning this year, the S&E Indicators will transition from a single report released every two years to a series of nine thematic reports released on a rolling basis. The thematic reports focused on elementary and secondary math and science education, higher education, S&E labor force, and publications output were published in the fall of 2019, with the remaining reports being rolled out this month. The 2020 State of U.S. S&E report highlights the key findings from all the thematic reports. The complete 2020 Indicators report is available at: https://ncses.nsf.gov/indicators

**Day One Project: Prioritize Mass Digitization of Biodiversity Collections**

A new report from the Day One Project is calling for the next Administration to make mass digitization of biodiversity collections an immediate priority.

The report concludes: “U.S. biodiversity collections are made up of nearly half a billion specimens that are irreplaceable and mostly unknown. A large-scale digitization program will illuminate these data, making them visible, accessible, and searchable. Digitization will also protect these data in perpetuity so that future researchers and citizens can answer questions not yet asked. To catalyze this mass digitization effort, the next administration should host a White House Summit on Biodiversity Digitization that (1) capitalizes on U.S. science leadership and (2) results in a coordinated digitization plan that will help secure a precious scientific resource—the biodiversity holdings of our nation—for generations.”

The Day One Project is one of a number of efforts underway in the lead-up to November to articulate and advance priorities for the next Administration, whether that is a second Trump term or someone else.
OSTP Wants Input on Data Repositories

The White House Office of Science and Technology Policy (OSTP) is seeking public comments on a draft set of desirable characteristics of data repositories used to locate, manage, share, and use data resulting from federally funded research. The request was published in the Federal Register on January 17, 2020.

With this request, OSTP intends to “identify and help Federal agencies provide more consistent information on desirable characteristics of data repositories for data subject to agency Public Access Plans and data management and sharing policies, whether those repositories are operated by government or non-governmental entities.” Improved consistency in guidelines and best practices for data repositories provided by agencies is expected to reduce the burden for researchers. Feedback from the public will help to inform coordinated agency action.

The proposed set of desirable characteristics of data repositories have been developed by the Subcommittee on Open Science (SOS) of the National Science and Technology Council's Committee on Science. SOS aims to advance open science and foster implementation of agency Public Access Plans that were formulated in response to the 2013 White House Office of Science and Technology Policy (OSTP) memorandum entitled “Increasing Access to the Results of Federally Funded Scientific Research” that called for improved access to data and publications resulting from federally funded R&D.

Comments on this draft can be submitted online to OpenScience@ostp.eop.gov on or before 11:59 PM ET on March 6, 2020. More information and instructions are available at https://www.govinfo.gov/content/pkg/FR-2020-01-17/html/2020-00689.htm.

Opportunity to Provide Input on Open Access Publishing

The White House Office of Science and Technology Policy (OSTP) and the National Science and Technology Council's (NSTC) Subcommittee on Open Science (SOS) are requesting recommendations on approaches for ensuring broad public access to the peer-reviewed scholarly publications, data, and code that result from federally funded scientific research. This is part of ongoing efforts to explore opportunities to increase access to unclassified published research, digital scientific data, and code supported by the U.S. Government.

Comments can be submitted on or before 11:59 PM Eastern Time on March 16, 2020. More information, including submission instructions, can be found at https://www.govinfo.gov/content/pkg/FR-2020-02-19/html/2020-03189.htm.

Webinar: An Overview of the Nagoya Protocol from the U.S. Government

The Nagoya Protocol is a multilateral treaty that sets up a legal framework for utilizing genetic resources. It should be a part of every researcher's thinking, from how to conduct research, to
manage collections, and how to work with partners. Even for researchers based in the United States, familiarity with the Protocol, and what it requires, is important as provider countries may have rules/regulations/laws that carry obligations that apply to samples even after they have left the country, such as restrictions on use, third party transfer, and tracking of any shared benefits.

Please participate in the webinar on Thursday, February 27 when Patrick Reilly, from the U.S. Department of State, shares updates and information about the Protocol; offers a short history of how the Protocol was developed, what it actually says (and what it doesn't), the difference between monetary and non-monetary benefit sharing, and how the U.S. government can help. Following the presentation, Patrick will be taking questions from webinar participants.

Life Finds A Way: An Overview of the Nagoya Protocol from the U.S. Government

Location: Online
Cost: Free and Open to the Public

Presented by: The American Institute of Biological Sciences
Thursday, February 27, 2020
1:30 - 2:30 PM Eastern Standard Time
Presenter: Mr. Patrick Reilly, U.S. Department of State

Registration is free, but required. For more information about the program and speakers and to register for the webinar, please visit: https://www.aibs.org/events/webinar/nagoya-protocol.html.

Registration Open: 4th Digital Data in Biodiversity Research Conference

Indiana University (IU), iDigBio, and the Natural Science Collections Alliance (NSCA) will hold the 4th annual Digital Data in Biodiversity Research Conference on June 1-3, 2020 at Indiana University in Bloomington, IN. The theme for the conference is “Harnessing the Data Revolution and Amplifying Collections with Biodiversity Information Science.”

Registration as well as abstract submission for oral and poster presentations is now open: https://www.eventbrite.com/e/4th-annual-digital-data-in-biodiversity-research-conference-tickets-86931098255.

The conference wiki, which includes plenary and keynote speakers, a draft agenda, a list of workshops and events, and lodging options is available at: https://www.idigbio.org/wiki/index.php/4th_Annual_Digital_Data_Conference,_Indiana_University.

Registration Now Open for Biodiversity Summit 2020
iDigBio, National Museum of Natural History (NMNH), Global Biodiversity Information Facility (GBIF), and Biodiversity Information Standards (TDWG) have opened registration for the Biodiversity Summit 2020 to be held September 20-25, 2020 in Alexandria, Virginia.

Register at: https://www.eventbrite.com/e/biodiversity-summit-2020-tickets-85264844445. Registration is free, but all participants must register and display credentials. Deadline for abstract submission is March 31, 2020. For more information visit: https://www.idigbio.org/content/biodiversity-summit-2020.

Public Meeting on Biodiversity Beyond National Jurisdiction

The Department of State is holding an information session regarding upcoming United Nations negotiations concerning marine biodiversity in areas beyond national jurisdiction. The public meeting will be held on February 25, 2020, 2:00-3:00 PM at the Harry S. Truman Main State Building, Room 3940, 2201 C Street NW, Washington, DC 20520.

If you are interested in attending, please send your name, organization, email address, and phone number, as well as any requests for reasonable accommodation, to Elana Mendelson at Katz-MinkEH@state.gov. More information is available here: https://www.govinfo.gov/content/pkg/FR-2020-02-03/html/2020-01931.htm

Participate in 2020 Congressional Visits Day

NSC Alliance members are invited to participate in the 2020 Congressional Visits Day organized by the American Institute of Biological Sciences (AIBS) on April 20-22, 2020 in Washington, DC.

The event allows you to meet with your members of Congress to help them understand the important role the federal government plays in supporting the biological sciences. Advocate for federal investments in biological sciences research supported by the National Science Foundation and other federal agencies.

Participants will complete a communications and advocacy training program provided by AIBS that prepares them to be effective advocates for their science. AIBS also provides participants with background information and materials, as well as arranges meetings with lawmakers. On April 22, scientists will participate in meetings with their Representative and Senators.

Training program: In conjunction with the 2020 AIBS Congressional Visits Day, AIBS is offering its highly acclaimed Communications Boot Camp for Scientists. This professional development course will be on April 20-21. All participants who complete the course receive priority access to the Congressional Visits Day program and a certificate of completion indicating that they have successfully completed 16 hours of communications training. This professional development program provides practical instruction and interactive exercises designed to help scientists (e.g. researchers, graduate students, administrators, educators)
translate scientific information for non-technical audiences and to effectively engage with decision-makers and the news media. As affiliate members of AIBS, NSC Alliance members can register for the training at a discounted rate.

Scientists, graduate students, educators, or other science community members who are interested in advocating for scientific research and education are encouraged to participate in this important event.

Express your interest in participating in the event by registering. Registration will close on March 16, 2020. Space is limited and it may not be possible to accommodate the participation of all interested individuals.

Register at: [https://www.aibs.org/public-policy/congressional_visits_day.html](https://www.aibs.org/public-policy/congressional_visits_day.html)

The Natural Science Collections Alliance is a Washington, D.C.-based nonprofit association that serves as an advocate for natural science collections, the institutions that preserve them, and the research and education that extend from them for the benefit of science, society, and stewardship of the environment. NSC Alliance members are part of an international community of museums, botanical gardens, herbariums, universities, and other institutions that house natural science collections and utilize them in research, exhibitions, academic and informal science education, and outreach activities. Website: [www.NSCAlliance.org](http://www.NSCAlliance.org).

The NSC Alliance Washington Report is a publication of the NSC Alliance. For information about membership in the NSC Alliance, please contact [dbosnjak@aibs.org](mailto:dbosnjak@aibs.org).