

**U.S. HOUSE OF REPRESENTATIVES  
SUBCOMMITTEE ON RESEARCH & TECHNOLOGY  
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY  
HEARING CHARTER**

*A Review of the National Institute of Standards and Technology FY 2020 Budget Request*

Tuesday, April 9, 2019  
10:00 a.m. – 12:00 p.m.  
2318 Rayburn House Office Building

**PURPOSE**

On Tuesday, April 9, 2019, the Subcommittee on Research and Technology of the Committee on Science, Space, and Technology will hold a hearing to exam the President’s Fiscal Year 2020 budget request for the National Institute of Standards and Technology (NIST) and related policy and management issues. We will discuss major areas of research under NIST’s laboratory programs, the agency’s role in working with industry to advance U.S. competitiveness, and key facilities construction and maintenance issues on both of NIST’s campuses.

**WITNESS**

**The Honorable Walter G. Copan**, Undersecretary of Commerce for Science and Technology and Director of the National Institute of Standards and Technology

**OVERARCHING QUESTIONS**

- What would be the impact of the proposed budget on NIST’s ability to carry out its mission? What analysis did the Administration use in deciding what programs to prioritize and what to eliminate?
- What is the state of facilities on NIST campuses and what is the impact on NIST’s ability to carry out its mission?
- What would be the impact of the proposed budget on U.S. leadership in international standards development, including for emerging technologies?

**OVERVIEW OF FY 2020 BUDGET REQUEST FOR NIST**

NIST is a non-regulatory agency within the Department of Commerce with a mission to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology. NIST has strong partnerships with the private sector, other government

agencies, and universities to develop and apply the technology, measurements, and standards needed for new and improved products and services.<sup>1</sup> The President’s FY 2020 budget request would provide a total of \$687 million<sup>2</sup> for NIST, representing a 30 percent (\$299 million) decrease below FY 2019 funding. The request proposes funding under NIST’s three accounts: Scientific and Technical Research and Services (STRS); Industrial Technology Services (ITS); and Construction of Research Facilities (CRF).

	<b>FY 2018 Enacted (\$M)</b>	<b>FY 2019 Enacted (\$M)</b>	<b>FY 2020 Request (\$M)</b>	<b>FY 2020 Request +/- over FY 2019 Enacted (\$M)</b>	<b>FY 2020 Request % Over FY 2019 Enacted</b>
<b>STRS</b>	<b>\$724.5</b>	<b>\$724.5</b>	<b>\$611.7</b>	<b>(\$112.8)</b>	<b>-15.6%</b>
Laboratory Programs	628.0	628.1	553.7	(74.4)	-12%
Corporate Services	17.3	17.3	11.9	(5.4)	-31%
Standards Coordination & Special Programs <sup>3</sup>	79.2	79.1	46.1	(33.0)	-42%
<b>ITS</b>	<b>\$155.0</b>	<b>\$155.0</b>	<b>\$15.2</b>	<b>(\$139.8)</b>	<b>-90.2%</b>
Hollings Manufacturing Extension Partnership	140.0	140.0 <sup>4</sup>	0.0	(140.0)	-100.0%
Manufacturing USA	15.0	15.0	15.2	0.2	1.3%
<b>CRF</b>	<b>\$319.0</b>	<b>\$106.0</b>	<b>\$59.9</b>	<b>(\$46.1)</b>	<b>-43.5%</b>
Construction & Major Renovations	255.0	31.0	19.2	(11.8)	-38%
Safety, Capacity, Maintenance & Major Repairs	64.0	75.0	40.7	(34.3)	-46%
<b>Total, NIST Discretionary</b>	<b>1,198.5</b>	<b>985.5</b>	<b>686.8</b>	<b>(298.7)</b>	<b>-30.3%</b>

<sup>1</sup> All facts, figures, and other information in this document are available through the President’s FY 2020 Budget Request Congress for the National Institute of Standards and Technology or [www.nist.gov](http://www.nist.gov).

<sup>2</sup> This figure includes \$19 million in funding for construction of research facilities contingent upon the enactment of the *Federal Capital Revolving Fund Act of 2019*. Excluding this \$19 million, the total request is \$668 million, which represents a 32% cut from FY 2019 enacted.

<sup>3</sup> Includes \$2.2M Baldrige Performance Excellence Program funding.

<sup>4</sup> Without a \$2M rescission of prior year unobligated balance to reduce budget authority.

## LAB PROGRAMS

The Scientific and Technical Research and Services (STRS) account funds NIST's laboratory research and includes collaborative research with industry. NIST operates five laboratories and two national user facilities in carrying out these activities. These include two metrology laboratories: the Material Measurement Laboratory and the Physical Measurement Laboratory; and three technology laboratories: the Engineering Laboratory, the Information Technology Laboratory, and the Communication Technology Laboratory. The two national user facilities are the Center for Nanoscale Science and Technology and the NIST Center for Neutron Research.

The FY 2020 budget request for the labs program is \$611.7 million, 16% below FY 2019 funding. The request would reduce funding for most of the research carried out under the laboratory program and reduce personnel by 400 staff, an approximate 17% reduction of NIST scientists and engineers.

The proposed budget also includes elimination of all three centers of excellence funded by NIST, including the Forensic Science Center of Excellence led by Iowa State University, the Community (Disaster) Resilience Center of Excellence led by Colorado State University, and the Advanced Manufacturing Center of Excellence led by Northwestern University. The request would also eliminate funding for NIST's climate measurement research carried out under the Urban Dome program.

The request would make cuts to the following STRS focus areas:

- 41.2% decrease for Advanced Communications, Networks, and Scientific Data Systems
- 20.5% decrease for Advanced Manufacturing and Materials Management
- 1.5% decrease for Exploratory Measurement Science
- 12.3% decrease for Fundamental Measurement, Quantum Science, and Measurement Dissemination
- 14% decrease for Health and Bioscience
- 8.4% decrease for NIST User Facilities
- 30.5% decrease for Physical Infrastructure and Resilience

*Advanced Communications, Networks, and Scientific Data Systems* – The Advanced Communications program funds important research in areas such as AI, internet of things (IoT), 5G wireless communications, and wireless spectrum sharing technologies. The FY 2020 budget includes an additional \$8 million for AI for a total of \$24 million. This would fund AI user facilities for training and testing AI systems, modeling AI behavior, and comparing systems. NIST's work has included measuring AI trustworthiness issues including privacy, security, explainability, resilience, and reliability. In addition, NIST invests in AI technology evaluation for natural language processing, visual understanding, information retrieval, identity, and

usability. Research in 5G wireless would also be a priority. However, the increases for AI and 5G would come at an even greater cost for this program's other important work. The Administration proposes to eliminate funding for internet infrastructure protection, cloud computing, medical record interoperability, data visualization, cyber physical systems interoperability, and other ongoing information technology and data challenges.

*Advanced Manufacturing and Material Measurements* – NIST works closely with industry to assist U.S. manufacturers in competing in the global market. It facilitates the development of standards, test methods and reference for innovative technologies including robotics, additive manufacturing, and biopharmaceuticals. The Administration has prioritized microelectronics research across agencies, including in the Materials lab at NIST. However, the Administration is proposing to eliminate funding for bridge and pipeline reliability testing, body armor testing, trace materials detection, and all work on energy and environment applications including an extramural grant to Troy University in Alabama supporting the recycling and reuse of plastics. It would also end long-standing investments in and operations for materials characterization at Brookhaven National Laboratory and Northwestern University.

*Cybersecurity and Privacy* – The FY 2020 budget request would maintain basically flat funding (\$1m increase) for NIST's cybersecurity and privacy efforts. The proposed budget supports development of the first post-quantum standards, maintaining the NIST National Vulnerability Database, the NIST Cybersecurity for the Internet of Things program, development of a Privacy Framework, and NIST's continued leadership of the National Initiative for Cybersecurity Education (NICE) program.

*Exploratory Measurement Science* – The budget includes basically flat funding (\$1m decrease) for NIST's high risk and potentially transformative research. The proposal would include elimination of the agency's support of the Joint Institute of Metrology in Biology (JIMB), a partnership with SLAC, a Department of Energy National Lab, and Stanford University.

*Biosciences* - Overall, the Administration proposes a 14% cut to health and biological systems measurement activities, including the elimination of JIMB. NIST's work supports the underlying technologies and measurements for precision medicine, medical imaging, synthetic biology, genomics, and more. The *Engineering Biology Research and Development Act*, introduced in previous Congresses and to be reintroduced by Chairwoman Johnson soon, would authorize much of the biosciences work at NIST slated for reduction or elimination in the FY 2020 budget proposal.

*Fundamental Measurement, Quantum Science, and Measurement Dissemination* – Last Congress, the Science Committee helped usher into law the *National Quantum Initiative Act* [P.L. 115-368]. NIST is one of three agencies charged under that Act with supporting and

expanding basic and applied quantum information science and technology research and development of standards. The FY 2020 budget proposal includes an additional \$10 million for quantum information sciences, including operation of the Quantum Economic Development Consortium. However, the proposed 12% cut to the overall fundamental measurement program would require eliminating or reducing NIST's activities in support of customers in the communications, defense, manufacturing, transportation, and other sectors.

*NIST User Facilities* – The Administration proposes an 8.4% decrease in funding for the NIST Center for Neutron Research (NCNR) and the Center for Nanoscale Science and Technology (CNST). The NCNR and the CNST provide the U.S. research community with access to state-of-the-art facilities for neutron measurement and nanostructure characterization. The proposed budget would require a significant reduction of service at NCNR, an already oversubscribed user facility.

*Physical Infrastructure and Resilience* – The budget includes a 30.5% decrease in spending for disaster resilience activities that provide guidance to communities for infrastructure safety, interoperability, and resilience against hazards such as fire, windstorms, and earthquakes.

## **MANUFACTURING**

*Manufacturing Extension Partnership (MEP)* – Once again, the Administration proposes to eliminate funding for NIST's primary program that provides services to support adoption of new technologies in the manufacturing industry, the Hollings Manufacturing Extension Partnership (MEP) Program. Congress funded MEP at \$140 million in FY 2019. MEP Centers are funded by the Federal government, state governments, and client fees on a cost-share basis and are operated in all 50 States and Puerto Rico. MEP Centers employ 81 federal workers and 1,300 non-federal technical experts.

*Manufacturing USA*- The FY 2020 budget includes \$15 million for carrying out activities under Manufacturing USA, including ongoing support for NIST's only institute, the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL), and support for NIST's role as the lead agency for interagency coordination. There are currently a total of 14 institutes, the remaining 13 supported by the Departments of Energy and Defense.

## **CONSTRUCTION OF RESEARCH FACILITIES**

The FY 2020 budget proposal includes \$60 million for NIST's construction budget, a \$46 million (44%) decrease below the FY 2019 enacted level. However, this figure includes \$19 million in funding for construction of research facilities contingent upon the enactment of the *Federal Capital Revolving Fund Act of 2019*, which is unlikely to occur. Therefore, the request in reality includes only \$41 million in discretionary funding.

The renovation project for Building 245, the radiation physics building on the Gaithersburg campus, is now fully funded thanks to an influx of funding from Congress in FY 2018. Building 1 on the Boulder, CO campus is currently undergoing significant renovation. The building is comprised of multiple wings. The estimated cost to complete renovation of Wing 5 (which is underway) is \$43 million in FY 2020. In total, to complete the renovation of Building 1 is estimated to cost \$337 million over several years. It is this \$337 million that the Administration is proposing to fund through a revolving fund through GSA, with NIST paying back into the fund annually through appropriations (\$19 million in FY 2020). It is unlikely the Appropriators would support such a proposal. The \$41 million in the discretionary proposal would support staff salaries and recurring preventative maintenance contracts and materials. Under this budget, previously scheduled equipment replacements for FY 2020 will be delayed and none of the \$300 million of deferred maintenance of NIST infrastructure and utilities would be addressed.

Many of NIST's facilities date back to the 1950's. Currently, 54% of the facilities area (by square footage) in Boulder is in poor to critical condition per Department of Commerce standards. Similarly, 58% of Gaithersburg's facilities are in poor to critical condition. The Gaithersburg campus is losing approximately 50,000-70,000 gallons of water per day because of leakage in their steam heat system, and in the winter of 2018, an entire building was closed for a week due to a failed steam valve. That's just the tip of the proverbial iceberg of deferred maintenance at both campuses.