UNITED STATES

National Science Foundation
FY 2020 Performance and Financial Highlights

Mission: To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.

Vision: A Nation that is the global leader in research and innovation.

Who We Are and What We Do

- Established by Congress in 1950 as an independent federal agency to promote American science and engineering (S&E).
- The National Science Foundation (NSF) is the only federal agency that invests in fundamental, basic research and education across the full spectrum of science, technology, engineering, and mathematics (STEM) disciplines.
- NSF invests in basic research that sets the stage for transformative breakthroughs and leads to new ways of thinking about scientific, economic, and sociotechnical challenges facing the Nation and the world.
- NSF supports research and workforce development programs that help drive future economic growth and enhance our Nation's security and global competitiveness.
- NSF funds advanced instrumentation and facilities, Arctic and Antarctic research and operations, cooperative research between universities and industry, and U.S. participation in international scientific efforts.

At A Glance

$8.4 billion	FY 2020 Appropriations (does not include mandatory accounts)
1,421	NSF Employees (Full Time Equivalents in FY 2020)
1,900	Colleges, universities, and other institutions receiving NSF funding in FY 2020
12,200	Competitive awards funded in FY 2020
28%	Funding rate in FY 2020
313,000	Estimated number of people NSF supported directly in FY 2020 (researchers, postdoctoral fellows, trainees, teachers, and students)

NSF-led AI Research Institutes: Pushing Forward the Frontiers of Artificial Intelligence

From the Director

Credit: NSF/Stephen Voss

I am pleased to present the National Science Foundation's *Fiscal Year (FY) 2020 Performance and Financial Highlights* report, one of three accountability reports that provides key financial and performance information to our stakeholders and the American people. In addition to this report, I encourage you to review NSF's *FY 2020 Agency Financial Report* and our website at *www.nsf.gov* to learn more about NSF's investments in science and engineering research and education.

It was a great honor to be named NSF's Director in 2020, the year that marked the 70th anniversary of the agency's establishment. Over these seven decades, NSF has achieved its mission through critical investments advancing key national and scientific policy priorities, accomplished through broad-based support of science and engineering research and education.

Because NSF is the Nation's preeminent source of federal funding for basic research in computer science, engineering, biology, the social sciences, mathematics, geosciences, the physical sciences, and education, its importance was brought to the fore this past year. In FY 2020, NSF-supported scientists and engineers engaged in nearly all aspects of coronavirus disease research—from developing supercomputer-based models of the virus's structure and transmission to investigating anti-viral chemicals that can be safely embedded in self-sanitizing masks. Furthermore, as we funded urgent, deployable research related to the pandemic, NSF continued to invest in ground-breaking basic research expanding the frontiers of scientific knowledge and leading to innovations supporting economic growth, societal well-being, and national security. NSF also elevated its efforts to promote STEM education and career opportunities for all Americans, with particular emphasis on engaging groups that have been underrepresented in STEM for far too long.

The information in this report highlights NSF's longstanding commitment to efficient and effective management practices, sound financial oversight, and to high standards of transparency and accountability. Through this commitment, NSF is building on its distinguished history, and it is moving forward with a focus on advancing the frontiers of research, ensuring accessibility and inclusivity, and sustaining the Nation's global leadership in science and engineering.

Sethuraman Panchanathan
January 19, 2021

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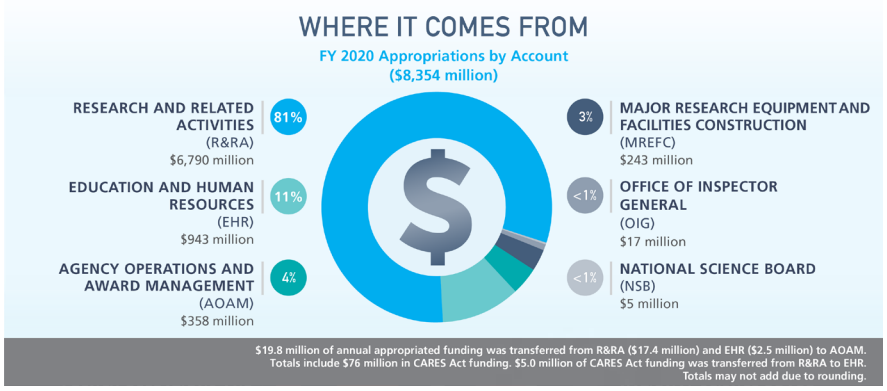
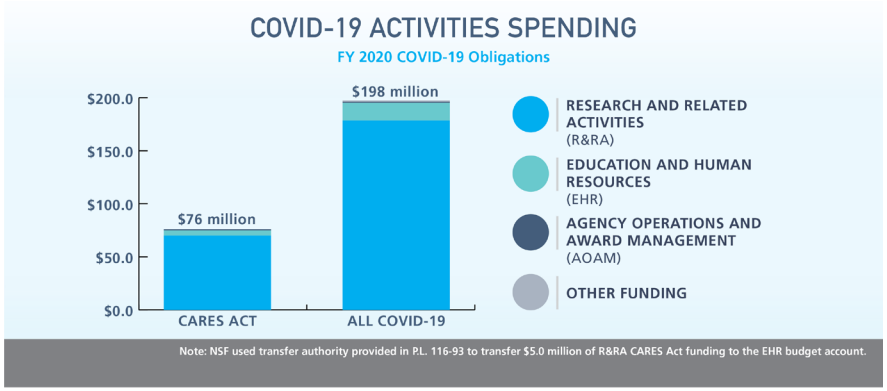
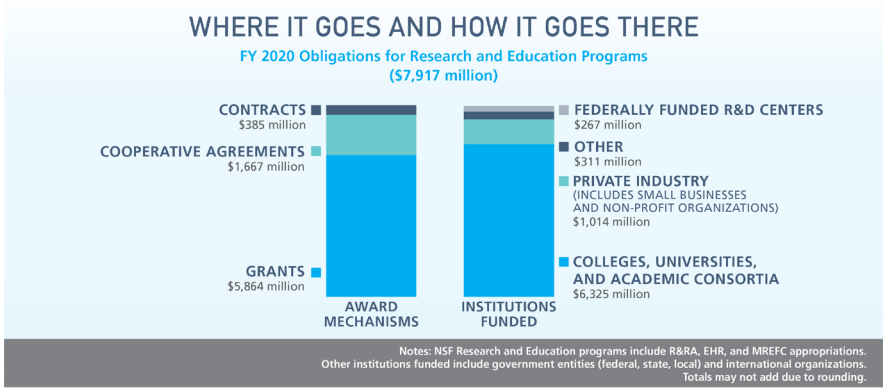
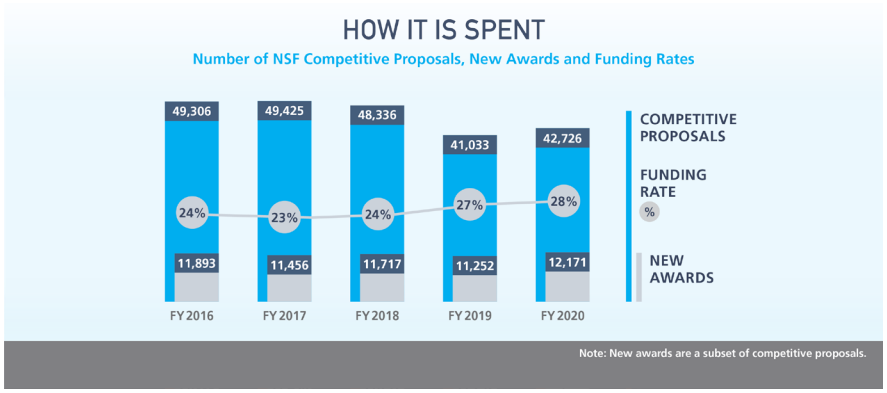
NSF by the Numbers









- **$8,354 million total appropriations:** R&RA, EHR, and MREFC fund the agency's programmatic activities. The AOAM appropriation provides funds to administer and manage those programmatic activities. Separate appropriations support the activities of the OIG and NSB. The FY 2020 appropriations were approximately 3 percent higher than the FY 2019 appropriation total of $8,075 million.
- **$76 million supplemental funding:** NSF received funding under the *CARES Act*, of which $75 million supported a wide range of research to help the country prevent, prepare for, and respond to the coronavirus. In addition, NSF drew $122 million from its FY 2020 base appropriations and other available funds to support research related to COVID-19.
- **Over 30,000 members of the S&E community** participated in the merit review process as panelists and proposal reviewers with almost 200,000 proposal reviews conducted. More than 42,700 proposals were evaluated, and approximately 12,200 new awards were made.
- **An estimated 313,000 people** were directly involved in NSF programs and activities. Beyond these figures, NSF programs indirectly impact millions of people. These programs reach kindergarten through 12th grade students and teachers, the public, and researchers; informal science activities such as museums, television, videos, and journals; outreach efforts and dissemination of innovative instructional resources and teaching methods.
- NSF supports **24 percent of all federally-sponsored basic scientific research** conducted by America's colleges and universities. NSF's support increases to 57 percent when medical research supported by the National Institutes of Health is excluded.

Financial Audit Results

- Earned its **23rd consecutive unmodified (clean) audit opinion** on its financial statements.
- Complied with the Improper Payment Elimination and Recovery Act.
- Showed effective internal controls over operations, reporting and compliance.

Complete FY 2020 financial information is in the Agency Financial Report at:
www.nsf.gov/publications/pub_summ.jsp?ods_key=afr

How We Are Doing: Performance Results

NSF's Strategic Plan for FYs 2018-2022, *Building the Future: Investing in Discovery and Innovation*, lays out two strategic goals that embody the dual nature of NSF's mission to advance the progress of science while benefitting the Nation: *Expand knowledge in science, engineering, and learning* and *Advance the capability of the Nation to meet current and future challenges*. A third goal, *Enhance NSF's performance of its mission*, directs NSF to hold itself accountable for achieving excellence in carrying out its mission. Goals in this Strategic Plan each contain two Strategic Objectives, which are comprehensive of all agency program activities. This goal structure enables NSF to link its investments to longer-term outcomes.

Strategic Goal		Strategic Objective
1	Expand knowledge in science, engineering, and learning.	**1.1 | Knowledge** Advance knowledge through investments in ideas, people, and infrastructure.
		1.2 | Practice Advance the practice of research.
2	Advance the capability of the Nation to meet current and future challenges.	**2.1 | Societal Impacts** Support research and promote partnerships to accelerate innovation and to provide new capabilities to meet pressing societal needs.
		2.2 | STEM Workforce Foster the growth of a more capable and diverse research workforce and advance the scientific and innovation skills of the Nation.
3	Enhance NSF's performance of its mission.	**3.1 | Human Capital** Attract, retain, and empower a talented and diverse workforce.
		3.2 | Processes and Operations Continually improve agency operations.

In FY 2020, eight performance goals were tracked, one of which was a 2-year Agency Priority Goal (APG) in its first year of activity. Four of the eight achieved all or some of their targets, or were on track throughout the year. As shown on the table below, NSF did not achieve its targets for three goals, and the measurement framework was changed mid-year for a fourth. NSF's *FY 2020 Annual Performance Report* (APR) provides additional details on these results. It notes that several areas were affected by key decisions that were made for prioritizing work and providing staff with flexibilities to adjust to the changed working environment necessitated by the COVID-19 pandemic. The APR also provides a full description of the agency's performance framework, including descriptions of the strategic reviews and the performance metrics, methodologies, results and explanations of unmet targets, and trends, along with a list of relevant external reviews. Performance data have been independently verified and validated.

FY 2020-2021 Priority Goal	Status
Strategically engage in public and private partnerships to enhance the impact of NSF's investments and contribute to American economic competitiveness and security. To benefit the U.S. scientific and engineering research and education enterprise, by September 30, 2021, NSF will develop and pursue an agency-wide partnerships strategy, components of which include targeted outreach, implementation of process improvements, and improvement of internal and external communications.	On track. Progress made in FY 2020 in three areas: internal communications, process improvements, and outreach. For more details, refer to *Performance.gov.*

FY 2020 PERFORMANCE GOAL	RESULT
1. *Agency Priority Goal:* Developing an Agency-Wide Partnerships Strategy.	On Track
2. Ensure that key NSF-wide program investments are implemented and on track.	Achieved
3. Ensure program integrity and responsible stewardship of major research facilities and infrastructure.	Not Achieved
4. Inform applicants whether their proposals have been declined or recommended for funding in a timely manner.	Not Achieved
5. Improve the quality of written reviews of NSF proposals.	Achieved
6. Foster a culture of inclusion through change management efforts resulting in change leadership and accountability.	Not Achieved
7. Ensure that employee job requirements are aligned with competencies and skills needed for the future.	Not Applicable (Measure redefined mid-year)
8. Streamline and simplify user interactions with IT systems and functions that support the merit review process, reducing non-value-added steps and reducing the time spent managing the proposal and award lifecycle.	Partially Achieved

More information about our performance is at:
https://www.nsf.gov/about/performance/annual.jsp

Management Challenges

For FY 2020, the NSF Office of the Inspector General (OIG) identified six management and performance challenges facing the agency and one emerging challenge:

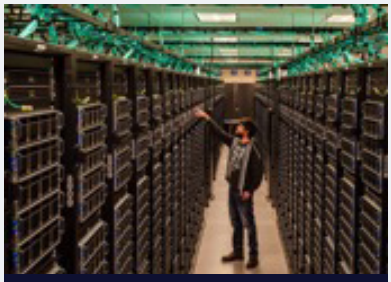
- Managing major multi-user research facilities to ensure effective oversight.
- Meeting Digital Accountability and Transparency Act of 2014 (DATA Act) reporting requirements using government-wide data standards.
- Managing and providing oversight of the Intergovernmental Personnel Act program that brings external researchers and educators to work temporarily at NSF.
- Managing the Antarctic Infrastructure Modernization for Science project in a harsh climate without impacting scientific research.
- Encouraging the ethical conduct of research through providing oversight and guidance on the implementation of responsible conduct of research requirements and training.
- Mitigating threats posed by foreign government talent recruitment programs that have the potential to exploit the openness of American universities and threaten the integrity of U.S. research initiatives.
- *Emerging challenge*: Managing the enterprise-wide internal control environment and ensuring there are no gaps in addressing cross-functional issues.

NSF Management's progress report on the significant activities undertaken in FY 2020 to address these challenges is in NSF's *FY 2020 Agency Financial Report*, along with the OIG's memorandum identifying the FY 2021 Management Challenges.

More information about our FY 2020 Progress Report on OIG Management Challenges is in Appendix 2B of the FY 2020 AFR: *www.nsf.gov/pubs/2021/nsf21002/pdf/08-chap3-appendices.pdf*

Research Highlights

Computing consortium takes on COVID-19. For more than four decades, NSF has been at the forefront of advanced computing capabilities that underpin U.S. leadership in research and innovation. Now, NSF-supported computing systems are an essential element of the COVID-19 High Performance Computing (HPC) Consortium, which is enhancing access to HPC resources to support global health efforts in the face of an ongoing pandemic. The HPC Consortium is a unique public-private partnership—spearheaded by the White House Office of Science and Technology Policy, IBM, U.S. Department of Energy and NSF—that gives researchers working to understand the COVID-19 virus access to powerful computational platforms that can enable major breakthroughs. Through data analytics, machine learning, artificial intelligence, and other advanced computing capabilities, researchers are modeling COVID-19 transmission, simulating the atomic structure of viruses, and forging new paths for fighting the disease.



Credit: Texas Advanced Computing Center

Tiny optical cavities could advance quantum networks. Engineers have reached a new milestone for Quantum Information Science and the quest to create a quantum internet. The internet as we know it today is built on familiar technology like high-power microprocessors that power computation and networking infrastructure that is the backbone of connectivity, but scientists are still designing counterparts for the future of quantum computing. Funded by NSF under the Quantum Leap Big Idea, researchers have answered an important question about how quantum information can be sent and received through a quantum internet. Scientists can encode information in the quantum properties of individual atoms, which can be transmitted to other quantum computers. But how to "read" that information when it is received has been an open question until now. The researchers sculpted microscopic cavities in tiny pieces of crystal capable of holding atoms encoded with quantum information and sensing the atom's quantum properties. Just as technology like floppy disks kickstarted the digital age in the 1960s, quantum breakthroughs like this are enabling leaps forward in the Industries of the Future.

Credit: The Opte Project/Wikimedia (CC BY 2.5)

Information about NSF's Research and Education Discoveries is at: *www.nsf.gov/discoveries*

Information about NSF Senior Management and National Science Board Members is in Appendix 10 of the FY 2020 AFR: *www.nsf.gov/pubs/2021/nsf21002/pdf/08-chap3-appendices.pdf*

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We welcome your comments on how we can make this report more informative.
Contact us at *Accountability@nsf.gov.*

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