UNITED STATES

National Science Foundation
FY 2022 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 leads the world in science and engineering research and innovation, to the benefit of all, without barriers to participation.

Who We Are and What We Do

- The National Science Foundation (NSF) was established by Congress in 1950 as an independent federal agency to promote American science and engineering (S&E).
- 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 use-inspired and translational research that gives rise to new industries and innovative technologies.
- 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, and cooperative research between universities and industry, and U.S. participation in international scientific efforts.

NSF is Transforming Our World.

At A Glance

$8.8 billion	FY 2022 Appropriations
1,516	NSF Employees (Full Time Equivalents in FY 2022)
2,000	Colleges, universities, and other institutions receiving NSF funding in FY 2022
11,000	Competitive awards funded in FY 2022
28%	Funding rate in FY 2022
352,000	Estimated number of people NSF supported directly in FY 2022 (researchers, postdoctoral fellows, trainees, teachers, and students)

From the Director

Credit: NSF/Stephen Voss

The U.S. National Science Foundation is pleased to present its Fiscal Year (FY) 2022 *Performance and Financial Highlights,* one of three *accountability reports* that provides key financial and performance information to our stakeholders and the American people.

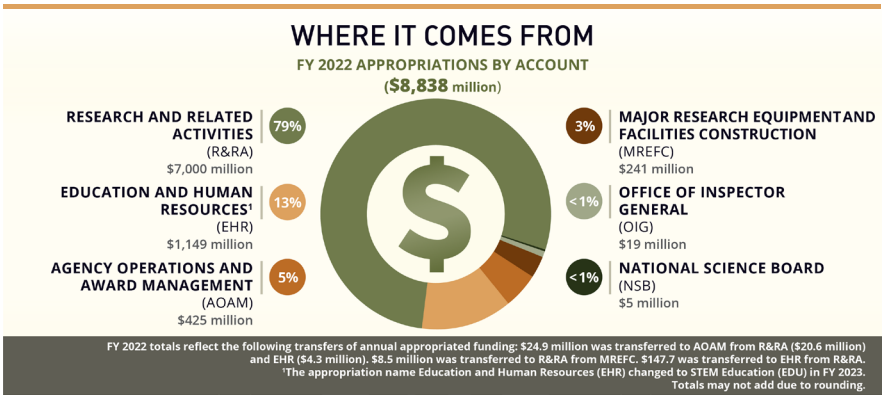
This past year has been an exciting one at NSF. In FY 2022, the "CHIPS and Science Act" (the Act) was signed into law, and we announced the establishment of the first new NSF directorate in over 30 years, the Directorate for Technology, Innovation and Partnerships, or TIP. The Act empowers NSF's core research programs to expand their impact and work together in new ways to spur innovation across all science and engineering fields and help bring new technologies to society more rapidly. It enables NSF to further strengthen the next-generation workforce by proposing significant investments in STEM training and education and broadening participation in underrepresented communities. Together, these changes ensure that NSF's investments in talent and ideas will produce remarkable results for years to come.

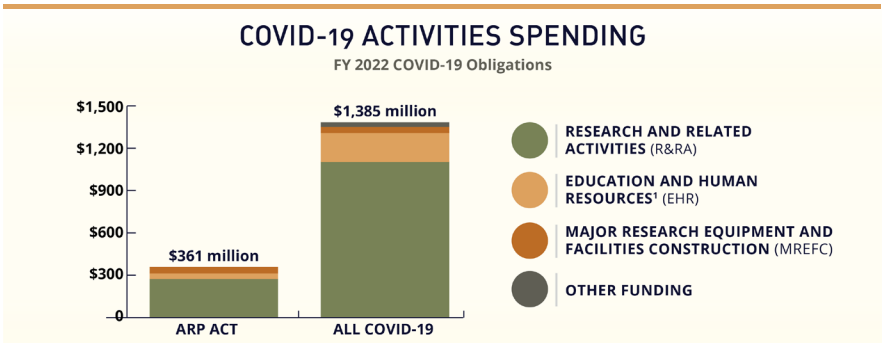
NSF also published its *FY 2022-2026 Strategic Plan* and began working to implement its vision and goals. The four strategic goals — Empower, Discover, Impact and Excel — are the foundation for transformational developments both inside the agency and externally with the science and technology communities we support.

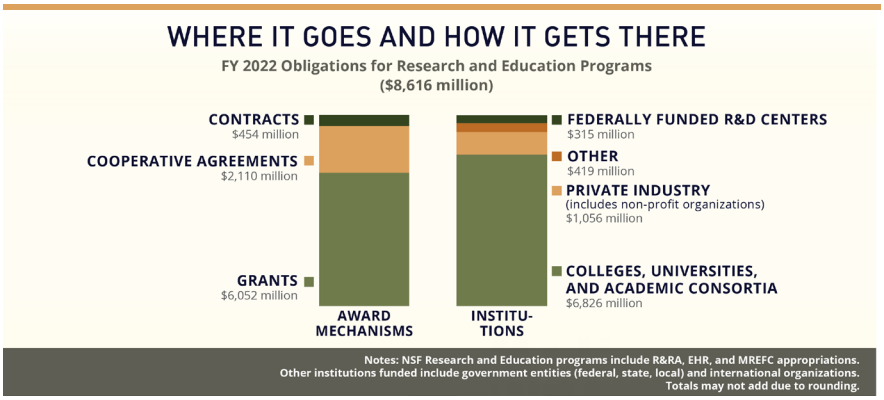
I invite you to visit our *NSF website* to learn more about the work we do to advance the frontiers of research and innovation, ensure accessibility and inclusivity, and sustain the nation's global leadership in science and engineering. Our nation is on a path toward a brighter future, and NSF is proud to be part of that journey.

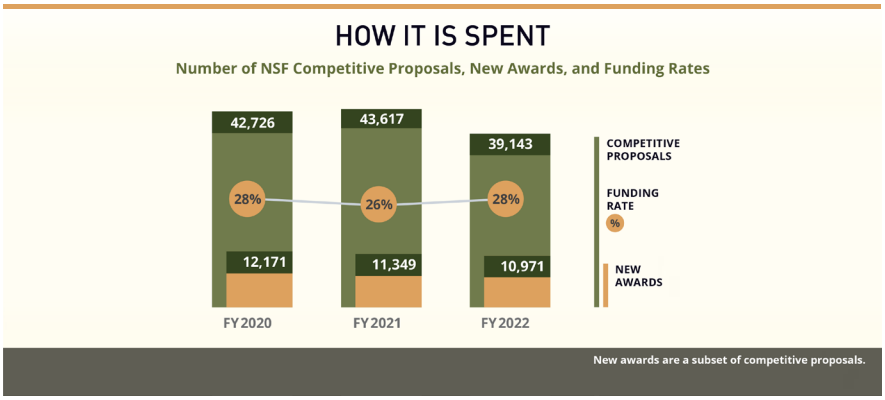
Sethuraman Panchanathan
March 13, 2023

NSF by the Numbers









- **$8,838 million total appropriations:** In FY 2022, R&RA, EHR, and MREFC funded the agency's programmatic activities. The AOAM appropriation provided funds to administer and manage those programmatic activities. Separate appropriations were provided to support the activities of the OIG and NSB. When adjusted to account for the $600 million in supplemental American Rescue Plan (ARP) Act funding received in FY 2021, the FY 2022 NSF funding level was approximately 4 percent higher than in FY 2021.
- **Coronavirus research funding:** As part of national efforts to recover from the COVID-19 pandemic, in FY 2022, NSF continued to fund important research, as well as recovery efforts to stabilize projects in construction and help the science, engineering, and STEM education communities rebound. FY 2022 activities were funded from FY 2021 ARP (a 2-year appropriation), NSF's FY 2022 base appropriations, and other available funds to support research related to COVID-19. NSF's website provides updates on *NSF's response to the pandemic*.
- **32,000 members of the S&E community** participated in the merit review process as panelists and proposal reviewers with approximately 190,000 proposal reviews conducted. 39,143 proposals were evaluated, and 10,971 new awards were made.
- **An estimated 352,000 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 **23 percent of all federally sponsored basic scientific research** conducted by America's colleges and universities. NSF's support increases to 56 percent when medical research supported by the National Institutes of Health is excluded.

Financial Audit

In FY 2022, NSF:

- Earned its 25th 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 2022 financial information is in the Agency Financial Report, **Chapter 2.**

Performance

FY 2022 was the first year that NSF operated under its Strategic Plan for FYs 2022- 2026, *Leading the World in Discovery and Innovation, STEM Talent Development, and the Delivery of Benefits from Research.* The four strategic goals in this plan are built upon four themes—Empower, Discover, Impact, and Excel—that form the core of the plan. These themes focus on expanding frontiers, engaging people, and delivering solutions. Under each goal are two Strategic Objectives, which together encompass all areas of agency activity and enable NSF to link its investments to outcomes.

Strategic Goal		Strategic Objective
1	**Empower:** Empower STEM talent to fully participate in science and engineering	**1.1 | Ensure accessibility and inclusivity –** Increase the involvement of communities underrepresented in STEM and enhance capacity throughout the nation.
		1.2 | Unleash STEM talent for America – Grow a diverse STEM workforce to advance the progress of science and technology.
2	**Discover:** Create new knowledge about our universe, our world, and ourselves	**2.1 | Advance the frontiers of research –** Accelerate discovery through strategic investments in ideas, people, and infrastructure.
		2.2 | Enhance research capacity – Advance the state of the art in research practice.
3	**Impact:** Benefit society by translating knowledge into solutions	**3.1 | Deliver benefits from research –** Advance research and accelerate innovation that addresses societal challenges.
		3.2 | Lead globally – Cultivate a global science and engineering community based on shared values and strategic cooperation.
4	**Excel:** Excel at NSF operations and management	**4.1 | Strengthen at speed and scale –** Pursue innovative strategies to strengthen and expand the agency's capacity and capabilities.
		4.2 | Invest in people – Attract, empower, and retain a talented and diverse NSF workforce.

NSF's FY 2024 Budget Request includes the agency's *Annual Performance Plan for FY 2024 and Annual Performance Report for FY 2022.* The Annual Performance Plan and Report provides a full description of the agency's performance framework, including descriptions of the performance metrics, methodologies, results and explanations of unmet targets, and trends. Performance data have been independently verified and validated.

In FY 2022, NSF gauged its performance against nine annual goals, including the Agency Priority Goal (APG) for FY 2022-FY 2023, *Improve Representation in the Scientific Enterprise.* NSF also highlighted three contextual indicators to provide information that is relevant to NSF's overall investment strategy and its impact. Contextual indicators are not appropriate for tracking against annual targets, generally because of the need to further mature the underlying measure or because of the timing of the available data.

NSF's *FY 2022-2023 Agency Priority Goal* is to improve representation in the scientific enterprise by making changes that will lead to an increase in proposal submissions led by individuals from underrepresented groups and from underserved communities. Specifically, by September 30, 2023, NSF will increase both the number and proportion of proposals received 1) with principal investigators (PIs) from groups underrepresented in STEM and 2) from underserved institutions by 10 percent over the FY 2020 baselines.

FY 2022 Results

Strategic Objective	Annual Goal (AG)/Contextual Indicator (CI)		Result
Empower 1.1	**AG 1**	APG: Improve representation in the scientific enterprise	N/A
Empower 1.2	**CI 1**	NSF funding to Minority Serving Institutions (MSIs)	✓
Discover 2.1	**AG 2**	Ensure Major Facility Infrastructure Investments are on Track	✗
Discover 2.2	**AG 3**	Ensure Mid-Scale Infrastructure Investments are on Track	●
Impact 3.1	**AG 4**	Grow Partnerships	N/A
	CI 2	Number and diversity of entrepreneurs participating in I-Corps™	✓
Impact 3.2	**CI 3**	Awards with international collaborations	✓
Excel 4.1	**AG 5**	Provide robust and reliable IT services	●
Excel 4.2	**AG 6**	Implement the Human Capital Operating Plan	●
	AG 7	Foster a Culture of Inclusion	●
Cross-cutting	**AG 8**	Make Timely Proposal Decisions	✗
	AG 9	Ensure Key Program Investments are on Track: ARP	●

● = Achieved N/A = No 2022 target
✗ = Missed ✓= Contextual Indicator

APG Indicator	Progress toward APG FY 2023 Target
Number of proposals with PIs from groups underrepresented in STEM	+1.6% from 2020 baseline
Proportion of proposals with PIs from groups underrepresented in STEM	+11.0% from 2020 baseline
Number of proposals from underserved institutions	-2.7% from 2020 baseline
Proportion of proposals from underserved institutions	+6.1% from 2020 baseline

More information on our performance reporting is **here.**

Management Challenges

For FY 2022, the NSF Office of the Inspector General (OIG) identified eight management and performance challenges facing the agency:

- Increasing diversity in S&E education and employment to strengthen the overall STEM workforce.
- Overseeing the United States Antarctic program, including revisions to project plans and budgets due to COVID-related delays.
- Overseeing grants in a changing environment by strengthening outreach and grants management guidance to the research community.
- Managing the Intergovernmental Personnel Act (IPA) program, with a focus on the process to vet candidates' eligibility to serve as IPAs.
- Overseeing major multi-user research facilities, which are inherently risky due to complexity and cost.
- Mitigating threats posed by foreign government talent recruitment programs which have the potential to exploit the openness of American universities and threaten the integrity of U.S. research initiatives.
- Mitigating threats posed by the risk of cyberattacks through zero trust measures.
- Managing transformational change due to pending legislation, the establishment of a new directorate, and a shift to a hybrid workforce.

NSF Management's report on the significant activities undertaken in FY 2022 to address these challenges is in NSF's *FY 2022 Agency Financial Report*, along with the OIG's memorandum identifying the FY 2023 Management Challenges.

More information about our FY 2022 Progress Report on OIG Management Challenges is in the Agency Financial Report, **Chapter 3/Appendix 2B**.

Research Highlights

Recycling CO2 into sustainable aviation fuels

Dimensional Energy, launched with help from NSF's SBIR/STTR programs, known as America's Seed Fund, has developed a method to use sunlight to convert carbon dioxide into energy. Co-founded by two Cornell faculty members, the company gathers carbon dioxide from sources like industrial sites (cement plants) or from direct-air capture, then adds renewable energy and hydrogen to their system of reactors, to transform it into an environmentally friendly fuel. The goal of the founders is to decarbonize the aviation industry with sustainable jet fuel and, in June 2022, United Airlines agreed to purchase at least 300 million gallons of their product over 20 years.

Credit: Dimensional Energy


Credit: Victor Gensini, Northern Illinois University

Scientists hone long-range forecasts of U.S. tornadoes, hail

NSF-supported scientists are improving extended-range weather forecasting in the U.S. by studying atmospheric phenomena halfway around the globe. The researchers found 100 instances of significant weather fluctuations from 1979 through 2019 in the Madden-Julian Oscillation – a major disturbance of wind, rain, and pressure that circles the globe every 30 to 60 days. As these disturbances moved over the Maritime Continent, which includes Indonesia and the Philippines, they found 53 of these storms gained strength as they entered the Pacific Ocean, creating ripples in the atmosphere and eventually changing circulation patterns over North America. The researchers identified three categories of storms, and all heightened the potential to increase U.S. tornado and hail events. This information can be used to create extended-range forecasts and provide more time to raise awareness of severe weather.

NSF partners with leading foundations to improve U.S. STEM education

At the core of NSF's approach to accelerating discovery, innovation, and STEM education is a commitment to building strong partnerships across an array of agencies, industries, and organizations. That is why NSF together with the Bill & Melinda Gates Foundation, Schmidt Futures, and Walton Family Foundation have developed a new partnership to fund unique initiatives that will improve the quality of U.S. STEM education for all students, particularly those whose talents, intelligence, and entrepreneurship have been underutilized in the nation's STEM enterprise. This historic collaboration brings together some of the largest public and private funders committed to STEM education and is one of the first of its kind involving these organizations. NSF is proud to match the money from the foundations for each funded activity and help researchers answer some of the most pressing challenges in U.S. STEM education.


Credit: NSF

Information about NSF's research and education discoveries is **here.**
Information about NSF Senior Management and National Science Board Members is in the Agency Financial Report, **Chapter 3/Appendix 10.**

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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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