National Science Board

Indicators 2026

Science and Engineering Policy Committee

July 23, 2025

Discovery: R&D Activity and Research Publications

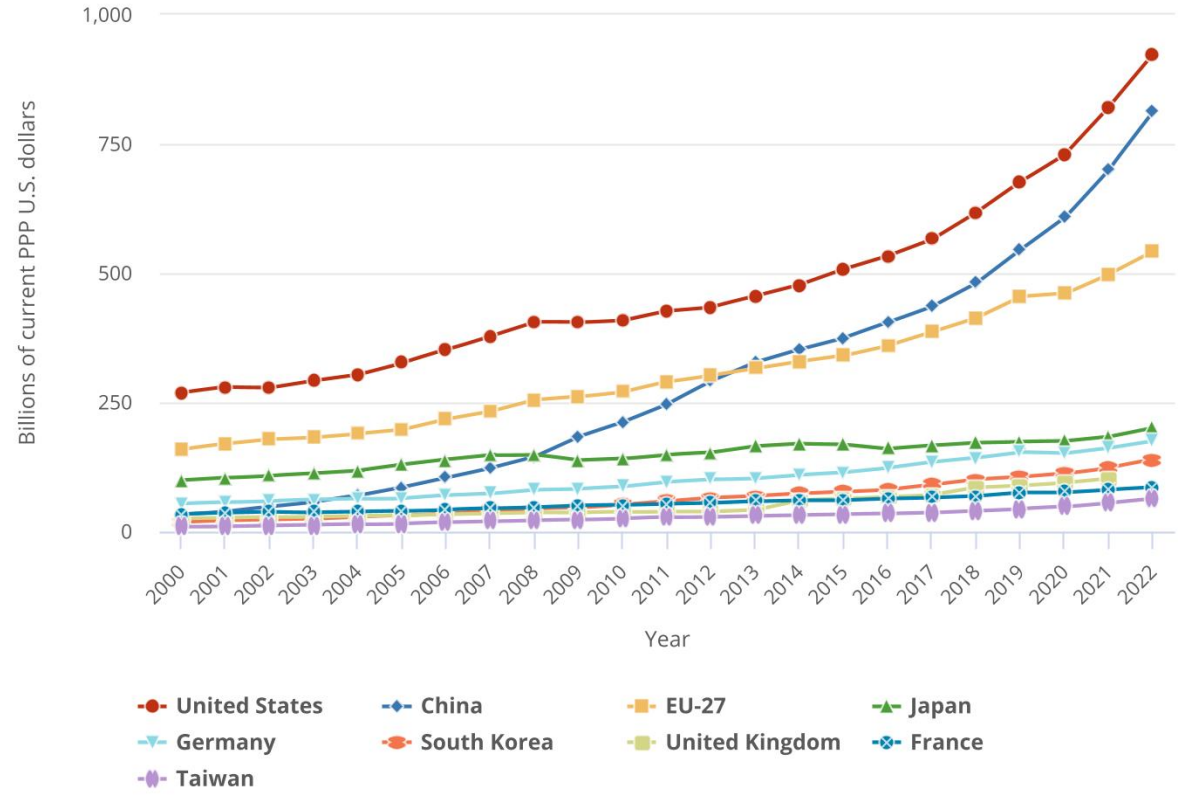
Today, releasing first of the 2026 *Science and Engineering Indicators* reports, *Discovery: R&D Activity and Publications*

The report quantifies how the R&D landscape is changing and answers key questions such as:

- Who is spending how much money to increase their stock of knowledge?
- In what ways are they doing so?
- And what results from this research?

National Center for Science and Engineering Statistics | NSB-2025-7

Figure DISC-18. Gross domestic expenditures on R&D, by selected region, country, or economy: 2000–22



EU-27 = European Union; PPP = purchasing power parity.

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Winning the Race for the Future

Winning the Race for the Future

A National Science Board Policy Companion to the *Indicators* Report *Discovery: R&D Activity and Research Publications*

U.S. competitiveness and security hinge on:

- Funding bold, curiosity-driven basic research - the next, *next* big things - keeps America ahead in critical technologies.
- Growing domestic science, technology, engineering, and math (STEM) talent through direct support for the next generation of scientists, engineers, and technicians.

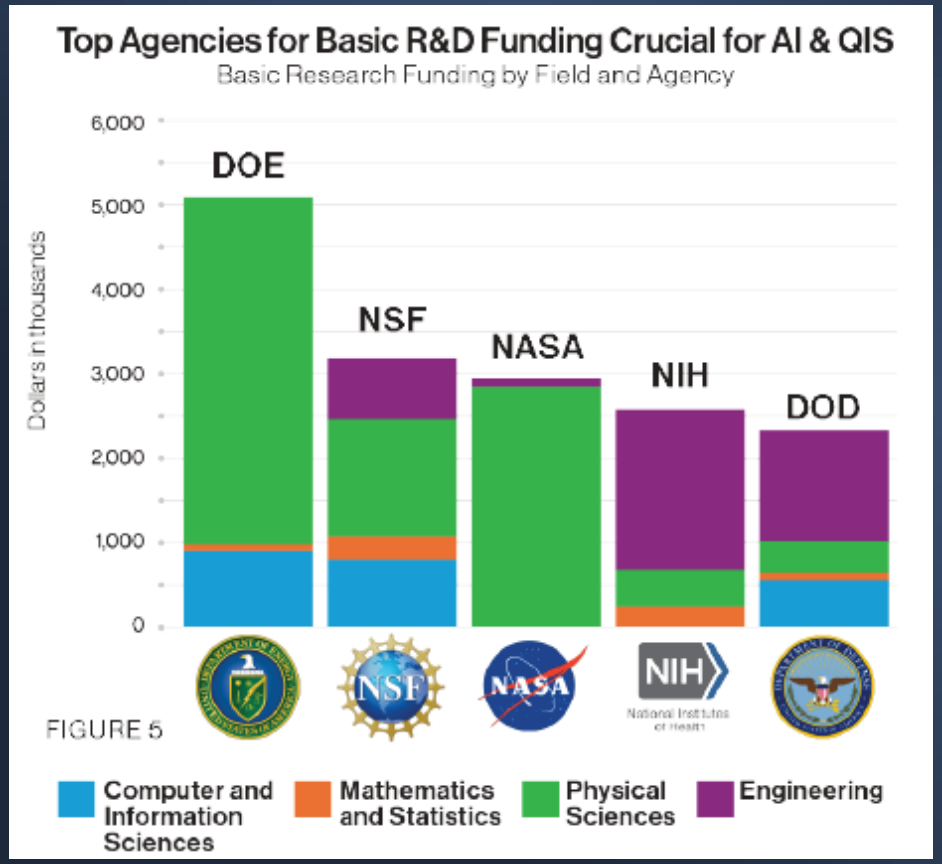
Winning the Race for the Future

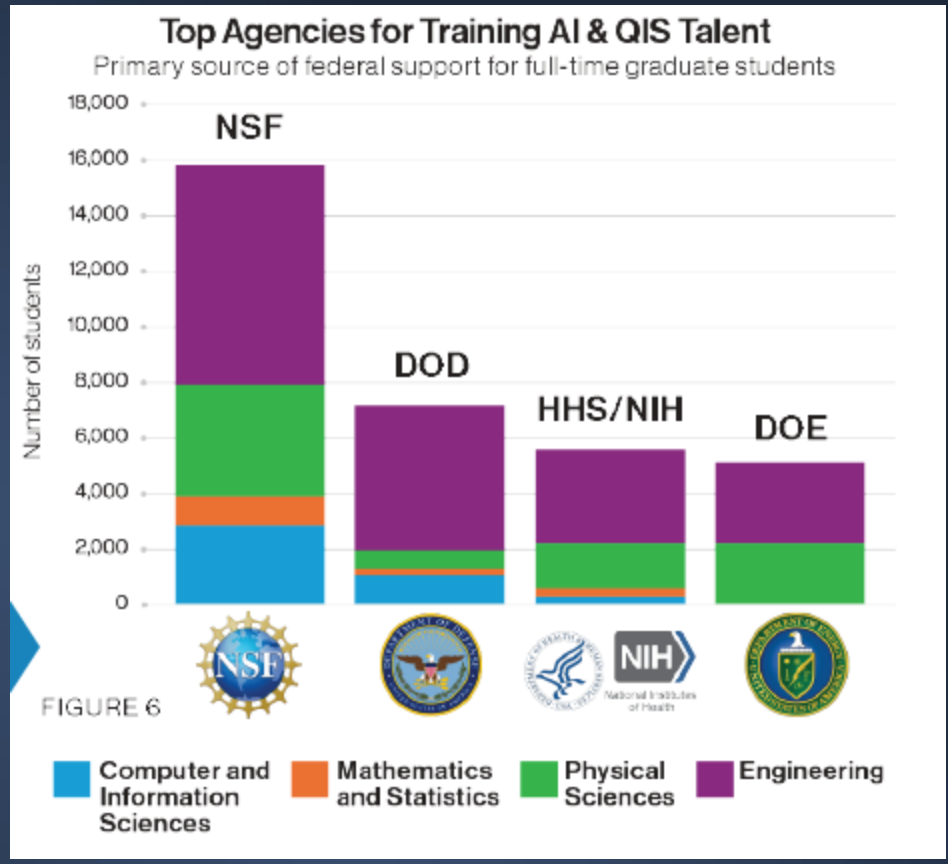
WHY IT MATTERS

- **Basic research pays off.** Federal basic research dollars return 140-210%[1] to the economy, spark game-changing discoveries, and create a STEM ready workforce.
- **China is closing in fast**. Without recent private sector research & development (R&D) growth, the People's Republic of China (PRC) would already outspend the the U.S. in R&D.
- **Industry can't do it alone.** Companies fund near-term R&D, but the most transformative breakthroughs need longer investments that fall outside their payback window.

1 – The Returns to Government R&D: Evidence form U.S. Appropriations Shocks. 2024, Fieldhouse and Mertens

Winning the Race for the Future





Factsheet: NSF and AI / Quantum

National Science Board 2025

NSF Investments Are Key to US Leadership in AI & Quantum

National Science Foundation: A Change Agent for the Change Agents

Discoveries in the fields of Artificial Intelligence (AI) and Quantum science hold the promise to catalyze economic growth and transform the way we live. **The NSF is an indispensable player in the AI and Quantum ecosystem, seeding promising ideas and companies with the funds to create breakthroughs and take them to market.**

How has the NSF already impacted the AI and Quantum enterprise?

- **Funding early research in stochastic modeling and neural networks**, which are the basis for many of today's AI tools like ChatGPT, and paving the way for industry's now annual investment of tens of billions of dollars toward AI research ad development.
- **Supporting early quantum algorithm and qubit hardware research**, demonstrating the capabilities and feasibilities of quantum-computing, and igniting a wave of interest by industry leaders to build upon this NSF-funded research.
- **Accelerating the transition from knowledge into economic competitiveness** by providing entrepreneurship training to researchers and seed funding to startups creating game-changing technologies. The NSF's Technology, Innovation, and Partnerships directorate heads these programs for strategic coordination matching agency priorities.

Share of highly cited US AI- and Quantum-related articles funded
By federal agency 2018-2023

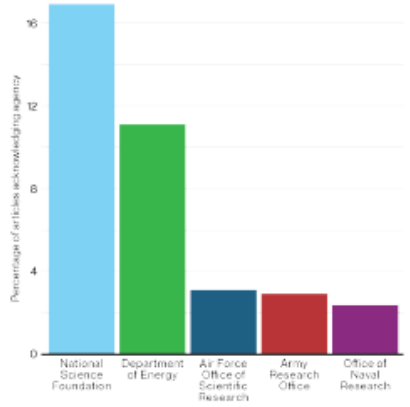


Figure 1

Since FY2022 alone, NSF has invested more than $289M in seed funding for almost 600 AI- and Quantum-related companies, setting the stage for industry and venture capital (VC) funding and creating paradigm shifts in a range of fields. *Here's a look at some of the companies the NSF has funded over the years:*

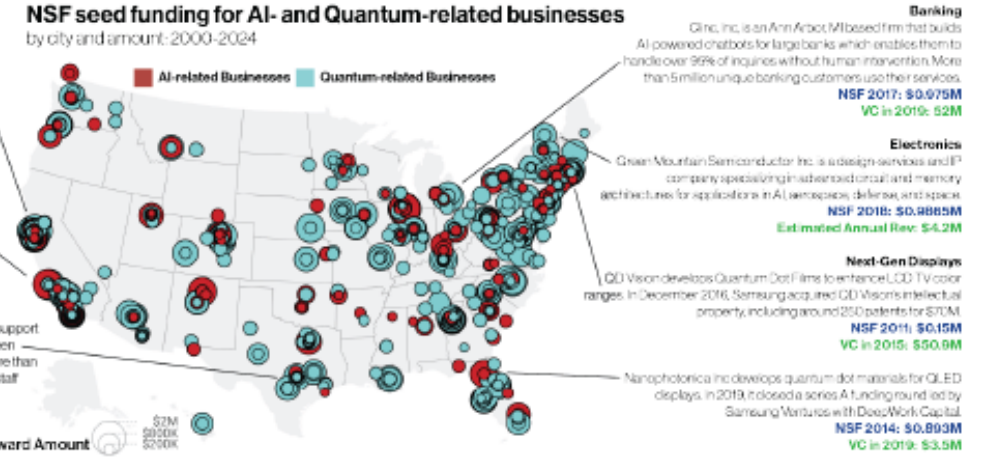


Figure 2

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NSB-2025-15
https://www.nsf.gov/nsb/publications/2025/NSFAIQ.pdf

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Factsheet: NSF and AI / Quantum

How has NSF reached such a pivotal position?

Through strategic investment in AI and Quantum talent and research.

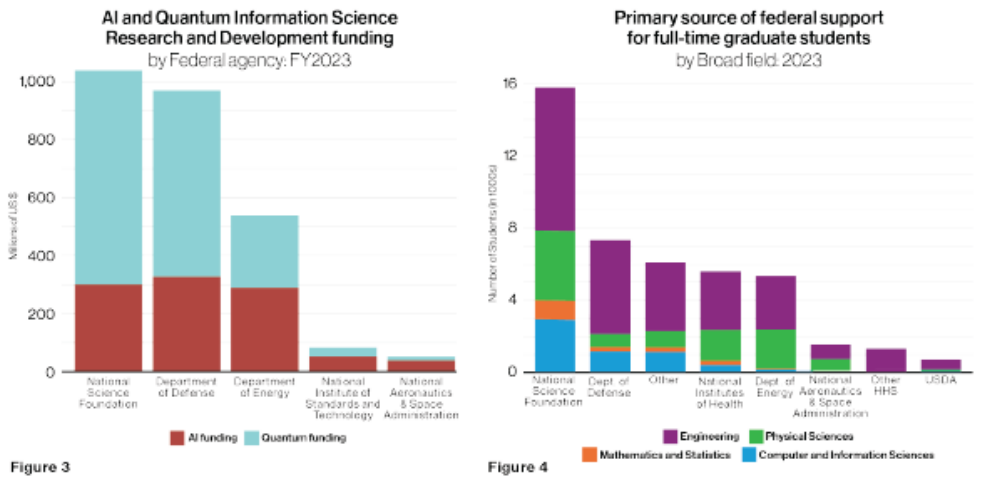

Figure 3

Figure 4

NSF is unique among federal agencies in its approach to supporting emerging technologies like AI and Quantum Science, funding both talent and R&D in concert. From 2000-2022, NSF has funded 6900+ PhD dissertations in Quantum and AI[2] and propelled the careers of field leaders like:

Geoffery Hinton

2025 Nobel Prize Winner in Physics for early work in neural networks. His research was funded by NSF in 1986.

Fei-Fei Li

AI researcher, one of Times's 2023 most influential people in AI, and special advisor to the UN Secretary general. Received NSF career award in 2006.

Peter Shor

Theoretically demonstrated the ability of quantum computer to break RSA encryption. Received multiple NSF awards similar research.

Prineha Narang

Founder and CTO of Aliro, a company focused post-quantum cryptography. Featured on Forbes 30 under 30 Received an NSF graduate fellowship and career award.

Mark Chen

Chief Research officer of OpenAI. First article was published at at harvard visiting scholars program funded in part by NSF.

NSF investments like these in STEM education and workforce training come from research-oriented and education-oriented programs alike. NSF-funded talent is therefore closely connected to NSF-funded basic research and facilities, creating a self-reinforcing network of STEM collaboration and advancements. Part of this holistic investment is a focus on building broad and deep collaboration networks and innovation ecosystems.

Ways the NSF advances[a] U.S. leadership in AI and Quantum:

- **Training the workforce** - The Advanced Technology Education (ATE) program provides hundreds of two-year colleges with grants to modernize their courses, purchase up-to-date equipment, and retrain instructors so the U.S. has a strong workforce of trained technicians.
- **Doing the deep science** - The **5 Quantum Leap Challenge Institutes** are multi-campus collaborations focusing on creating breakthroughs in Quantum through collaboration, education, and innovation. **27 AI research institutes with investment levels totaling $540M**, one third of which comes from other agencies or the private sector. These institutes connect over 500 funded and collaborative institutions working on AI research across the U.S. and world.
- **Creating economic growth** - Regional Innovation Engines (RIE) serve to spur regional and national economic growth, as well as form regional coalitions of institutions, researchers, and companies to advance critical technologies and address pressing national challenges.

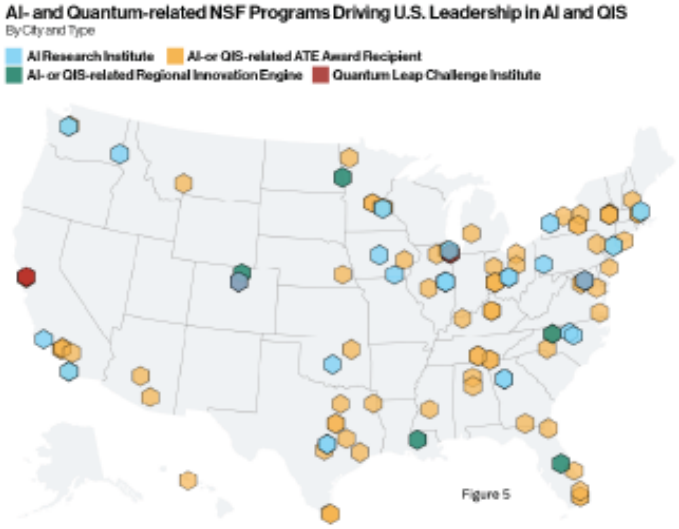

Figure 5

a ATE program, AI Institutes, Quantum Leap Challenge Institutes

Figure 3: NCSES and NITRD Focus Supplement to the President's Budget

Figure 4: National Center for Science and Engineering Statistics (NCSES). 2020. Survey of Graduate Students and Postdoctorates in Science and Engineering. Fall 2020. NSF-22-307. Alexandria, VA: U.S. National Science Foundation. Available at https://ncses.nsf.gov/surveys/graduate-students-postdoctorates-e-e/2020.

Figure 5: NSF award database; AI institute map: July 2024. QIS-related and AI-related awards determined by keywords "Quantum" and "Artificial Intelligence" respectively

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