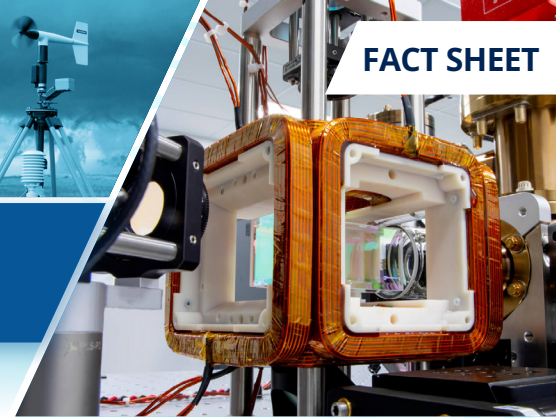




QUANTUM LEAP

Scientific Investments Transform Daily Life



Bold investments by the **U.S. National Science Foundation** (NSF) in quantum research and innovation ensure America's leadership in critical and emerging technologies that power modern life. NSF support for foundational research translates into long-term economic, technological and national security advantages, driving innovations such as GPS, MRI, smartphones and fiber-optic internet, while continuing to explore new frontiers and translate discoveries into strategic impact.

MORE THAN 75 YEARS OF DISCOVERY AND INNOVATION AT NSF

In 2025, NSF commemorated its 75th anniversary of advancing U.S. leadership in science and engineering. Since 1950, NSF investments have strengthened the research ecosystem, built the science, technology, engineering and mathematics workforce and ensured American leadership in technologies that drive economic growth, safeguard health and enhance security. **Quantum information science** is central to this mission, powering high-resolution MRI, semiconductor technologies and fiber-optic networks, while future advances could accelerate drug discovery, resource detection and precision navigation.

NSF PARTNERSHIPS IN QUANTUM RESEARCH

NSF collaborates with **Amazon, Microsoft, IBM, the U.S. Department of Energy, the National Institute of Standards and Technology, the National Institutes of Health** and international allies such as the **United Kingdom, Canada and France** to advance quantum computing, sensing, communication and their applications. These partnerships strengthen basic research in advanced communications technologies, expand the research ecosystem, train the quantum workforce, and reinforce U.S. leadership in critical and emerging technologies.

NSF QUANTUM PORTFOLIO

NSF drives cutting-edge research in **quantum computing, sensing and networking**, advancing fundamental science, strengthening critical technologies, fostering public-private partnerships, developing the domestic quantum workforce, and accelerating applications that reinforce U.S. leadership and national advantage.

DID YOU KNOW?

With NSF support, researchers at the Physics Frontiers Center for Ultracold Atoms and the startup **QuERA** built a 48-qubit quantum computer prototype — named **"Breakthrough of the Year"** by Physics World in 2024 — creating the most advanced quantum computer yet and accelerating transformative advances in medicine, finance and other fields.



FAST FACTS

\$360M

NSF annual investment in quantum information science and engineering (QISE) research, Fiscal Year 2024.

11,000+

Faculty, students and postdocs engaged in QISE research funded by NSF.

300+

Universities and colleges with active NSF QISE grants in 2025.

380

Granted QISE patents acknowledging NSF funding.

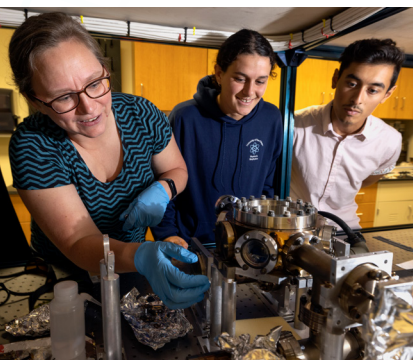
47

Nobel laureates in quantum science funded by NSF, 1964-2024.

160+

NSF Graduate Research Fellowship Program fellows working on QISE topics in 2025.





CUTTING-EDGE SCIENCE AND COLLABORATIONS

NSF interdisciplinary research and translation: Programs such as the Quantum Leap Challenge Institutes, Transformational Advances in Quantum Systems and Convergent Accelerated Discovery Foundries accelerate discoveries, workforce development and deployment of quantum technologies.

NSF nationwide quantum innovation: Initiatives such as Expanding Capacity in QISE, the NSF National Quantum Virtual Laboratory, and NSF Convergence Accelerator Track C develop infrastructure, technologies and applications — strengthening the research ecosystem and reinforcing U.S. leadership in critical and emerging technologies.

Foundations: Early 2000s NSF-supported research on topological materials helped enable methods for protecting quantum information, including technology behind Microsoft's Majorana-1 chip announced in 2025.

Error correction: In 2025, an [NSF Physics Frontiers Center](#) demonstrated a [new system](#) that can detect and remove quantum errors below a key threshold — a step toward practical quantum computing.

Scaling: Another NSF Physics Frontiers Center built a [record-setting array](#) of 6,100-qubit neutral-atom array and moved atoms across a laser grid while maintaining superposition, advancing scalable quantum systems.

BUILDING ADVANCED QUANTUM COMPUTERS, NETWORKS, ALGORITHMS AND WORKFORCE

NSF is making quantum computers and networks a reality while training a quantum-literate workforce:

NSF quantum innovation: Projects like **Software-Tailored Architecture for Quantum Codesign** and the **Engineering Research Center for Quantum Networks** drive the development of practical quantum computing and the creation of secure, reliable quantum networks.

NSF workforce and education initiatives: NSF trains the next generation of quantum-literate scientists, engineers and educators through programs such as:

- **Expanding Capacity in Quantum Information Science and Engineering (ExpandQISE):** Designed to increase research capacity and secure a robust talent pipeline for the quantum field across the United States.
- **National Q-12 Education Partnership** (NSF and the Office of Science and Technology Policy): Provides educators with materials, tools, and career pathway support to strengthen quantum learning.
- **NSF teacher training programs** (e.g., Quantum Education for Students and Teachers): Equip high school teachers with curriculum and resources to bring QISE into the classroom. [computer](#), while the [Engineering Research Center for Quantum Networks](#), led by the University of Arizona, is laying the foundations for a socially-responsible quantum Internet.

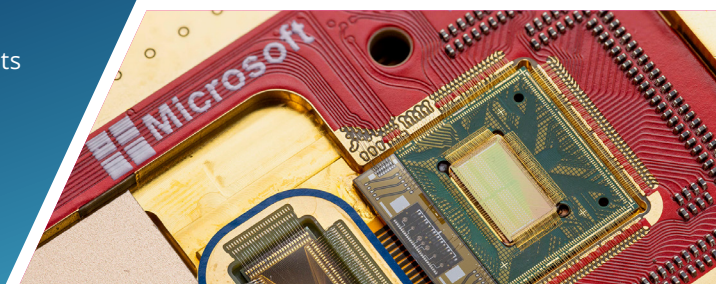
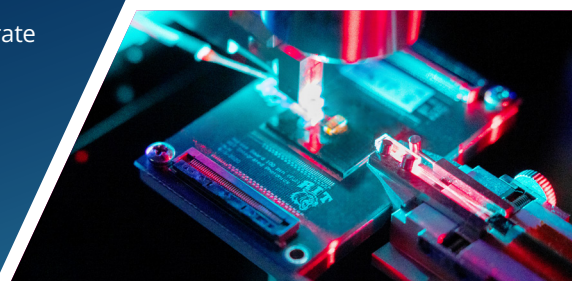


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