



POSITION STATEMENT

Quantum Technology

*Approved by the IEEE-USA
Board of Directors 27 June 2025*

Quantum technology underpins much of our modern world, including microelectronics and precision metrology. Recent progress in quantum information science and technology (QIST) offers opportunities for revolutionary advances in these and other areas, including quantum computing, quantum communication, and quantum sensing. Maintaining US leadership in QIST is vital to national security, economic competitiveness, and quality of life, especially in light of China and Russia's large and growing QIST programs. The Institute of Electrical and Electronics Engineers-United States of America (IEEE-USA) urges that Congress and the Administration work together to:

- Enact the National Quantum Initiative Reauthorization Act to continue present authorities, create a hub for quantum curriculum and workforce development, authorize three NIST QIST centers, and establish a DOE "Quantum Foundry".
- Significantly increase quantum science and technology funding for fundamental research, technology development, and construction of state-of-the-art facilities.
- Invest in education and training to build a skilled US workforce in quantum science and engineering.
- Attract and retain outstanding international talent when necessary.
- Increase public awareness of quantum technology.
- Expand public-private QIST partnerships within the USA to facilitate domestic development and manufacturing of QIST applications.
- Enhance QIST collaboration with allies.
- Assume a leadership role in the development of international standards for quantum technology.

This statement was developed by the IEEE-USA Research and Development Policy Committee and represents the considered judgment of a group of U.S. IEEE members with expertise in the subject field. IEEE-USA advances the public good and promotes the careers and public policy interests of the nearly 160,000 engineering, computing and allied professionals who are U.S. members of the IEEE. The positions taken by IEEE-USA do not necessarily reflect the views of IEEE, or its other organizational units.

Background

Quantum information science and technology (QIST) offers revolutionary technical applications in computing, cryptography and secure communications, metrology and sensing, and quantum simulation.¹ Leaders in this exciting new field include the USA, China, the European Union and some member states, Canada, Japan, Australia, South Korea, Singapore, and Russia. China has made QIST a national priority.²

Recognizing the importance of QIST, Congress enacted the National Quantum Initiative Act^{3,4} in 2018 to coordinate and accelerate quantum information research and development in the USA, and President Trump signed it into law. Coordination occurs through the National Science and Technology Council (NSTC) Subcommittee on Quantum Information Science (SCQIS) and the NSTC Subcommittee on Economic and Security Implications of Quantum Science (ESIX), supported by the National Quantum Coordination Office in the Office of Science and Technology Policy and the National Quantum Initiative Advisory Committee. The act also resulted in 14 multidisciplinary QIS centers, accelerating innovation across the science agencies and training the future Quantum Workforce. The Quantum Economic Development Consortium⁵ (QED-C) enhances QIST cooperation among government agencies, academia, and industry. Unfortunately, the act expired over a year ago. Reauthorizing the National Quantum Initiative is important to maintain the coordination activities, provide a clear indication to prospective workers that quantum technology is a viable long-term career field, and ensure the continued high visibility of QIST and its applications.^{6,7}

To maintain its leadership in QIST, the USA must make it an all-of-nation priority. The federal government's role includes supporting fundamental research, supporting

¹ Quantum Information Science and Technology, <https://uwaterloo.ca/institute-for-quantum-computing/resources/quantum-101/qist>.

² Military and Security Developments Involving the People's Republic of China 2024, <https://media.defense.gov/2024/Dec/18/2003615520/-1/-1/0/PDF>.

³ About the National Quantum Initiative, <https://www.quantum.gov/>.

⁴ National Strategic Overview for Quantum Information Science, https://www.quantum.gov/wp-content/uploads/2020/10/2018_NSTC_National_Strategic_Overview_QIS.pdf.

⁵ Quantum Consortium, [QED-C | The Quantum Economic Development Consortium](https://www.qed-c.org/).

⁶ H.R.6213 - National Quantum Initiative Reauthorization Act, <https://www.congress.gov/bill/118th-congress/house-bill/6213/text>.

⁷ NPI Praises House Science Committee Introduction of National Quantum Initiative Reauthorization Act, <https://www.lightourfuture.org/home/news-media/press-releases/npi-house-science-nqi-reauth>.

relevant workforce education at all levels, providing national facilities, and in some cases developing QIST technologies. Recent budgets have been about \$1B per year, distributed among the Department of Defense, Department of Energy, National Science Foundation, National Institute of Standards and Technology, and National Aeronautics and Space Administration.⁸ Although specifying the amount that should be spent by the federal government is difficult, it certainly needs to be substantially larger. Targeting at least \$2B per year seems reasonable.

Domestic production of QIST applications is important for US military and economic security, as well as for providing steady, high-paying employment. The Quantum Industry Coalition represents twenty-three “leading businesses working to further all aspects of quantum computing, sensing, networking, and cryptography”.⁹ (Additional businesses, along with universities and federal agencies are members of the QED-C.) QIST commercialization requires a robust supply chain, including quantum small businesses.¹⁰ Both large and small businesses will, of course, need a trained workforce.

Achieving a quantum-smart workforce for tomorrow includes developing and maintaining an understanding of the workforce needs in QIST with both short-term and long-term perspectives, introducing broader audiences to QIST through public outreach and educational materials, addressing QIST-specific gaps in professional education and training opportunities, and making careers in QIST and related fields broadly accessible.¹¹ Failure to act now could hold back US QIST progress in the future.

As noted earlier, several US allies also have robust QIST programs. Sharing information and facilities, when mutually beneficial, can accelerate QIST progress in the USA and other democracies. Equally important is proactive US involvement in the QIST international standard-setting process, which will help assure that US-made QIST products have large overseas markets.

⁸ National Quantum Initiative Supplement to the Presidents FY2025 Budget, <https://www.quantum.gov/wp-content/uploads/2024/12/NQI-Annual-Report-FY2025.pdf>.

⁹ Quantum Industry Coalition, <https://www.quantumindustrycoalition.com/>.

¹⁰ QIC Urges Congress to Pass Quantum Legislation, [QIC+Letter+to+Congress+Re+Quantum+Opportunities+in+2025+01-22-25.pdf](https://www.quantumindustrycoalition.com/wp-content/uploads/2025/01/22-25.pdf).

¹¹ Quantum Information Science and Technology Workforce Development National Strategic Plan, <https://www.quantum.gov/wp-content/uploads/2022/02/QIST-Natl-Workforce-Plan.pdf>.