



FEDERAL WORKFORCE ACTIVITIES IN QUANTUM INFORMATION SCIENCE



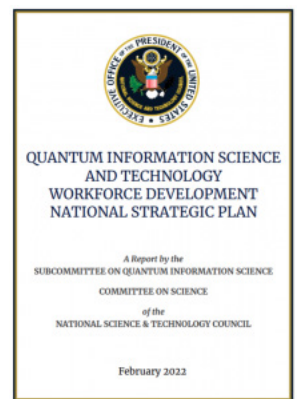
OVERVIEW

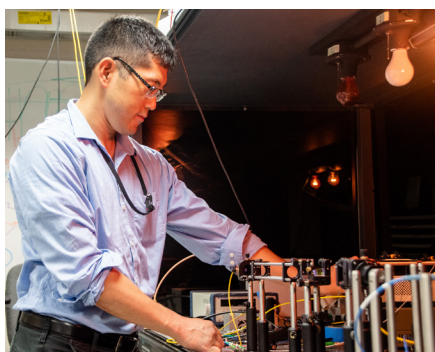
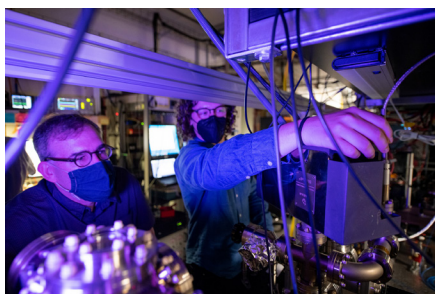
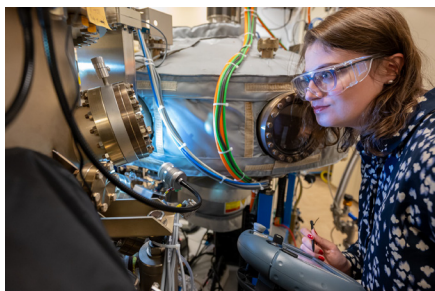
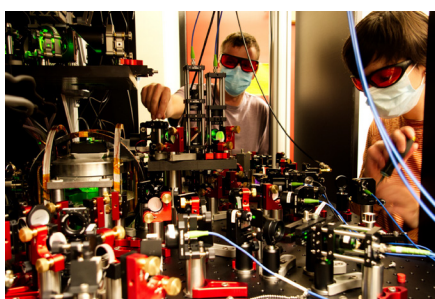
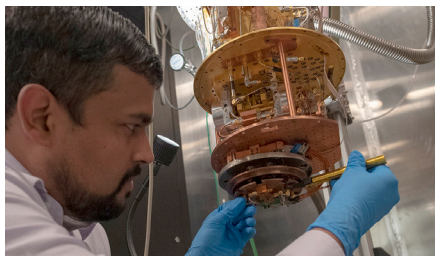
The 2018 [National Strategic Overview for Quantum Information Science \(QIS\)](#) identifies **creating a quantum-smart workforce for tomorrow** as a key policy area. The strategy for creating this workforce is detailed in the [Quantum Information Science and Technology \(QIST\) Workforce Development National Strategic Plan](#), and it includes four critical actions:

1. Develop and maintain an understanding of the **workforce needs** in the QIST ecosystem, with both short-term and long-term perspectives.
2. Introduce **broader audiences** to QIST through public outreach and educational materials.
3. Address QIST-specific **gaps** in professional education and training opportunities.
4. Make **careers** in QIST and related fields more accessible.

One of the primary mechanisms for coordinating Federal workforce activities in QIST is through the National Science and Technology Council Subcommittee on Quantum Information Science **Interagency Working Group on Workforce**.

This factsheet gives some examples of activities that Federal agencies have engaged in or funded in order to create a quantum-smart workforce for tomorrow. At the **K-12** level, the activities include identifying QIST concepts and integrating them into existing K-12 courses, developing and curating approachable quantum lessons and activities, providing professional development for teachers, and engaging in public outreach about QIST and QIST careers. For **undergraduate** and **graduate** students, the activities increasingly involve scholarships, fellowships, and research opportunities, while providing additional on-ramps to QIST through summer schools. For **postdoctoral** scholars and **professionals**, activities include fellowships, summer schools, research opportunities, and funding for early career researchers.





There are a number of workforce development efforts underway across all sectors. To show the breadth of activities, here is a *small sampling* of efforts that Federal agencies have engaged in or funded.

K-12

- [Q-12 Education Partnership](#) of industry, academia, and government (OSTP & NSF spearheaded)
- Workshop on nine [Key Concepts for Future QIS Learners](#) (NSF funded)
- [Frameworks](#) for including QIS topics in high school physics, computer science, math, and chemistry courses (NSF funded)
- Classroom activities (e.g., [Q-12 QuanTime](#))
- Professional development for teachers (e.g., NSF-funded [Quantum for All](#) and [QuEST](#))
- Videos about quantum careers (e.g., for [World Quantum Day](#), [Q-12 Careers](#))
- High school summer internships at Government Labs (e.g., [NIST SHIP](#)) and universities (e.g., [ARO High School Apprenticeship Program](#))
- Summer schools (e.g., [DOE National QIS Centers](#), [AFRL Quantum STEM Summer Camp](#), NSF-funded [Quantum for All](#) and [QuEST](#))

UNDERGRADUATE

- Scholarships (e.g., [DOD SMART](#))
- Curriculum development (e.g., NSF-funded [QuSTEAM](#))
- Summer research (e.g., [NSF REU](#), [NIST SURE](#), [Naval Research Enterprise Internship Program](#), [Pathways Program](#), [AFRL Scholars Program](#))
- Summer schools (e.g., [LPS Qubit Collaboratory](#), NSF-funded [STAQ Virtual School](#))

GRADUATE

- Fellowships (e.g., [DOD SMART](#), [DOD National Defense Science and Engineering Graduate Fellowship](#), [DOE Computational Science Graduate Fellowship](#)) and funding through academic Principal Investigators
- Research at [National QIS Research Centers](#) (NSF, DOE, DOD, NSA), Government Labs (e.g., NIST, NASA, LPS, DOD), National Labs (DOE), and joint research institutes (e.g., [JILA](#), [JQI](#), [LPS](#), [QuICS](#))
- Research with academic and industry partners (e.g., [NSF QISE-NET](#))
- Summer schools (e.g., [DOE LANL Summer School Fellowship](#), [DOE QSC Center](#), [DOE C2QA Center](#))

POSTDOCTORAL

- Fellowships (e.g., [LQC Postdoctoral Fellowship](#), [NRC Fellowship](#), [ODNI IC Postdoctoral Research Fellowship](#))
- Summer schools (e.g., DOE-funded [U.S Quantum Information Science School](#))

PROFESSIONAL

- Summer research at Government Labs (e.g., [Army](#), [Navy](#), and [Air Force](#) Summer Faculty Fellowships)
- Career fairs (e.g., [DOE Centers QIS Career Fair](#))
- Funding for early career researchers (e.g., [DOE Early Career Research Program](#), [NSF CAREER](#), [NSF LEAPS-MPS](#), DOD Young Investigator Programs at [ONR](#), [AFOSR](#), [ARL](#), and [DARPA](#))
- Summer schools (e.g., AFRL/RI Short Courses)

Image Credits: [Banner] R. Postel, Fermilab [Pictures Top to Bottom] R. Hahn, Fermilab; LPS; Kaufman Group, CU Boulder, QSA; Argonne National Lab; K. Houser, UC Berkeley, QSA; NASA