

Quantum science has potential to drive significant scientific discovery

Wealth of opportunities in HEP \Rightarrow QIS relationship: [M. Garcia-Sciveres](#), [A. Grasselino](#), [J. Misewich](#)



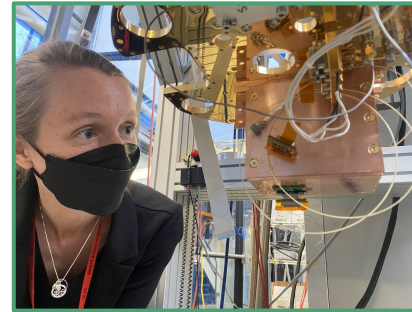
Excitement for revolutionary technology development + applications is bringing young people to the field! (Ex: half of recent Lederman Fellows work on QIS)

Quantum science has potential to drive Early Career leadership

Relatively unexplored cross-disciplinary space yields many opportunities for success:

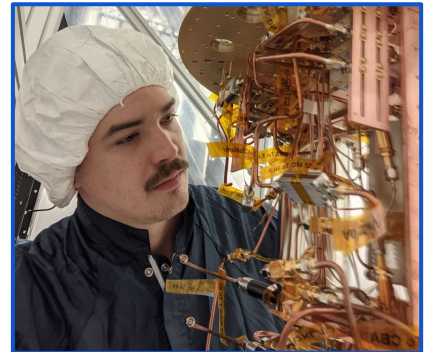
- High-impact projects...
- ...of a scale that can be led by Early Career researchers and carried forward into permanent positions...
- ...that can be accomplished on timescales relevant to their careers.

Ryan Linehan, QSC postdoc
Simulation and measurement of transmon qubits for low-threshold DM detection



Kelly Stifter, QSC postdoc
Flexible calibration system for range of cryogenic and superconducting devices

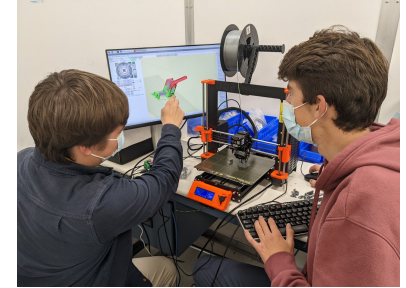
Dylan Temples, QSC postdoc
Development of cutting-edge cryogenic microwave and optical resonator devices for applications in DM searches and QIS



Quantum science has potential to drive workforce development

Current scale of projects gives “full-stack” experience:

Superconducting materials, cryogenics, RF electronics, device controls and operation, etc.



Growing demand in both academia and industry:

Developing researchers with these skill sets is a National Priority:

National Quantum Initiative Act of 2018

An infographic titled "PRESENT JOB ROLES IN Quantum Computing" from LinuxWorld. It features a central image of a quantum computer chip. Surrounding the image are ten job roles listed in rounded rectangular boxes:

- QUANTUM COMPUTER DEVELOPER
- QUANTUM MICROWAVE ENGINEER
- QUANTUM SOFTWARE DEVELOPER
- QUANTUM CONTROL RESEARCHER
- QUANTUM USER EXPERIENCE DESIGNERS
- QUBIT RESEARCHER
- QUANTUM COMPUTER ARCHITECTS
- QUANTUM CRYOGENIC RESEARCHER
- QUANTUM ALGORITHMIC RESEARCHERS
- QUANTUM RESEARCH SCIENTIST

The infographic also includes the hashtag #13 LEARN TO LEAD and the LinuxWorld logo.

The purpose of this Act is to ensure the continued leadership of the United States in quantum information science and its technology applications by—

(1) supporting research, development, demonstration, and application of quantum information science and technology—

(A) to expand the number of researchers, educators, and students with training in quantum information science and technology to develop a workforce pipeline;

Request to P5 committee

When prioritizing projects, consider opportunities for Early Career scientists in terms of individual interest, scientific impact, career timescales, and skill set development. In particular, this can be achieved by:

1. Supporting HEP's continued involvement in robust US quantum program
2. Supporting expanded funding for small-scale projects, R&D, and instrumentation, including support for students

Growing number of related calls:

[Workforce development across boundaries](#)

[Support small-scale R&D](#)

[Support instrumentation R&D](#)

[Increase research funding](#)

[Invest in paradigm shifting technologies](#)

[Early career considerations in collider experiments](#)

[Support for student funding](#)