

Job Description



Job Title:	Lead Scientist, Quantum Device Fabrication
Department:	CFREF - Transformative Quantum Technologies (TQT)
Reports To:	Principal Investigator, TQT
Jobs Reporting:	N/A
Salary Grade:	USG 10
Effective Date:	May 2021

Primary Purpose

This position advances TQT shared infrastructure and technology development at the University of Waterloo. The candidate will be responsible for research into the fabrication of quantum devices, for organizing the maintenance of shared TQT tools for growth and characterization of quantum materials, and for developing SOP's as directed by Prof. David Cory. The successful candidate will prepare training materials for students and other users of the facility. They will advise students on fabrication methods, and work closely with early adopters in the TQT project to help develop a fabrication pathway for new applications of quantum technologies. The incumbent will be the technical lead on molecular beam epitaxy (MBE) growth, pulsed laser deposition (PLD), and X-Ray diffraction (XRD) for thin films. They will help advance the use of low temperature transport measurements, scanning tunneling microscopy (STM) and angle resolved photoelectron spectroscopy (ARPES) characterization of materials.

Key Accountabilities

Lead, Fabrication Scientist

- Develop and document fabrication processes for quantum devices
- Carryout and validate fabrication processes, improve and iterate where appropriate
- Develop and document SOP's for successful fabrication
- Develop and document testing procedures for quantum devices
- Validate testing procedures, improve and iterate where appropriate
- Develop and document SOP's for successful testing
- Maintain SOP's and update as needed
- Develop and document training procedures for MBE, PLD, XRD, STM and ARPES
- Consult with users about process development for their activities.
- Engage with the QNFCF staff, including sharing best practices.

Early Adopter Projects

- Support the fabrication and characterization needs of early adopters. This includes connecting to researchers from industry, other academics, national labs and medical centers. Note, early adopters will mostly not have fabrication and device testing experience; thus, there is a need to lead the development, engage with a broader community and teach new skills to early adopters.
- Support the development of quantum technologies to be deployed outside of a lab setting through leading the materials development needed for these devices.

Technical Laboratory Support

- Develop and run technical training for researchers, including senior researchers, postdocs, graduate and undergraduate students.
- Develop and document new laboratory technology and processes for quantum devices.
- Help develop the IP around these new developments.
- Working closely with TQT researchers, including the overseeing and training where necessary of students working with the instrumentation/equipment and ensuring that all users adhere to university and government health and safety guidelines.

Job Description

Contribute to Research Outcomes

- Contribute to preparation of scientific reports and articles (scientific and administrative)
- Conduct literature searches, reviews and prepares manuscripts and makes informal and formal presentations

Community building and continued training

- In the first year participate in EDI and leadership training.
- Every year attend either a conference, such as The Materials Research Conference, or participate in an industry led workshop on materials for quantum devices.
- Provide technical expertise for academic, industrial research or contract projects

All employees of the University are expected to follow University and departmental health and safety policy, procedures and work practices at all times. Employees are also responsible for the completion of all health and safety training, as assigned. Employees with staff supervision and/or management responsibilities will ensure that assigned staff abide by the above, and actively identify, assess and correct health and safety hazards, as required.

Required Qualifications

Education

- PhD connected to materials growth (particularly MBE),

Experience

- Previous experience in an academic laboratory environment
- A minimum of three years experience running MBE facilities with a focus on growth and testing of superconducting films.
- In depth knowledge of materials growth
- In depth knowledge of thin film superconductors, growth and characterization
- In depth knowledge of lithography
- In depth knowledge of standard clean room processes

Knowledge/Skills/Abilities

- Exceptional time-management, communication and interpersonal skills
- Detail oriented
- Works well as part of a team
- Effective at communicating complex scientific concepts
- Able to design, implement and follow critical process procedures

Nature and Scope

- **Contacts:** Multidisciplinary team within the TQT program.
- **Level of Responsibility:** Lead the development of new processes and train others in their effective application
- **Decision-Making Authority:** Problem solving for fabrication and device testing
- **Physical and Sensory Demands:** Typical lab environment.
- **Working Environment:** Typical lab environment, occasional travel to early adopter locations.