Governor's Chair in Quantum Information Science and Engineering

Established in 2006 and funded by the State of Tennessee and the Oak Ridge National Laboratory (ORNL), the prestigious Governor's Chair program, managed by the UT-Oak Ridge Innovation Institute (UT-ORII), attracts science and technology leaders to broaden and enhance the research partnership that exists between the University of Tennessee (UT) System and ORNL, the nation's largest multiprogram science laboratory, managed by UT-Battelle LLC for the US Department of Energy.

The University of Tennessee at Chattanooga (UTC) and ORNL are searching for a highly accomplished researcher and educator to join the quantum program as a **Governor's Chair Professor in Quantum Information Science and Engineering (QISE)** with a joint appointment at ORNL.

Successful candidates will be known for excellence in research, program leadership and development, and teaching. They will have a strong desire to engage with a multi-disciplinary team of scientists, engineers and students to further the development of a special QISE program that advances foundations and demonstrates the value of this technology in use-cases that will have accelerating impact through productive relationships with the economic development ecosystem in Chattanooga TN, one of the leading US mid-size metropolitan areas and a paradigm for urban renewal and sustainable development.

UTC is a founding member of the Chattanooga Quantum Collaborative (CQC) and has been making significant investments in the new UTC Quantum Center to create capacity for use-inspired R&D in QISE and to offer QISE educational programs at all levels. The new Governor's Chair will have the opportunity to actively engage in governance and programming of CQC efforts and in collaborations to advance the Chattanooga quantum ecosystem. Relationships between ORNL, CQC and other entities in the Chattanooga ecosystem that developed to advance and demonstrate the value of this emerging technology are widely recognized and poised for growing impact.

The joint appointment at ORNL will be in the Quantum Information Science Section, of the Computational Sciences and Engineering Division. This section is focused on foundational quantum theory and experimentation in quantum computing, quantum networking and quantum sensing. The section applies its expertise to address national priorities in energy, security and scientific discovery. ORNL is a leader in high performance computing with Frontier, currently the world's fastest supercomputer, and actively working on integration of quantum computing with traditional high-performance computing.

UTC, ORNL and UT-ORII offer an exceptionally supportive environment to enable successful candidates to further their careers and have significant impact on science, technology, economic development, and advancing quality of life for all.

Deadlines

Applications are reviewed upon receipt. Remote initial discussions with candidates are expected to start in December 2024 and January 2025. We expect site visits by finalist candidates are to be conducted in April 2025.

Qualifications

Candidates for UTC Governor's Chair in QISE will be tenured full professors in Physics, Mathematics, Computer Science or Electrical Engineering or qualify for tenure. Their research activities will be in one or more of the following areas: Quantum algorithms, Quantum control, Quantum networking, Quantum sensing, Quantum simulation. They have a successful record in building productive R&D teams, capturing extramural funding, and are widely recognized as thought leaders in their area of specialization. Their vision includes advancing QISE foundations and demonstrating the value of this technology in key areas such as energy and transportation systems and educating the next generation experts in these areas.

Governor's Chair Task Areas

Strategic Leadership: Collaborate with faculty and program leadership at UTC and ORNL to further develop the QISE program strategy and to execute critically important activities such as staffing, student recruitment, and stakeholder relationship management.

Academic Quality: Pursue leading research and support ongoing efforts to create an environment of simultaneous excellence in research, innovation, education, and work force development.

Collaborations: Expand collaborations among UTC, ORNL and other regional, national and international partners.

Funding: Leverage all relevant assets at UTC and ORNL to lead the management of stakeholder relationships and capture significant extramural funds for a solid and sustained portfolio of well-funded activities in QISE R&D and education.

Community Relations: UTC and ORNL are known for excellence in their respective community relations thereby amplifying their impact on the socio-economic ecosystem of the State. The Governor's Chair is expected to engage with these activities and amplify this impact with specific focus on QISE.

Oak Ridge National Laboratory

The Quantum Information Science Section within the ORNL Computational Science and Engineering Division is focused on foundational quantum theory and experiment in the areas of quantum computing, quantum networking, and quantum sensing. The section addresses national priorities in energy, security and scientific discovery and is comprised of three groups which combine theory, simulation and experiment.

The section is working to develop platforms that utilize continuous variable (CV, for example, encoding in a continuum such as position and momentum) as well as discrete

variables (DV, for example, the most widely studied two-level system, a qubit). Specific quantum computing platforms include CV cluster states generated by warm rubidium vapor four wave mixing, DV linear optics in discretized frequency (in optical fiber as well as integrated photonic circuits) and trapped ions.

In addition to in-house developed platforms, ORNL has world-leading expertise at developing algorithms for science and at getting the most out of noisy intermediate scale quantum information processing platforms available through the Quantum Computing User Program, to make proof-of-principle demonstrations of quantum computing functionality of interest to the U.S. DOE's Office of Science. These are critical steppingstones to eventually developing large-scale integration of quantum computing with more traditional high-performance computing, in which ORNL is a world leader.

ORNL has further developed several leading platforms for generating squeezed light to realize quantum sensors which routinely surpass the shot noise limit. ORNL also is a leader in developing CV-quantum key distribution (QKD) and showing that QKD can be used in critical infrastructure in partnership with EPB, among other locations.

Finally, ORNL is home to one of the largest dark fiber testbeds in the world, (more than 200 km in deployed 15-km increments) to develop substantially all the critical pieces of quantum repeaters, including solid-state doped quantum memory, hybrid CV/DC quantum repeater research, and linear optical frequency processing at telecommunications wavelengths to enable the eventual quantum internet.

The QIS currently has 36 full-time staff and postdocs. It is anticipated that the section will move into new lab space at ORNL that will bring its total experimental space to approximately 10,000 square feet, much of which will be low-vibration and low-electromagnetic interference space.

Chattanooga

Chattanooga, located on the Tennessee River, is a vibrant city surrounded by beautiful outdoor environments in the Appalachian Mountains, and just a day's drive from the Gulf of Mexico and the Eastern U.S. Seaboard. With excellent air travel connections to major cities in the East and Midwest, it is easily accessible for both work and play.

Renowned as one of the innovative “smart” cities in the U.S., Chattanooga was one of the first to be recognized by US Ignite as a Smart Gigabit Community. This designation reflects the city’s commitment to leveraging advanced technologies to enhance processes and improve quality of life for all residents.

The city’s dedication to advancing technology has attracted numerous startups alongside established companies like Volkswagen, Amazon, Unum, McKee Foods, U.S. Xpress, and Coca-Cola Bottling Co. United. With a thriving arts scene, diverse dining options, and endless outdoor activities, Chattanooga is an ideal place to live, work, and enjoy a high quality of life.

For further information or guidance on how to apply, please send email to quantum@utc.edu