

April 13, 2023

The Edward S. Rogers Sr. Department of Electrical and Computer Engineering University of Toronto

JOB POSTING – POSTDOCTORAL FELLOW

Areas of Research: Monolithic Quantum Processors in Production CMOS

Description of duties:

- Operate and maintain a 2K Lake Shore Cryotronics CPX-VF-LT probe station with adjustable vertical field magnet.
- Design and characterize 1D linear quantum dot (QD), double QD with selective back gate, and linear qubit arrays with more than 512 qubits.
- Design along with Prof. Voinigescu, characterize, and demonstrate a scalable monolithic quantum processor consisting of a linear array of 1024 single- and double hole-spin qubits capacitively coupled to a linear array of readout QDs and of the associated individual-per-qubit control and readout electronics.

Salary: \$80,000-85,000

Required qualifications:

- A PhD in Experimental Physics, Engineering Physics or Electrical and Computer Engineering with a focus on Quantum Computing Hardware.
- Strong theoretical background in semiconductor spin qubits, spin control and readout principles, circuits and qubit measurement protocols (Larmor and Rabi frequencies, T_1 , T_2 , single and two-spin gates, randomized benchmarking) at cryogenic temperatures below 4 K.
- Familiarity with microwave and mm-wave lab equipment: Vector Network Analyzer, Noise Figure Analyzer, Real Time Oscilloscope, Arbitrary Waveform Generator, Lock-in-Amplifier, Semiconductor Parameter Analyzer, and Spectrum Analyzer testing from dc to 300 GHz and on-wafer probing of devices and circuits at cryogenic temperatures.
- Experience using state-of-the-art IC and semiconductor device CAD tools:
 - Cadence Analog Artist Spectre RF, Composer, Virtuoso
 - Sentaurus, QuantumATK or similar device simulators
 - inductor, transformer and multiport EM design and modelling using EMX or equivalent 2.5D or 3D electromagnetic simulator.
- Good understanding of and experience using 22nm FDSOI, 3nm/5nm FinFET CMOS, and SiGe BiCMOS technology process flow, device modelling and layout.

Application instructions: All individuals interested in this position must submit their CV and the names of two references, include a one-page description outlining your specific qualifications for this position to Professor Sorin Voinigescu (sorinv@ece.utoronto.ca).

Closing date: July 1, 2023

Supervisor: Professor Sorin Voinigescu

Expected start date: September 1, 2023 (or shortly thereafter)

Term: 2 years extendable to 3 years.

FTE: The normal hours of work are 40 hours per week for a full-time postdoctoral fellow (pro-rated for those holding a partial appointment) recognizing that the needs of the employee's research and training and the needs of the supervisor's research program may require flexibility in the performance of the employee's duties and hours of work.

Employment as a Postdoctoral Fellow at the University of Toronto is covered by the terms of the CUPE 3902 Unit 5 Collective Agreement.

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The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from racialized persons / persons of colour, women, Indigenous / Aboriginal People of North America, persons with disabilities, LGBTQ2S+ persons, and others who may contribute to the further diversification of ideas.