



Career Opportunities

Tier 2 Canada Research Chair in Quantum Computing for Optimization of Complex Urban Systems FEAS, Mechanical & Industrial Engineering

Posted: August 27, 2024
Deadline to Apply: Friday, October 11, 2024

[Start Application Process](#)

Located in downtown Toronto, the largest and most culturally diverse city in Canada, and situated on the territory of the Anishinaabeg, Haudenosaunee, Mississaugas of the Credit and the Wendat Peoples, the Departments of [Civil Engineering](#) and [Mechanical, Industrial, and Mechatronics Engineering](#) in the [Faculty of Engineering and Architectural Science \(FEAS\)](#) at [Toronto Metropolitan University](#) (TMU) invite applications for a Tier 2 Canada Research Chair (CRC) in Quantum Computing for Optimization of Complex Urban Systems.

The [Canada Research Chairs Program](#) is a federally funded program that seeks to achieve excellence by attracting and retaining the most accomplished and promising researchers. The Tier 2 CRC is intended for exceptional emerging scholars, i.e., candidates must have been active researchers in their field for fewer than 10 years at the time of nomination, who bring new perspectives, ideas, and experiences to produce groundbreaking work. Further details on the CRC eligibility criteria can be found [on the Canada Research Chairs website](#).

In collaboration with TMU, the successful candidate will develop the CRC application for the April 22, 2025 deadline. The candidate will be appointed to a tenure track position at the rank of **Assistant** or **Associate Professor**, conditional upon the success of the CRC application, effective October 2025. The CRC Tier 2 appointment is tenable for five years and renewable once. The appointment is subject to final budgetary approval. All nominations are subject to review and final approval by the CRC Secretariat.

The successful candidate will engage in a combination of research, teaching and service duties, and maintain an inclusive, equitable, and collegial work environment across all activities. The incumbent will be expected to develop and maintain a strong, independent, externally funded research program that will be internationally recognized in five to ten years, to select, mentor and support diverse trainees, students, future researchers and colleagues in forms such as organizing workshops, co-authoring papers, obtaining patents, and contributing to public policy and professional practice. The incumbent will also effectively teach undergraduate and graduate courses to a diverse student population, and engage in collegial service.

Qualifications

Candidates must have a Ph.D. in Engineering or a related discipline such as Computing, Mathematics, or Physics, in accordance with the Faculty's requirements. Nominees for Tier 2 Chair positions should, at a minimum, be Assistant or Associate Professors, or possess the necessary qualifications to be appointed to these ranks.

Candidates must also:

- be excellent emerging world-class researchers who have demonstrated particular research creativity, in accordance with the CRC Program guidelines;
- have demonstrated the potential to achieve international recognition in their field(s) in the next five to ten years, in accordance with the CRC Program guidelines;
- as chairholders, have the potential to attract, develop and retain excellent diverse trainees, students and future researchers, in accordance with the CRC Program guidelines;
- be proposing an original, innovative research program of high quality, in accordance with the CRC Program guidelines;
- have established a strong emerging research profile that demonstrates creativity and evidence of impact, such as peer reviewed publications/contributions, patents, special papers, reviews, conference/ symposia proceedings and abstracts, government publications and policy contributions, book reviews by the nominee or published reviews of their work, papers presented at scholarly meetings or conferences, and other forms of scholarly expression, including participation in public discourse and debate and non-peer reviewed publications, which constitute a contribution to research;
- have the potential to attract diverse world-class collaborators;
- demonstrate the ability to establish an independent, highly productive program of research which will attract high levels of external funding, including Tri-Council funding;
- have a record of commitment to equity, diversity and inclusion in leadership, teaching and research, including recommended practices of recruiting, mentoring and supporting students and research trainees with diverse backgrounds and experiences and from underrepresented groups, such as women, racialized people, persons with disabilities, Indigenous Peoples, Black People, and 2SLGBTQ+ people;
- demonstrate the ability to effectively teach students with diverse backgrounds and experiences in applied quantum computing courses in engineering undergraduate and graduate programs, and the potential to contribute to inclusive and accessible learning, course development and pedagogy;
- demonstrate the ability to participate in leadership activities in collegial (internal and external) service;
- demonstrate sound expertise in quantum computing, with a particular interest in the discovery of new quantum algorithms, including algorithms across various applications, such as quantum optimization, quantum machine learning, adiabatic quantum computing, variational quantum algorithms, hybrid algorithms, quantum Monte Carlo simulation, as well as quantum-inspired classical algorithms;
- be expected to collaborate with existing faculty members in their home department and beyond on various large-scale and/or real-time optimization problems. Potential applications for collaboration at the Department of Civil Engineering include on-demand mobility services; multi-modal transportation systems planning, design, and operations; risk, reliability and resilience of complex infrastructure systems; and computational fluid dynamics in urban buildings design. Potential applications for collaboration at the Department of Mechanical, Industrial, and Mechatronics Engineering include

production planning, predictive and prescriptive maintenance, robot path planning, computational fluid dynamics, materials science, structural mechanics, combustion, and supply chain management; and

- while eligibility for P.Eng. licensure is preferred, it is not mandatory for this position.

TMU recognizes that scholars have varying career paths and that career interruptions can be part of an excellent academic record. Candidates are encouraged to provide any relevant information about their experience and/or career interruptions to allow for a fair assessment of their application. Search committee members have been instructed to give careful consideration to diverse experiences and knowledge, and to be sensitive to the impact of career interruptions in their assessments.

Applicants who are more than 10 years from having earned their highest degree (and where career breaks exist, such as pregnancy, parental leave, extended medical leave, clinical training, etc.) may have their eligibility for a Tier 2 Chair assessed through the program's [Tier 2 justification process](#).

All eligible leaves (e.g., pregnancy, parental, medical, bereavement) are credited at twice the amount of time taken; part-time leaves will be taken into consideration, calculated according to the percentage of leave taken, and credited at twice the amount of time taken; professional leaves (e.g., sabbatical) are not credited, but certain training or administrative leaves may be considered. Other leaves that have had an impact on the nominee's research career may be taken into account (e.g., mandatory military service, non-research-related positions, unemployment and training unrelated to the research career). This information must be supported by the information contained in the nominee's CV. Research interruptions caused by the COVID-19 pandemic (e.g., closures) are recognized and may be counted as an eligible delay (credited at twice the amount of time) beginning March 1, 2020.

To inquire about CRC eligibility, please contact Dayle Levine, Director, Institutional Programs, Office of Vice-President, Research and Innovation by sending an email to dayle.levine@torontomu.ca with "Tier 2 Justification" in the subject line.

This position falls under the jurisdiction of the Toronto Metropolitan Faculty Association (TFA) (www.tfanet.ca). Visit us at www.torontomu.ca/faculty-affairs to view the [TFA collective agreement](#) and a summary of [TFA benefits](#).

Toronto Metropolitan University (TMU)

Serving a highly diverse student population of over 45,000, with 100+ [undergraduate](#) and [graduate](#) programs built on the integration of theoretical and practical learning and distinguished by a professionally focused curriculum with a strong emphasis on excellence in teaching, research and creative activities, [TMU](#) is a vibrant, urban university known for its culture of innovation, entrepreneurship, community engagement and city-building through its award-winning architecture.

QuantMU

The establishment of the [QuantMU](#) initiative and associated strategy at TMU has laid a strong foundation for the associated research activities and the critical mass required for the Canada Research Chair nominee.

FEAS researchers have successfully acquired funding from NSERC Alliance and Mitacs Elevate programs to develop cutting-edge research on the application of quantum computing in engineering problems. TMU has established strong collaborations with quantum computing hardware companies, such as IBM, Amazon, Xanadu, D-Wave, Pasqal, Cogniframe, and QuEra. Through these collaborations, TMU researchers have access to quantum processing units (QPU) and the associated training to develop their algorithms and test on real problems. Companies such as Pasqal and QuEra invited TMU researchers to visit their facilities, use their QPUs, and develop joint collaborations. Students at TMU are actively engaged through a student group, and hackathons organized by industry partners. FEAS offers new courses to train undergraduate and graduate students in quantum computing. Several externally funded research labs undertake quantum research, such as the [Laboratory of Innovations in Transportation \(LiTrans\)](#), [Reliability, Risk and Maintenance Research Laboratory \(RRMR\)](#), TMU Boundary Layer Wind Tunnel, and [Cybersecurity Research Lab \(CRL\)](#).

Faculty of Engineering and Architectural Science (FEAS)

Our faculty offers undergraduate and graduate (Master's and Doctoral) programs to students of diverse backgrounds. Our faculty prides itself on the excellence of its research, the quality of its teaching and community engagement. We are interested in candidates who will contribute to our existing strengths in research/creativity activity and teaching through academic, professional and diverse lived experiences and perspectives.

The successful candidate will be hired by one of the following departments in FEAS: [Civil Engineering](#) or [Mechanical, Industrial, and Mechatronics Engineering](#). For more information, please consult the individual departments' websites. FEAS with the input from the candidate will select the interviewing department.

Working at Toronto Metropolitan University

At the intersection of mind and action, TMU is on a transformative path to become Canada's leading comprehensive innovation university. At TMU and within our department/school, we firmly believe that equity, diversity and inclusion are integral to this path; our current [Academic Plan](#) and [Strategic Research Plan](#) outline each as core values and we work to embed them in all that we do.

Dedicated to a people first culture, TMU is proud to rank number one on the [Forbes list](#) of Canada's Best Employers for Diversity.

We invite you to explore the range of [benefits and supports](#) available to faculty, including access to our diverse [faculty and staff networks](#).

Visit us on X at [@torontomet](#), [@VPFAtorontomet](#) and [@TorontoMetHR](#), and our [LinkedIn page](#).

TMU is committed to accessibility for persons with disabilities. To find out more about legal and policy obligations please visit the [Accessibility](#) and [Human Rights](#) websites.

TMU welcomes those who have demonstrated a commitment to upholding the values of equity, diversity, and inclusion and will assist us to expand our capacity for diversity in the broadest sense. In addition, to correct the conditions of disadvantage in employment in Canada, we encourage applications from members of groups that have been historically disadvantaged and marginalized, including First Nations, Métis and Inuit peoples, Indigenous peoples of North America, Black-identified persons, other racialized persons, persons with disabilities, and those who identify as women and/or 2SLGBTQ+ people.

How to Apply

Applicants must submit their application online via the [Faculty Recruitment Portal](#) [<https://hr.cf.torontomu.ca/ams/faculty/>] by clicking on "Start Application Process" to begin. Applications will be reviewed starting **September 16, 2024**. The application must contain the following:

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1. a **letter of application** that includes your interest in the position; what you would bring to the Department and Faculty; the impact on the field of quantum computing that you foresee for your research (your 3-page research proposal for the CRC can elaborate on this); and what makes you a strong candidate overall as a researcher, educator, and community member;
2. a **current curriculum vitae** providing a clear sense of your scholarly and professional development via your education and your research activities and outcomes; your contributions to making quantum computing a more equitable and inclusive discipline through committee work, community engagement, social media, and advocacy;
3. a **research statement** discussing the significance, originality, and potential impacts of your current research program (up to 3 pages), and a research proposal for the first term of your CRC research program (up to 3 pages);
4. **recent examples of research activities and outcomes**, including, but not limited to, peer-reviewed and non-peer reviewed publications, conference presentations, public talks, articles reaching specialist and non-specialist audiences, and effective use of social media for research impact and networking, knowledge dissemination and translation;
5. a **teaching statement** (up to 3 pages) and a dossier of syllabi and other evidence, if available. These must demonstrate how you engage, encourage, and develop the learning capacity of students entering higher education from a diverse array of backgrounds and experiences, and how you embed practices and principles of equity, diversity and inclusion, including universal design for learning in your classroom, course materials, guest lectures, how you embed practices and principles of equity, diversity and inclusion in your classroom, your assignments, and your classroom style;
6. **the names and email contact information of three academic referees** who know you and your research well; and
7. a **statement discussing your record of demonstrated commitment to equity, diversity and inclusion**, including your record of attracting and mentoring students, trainees, and research personnel from under-represented equity-deserving groups as noted above, and establishing an equitable and inclusive research environment. This should include a plan for establishing and maintaining a diverse core team (at the student, trainee, personnel and early-career researcher levels), and an environment that is safe and inclusive and allows all team members to reach their full research potential (e.g., through the recruitment and outreach strategy, equitable training opportunities, and professional development and mentoring).

Please note that all qualified candidates are encouraged to apply; however, applications from Canadians and permanent residents will be given priority, in accordance with Canadian immigration regulations.

As part of its efforts to amend the conditions of disadvantage in Canada for under-represented groups, and the under-representation of equity-deserving groups in faculty and academic staff positions, TMU invites all applicants to voluntarily complete an online Diversity Self-ID questionnaire at the time of submitting their application in the recruitment portal.

The information collected will be treated as confidential but will not be anonymous. Applicant Diversity Data containing personal information is accessible by TMU staff in the Office of the Vice-Provost Faculty Affairs (OVPPFA), individuals serving on the Department Hiring Committee, and others involved in recruitment, hiring, retention, training, and evaluative processes.

This information is collected under the authority of Toronto Metropolitan University Act and is needed to establish equity, diversity and inclusion goals and plans, take action to achieve those goals, report on progress, and for other related purposes. All personal information that is collected is used, stored, and destroyed in accordance with TMU's Notice of Collection and the Freedom of Information and Protection of Privacy Act.

If you have questions about the collection, use and disclosure of this information by TMU, please contact Zenab Pathan, Director, Faculty Recruitment and Development, OVPPFA, at zenab.pathan@torontomu.ca.

Contacts

Any confidential inquiries about the opportunity can be directed to the Academic Chair Hiring Committee (ACHC) Chair, Professor Stephen Waldman at swaldman@torontomu.ca.

For more information about TMU's CRC nomination process, please contact Julia Pyryeskina, Research Proposal Facilitator (CRC Portfolio), at (julia.pyryeskina@torontomu.ca) or Dayle Levine, Director, Institutional Programs, (dayle.levine@torontomu.ca) in the Office of the Vice-President, Research and Innovation.

Candidates who belong to one or more of the equity-deserving groups recognized at TMU (women, racialized people, First Nations, Métis and Inuit (FNMI) Peoples, Black people, persons with disabilities and 2SLGBTQ+ people) are welcome to connect with Debbie Thompson (debbie.thompson@torontomu.ca), Executive Director, [Office of the Vice-President, Equity and Community Inclusion](#).

Indigenous candidates who would like to learn more about working at TMU are welcome to contact James McKay, TMU's Indigenous Human Resources Lead (Indigenous@torontomu.ca)

For any confidential accommodation needs in order to participate in the recruitment and selection process and/or inquiries regarding accessing the Recruitment Portal, please contact vpfa@torontomu.ca.

[Faculty Job Postings](#)