FACULTY OF SCIENCE

Toronto Metropolitan University

Faculty of Science

Academic Plan: 2025-2030

Toronto is in the "Dish with One Spoon Territory."

As we embark on Toronto Metropolitan University (TMU)'s 2025-2030 Academic Plan for the Faculty of Science, we begin by acknowledging the land on which our institution stands.

TMU's campuses in Toronto and Brampton operate on the Treaty Lands of the Mississaugas of the Credit. This land has been part of the traditional territories of the Anishinaabe, Huron-Wendat and Haudenosaunee. They are now home to many Inuit, Métis and First Nations Peoples from across Turtle Island.

We honour and uphold the Dish With One Spoon Treaty, we commit to valuing the Two Row Wampum and we vow to treat the land and people of our community with understanding built on mutual respect.

This land acknowledgment reminds us of the ongoing need for education and action toward reconciliation and that there is more to be done on our campus. We encourage our community members to take time to recognize the lands on which we teach, learn and live and to educate themselves in the Indigenous histories and current realities of those lands.

As we advance our academic mission, we remain committed to creating pathways for meaningful engagement and partnerships with Indigenous communities, ensuring that our academic and social contributions reflect the values of respect, reciprocity and responsibility.

CONTENTS

Dean's Foreword

The strategic vision and plan for the Faculty of Science (FOS) at Toronto Metropolitan University provides a roadmap to achieve our collective goals. It is based on over 5 years of conversations, observations, and estimations of our collective strengths and opportunities, as well as more than 75 meetings with individual faculty members, staff and students. The Academic Plan was ratified by the Science Faculty Council on February 13, 2024.

Our Academic Plan is aligned with the FOS Strategic Research (November 30, 2022) and FOS Graduate and Postdoctoral Studies (February 13, 2024) plans and will enhance what we are known for: our connection with the community and our ability to help our learners prepare for the real world.

This plan harmonizes well with the TMU Academic Plan: Transforming Futures 2025-30. Through our own local strategic activities, we will support TMU's strategies to enhance student success; promote Scholarly, Research and Creative (SRC) excellence and collaboration; place people and community first; action truth and reconciliation; and be forward-thinking.

Much of this plan is laid out in broad strokes, so individual departments and support units can map these ideas to their operations. This academic plan, when realized, will provide momentum for changing the way people think about science and for transforming FOS into the most relevant faculty in Canada.

Our strong history of community connections will continue to be a source of pride and a focus of effort. The members and graduates of FOS will continue to grow and serve as ambassadors of science and the methods of discovery, understanding, and development.

All of our undergraduate and graduate programs are stable and sustainable. With increased activity in community outreach and consultation, they will continue to be so. With the implementation of our academic plan, retention will remain strong or even improve.

DR. DAVID CRAMB
Dean, Faculty of Science
Toronto Metropolitan University

Vision and mission

Vision

To be a national leader in research and education, and one that is most connected with the community we serve.

Mission

Seamless integration of research and undergraduate education. To serve community needs and prepare the citizens of tomorrow.

- We create: authentic scientists, new ideas, technology, urban connections and partnerships, in an environment of wellbeing and support.
- We champion and uphold diversity: of ideas, of cultures, of individuals, of teams.
- We are passionate: about community, collaborations, experiential learning and making an impact locally and globally.

Values

This academic plan is grounded in our collective values, which were developed through Faculty Council discussions and are as follows:

Engagement

We are passionate about being excellent educators, dedicated researchers, progressive thinkers, righteous and responsible citizens and compassionate humans.

Diversity

We leverage our location in the heart of Toronto to embrace and champion the diversity of thought, ideas, cultures, individuals and teams. We believe in bridging gaps through collaboration and respect.

Community

We gather together and aim to grow our community. We build connections between our community and authentic science experiences. We foster a culture of inclusiveness and cooperation. We seek to confront and lift barriers and injustices faced by equity-deserving groups and individuals.

Discovery

We approach challenging problems with curiosity and critical thinking. We take time to think, grow, break new ground and create new knowledge. We innovate by uncovering new ways to do things. We are committed to scholarship and to academic freedom.

Student Experience

We strive to provide a well-rounded science education grounded in innovative science, amplified by experiential opportunities and delivered through an exceptional educational experience for our students. We constantly challenge our students, creating authentic scientists who champion and uphold the diversity of thought, experience, cultures, and backgrounds.

Balance

We invest in creating a supportive environment where the abilities and aspirations of our students, faculty and staff are welcomed with attention, integrity and respect. We are compassionate and holistically minded and believe that the best path to creativity is through a balanced life.

Strategic priorities and implementation

Over the next five years, the following priorities will guide the Faculty of Science as it strives to achieve its vision.

Enhance the learning journey for greater student success

Strengthen academic programming

The FOS Learning Environment strategy will be implemented as is appropriate for each department (teaching and research) in the faculty, with action plans centred around integrating authentic research into every student's experience.

Research is a way of thinking that acknowledges observation, hypothesis development, testing and iterating ideas. Our programs strive to incorporate sufficient time for learners to develop strong research-relevant skills that will apply to any career they choose.

Objective 1:

All teaching departments will design and implement SRC-like learning modules that can be inserted into existing courses.

These experiential modules will help guide students in discovery and open-ended learning practices. They will necessarily replace some of the content in the courses where they are implemented. The learning outcome is to help students develop improved, transferable troubleshooting and problem-solving skills.

Objective 2:

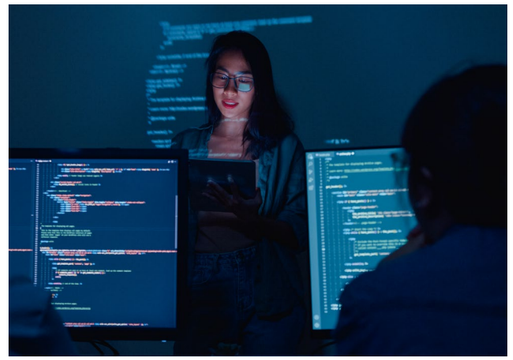
Additionally, as a change in practice, both in its own right and as a response to generative AI's influence on learning and assessments, programs will begin to employ competency-based assessments.

We will collectively embrace AI as a learning tool and accept that this necessarily changes learning outcome assessment practices. This will move us collectively away from rote learning and memorization towards the implementation of knowledge. This will involve more practical assessments through laboratories and oral assessments of students' understandings.

Objective 3:

Launching a Cyber Science degree program.

This program was designed based on real-world needs for graduates who understand both the technical and societal impact aspects of cybersecurity. The learning outcomes are directed towards practical and flexible employment skills and build on the unique opportunities the Rogers Cybersecure Catalyst provides, particularly through the Catalyst Cyber Range. The cyber range is a sophisticated computer system that allows students to practice defending against cyber attacks in a simulated environment, such as a bank's operating system.



PRIORITY 2

Create positive impact through SRC excellence and local and global collaboration

Make impact through SRC and innovation

SRC – Fundamental to Science at TMU is research in all its manifestations.

In 2022, a Strategic Research Plan was developed to guide research strategy within FOS. The strategic research directions for the next 5 years in our Faculty are: Biomedical Innovations; Novel Materials for Health; Complex Systems; Advanced Computing; Natural and Urban Ecosystems; and STEM Education Research. These activities rely on strong graduate student and postdoctoral scholar support.

Objective 1:

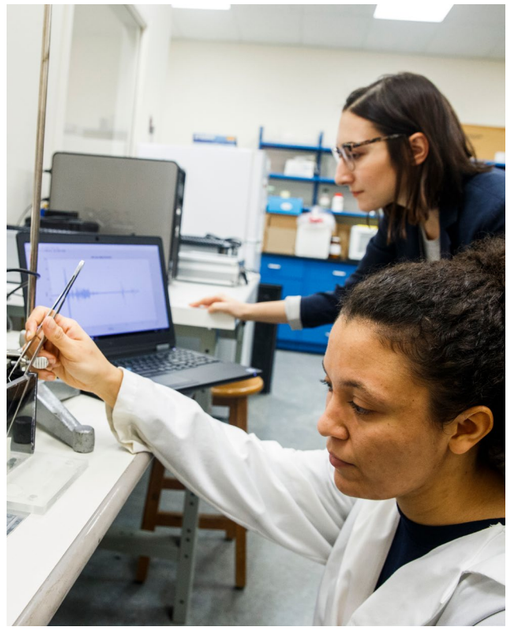
Develop strategic research Chairs in every department.

Through programs such as CRC and CERC, and TMU's advancement office, create up to 7 new research chairs in FOS. Strategic areas have been identified (CRC and CERC in medical imaging, for example), and cases for support are being written for the donor-sponsored chairs.

Objective 2:

Explore the establishment of research centres.

FOS has considerable success in well-established research centres such as iBEST and Urban Water. There are opportunities to imagine further centres as natural evolutions of current SRC excellence: Complexity Science, Nutrition, EDIA in STEM and STEM education. We will explore the logistics and predicted advantages of developing centres.



Engage globally for a world of perspectives

Globalization - Enhance global impact through transnational education.

Given the current immigration landscape in Canada, ambitions for globalization will not be met solely through recruiting students to TMU. However, opportunities abound to deliver our excellent programs remotely through transnational and SRC agreements or online programming.

Objective 1:

Develop collaborations with universities in target countries to deliver TMU degrees.

There has been considerable outreach from universities in Asia to collaborate on the delivery of FOS degrees at their institutions. In particular, we are already exploring partnerships with Vietnam, Sri Lanka and China.

Objective 2:

Create online course-based MSc programs directed at international students.

There is great demand and potential for MSc programs in Computer Science and Financial Mathematics, for example. Such programs could serve as both a source of future thesis-based graduate students and a source of revenue.

PRIORITY 3

Support people and community

Embrace community inclusion and belonging

Teamwork and EDIA – Supporting the growth of both awareness and cultural promotion of best EDIA practices.

- Create a space for civil discourse in all gatherings by empowering all voices and enabling engagement.
- Assign duties appropriate to the positions held, both in faculty and staff complements.
- Provide transparency into service commitments and ensure local community engagement so that every science student does something science-related in their community.

Objective 1:

Increase return to campus activities.

In meetings with staff and faculty, the Dean found that the primary driver of a desire to be on campus was the opportunity to interact with colleagues. Therefore, we instigated “on campus Thursdays”, where every staff member and faculty member was encouraged to come to campus. We established a popular morning coffee klatch every second Thursday, which will continue. We plan to increase community through on-campus retreats, department councils, faculty councils and other high-value events.

Objective 2:

Continue to support SciXchange and establish strong connections with the Ontario Science Centre.

SciXchange is a point of pride for FOS as it enhances science awareness in the community in a very proactive way. We will continue to support this entity and its activities. An increased partnership with the Ontario Science Centre is anticipated in the coming years. With the closure of the OSC site, the centre is seeking partnerships to deliver its programming. FOS has already co-hosted events and is looking to partner in high school education programming. This is coordinated through SciXchange and the departments of Chemistry and Biology, and Physics.

Objective 3:

Supporting Dimensions Faculty Lead (DFL) Strategic Priorities.

The strategic priorities of the FOS DFL will center on advancing the objectives and outcomes set out in the TMU Dimensions Action Plan, ensuring that strategies and initiatives are aligned. While the next phase of the national Dimensions initiative is under development, we will maintain momentum by implementing the action plan established during TMU’s Dimensions pilot program, actively engaging with the national community of practice, advancing ongoing initiatives, and building on the foundation laid by the previous FOS DFLs. A key element of this strategy involves making evidence-based decisions informed by existing data, such as the 2024 FOS climate survey, and expanding current programs. Below is a list of planned initiatives included in the FOS Dimensions Faculty Lead (DFL) Strategic Plan, which is supported by the Dean’s Strategic Advisory Committee. Activities at FOS Faculty Council have been underway through the EDIA standing agenda item.

- Inclusive Research Designs: Consultations with Disciplinary Experts and Establishing Focus Groups
- Effective and Inclusive Mentorship Training in STEM (for FOS Faculty)
- Effective and Inclusive Peer/Near-Peer Mentorship Training in STEM (for HQP)
- Industry Partnerships (Study): Increasing research collaborations with industry partners

PRIORITY 4

Continue our commitment to Truth and Reconciliation

Advance Indigenous scholarship and education
Build partnerships with Indigenous communities

The Decolonizing STEM strategy

- Taking real steps towards understanding colonial biases in science and in the learning and teaching of STEM concepts.
- Encourage students to explore their place in science and discovery, and bring their cultural norms and traditions into the conversation.

Objective 1:

Supporting the transition of Indigenous STEM learners to university environments.

In discussions with some Indigenous communities, a significant hurdle for Indigenous learners in STEM programs has been the abrupt transition from their home community to the University. University STEM programming presumes a strong degree of experience in Western STEM skills and ideas, which may not align with the Indigenous learner. We propose co-developing transition programs that can be embedded within Indigenous communities to help learners make the transition with greater ease and support.

Objective 2:

Incorporating Indigenous ways of knowing in STEM programming.

We will strategically prioritize our successful practice of Indigenous knowledge, the activities of the Advisor to the Dean on Indigenous Education, and initiatives from SciXchange (an award-winning STEM communication and engagement centre within the Faculty of Science) and their Indigenous knowledge and outreach co-ordinator. This will also be supported by TFA hires in Indigenous Science.

We will continue STEM programming through activities led by SciXchange. SciXchange engages the community through events that increase awareness of Indigenous ways of knowing with respect to Western STEM fields. This will continue to be accomplished through strong connections to the Indigenous community, both locally at TMU and more broadly.

PRIORITY 5

Ensure future readiness

Prepare our students for evolving careers

Enhancing co-op/internships – As part of sustaining and improving the student experience, program changes that enhance co-op/internships will receive high priority in resource allocation.

The goal is to ensure every student in the Faculty also has a sense of the job market in their field and beyond, and is “job-ready and future-ready” when they graduate.

Objective 1:

Improve placements for students and employers.

All undergraduate programs in FOS currently offer co-op options. The effectiveness of students’ placements has been increasingly challenging to manage. This may in part be due to a disconnect between TMU and our traditional co-op partners. We will improve placement practices through strengthened connections with our partners, leading to the most meaningful job experiences for our students.

Objective 2:

Include AI-based learning in all programs.

There is unprecedented acceleration in AI activity worldwide. We must embrace and navigate this in our degree programs as well. This will be program-dependent, but will likely encompass understanding statistical predictability, algorithm optimization, and validating big data. We will need to discuss the best approach for this: either as a separate learning module or as a complete integration with the current programming.

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