RESEARCH INTERNSHIP PROGRAM

POLYTECHNIQUE MONTRÉAL

TECHNOLOGICAL UNIVERSITY

SUMMER 2025

Polytechnique Montréal is one of Canada's leading research engineering universities. Founded in 1873, Polytechnique Montréal has the largest engineering student body in Quebec and is highly ranked for the number of Canada Research Chairs in Engineering and the scope of its research activities. The world needs creative and innovative engineers more than ever. Polytechnique is producing them, in Montreal, a city ranked among the top student cities in the world for the last 5 years!

RESEARCH INTERNSHIP PROGRAM

Every year, Polytechnique's research laboratories welcome over 250 students from other universities wishing to put into practice the technical and scientific knowledge acquired in their studies. The research conducted, supervised by a Polytechnique professor and respectful of all health and safety measures, emanates from a real societal or industrial need, and is carried out in the lab or *in situ*.

ELIGIBILITY CRITERIA

- Enrolled in one of Polytechnique Montréal's partner universities
- Be officially nominated by your home university before applying to this program. Do to so, please contact your International Relations Office or your Internship Office
- Completed at least two years of an engineering undergraduate program or be registred in a graduate program (Master or Ph.D.) according to the projects' university cycle requirements
- Enrolled in a full-time program and will continue to be enrolled after your internship
- Minimum GPA of 2.75 out of 4 (or equivalent)
- Meet the required skills for the internship
- Be fluent in English or in French (research intern must have a competency sufficient to succeed in a university-level engineering research project and to fully participate in the life of their host lab)

DURATION

The recommended duration of the internship is 4 months, with 5 possible starting dates between April and July. Once the admission to the program has been confirmed, no change in the duration or the dates can be made. Please confirm the research duration with your home university Program Coordinator before applying. Note that it is a full-time research internship in Montreal (7 hours a day, 35 hours a week).

Outstanding candidates may receive one of the 25 scholarships available annually!

Maximum amount of the scholarship: 6,000 CAD for 4 months (prorated at 1 500 CAD/month).

APPLICATION PROCEDURE

Follow the link below to browse the list of research projects offered by area(s) of expertise and/or university cycle, and apply by **January 15, 2025**: *polymtl.adv-pub.moveonca.com/rip*

Note that an online conference call may be organized for final selection.

LIST OF RESEARCH PROJECTS

CHEMICAL ENGINEERING

CHE 01	Auxetic Materials and Structures for Bioelectronics
CHE 02	Co-axial non toxic collagen/PCL electrospinning
CHE 03	Computational Fluid Dynamics Simulation of Industrial Gas-liquid Flows
CHE 04	Control System for Active EMI Shielding
CHE 05	Dairy waste to valued green products in intensified rotating reactor
CHE 06	Design an heat exchanger for the Fischer–Tropsch reactor
CHE 07	Highly Conductive and Magnetic Material
CHE 08	How long to cool a bottle of wine?
CHE 09	Ink-jet Printed Flexible Organic Electrochemical Transistor for Neuromorphic Functions
CHE 010	Novel Composite Conducting Materials for Biomedical Devices
CHE 011	Optimization of Electrospun Nanofibers for Wearable Biosensors
CHE 012	Printable soft bioelectronic device
CHE 013	Self-healing conductive polymers for neuronal repair
CHE 014	Surface and interface engineering of materials
CHE 015	Understanding the hydrodynamics of particle swarms through simulation
CHE 016	Vortex identification in mixing applications

CIVIL, GEOLOGICAL AND MINING ENGINEERING

CGM 01	Fluid-induced seismicity in subsurface geonergy technologies
CGM 02	Multiphase flow in porous media for hydrogen and CO_2 storage
CGM 03	Optimizing hospital sink drain disinfection to decrease infections
CGM 04	UHPFRC : From material development to structural applications
CGM 05	Rainwater systems : impact of design/operation on water quality

COMPUTER ENGINEERING AND SOFTWARE ENGINEERING

GIGL 01	Foundation Models for Swarm Robotics
GIGL 02	Machine Learning and Interaction of Large Dataset of Medical Images
GIGL 03	Mitigating Adversarial Attacks in Machine Learning
GIGL 04	Multi-Robot Systems and Swarm Robotics
GIGL 05	Mutation testing for LLM-generated code
GIGL 06	Safe Control of Lighter-than-Air Aircraft
GIGL 07	Security of ML models supply chains
GIGL 08	Virtual and Augmented Reality for Swarm Robotics
GIGL 09	The Portiloop - an AI-based closed-loop brain stimulation system

ELECTRICAL ENGINEERING

DGE 01	Modelling and Learning for Transmission Neural Networks
DGE 02	Energy-Efficient Holographic MIMO Techniques for LEO Satellites
DGE 03	Spatial Diversity Techniques in LEO Networks to Combat Jamming
DGE 04	Automated production and testing of superconducting cables
DGE 05	AI for intelligent neuromodulation medicine
DGE 06	Neurotechnology to recover paralyzed hand function in rat models
DGE 07	Shape Estimation of Soft Continuum Robots
DGE 08	Privacy-preserving distributed signal processing and control
DGE 09	Bayesian Optimization for Inferring Generation Cost Functions
DGE 10	Active navigation and perception strategies for autonomous object search
DGE 11	Binarized neural networks : implementation, optimization and explanation

ENGINEERING PHYSICS

PHY 01	Interfacing robotics with a high-resolution microscope to understand disordered proteins
PHY 02	Ultrasensitive biosensing by single-particle tracking
PHY 03	Raman spectroscopy for margins inspection during breast conserving surgery
PHY 04	Blood-based colorectal cancer screening and recurrence detection using optical spectroscopy
PHY 05	Semiconductors in the strong light-matter coupling regime
PHY 06	Mid-infrared lasers using the 2D semiconductor black phosphorus

MATHEMATICS AND INDUSTRIAL ENGINEERING

MAGI 01	Robotic Vision System for Samart Manufacturing Workcell
MAGI 02	Development of 4D navigation display for the cockpit

MECHANICAL ENGINEERING

MEC 01	Numerical Modeling the Transport of Sediments in Rivers
MEC 02	Validation of a temperature history model in Greenland
MEC 03	Deep learning algorithms for predicting flows through porous media
MEC 04	Development of interpolation operators for GPU accelerators
MEC 05	Inflatable greenhouse for urban agriculture
MEC 06	Deployable Space Membrane for Debris Collection
MEC 07	Manufacturing and design of reconfigurable structures
MEC 08	Additive manufacturing of polymer composites by Fused Granulate Fabrication
MEC 09	Bio-sourced composite materials for future aircraft
MEC 10	Artificial Intelligence for the Control of Assistive and Rehabilitation Robots
MEC 11	Design and Prototyping of an Ankle Exoskeleton with Linear Actuators
MEC 12	Design, Optimization and Prototyping of Assistive and Rehabilitative Robotic Systems
MEC 13	Development of a human-interface sensor-activator
MEC 14	Production method in rehabilitation based on digital molding technology
MEC 15	Low-cost device integrating neuro-rehabilitation technology into new-generation orthotics
MEC 16	Mechatronic development of a personal service robot in rehabilitation
MEC 17	Mechatronic development of an intelligent body weight support
MEC 18	Collision dynamics of graphite particles for battery applications
MEC 19	Simulation of acoustic emissions of shock-forming cavitation events
MEC 20	Particle fluid interactions