

# 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 registered 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](http://polymtl.adv-pub.moveonca.com/rip)

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

# LIST OF RESEARCH PROJECTS

## CHEMICAL ENGINEERING

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

## CIVIL, GEOLOGICAL AND MINING ENGINEERING

<b>CGM 01</b>	Fluid-induced seismicity in subsurface geonegy technologies
<b>CGM 02</b>	Multiphase flow in porous media for hydrogen and CO <sub>2</sub> storage
<b>CGM 03</b>	Optimizing hospital sink drain disinfection to decrease infections
<b>CGM 04</b>	UHPFRC : From material development to structural applications
<b>CGM 05</b>	Rainwater systems : impact of design/operation on water quality

## COMPUTER ENGINEERING AND SOFTWARE ENGINEERING

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

## ELECTRICAL ENGINEERING

<b>DGE 01</b>	Modelling and Learning for Transmission Neural Networks
<b>DGE 02</b>	Energy-Efficient Holographic MIMO Techniques for LEO Satellites
<b>DGE 03</b>	Spatial Diversity Techniques in LEO Networks to Combat Jamming
<b>DGE 04</b>	Automated production and testing of superconducting cables
<b>DGE 05</b>	AI for intelligent neuromodulation medicine
<b>DGE 06</b>	Neurotechnology to recover paralyzed hand function in rat models
<b>DGE 07</b>	Shape Estimation of Soft Continuum Robots

<b>DGE 08</b>	Privacy-preserving distributed signal processing and control
<b>DGE 09</b>	Bayesian Optimization for Inferring Generation Cost Functions
<b>DGE 10</b>	Active navigation and perception strategies for autonomous object search
<b>DGE 11</b>	Binarized neural networks : implementation, optimization and explanation

## ENGINEERING PHYSICS

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

## MATHEMATICS AND INDUSTRIAL ENGINEERING

<b>MAGI 01</b>	Robotic Vision System for Smart Manufacturing Workcell
<b>MAGI 02</b>	Development of 4D navigation display for the cockpit

## MECHANICAL ENGINEERING

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