ROBOTICS · MEDICAL IMAGING · APPLIED AI

Coleman Farvolden

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Graduate research by day, AI development by night. Published in medical imaging, and funded by NSERC and the Vector Institute.

EDUCATION

MASc, Mechanical and Materials Engineering 2026 – 2028
Queen's University — NSERC Canada Graduate Scholarship – Master's (CGS-M); Vector Scholarship in Artificial Intelligence

BEng, Mechatronics and Robotics Engineering 2022 – 2026
Queen's University — GPA 4.14/4.30 · Top 5% of class · Dean's Honour List

RESEARCH EXPERIENCE

Graduate Researcher — Ingenuity Labs, Small-Scale Robotics Lab May 2025 – present

- Developing an open-source magnetic micromanipulation system for studying cancer biomechanics, 3D-printable and adaptable to any inverted microscope.
- Mapping 3D stiffness gradients as cancer cells grow, linking mechanical properties to cell behaviour and migration.

Robotics Researcher — The Perk Lab, Queen's University May – Aug 2024

- Built a reusable open-source 3D Slicer and ROS module for motion planning with a low-cost 6-axis arm; 3.59 ± 1.4 mm average positional accuracy across a 16-point phantom.
- Built an electromagnetic cavity-tracking system with a sensor embedded in a 3D-printed retractor; 832.1 ± 132.6 ms tracking latency, successful tracking at nearly all test positions.
- Two papers presented at SPIE Medical Imaging 2025, San Diego.

PUBLICATIONS

An accessible 6-axis testbed for image-guided robotics research
C. Farvolden, K. Hashtrudi-Zaad, L. Connolly, C. Barr, G. Fichtinger — SPIE Medical Imaging 2025

Robotic tracking of a resection cavity using a low-cost bench-top robotic arm and electromagnetics
K. Hashtrudi-Zaad, **C. Farvolden**, L. Connolly, C. Barr, G. Fichtinger — SPIE Medical Imaging 2025

INDUSTRY EXPERIENCE

Automation Engineering Intern — Proax Technologies Ltd., Mississauga May – Aug 2023

- PLC programming in Omron Sysmac: SQL database management, automated barcode reading, MQTT communication.
- Assembled machinery from CAD; installed mechanical, electrical and pneumatic systems from engineering drawings.

TECHNICAL SKILLS

ROBOTICS	ROS2, motion planning, SLAM/Nav2, computer vision, 3D Slicer, optical & electromagnetic tracking
SOFTWARE	Python, C++, C, data structures & algorithms, PyTorch, NumPy, Pandas, Linux
HARDWARE	Embedded systems, circuit design & testing, electromechanical assembly, PLC, 3D printing
DESIGN	SolidWorks, Fusion 360, engineering drawing, FEA, COMSOL
APPLIED AI	LLM agent systems, evaluation, tooling

AWARDS & FUNDING

- **D.S. Ellis Memorial Award** — largest graduating award, chosen by classmates
- **Vector Scholarship in AI (VSAI)**, $17,500 — top AI master's students in Ontario
- **NSERC CGS-M** — graduate scholarship, 2026
- **DAAD RISE Germany**, $6,000 — ~250 of 2,512 applicants
- **Frank B. Lee Memorial Scholarship**, $16,400 — top 5% of class
- **Zurbrigg Memorial Scholarship**, $6,900 · **SPIE JMI Poster** 3rd place
- **NextGen Hackathon** 1st of 80 · **Mark Latham Memorial Award**
- Selected: **NSERC USRA** · **Waterloo Rising Stars** · USSRF · Principal's · Dean's List

SERVICE & ACTIVITIES

- **Queen's First Aid** — Logistics Officer; previously Supervisor, Responder (2023 – present)
- **Canadian Coast Guard** — Inshore Rescue Boat, Halifax (2025)
- **Queen's Varsity Triathlon** (2023 – present)
- **Ironman Canada**, Ottawa 2026 — 12:46:26
- Ironman 70.3 · Spartan Ultra, Mont-Tremblant