

Alex Forsyth

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Education

BASc Mechanical and Materials Engineering, Queen's University

3rd/4

- Focus on closed-loop control systems & leveraging FEA/CFD for mechatronic design.

Experience

Undergraduate Research Assistant | MAX-Nuclear at Queens University

May 2025 – Current

- Project lead under Tier 1 research chair Dr. Mark Daymond at the Reactor Materials Testing Laboratory.

Facility Operator & Ice Technician | Town of Milton

Jul 2022 – Aug 2024

- Operated a \$150,000 Zamboni and maintained the ice rink refrigeration system.

Hockey Instructor | HSC Hockey

Jul 2020 – Jul 2022

- Managed groups of 10-15 children to give back to the next generation of hockey players.

Projects

Accelerator Target Slider – Project Lead | MAX-Nuclear at Queens University

May 2025 – Current

- Designed and fabricated a \$10,000 multi-sample irradiation stage for CANDU reactor material research.
- Leveraged CFD modeling and ion-beam testing to design sample holders suitable for 500°C experiments.
- Implemented a LabVIEW/C++ automated control system for temperature, position, and irradiation dose.
- Facilitated 8x increase in irradiation efficiency accelerating CNL research on extending reactor lifespan.

Optimized Brake Pedal – Team Lead | Smith Engineering

Jan – Apr 2024

- Led a design team to develop a lighter weight brake pedal for the Queens Baja SAE Racing team.
- Reduced material with I-beam design and created stress uniformity with SolidWorks FEA static analysis.
- Outperformed the previous design by >50g while maintaining 1.5 FOS and driver ergonomics.

Continuously Variable Transmission (CVT) | BAJA SAE-Off Road Racing Team

Sept 2024 – Apr 2025

- Remodelled primary CVT using SolidWorks CAD, updated cooling fins to further increase convection.
- Increased manufacturability and researched future methods of CVT tuning using MATLAB Simulink.

Automated Chess Board | Personal

Apr 2025 - current

- Modelled and fabricated a belt driven 2D gantry to move chess pieces with an electromagnet.
- Developed path finding algorithm on C++ to achieve 0.5mm positional accuracy.
- Integrated a hall sensor array and embedded chess engine for accurate response to move detection.

Skills

- **Data Analysis:** Python, MATLAB, LabVIEW, Arduino-C++.
- **Design Tools:** SolidWorks CAD, Flow Simulation (CFD), Static Analysis (FEA), KiCad.
- **Fabrication:** Design Proposals, Technical Reports, ASME Drafting Standards.