Rishi Shah

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Education

McMaster University **Apr. 2029**
Engineering - Schulich Leader Scholar (1 of 50 in Canada to win $120K national STEM scholarship) *Hamilton, Ontario*

Experience

The Centre for Mechatronics and Hybrid Technologies **Oct. 2025 – Present**
Machine Learning Researcher *Hamilton, ON*

- Engineered a hybrid LSTM model on top of PyBaMM SPMe simulations to predict anode potential, reducing RMSE from 8 mV to 1.24 mV
- Built hybrid SPMe–ML voltage-correction model improving SPMe RMSE from 56.5 mV to 2.6 mV

Western University **Apr. 2024 – Aug. 2025**
Machine Learning Researcher *London, ON*

- Engineered a recurrent, denoising CORNet-S variant that outperformed MIT's CORNet-S by up to 10% in adversarial robustness across MNIST, CIFAR-100, and ImageNet100
- Achieved 97.82% adversarial accuracy, surpassing ResNet-18 and AlexNet in PGD, CW, and patch-attack benchmarks

3D Forge **May 2024 – Sep. 2024**
Founder *London, ON*

- Scaled a 3D-printing business to 100+ customers and $3,500+ profit in one summer
- Awarded Ontario's Summer Company Grant for student entrepreneurship

Robarts Research Institute **Nov. 2022 – May 2024**
Student Researcher *London, ON*

- Developed U-Net CNN segmentation models for DICOM medical images
- Produced high-precision ground-truth masks used directly to train clinical tool-tracking networks
- Built real-time AR visualization systems in Unity/Vuforia for surgical imaging experiments

Projects

Adaptive Learning Robot | *C++, Arduino, Python, Cohere LLM* | *Top 32 at Hack the North* **Sept. 2025**

- Built a dual-system robot inspired by Kahneman's System 1 / System 2 model that learns new skills instantly from natural language without pre-training or rigid scripts
- Implemented Cohere LLMs with real-time search to convert messy instructions into smooth, executable motions for 2 custom 3-DOF robotic arms

Sentinel | *C++, TypeScript, JavaScript, Node.js* | *Best Developer Tool at HackWestern 12* **Nov. 2025**

- Built a hardware-aware static analyzer with a custom TypeScript LSP performing 50+ silicon-level checks, including RAM/Flash budgeting, I^2C/SPI conflict detection, and pin-map validation.
- Developed full VS Code integration for real-time diagnostics on embedded C/C++ projects

From Pixels to Precision | *Python, MatLab* | *National Bronze; Divisional Gold; Sanofi BioGenius Award* **May 2023**

- Partnered with Synaptive Medical Inc. and surgeons to develop a deep-learning CNN to track surgical tool movements in minimally invasive surgeries
- Trained on 300 manually segmented surgical images and achieved 95% DICE accuracy
- Analyzed performance across 4 illumination and tool scenarios with sub-0.12s inference speed per image

Leadership & Extracurricular Activities

Hack49 Global **Jun. 2024 – Jun. 2025**
Co-founder and Lead of Outreach *Remote*

- Built a global programming community of 950+ students across 40+ countries with industry recognition from TD, Spotify, and Amazon
- Secured $19,000+ in sponsorships and partnered with Elegoo

DECA Chapter Lead **Sep. 2023 – Jun. 2025**
President *London, ON*

- Mentored 80+ students, and grew chapter by 55%, raising provincial qualifiers by 52% and international by 50%

Technical Skills

Languages: Python, C++, JavaScript, TypeScript, Java, C#, MATLAB, SQL, Bash
Frameworks: PyTorch, Keras, OpenCV, YOLO, React, Django, Flask, TailwindCSS, Electron, Node.js
Tools: Arduino, Raspberry Pi, ESP32, Unity, Git/GitHub, VS Code, AWS, Fusion 360, Blender, OnShape, KiCad