

# Mahad Hassan

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## EDUCATION

### McMaster University

Expected May 2027

Honours Software Engineering Co-op Level III, B.Eng (3.9 GPA)

Hamilton, ON

- **Achievements:** Consistent Dean's List | Finalist at MacEngComp 23' | \$3k entrance scholarship
- **Courses:** Data Structures & Algorithms | OOP (Java) | Development (C, Git, Bash) | Math in Python | Databases (SQL)
- **Leadership:** Events VP, MacPSA | VP Operations, Voices@Mac | Attendee Relations, DeltaHacks | Web Dev @ MacSES

## TECHNICAL SKILLS

**Languages:** C/C++, Python, MATLAB, Bash, Verilog, Java, SQL, TypeScript

**Embedded & Systems:** Linux, Jetson Nano, Firmware (C/C++), Telemetry Systems, Serial I/O, MATLAB/Simulink

**Machine Learning & CV:** TensorFlow, OpenCV, NumPy, Pandas, Matplotlib, Model Optimization, Classical CV

**Tools:** Git/GitHub, Jupyter, VS Code, PyCharm, Anaconda, Vim, Onshape, KiCad, Maven

**Web & DevOps:** React.js, Node.js, Firebase, Terraform, GitHub Actions, CI/CD, Cloud (AWS/Azure)

## EXPERIENCE

### Software Engineer Intern

May 2025 – August 2025

TD Bank

Toronto, ON

- Developed **FRAM**, a microservice implementation in Java/Spring on Azure using Kafka for data transfer and async design
- Migrated API client processing to non-blocking, concurrent execution, delivering **\$1M/year** in infrastructure cost savings
- Optimized CI/CD pipelines via GitHub Actions, reducing deployment time by 20% across 7 distributed services
- Updated **Terraform** configurations to support infrastructure **failover testing** in secondary environments

### Machine Learning Engineer

October 2025 – Present

McMaster Aerial Robotics and Drones Club

Hamilton, ON

- Implementing a real-time **circle-detection vision system** using TensorFlow + classical CV for autonomous landing
- Optimizing ML inference on the **Jetson Nano** (CUDA-accelerated) for sub-50 ms onboard processing
- Integrating detection outputs with **precision-landing controllers** and waypoint-navigation logic
- Processing depth and telemetry streams to improve inference stability, noise rejection, and landing accuracy

### Controls Subteam Member

September 2025 – Present

McMaster Rocketry

Hamilton, ON

- Building a real-time **strain-gauge data pipeline** with waveform visualization for airframe load testing
- Collaborating on features for **data viewing**, recording, and trimming while supporting integration with live telemetry
- Developing **MATLAB/Simulink** control models and contributing to onboard **C++ firmware** for flight systems

### Software Developer

January 2025 – Present

McMaster iBioMed Society

Remote

- Developing an **app** with **React Native** and **Firebase** to centralize **mental, physical, & financial** support for patients
- Implementing end-to-end **encryption**, including a **secure medical resume** section and **protected data storage**
- Designing an **accessible**, user-focused interface to **ensure privacy, data security**, and **seamless patient interaction**

## PROJECTS

### Digit Recognizer AI | Typescript (React, Tailwind CSS), Python (TensorFlow, Matplotlib)

- Built an **8-layer CNN** with **99.3%** accuracy on MNIST, trained on **60,000** grayscale digit images, and tested on **10,000**
- Utilized **Matplotlib** to visualize model predictions with confidence levels for each digit class, including probabilities
- Integrated **React & TailwindCSS** to visually display **live** bar chart predictions for drawn digits

### PrepPal | TypeScript (React, Next.js), Tailwind CSS, GCP Vision, OpenAI

3rd Place @ MacEngComp 25'

- Developed an **AI-powered** disaster-readiness platform using **Next.js + GCP Vision** with **<2s** image detection
- Designed a modular detection pipeline (**localization + OCR + label matching**), boosting reliability by **40%**
- Integrated **global hazard data** (USGS/NOAA/NASA) enabling **instant (<1s)** risk lookups and threat analysis

### SecureVault | Python (OpenCV, Flask, Cryptography), SQL, Git

2nd Place @ MacEngComp 24'

- Designed a system combining **facial recognition, password manager**, and **file encryption** to enhance data protection
- Leveraged Python and SQL to develop a solution within a **7-hour coding sprint**, securing **2nd place** among 30+ teams

### C-View | C, Bash, Git

- Developed a **C-based utility** to apply filters like **grayscale, reflection, rotation, edge detection**, and **blur**
- Designed to process images up to **30%** faster than comparable tools with reduced memory use