

# Ahmed M. Omran

a.omran@mail.utoronto.ca | +1(437)-970-9879 | LinkedIn: [linkedin.com/in/ahmed-omran-04amo/](https://www.linkedin.com/in/ahmed-omran-04amo/)

Website: <https://ahmedomran17.github.io/personal-website>

## EDUCATION

**Bachelor of Applied Science in Mechanical Engineering + PEY Co-op** Sep 2023 - Apr 2028 (expected)  
*University of Toronto* Toronto, ON, Canada

- **Concentrations:** Mechatronics and Bioengineering
- **Intended Minors:** Engineering Business, and Robotics
- **GPA:** 3.72/4.00, *Dean's List*
- **Related Coursework:** Mechanical Design, Mechanics of Solids, Engineering Analysis, Computer Fundamentals (C), Applied Fundamentals of Deep Learning, Corporate Accounting and Finance.

## SKILLS

**Programming:** MATLAB, C, Python, JavaScript

**Tools:** Microsoft Office, Solidworks, VS Code, AnyLogic, Finite Element Analysis

**Machining:** Drill press, Lathe, Mill

**Professional:** Leadership, collaboration, problem-solving, adaptability

## PROJECTS

**EMG-controlled Robotic Bionic Hand**, Personal Project Jun 2025 - Jul 2025  
*Local workshop and home tools* Eastern, Saudi Arabia

- Designed and prototyped a 5-finger bionic hand; each finger used a 3-joint tendon-like mechanism, resin 3D printed at 40 µm resolution; iteratively improved design by reducing joint friction, tuning elastic cords, and adjusting tolerances for smoother actuation and stability.
- Implemented embedded control on an ESP32-S3 with PSRAM, driving 5 SG90 micro servos via PCA9685.
- Developed two control methods: computer-vision teleoperation using MediaPipe for early validation, and surface EMG with AI for gesture inference. Trained a TensorFlow Lite CNN on 10k+ EMG samples (100 Hz, 500 ms sliding windows), achieving 83% accuracy across 4 gestures (rest, open hand, fist, pinch).
- Overcame deployment limits by redesigning a GRU into a CNN, enabling real-time inference on the ESP32-S3 (<200 ms latency), and iteratively refined mechanics by reducing joint friction, tuning elastic cords, and adjusting tolerances for smoother actuation.

**Skin Cancer Lesion Classifier**, Group Member Jan 2025 - April 2025  
*App. Fund. of Deep Learning Course, University of Toronto* Toronto, ON, Canada

- Developed a deep learning model trained on 25,000 images from the ISIC 2019 dataset to classify 8 types of skin cancer lesions, achieving 76% test accuracy.
- Built a baseline model with 3 CNNs and 3 fully connected layers, totaling 13 million trainable parameters, to establish performance benchmarks.
- Implemented transfer learning with PyTorch's ResNet-50 as a feature extractor, enhancing model efficiency.
- Conducted qualitative performance analysis using confusion matrices and Grad-CAM, improving model interpretability.
- Led team coordination by managing work distribution, setting internal deadlines, facilitating meetings, and ensuring timely project completion.

**CNC Router**, Team Leader Sep 2024 - Dec 2024  
*Mechanical Engineering Design Course, University of Toronto* Toronto, ON, Canada

- Researched 22 commercial CNC models and market gaps through online forums and manufacturers' data to define engineering specifications for beginner and hobbyist users.
- Led a team of four engineering students through the engineering design process, facilitating weekly meetings, managing work distribution, and ensuring alignment with the project timeline.
- Developed CAD models of candidate and final designs using SolidWorks, creating a 44-component assembly with standardized parts for manufacturability.
- Achieved a 95% grade on the final course deliverable by producing a well-documented, optimized design that met functional and engineering requirements.

**Walkable Cities**, Team Leader Jan 2024 - Apr 2024  
*Engineering Strategies & Practices II Course, University of Toronto* Toronto, ON, Canada

- Led a team of five engineering students through the engineering design process by facilitating weekly team meetings and discussions and resolving team member conflicts, resulting in a successful submission of the conceptual design specifications report.
- Analyzed the Galbraith-Bahen crosswalk on St. George St through visual observations, sampling pedestrian and vehicle traffic, dimensions, and noise measurements to identify the lack of accessibility and safety features.
- Researched crosswalk standards through the City of Toronto, the Ontario Ministry of Transportation, and ISO Standards

to define a list of design objectives and evaluation metrics.

- Simulated proposed adjustments in traffic-light timing using AnyLogic simulation software, resulting in a projected 37% decrease in the number of pedestrians per traffic cycle.
- Developed CAD models of candidate and final solutions using SolidWorks, presented to course instructors and the client, and used for design implementation advocacy.

## EXTRACURRICULAR EXPERIENCE

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### Team Member

*University of Toronto Supermileage Team*

*Urban Concept Car Mechanical Division*

**Oct 2023 - Apr 2025**

*Toronto, ON, Canada*

- Developed SolidWorks CAD skills through team tutorials and workshops, enabling the design and modification of vehicle components.
- Installed the braking system onto the car frame by shaping brake-fluid delivery pipes and mounting friction pads onto the wheel hub using hand tools.
- Redesigned the kingpin steering mechanism in SolidWorks, reducing scrub radius and steering effort, while introducing a self-adjusting geometry for improved handling.
- Machined a front axle with precision chamfers, reduced diameters, and threaded sections using a lathe, ensuring compatibility with the final vehicle assembly.

## CERTIFICATIONS

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### Certified SolidWorks Associate (CSWA)

*Online Exam, University of Toronto*

**December 2024**

*Toronto, ON, Canada*

- Created new parts using reference geometry, extrusion, and sweep features, based on engineering drawings
- Created assemblies of given parts with various mating features to measure critical distances at specified positions.
- Adjusted material properties and density to complete mass measurements.

### Python Specialization

*University of Michigan / Coursera*

**May 2024 - Jun 2024**

*Virtual*

**Topics covered:** syntax, data structures, web data, databases, and data visualizations.

- Developed various Python scripts to read and analyze text files and mail headings
- Developed a web scraper and utilized *beautifulsoup4* to parse HTML and XML files
- Utilized SQLite software and libraries to create and edit databases.

### Machining Course

*George Brown College*

**Jan - Feb 2024**

*Toronto, ON, Canada*

- Machined piston and cylinder mechanism using aluminum rods.
- Operated the lathe machine to create piston ridges and shafts.
- Used drill press to create screw holes and hollow cylinders
- Used a 3-axis milling machine to reduce the thickness of the desired components.
- Assembled the piston and cylinder to a flywheel, creating a crankshaft mechanism.