University of Waterloo

Co-operative Work Terms

Omar Elgazzar
21138315
1B Mechatronics Engineering, Honours, Co-operative Program

Work Term	Employer	Evaluation
Jan - Apr 2025	Ottonomi.Ai Divisional Office Toronto Ontario Canada AI Software Engineering	EXCELLENT

Planned Future Work Term(s)

Sep - Dec 2025
May - Aug 2026
Jan - Apr 2027
Sep - Dec 2027
May - Aug 2028

Omar Elgazzar

My full portfolio: https://omar-elgazzar.vercel.app/

(416) 540-6024 | omar.k.elgazzar@gmail.com | linkedin.com/in/omar-elgazzar | github.com/omar

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Dear Hiring Manager,

I am writing to express my interest in the Mechatronics Engineering Co-op position at Kiwi Charge for the Fall 2025 term. As a Mechatronics Engineering student with strong hands-on experience in prototyping and system integration, I am eager to contribute to your innovative team developing Canada's first autonomous, mobile EV charging network.

My academic and personal projects have prepared me for real-world implementation challenges, from designing mechanical systems in SolidWorks to integrating sensors and actuators with microcontrollers like Arduino and Raspberry Pi. I am passionate about robotics and clean energy, and Kiwi Charge's mission to revolutionize urban EV infrastructure deeply aligns with my engineering values. I thrive in collaborative, interdisciplinary environments where rapid prototyping, testing, and iteration are essential to progress.

I am especially excited by the opportunity to work on end-to-end mechanical design and contribute to both the conceptual and physical development of your mobile charging robots. With experience in mechanical fabrication, electronics, and motion control systems, I am confident in my ability to support Kiwi Charge's hardware goals while learning from your talented team.

Thank you for considering my application. I would be thrilled to bring my curiosity, technical abilities, and dedication to Kiwi Charge this Fall, and to contribute meaningfully to your transformative work in EV infrastructure.

Sincerely,

Omar Elgazzar

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Technical Skills

CAD & Mechanical Design:: SolidWorks, AutoCAD, OnShape, SketchUp, Blender

Hardware & Prototyping: Soldering, 3D Printing, CNC, Laser cutting, Machine shop

Software & Tools: Docker, Git, React, Node.js, Express, MongoDB, Arduino, MATLAB

Languages: C#, C/C++, Python, HTML/CSS, Javascript, Git, Small Basic

Work Experiences

Mechanical Sub-team Member | *UW Orbital Design Team* **May 2025 – Aug 2025**

- Led CAD design of satellite chassis structure, prioritizing manufacturability and modular assembly
- Executed **FEA simulations** to validate structural integrity under launch and in-orbit loads

Mechanical Research Assistant | *Ontario Tech University* **Jan 2025 – May 2025**

- Researched and applied **vortex-induced vibration mitigation** techniques for enhanced mechanical resilience
- Designed **20+** bluff-body geometries in **SolidWorks** to simulate and optimize active flow control strategies
- Conducted wind-tunnel testing to validate models and guide product design improvements

AI Software Engineer | *Ottonomi AI* **Jan 2025 – May 2025**

- Developed a **Python** computer-vision pipeline for vehicle and roadkill detection, boosting detection performance by **200%**
- Automated analysis of frequent vehicle-stop zones with internal Python tools
- Containerized ML workflows using **Docker**, simplifying deployment and reproducibility

Projects

Nibbles | *MERN Stack, ESP32, OnShape* **Sept 2024**

- Created an IoT-based pantry-inventory system with recipe suggestions and shopping-list automation
- Integrated **ESP32** and **load-cell sensors** to measure ingredient weights and log data to **MongoDB**
- Developed a **React** frontend to visualize inventory and recipe options

PID Bridge Balancer | *PID, Arduino* **Jan 2024 – Feb 2024**

- Designed and laser-cut a balancing bridge; implemented **PID control** via ultrasonic sensor and Arduino
- Ensured precise stabilization of a moving cart under external disturbances

Oshawa Zoo Goat Shelter | *SketchUp, Machine Shop* **Jan 2023 – May 2023**

- Designed and fabricated a **$4,000** custom shelter, balancing animal safety, transport logistics, cost, and aesthetics

Autonomous Obstacle-Avoiding Car | *Arduino, TinkerCAD* **June 2023**

- Designed chassis and sensor placement; programmed real-time navigation and obstacle avoidance logic

Awards / Recognitions

- Recipient of the **$70,000** TD Scholarship for Community Leadership **2024**
- Certificate of Endorsement of Technological Studies **2024**
- Schulich Leader Award **2024**

Education

University of Waterloo Waterloo, ON

Candidate for Bachelor of Applied Science (BASc), Major in Mechatronics Engineering *Sep. 2024 – Present*

UNIVERSITY OF WATERLOO
UNOFFICIAL GRADE REPORT

Omar Elgazzar
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1B Mechatronics Engineering, Honours, Co-operative Program

Fall 2025

PD	20	Strategies for Career Success	
Term Average:	N/A	Decision:	

Spring 2025

MATH	118	Calculus 2 (Eng)	
MTE	119	Statics	
MTE	120	Circuits	
GENE	120	First-Year Eng Seminar	
MTE	100B	Seminar	
MTE	111	Material Struct & Props	
MTE	140	Algorithms & Data Structures	
Term Average:	N/A	Decision:	

Winter 2025

PD	19	Tactics for Workplace Success	CR
COOP	1	Co-operative Work Term	CR
Term Average:	N/A	Decision:	

Fall 2024

CHE	102	Chemistry for Engineers	83
MTE	121	Digital Computation	91
MATH	115	Linear Algebra (Eng)	91
MTE	100	Mechatronics Engineering	94
MATH	116	Calculus 1 (Eng)	93
GENE	119	First-Year Engineering Seminar	
MTHEL	99	First-Year Math Readiness	CR
Term Average:	90.73	Decision: Excellent Standing	

Omar Elgazzar

Mechatronics Engineering Student @UWaterloo

Project Portfolio

Explore my full portfolio: **https://omar-elgazzar.vercel.app**

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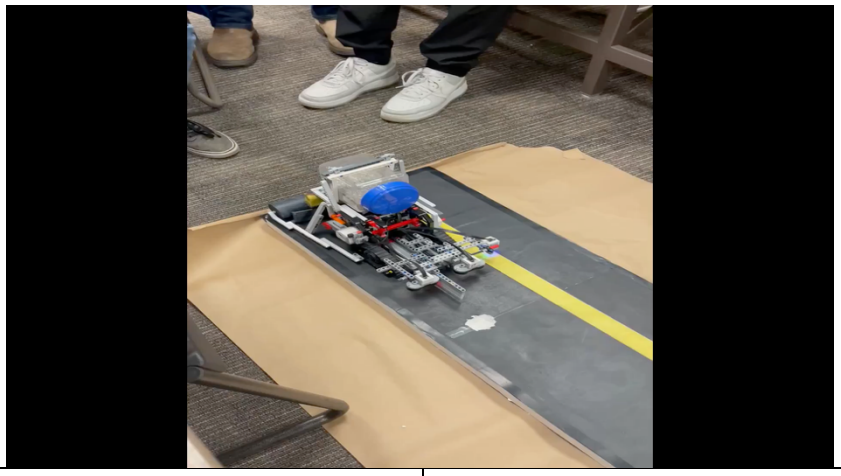
RoboPatch



What it is:

RoboPatch is an autonomous and manually operable robot that uses various sensors to interact with its environment, including ultrasonic sensors to detect the distance between the robot and the road, and a color sensor to follow the roadline. The robot's motors are responsible for moving it along the road, turning at intersections, and dispensing material to fill potholes. The robot can be operated manually through Bluetooth or set to automatic mode, where it follows a pre-programmed path and performs its tasks autonomously.

Languages: C/C++,

Applications: Lego Robotics, VSCode, Solidworks

Tools: 3D Printing

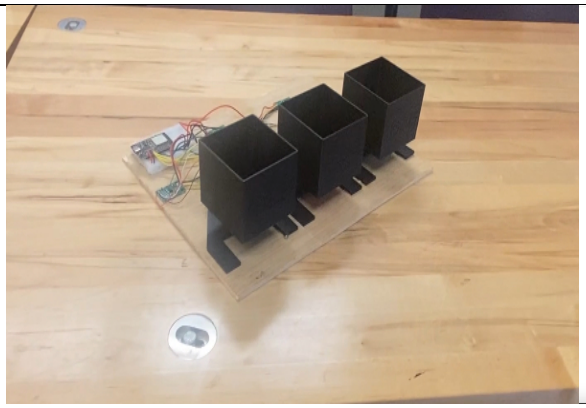
Challenges:

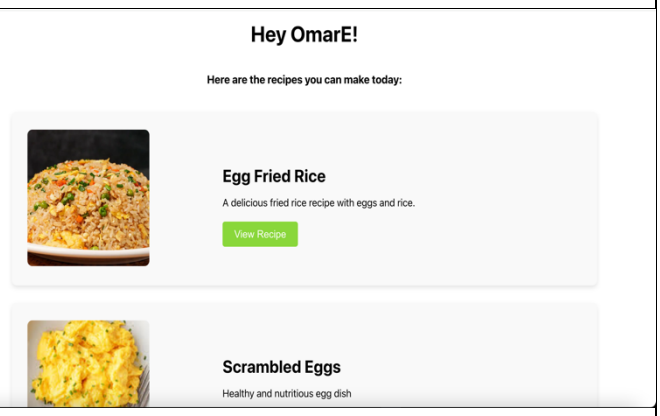
- Designing the rotor to dispense material such that it doesn't jam

Skills I learned:

- CAD Designing
- C++ Programming

Nibbles (Grocery Management Solution)





What it is:

Nibbles is a grocery management tool developed in 36 hours at Hack the North. An ESP32 tracks ingredients added to storage containers and updates their quantities in a MongoDB database. The React-based front-end retrieves this data, showing ingredient levels and suggesting recipes based on what's available. When quantities fall below a threshold, Nibbles generates a shopping list to ensure you never run out of essentials.

Languages: C/C++, HTML/CSS, JavaScript

Applications: Arduino IDE, MERN Stack, VSCode, SOLIDworks

Tools: 3D Printing, Soldering

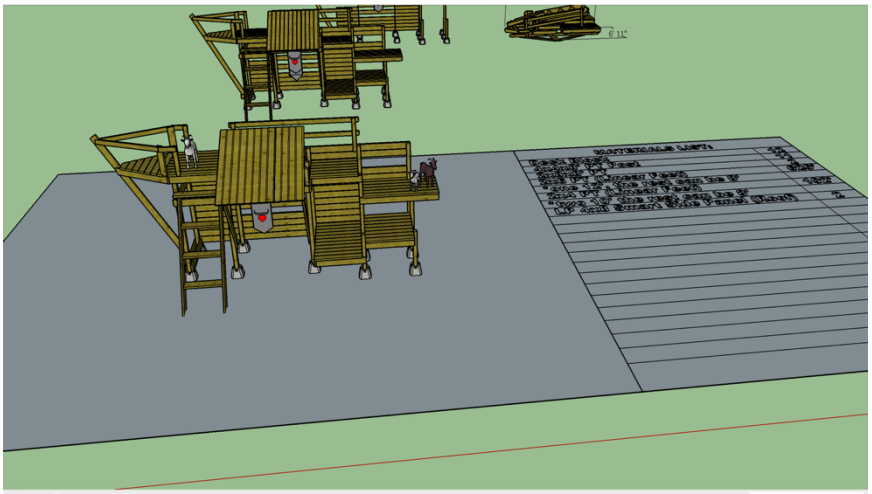
Challenges:

- Merging the front end and backend seamlessly to transfer ingredient data

Skills I learned:

- CAD Designing
- Front-End Development
- Back-End Development
- ESP32

Oshawa Zoo Goat Shelter



What it is:

"Alphas Mountain" is a mountain goat shelter. I created a 3D model for the owner of the Oshawa Zoo, emphasizing an aesthetic and accessible design with transportation and functionality in mind. The owner approved the design, and with government funding, we purchased over $4,000 in materials. The structure was built and transported to the zoo, where it stands today

Languages: N/A

Applications: Sketchup

Tools: Machine Shop, 3D Printing

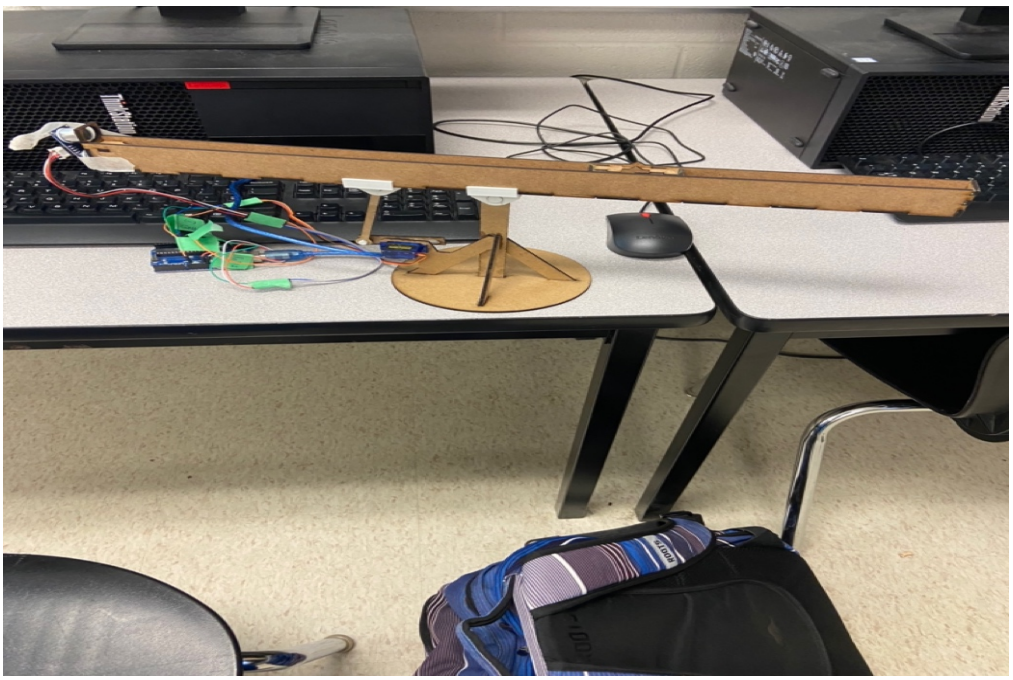
Challenges:

- Designing the shelter so that it could be separated into pieces, transported on a tow-behind trailer and then reassembled at the construction site

Skills I learned:

- CAD Designing
- Standard construction sizes and materials
- Cost reduction
- Technical Presentation

PID Controller



What it is:

A cart is placed in the middle of the bridge. When the cart is disturbed, a PID Control System is implemented and a servo constantly tilts the bridge so that the cart always ends up back at the exact center of the bridge

Languages: C/C++

Applications: Arduino IDE, Sketchup, TinkerCAD

Tools: Laser Cutting

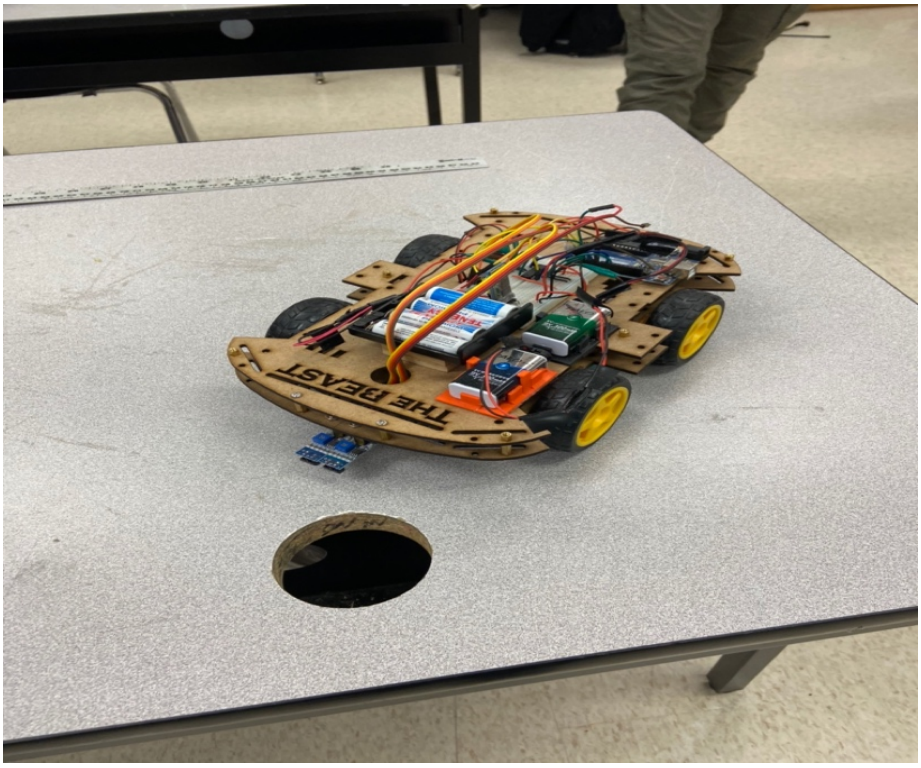
Challenges:

- Fine tuning the PID Control System to rapidly settle the cart

Skills I learned:

- PID Control Systems
- Laser Cutting

Self-Driving Arduino Vehicle



What it is:

This Arduino vehicle, using multiple sensors and an elaborate program, is able to either drive completely on its own while avoiding obstacles or follow a given line no matter how curvy it gets.

Languages: C/C++

Applications: Arduino IDE, TinkerCAD

Tools: L293D H-Bridge Chip, 3D Prints

Challenges:

- Programming the car so that it doesn't veer off in random directions

Skills I learned:

- Arduino
- Motors & Wiring

The Infected Game

What it is:

The Infected is a game developed using C#. It uses OOP and can be played using Xbox controllers or keyboards. The game is a simple tag concept, where the objective is to not be the last player to be the "Infected". The game features special powerups, an anti-gravity mode and different playable maps

Languages: C#

Applications: Visual Studio

Tools: N/A

Challenges:

- Learning how to setup the game so that it could be played with controllers

Skills I learned:

- Object Oriented Programming (OOP)
- C#

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This job is funded by the Government of Canada as advertised in the job posting. To be eligible you must be a Canadian citizen, permanent resident or a protected person defined by the Immigration and Refugee Protection Act. Do you meet this requirement?	Yes
Are you open to an 8 months co-op?	No