2025

MOHAMMED SAMER ALHAFFAR

MECHANICAL ENGINEERING GRADUATE

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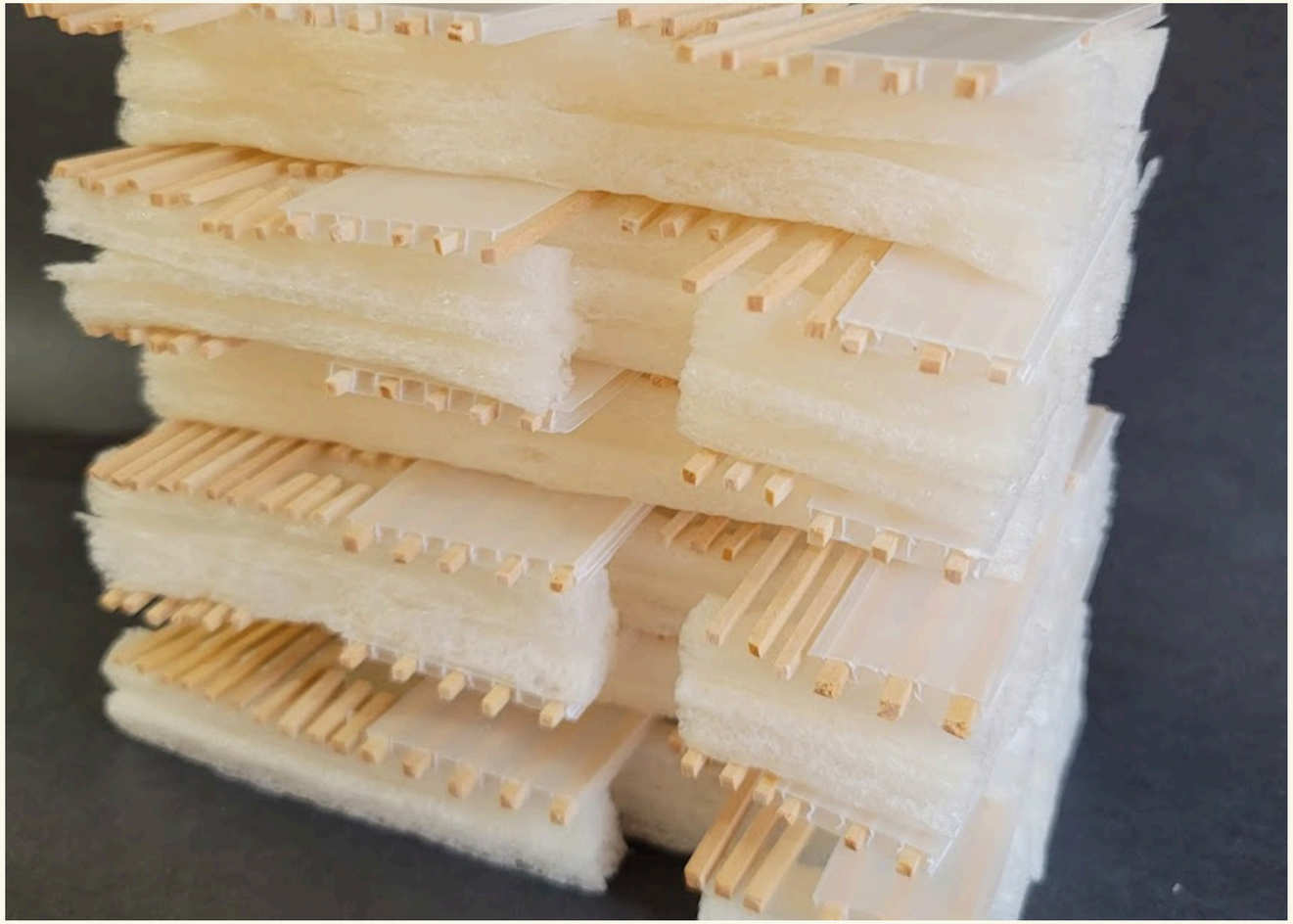
HTTPS://MSALHAFFAR.WIXSITE.COM/E-PORTFOLIO/PROJECT



PORTFOLIO

INTRODUCTION

I COMPLETED 1-YEAR UNDERGRAD IN PHYSICS & ASTRONOMY BEFORE SWITCHING TO MECHANICAL ENGINEERING

I'M A **MECHANICAL ENGINEERING GRADUATE** FROM YORK UNIVERSITY **(JUNE 2025)**, DRIVEN BY A PASSION FOR **INNOVATION** IN **MECHANICAL SYSTEMS**, **ADVANCED MANUFACTURING**, & **SUSTAINABLE DESIGN**.

WITH **24 MONTHS** OF HANDS-ON EXPERIENCE IN **AEROSPACE** & **DEFENSE** ENGINEERING, I'VE CONTRIBUTED TO **PROCESS IMPROVEMENTS**, **AUTOMATION INITIATIVES**, AND **TECHNICAL TOOLING** DESIGN THAT DELIVERED MEASURABLE **COST** & **TIME SAVINGS**.

I BRING A **CREATIVE**, **SOLUTIONS-FOCUSED MINDSET** TO EVERY CHALLENGE — BLENDING **DESIGN PRECISION** WITH **REAL-WORLD** IMPACT.

I'M EAGER TO **CONTINUE** BUILDING SYSTEMS THAT ARE NOT **ONLY EFFICIENT BUT MEANINGFUL** TO THE INDUSTRIES AND COMMUNITIES THEY SERVE.

EDUCATION & CERTIFICATIONS

A photograph from my latest visit to the Central Utilities Building (CUB) - A fossil fuel power plant that supplies York University with energy and heat.

YORK UNIVERSITY **2020 - 2025**

B.Eng., Spec. Hons. Mechanical Engineering

- In progress P.Eng (Professional Engineer), PEO
  - (20 months completed as an intern)
- WHMIS Certified, Standard First Aid
- IPC/WHMA-A-620 Requirements & Acceptance for Cable & Wire Harness Assemblies
- IPC-A-610 Acceptability of Electronics Assemblies Certification
- Lean Six Segma (White Belt)
  - Working towards Yellow and Green belts

Engineering & Simulation

CAD
CAM
CFD
FEA

SOLIDWORKS

FUSION 360

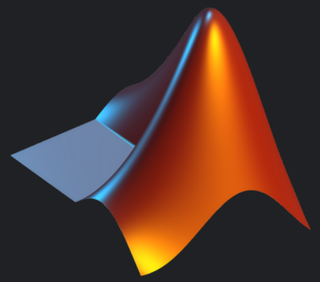
AUTOCAD

CATIA V5 - V6

Ansys: Fluent

STAR-CCM+

ABAQUS CAE



GRAPHICAL PROGRAMMING LANGUAGE & DEVELOPMENT ENVIRONMENT

- MATLAB SIMULINK
- LABVIEW

EVERYDAY USE

- MSO (WORD, EXCEL, POWERPOINT)
- GOOGLE SUITS (DOC, SLIDES, SHEETS)
- APP SHEETS
- LOCKER STUDIO
- MINITAB

PROGRAMMING

- Python
- VBA
- Google Apps Script
- Arduino IDE
- MATLAB

TECHNICAL SKILLS

TOOLS & PROGRAMMING

INTERNSHIP
COOP
WORK
EXPERIENCE

Manufacturing Process Engineering Intern –

Celestica*

Newmarket, ON

May 2023 - April 2025

During my 24-month internship at Celestica in the Aerospace & Defense division, I worked as a Manufacturing Process Engineering Intern supporting the optimization of high-reliability PCB assembly processes such as **component preparation manual and mechanical assemblies, WAVE and ERSA soldering, PCB depanalization, labels technology, wash and bake.**

I designed and validated over 35 custom tools and fixtures in SolidWorks, applying GD&T and DFM principles to ensure manufacturability and performance, which led to significant reductions in assembly time and contributed to annual savings exceeding $140,000. I supported process improvement for more than 100 active and NPI products by performing PFMEA, lean analysis, and root cause investigations, and I contributed to automation initiatives that streamlined manual operations, resulting in additional cost savings of $60,000. My role also involved technical documentation, thermal profiling, and collaboration with multidisciplinary teams to ensure production quality, efficiency, and reliability.

*Non-Disclosure Agreement: I will only disclose non-proprietary information regarding my work at Celestica. All images are public knowledge.

ALL WORK AT CELESTIC is SUBJECTED TO CGP (CANADAIAN CONTOLLED GOODS) AND ITAR International Traffic in Arms Regulations.

CELESTICA (INTERNSHIP)

Accreditation & Quality Assurance Assistant –

Lassonde School of Engineering • York University*

Newmarket, ON

September 2022 - April 2023

In my role as an Accreditation & Quality Assurance Assistant at the Lassonde School of Engineering, I supported the preparation and organization of program documentation for accreditation by the Canadian Engineering Accreditation Board (CEAB).

I was responsible for collecting, tracking, and maintaining course materials and curriculum data for the Earth Science and Space Engineering programs. My work involved liaising with faculty, course directors, and curriculum committees to ensure timely and accurate information gathering.

I also helped coordinate workshops, circulated materials, and contributed to the development of a centralized private portal for Lassonde's engineering programs — streamlining future accreditation processes and enhancing internal documentation systems.

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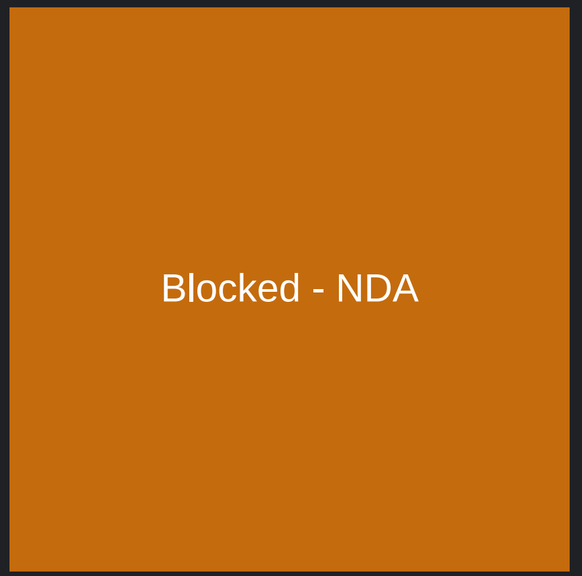

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YORK UNIVERSITY

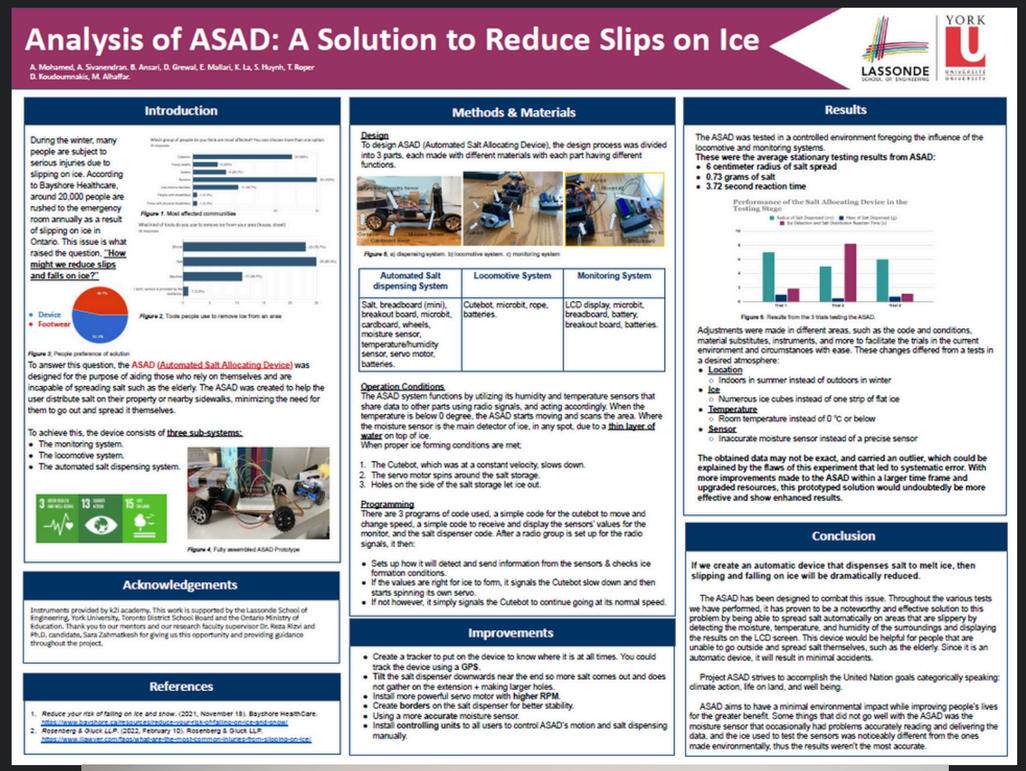
Research Mentor - Co-op Student – k2i Academy at Lassonde School of Engineering

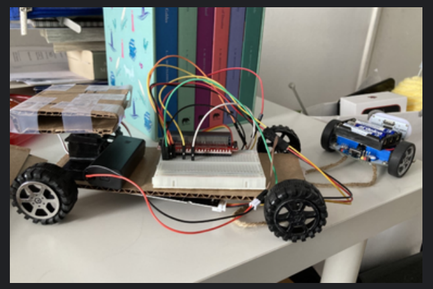
Toronto, ON

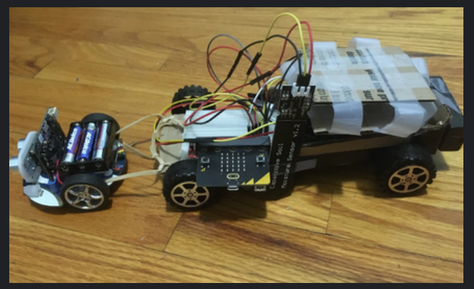
May 2022 - August 2022

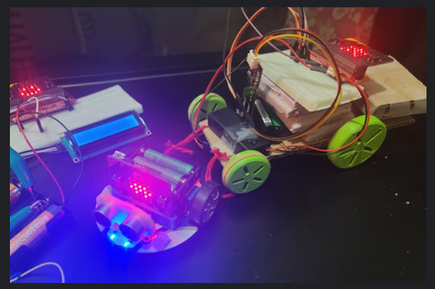
As a Research Mentor at the k2i Academy within the Lassonde School of Engineering, I led a team of eight high school students through a hands-on research project focused on real-world problem-solving and sustainable engineering.

Our work centered on designing an automated salt-dispensing device to safely remove ice accumulation in residential backyards. I supported the team in conceptual development, mechanical prototyping, and coding using Micro:Bit, while also teaching foundational skills in CAD design, electric circuits, and scientific research. This role strengthened my leadership, communication, and mentorship abilities while allowing me to apply technical knowledge in an educational and community-driven setting.



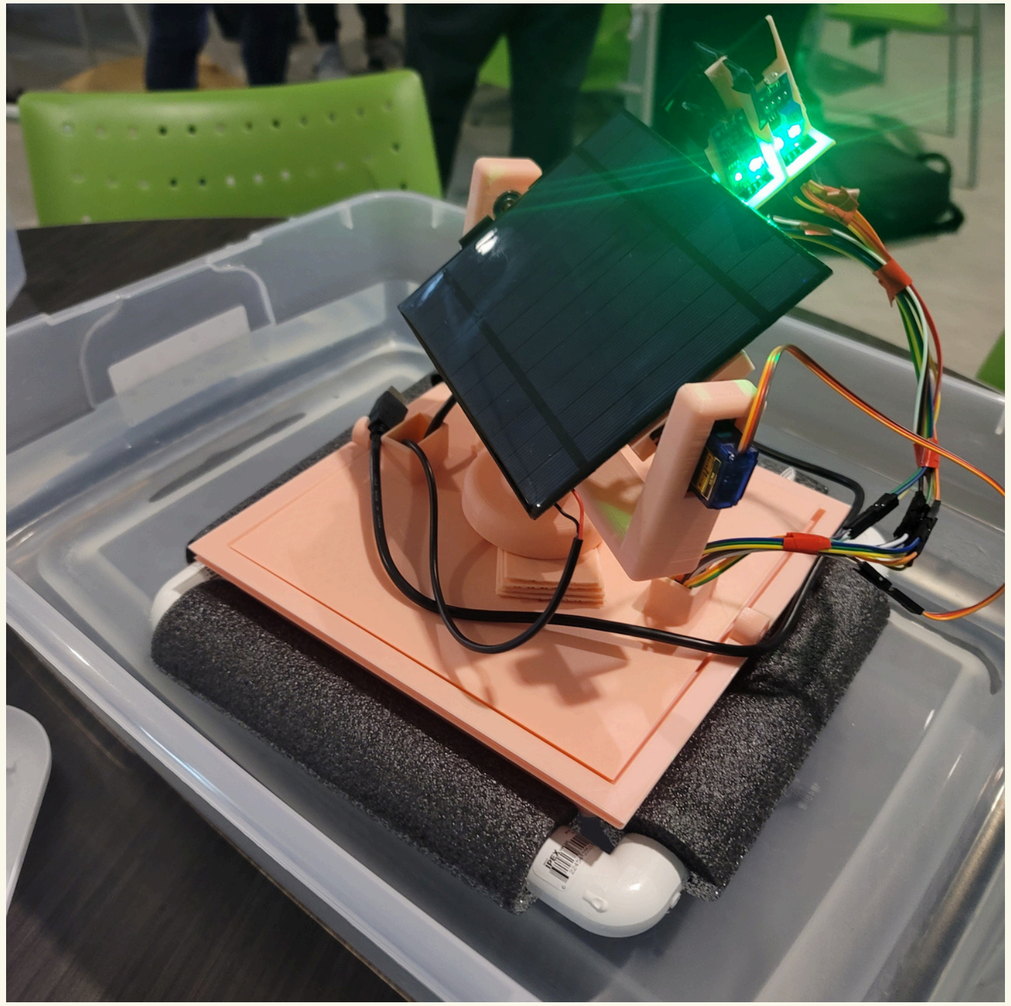


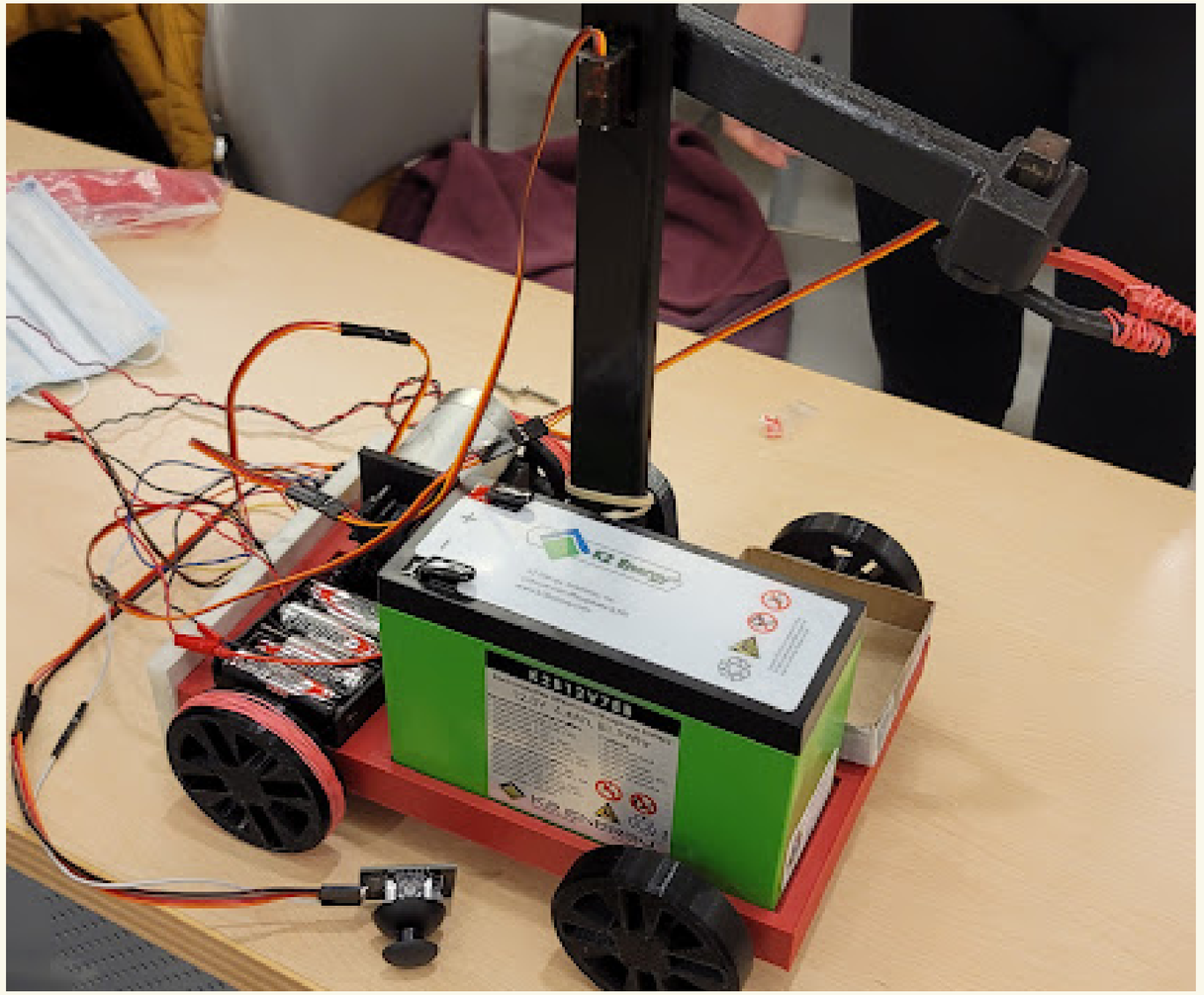




K2I ACADEMY (CO-OP)

SCHOOL PROJECTS

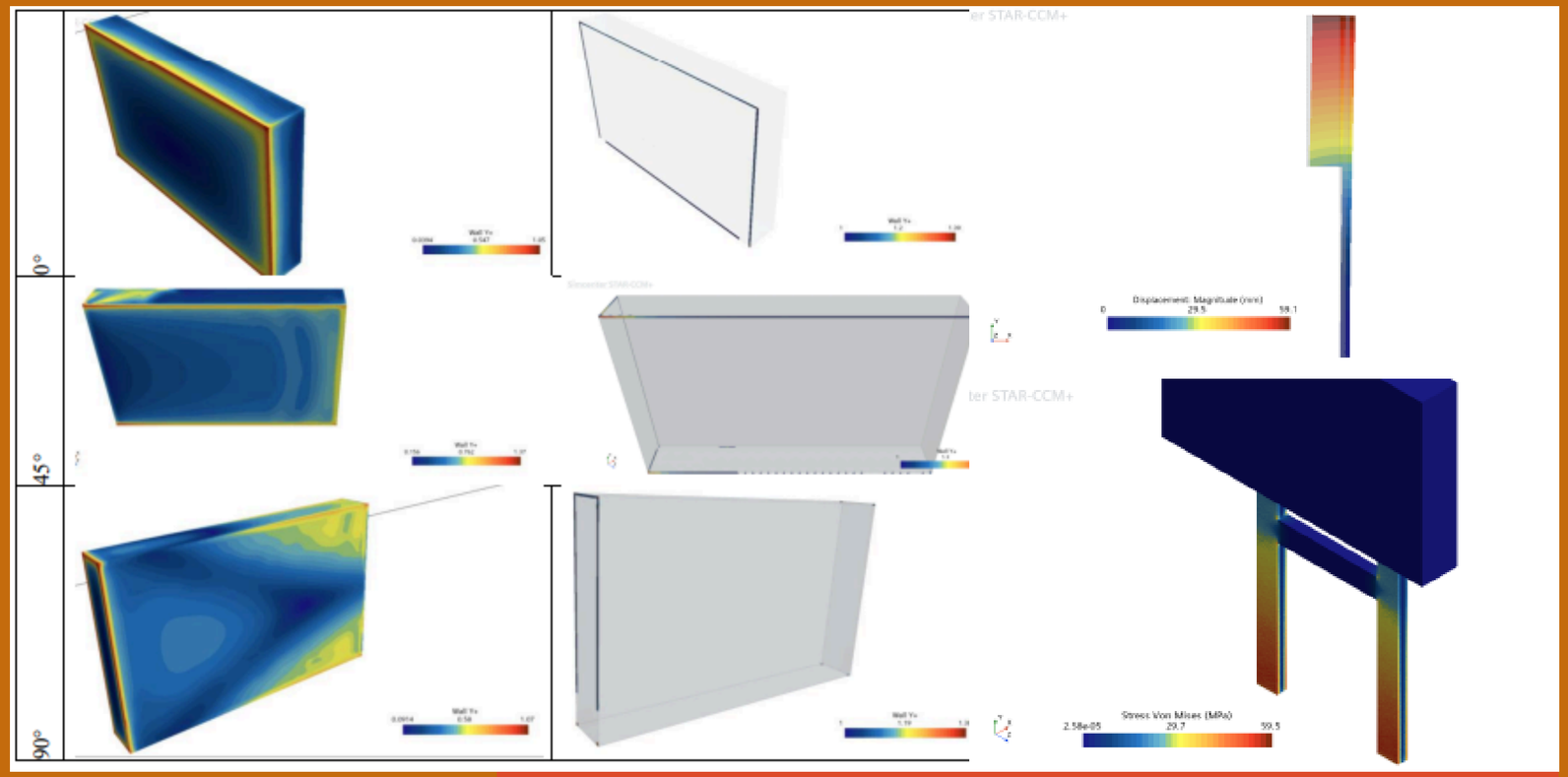


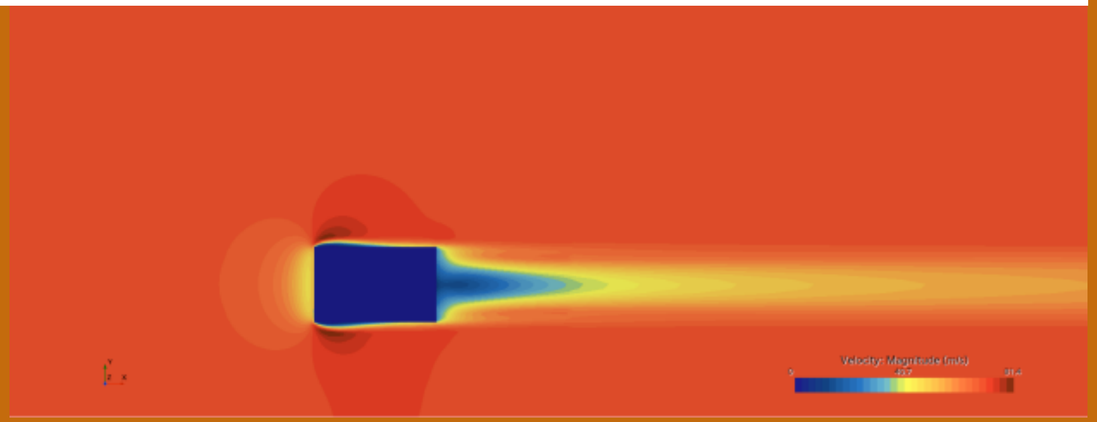


CFD & FEA Analysis of a Hurricane Evacuation Information Sign

This project involved the structural and aerodynamic analysis of a hurricane evacuation sign intended for use in high-wind environments. Using Star-CCM+, I performed detailed CFD simulations to evaluate the drag force acting on the sign structure under various wind speeds, including hurricane-level conditions. The results were used to determine critical pressure zones and assess structural loading.

I then conducted FEA to analyze stress distribution, deformation, and safety factors across the frame and base. Based on the findings, design modifications were proposed to improve aerodynamic stability and structural integrity, ensuring the sign could withstand extreme weather while maintaining visibility and reliability in emergency scenarios.





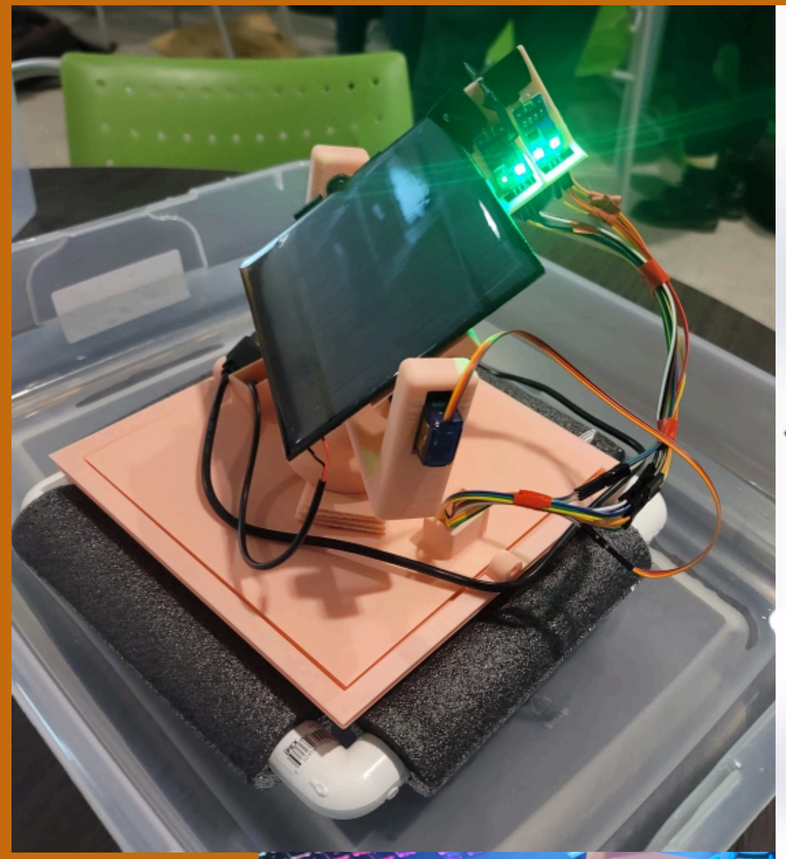
PROJECT 01

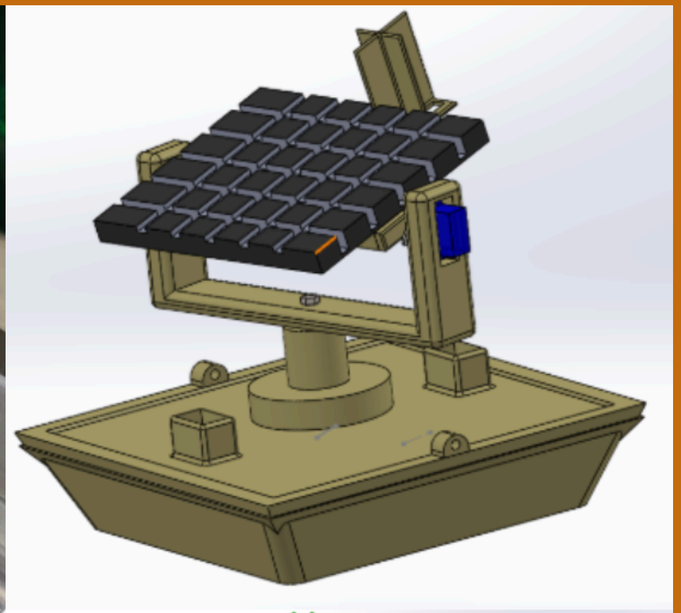
Floating Sun-Tracking Solar Panel Model

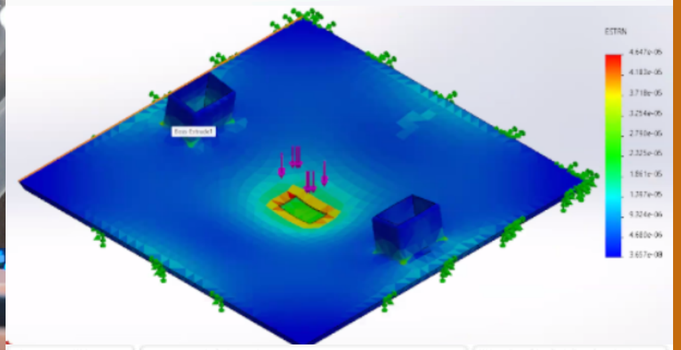
This project focused on designing a floating solar panel platform with an integrated sun-tracking mechanism to maximize solar energy capture on water surfaces. The system was developed to rotate along a single axis, allowing the panel to follow the sun's path throughout the day.

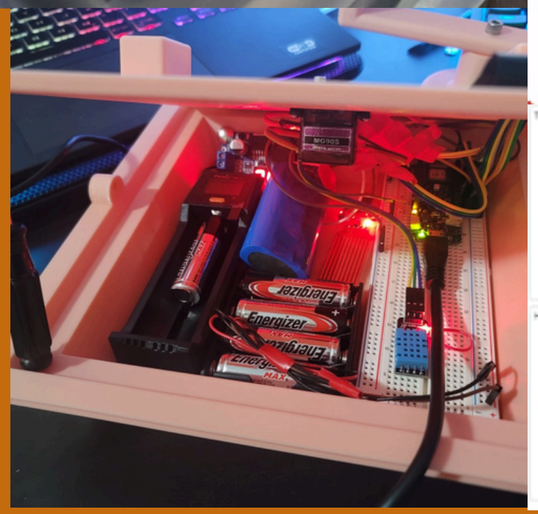
I applied mechanical design principles to create a stable, buoyant structure and integrated sensors and a microcontroller (Arduino) to control the tracking system.

The project emphasized energy efficiency, sustainability, and remote deployment potential for lakes or reservoirs. Special attention was given to balancing structural integrity, solar exposure, and system responsiveness under varying environmental conditions.









PROJECT 02

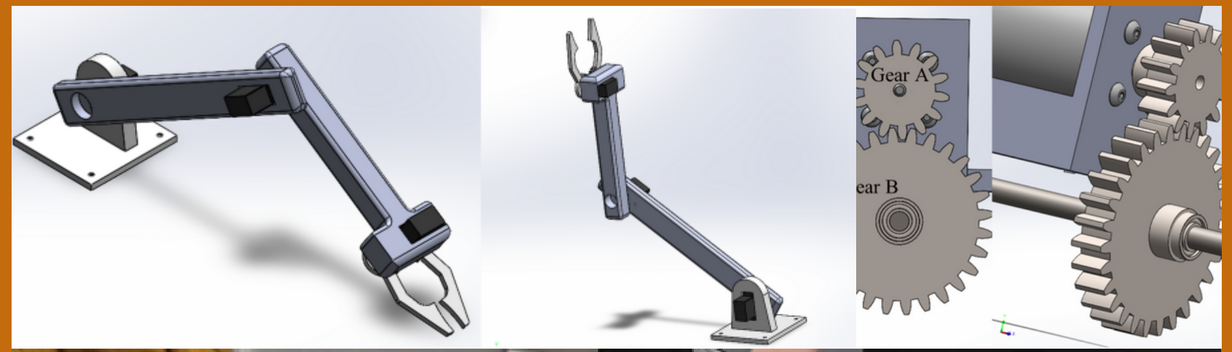
Lunar Rover Prototype

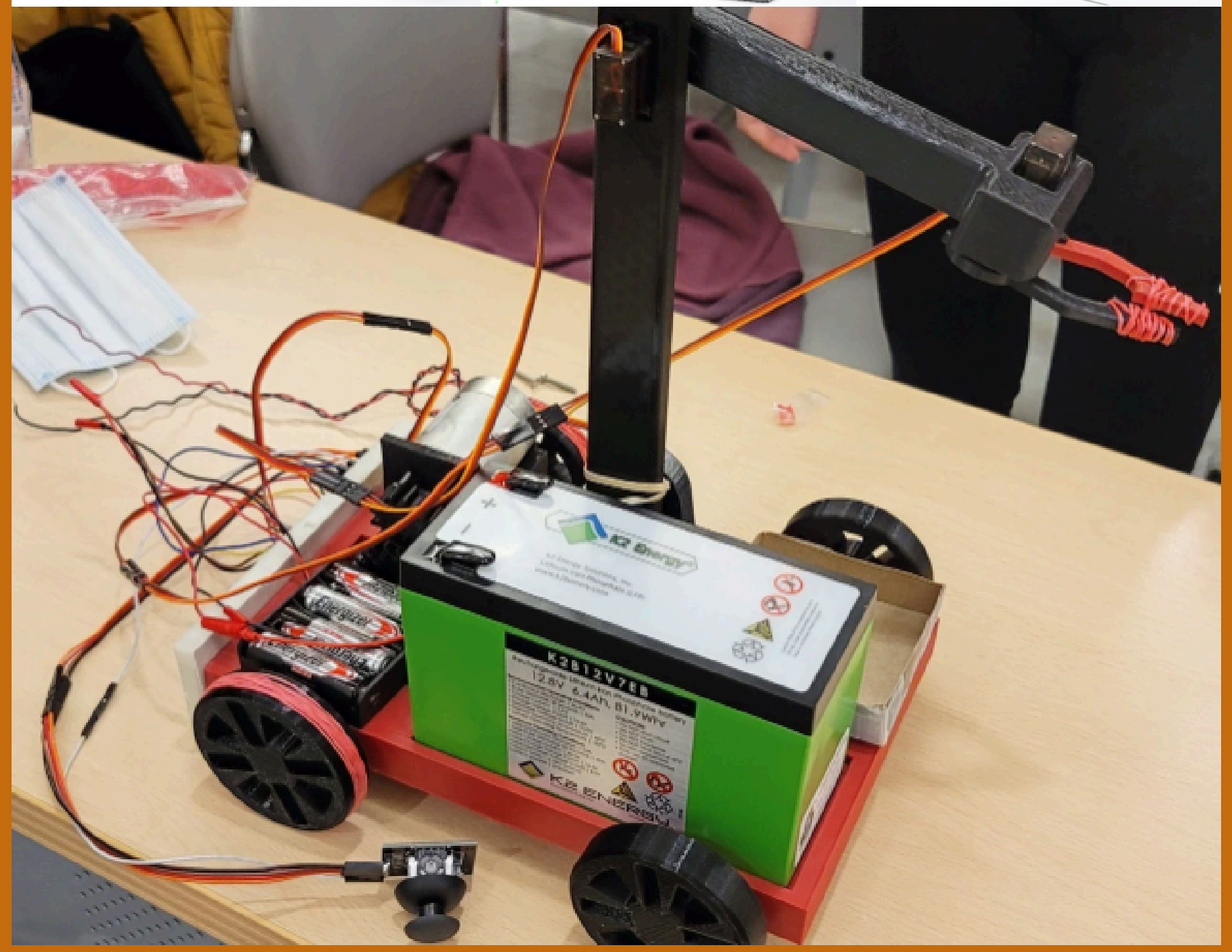
This team-based project involved designing and prototyping a functional lunar rover with three key subsystems: locomotion, chassis, and a robotic arm for material collection.

I led the mechanical design phase using SolidWorks to model the chassis, gear system, gripping mechanism, and robotic arm.

The rover was equipped with DC motors, ultrasonic sensors, and servo motors to enable autonomous obstacle detection and object retrieval.

I also developed the control logic using Arduino Nano and implemented a joystick-based interface for manual operation. The rover was prototyped using 3D printing and assembled in-house, emphasizing modularity, lightweight design, and terrain adaptability for extraterrestrial exploration.





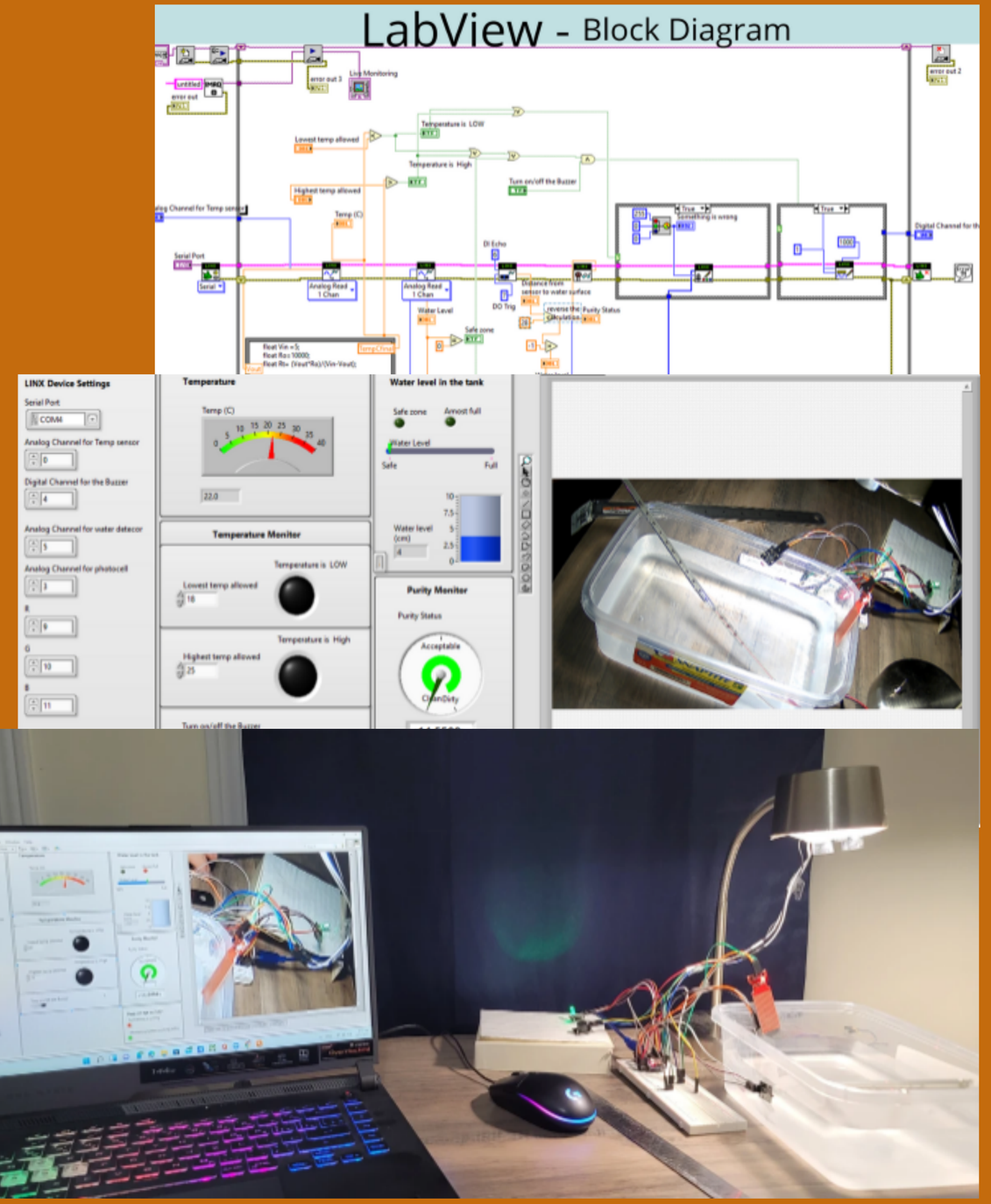
PROJECT 03

Fish Tank Monitoring System

This project involved designing a real-time monitoring system for fish tanks to track water temperature, purity, and level using a combination of analog and digital sensors.

I collaborated with a team to develop the circuit architecture using Arduino as the central control unit and programmed the interface in LabVIEW to visualize sensor data.

The system featured automated alerts for out-of-range parameters and was built to support both freshwater and saltwater applications. Emphasis was placed on sensor calibration, data acquisition, and system responsiveness to ensure a reliable and user-friendly solution for aquarium management.



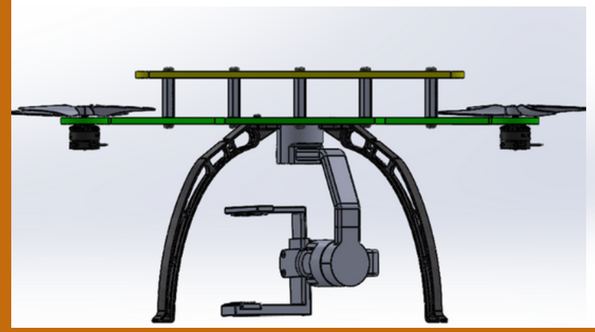
PROJECT 04

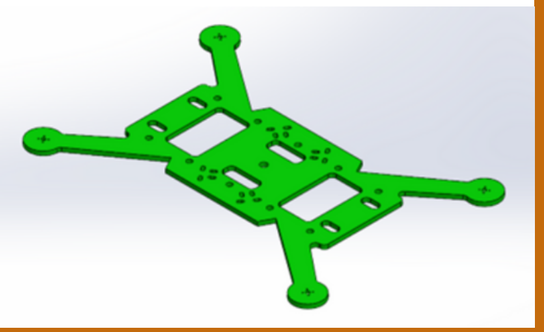
Design of a Drone Airframe Using Natural Fibers & Bio-Based Resin Materials

This project explored sustainable alternatives to conventional drone frame materials by designing a lightweight airframe using a PLA/jute composite.

The goal was to minimize environmental impact without compromising mechanical performance. I designed the airframe in SolidWorks and selected compression molding as the manufacturing method to ensure strong fiber-matrix bonding and reduce moisture absorption.

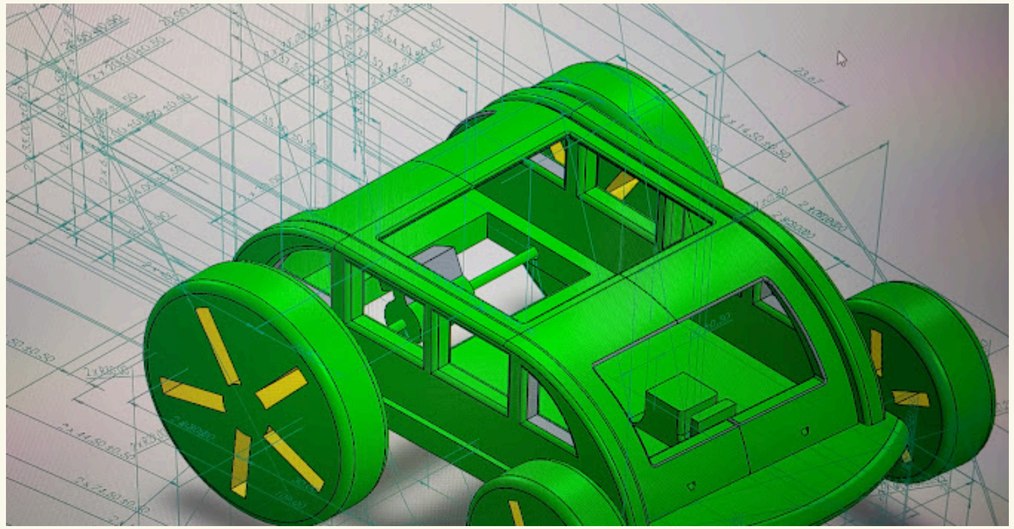
The structure was evaluated for stiffness, weight, and durability under flight-relevant conditions. This project combined material science, eco-conscious engineering, and practical design to demonstrate how biodegradable materials can be applied in modern aerial systems.

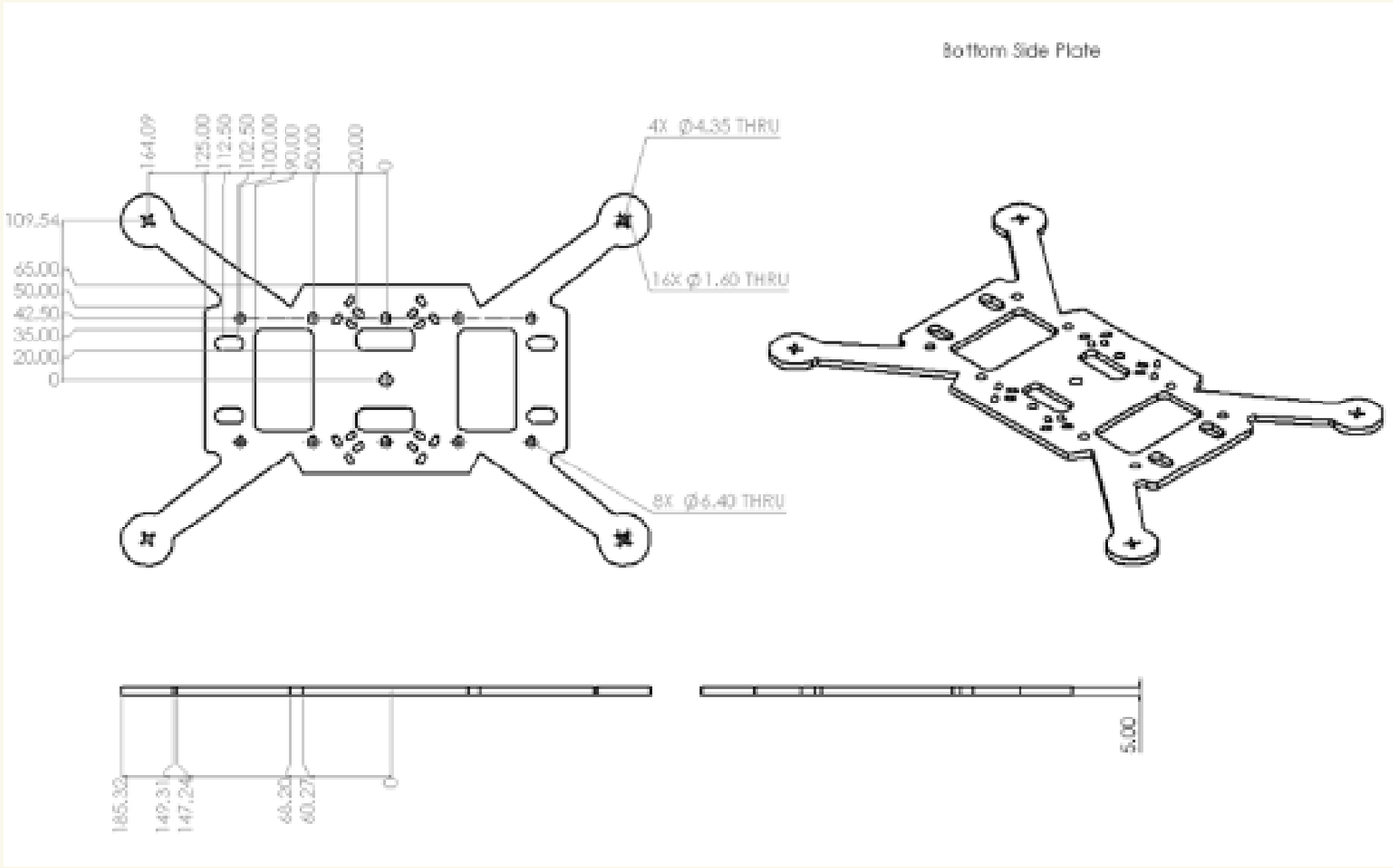




PROJECT 05

THANKS TO GREAT TEAMMATES, MENTORS, PROFESSORS, ALL ENGINEERS I WORKED WITH, AND VENDORS WHO USED TO MACHINE AND BUILD MY TOOLS AND FIXTURES, I HAVE IMPROVED FROM POINT A TO POINT B, EAGER TO REACH POINT ZZZX!



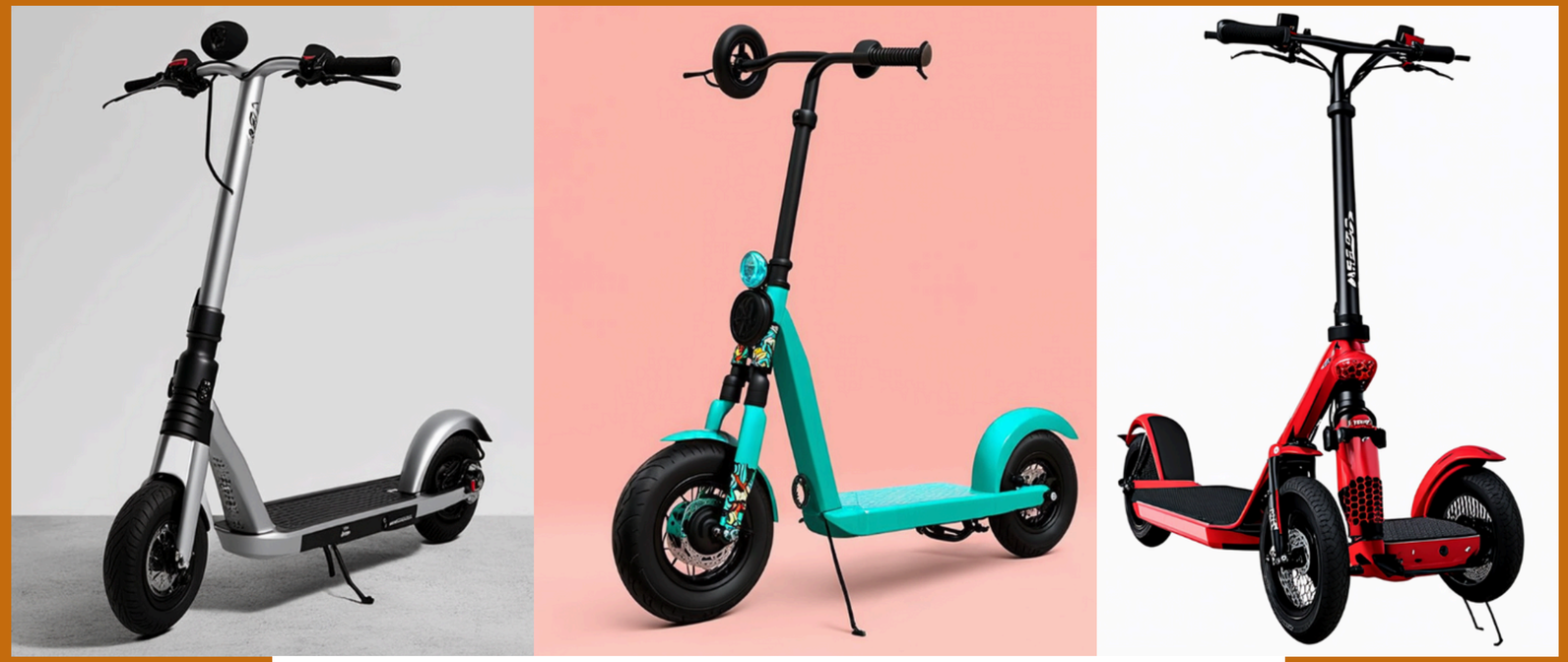


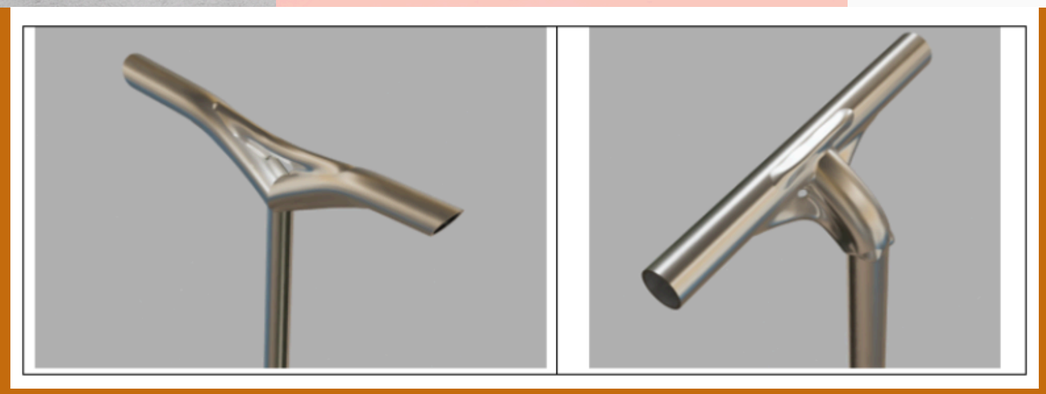
AI & Generative Designs

Used Python to create an LMM (Large Language Model) and AI diffusion models to generate new design concepts for a Sustainable Scooter.

In this exploratory project, I utilized Autodesk Fusion 360’s Generative Design feature to investigate how artificial intelligence can enhance mechanical design innovation. The objective was to create optimized structural forms based on defined constraints such as material type, load conditions, and manufacturing method.

I compared the AI-generated outputs that I developed a special AI diffusion model and an LLM for, to traditional CAD designs in terms of weight reduction, stress distribution, and material efficiency. This project highlighted the potential of AI-driven tools in accelerating the design process and producing high-performance, lightweight components that would be difficult to conceptualize manually.





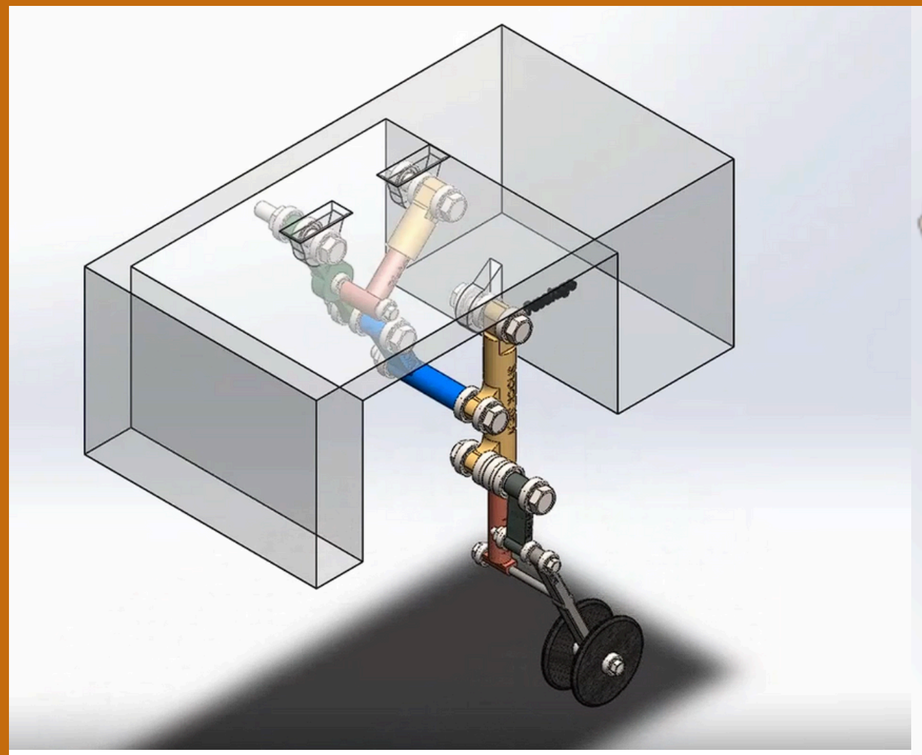
PROJECT 06

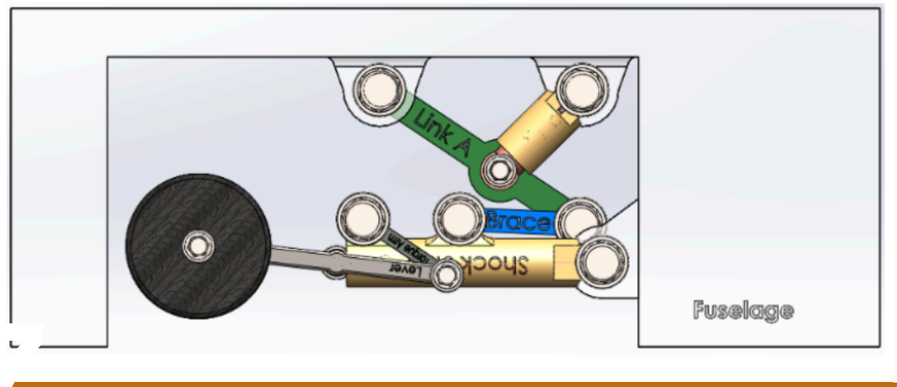
Mechanism of a Landing Gear System

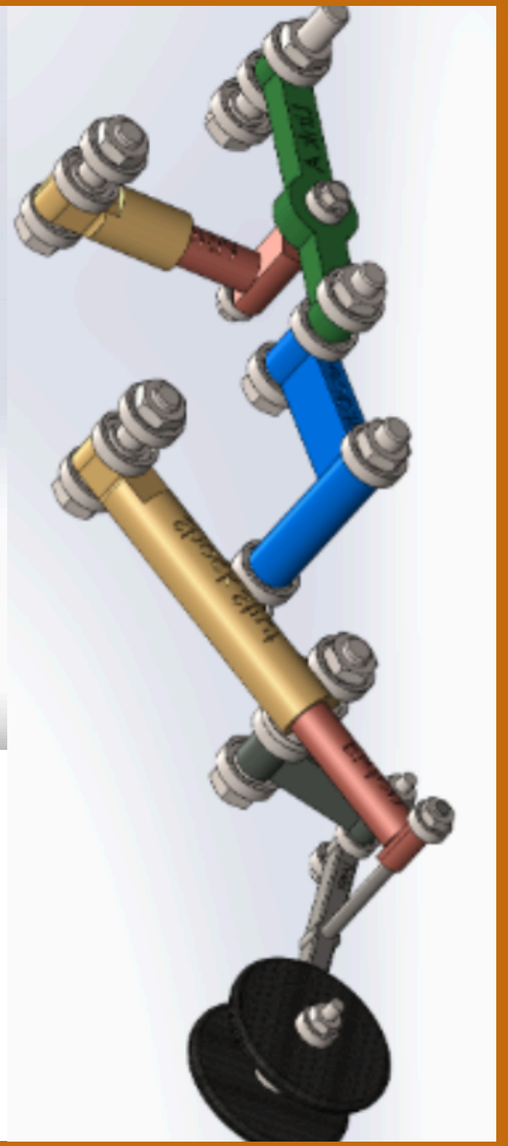
This project focused on analyzing and modeling the mechanical operation of an aircraft landing gear retraction and extension system.

Using SolidWorks, I created a detailed 3D assembly that simulates the movement of a four-bar linkage mechanism used to retract the gear into the fuselage.

The design considered the spatial constraints, mechanical advantage, and synchronization of motion required for reliable operation. Through this project, I gained deeper insights into kinematic analysis, actuator integration, and motion simulation within aerospace mechanical systems.







PROJECT 07

Academic Peer Support Assistant

As an Academic Peer Support Assistant at the Lassonde School of Engineering, I mentored over 50 first-year engineering students enrolled in the Renaissance Engineer 1 (ENG 1101) course.

I provided academic guidance through one-on-one tutoring and helped students build individualized study plans tailored to their learning goals.

I also delivered weekly presentations on essential topics such as course enrollment, time management, and available academic resources. This role strengthened my communication and leadership skills, while allowing me to foster a collaborative learning environment for new engineering students.

EXTRACURRICULAR

Students Refugee Program Coordinator

As a Program Coordinator for the World University Service of Canada (WUSC) at York University, I supported newly sponsored refugee students with their transition to life in Canada, assisting with academic, housing, and personal well-being needs.

I also organized and led weekly on-campus tabling events to raise awareness and secured an average of $80 per week in donations to help offset student expenses.

This experience enhanced my skills in student advocacy, cultural sensitivity, and community leadership.

EXTRACURRICULAR

Mars Rover – Mech Team Member

As part of the Mech Team for York University's Robotics Society over the Summer of 2022, I contributed to the design and prototyping of a Mars Rover that competed in the Canadian International Rover Challenge (CIRC) in Fall 2023.

My responsibilities included producing detailed technical drawings and assembly documentation for the electronic storage components that I 3D prototyped it and integrated within the Rover assembly.

EXTRACURRICULAR

Co-Founder – Move Forward Hiking & Camping Team

As one of the 6 founding members of the Move Forward Hiking Team, I helped establish a non-profit community dedicated to connecting people through nature-based experiences such as hiking, camping, and outdoor exploration. Our team organizes regular recreational events across national parks, forests, and natural reserves to encourage well-being, resilience, and social connection through outdoor activities.

My role included co-leading trip planning, contributing to communication and community outreach coordination, and preparing and facilitating recreational, team-building, and discussion sessions activities during the trips. — to empower individuals to overcome challenges through nature and build a supportive, inclusive community.

The Move Forward Community has since expanded and now is welcoming over +100 hikers and is planning for 2 long trips in the Summer of 2025.

THANK YOU FOR GOING OVER MY PORTFOLIO!

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Read more about me and my work in my e-portfolio

HTTPS://MSALHAFFAR.WIXSITE.COM/E-PORTFOLIO/PROJECT