

FAIZAN MALIK

ENGINEERING INTERNSHIP | 3rd YEAR ENGINEERING STUDENT

(236) 866-5758 | faizanmalikne@icloud.com | www.linkedin.com/in/faizanm1 | Vancouver, Canada

EDUCATION

BASc in **Mechatronic Systems Engineering**
Simon Fraser University, Burnaby, BC

Expected Graduation: **May 2026**

ENGINEERING TEAM PROJECTS

Team President

SFU Rocketry

Jan 2023 - Present

- Led and managed a cross-functional team, coordinating mechanical, electrical, and software subsystems to meet manufacturing and project milestones.
- Oversaw the **design-to-manufacturing process** for sensor integration, working with hardware engineers to ensure seamless data tracking and real-time performance.
- Developed and optimized firmware in C++ for microcontroller systems, such as **Raspberry Pi** and Arduino, ensuring efficient data processing and hardware control.
- Managed the production and **assembly of battery packs**, including documentation of the **Battery Management System**, ensuring adherence to safety and manufacturing standards.

Steering Systems Lead

SFU Formula SAE Electric

- Led the **manufacturing** of the vehicle's entire steering system, ensuring precision and quality throughout the process.
- Managed the **transition** from design to production, working closely with **CNC** operators, **3D printing** technicians, and **water jet** specialists to fabricate key components.
- Optimized manufacturing workflows by integrating **CAD models** directly into **CAM software**, streamlining CNC programming for complex parts.
- Directed the use of **additive manufacturing** (3D printing) for rapid prototyping and functional parts, reducing production lead times.
- Collaborated with the driver controls and electric teams to **manufacture dashboard** components, integrating electrical systems into physical assemblies with accuracy.
- Conducted **material selection** for **manufacturing processes**, ensuring durability while meeting weight and strength requirements..

EXTRACURRICULAR

Wheelchair "Table" Prototype

Feb 2023

Won 2nd Place in UBC Engineering CADathon

- Led the design** of an innovative wheelchair table prototype using **SolidWorks**
- Designed a unique table and wheelchair design a for disabled person's use, optimized for manufacturing feasibility utilizing minimal material.
- Executed **FEA**, rendering, and **tolerance analyses**, optimizing the design and **reducing manufacturing costs by 30%**, showcasing strong **cost-effective** engineering **solutions**.
- Prepared and delivered a compelling presentation of the project's journey from **concept to prototyping** to a panel of judges and industry experts.
- Compiled comprehensive documentation, including design notes, **simulation results**, and **manufacturing** guidelines.

Won 2nd Place SFU Engineering Competition

Dec 2023

- Designed and prototype a lightweight earthquake safety helmet.
- Conducted iterative testing, applied principles of product analysis for durability, and effectively communicated the technical process.

Lithium-Ion Cell and Enclosure Design

- Designed** Li-ion cell components and developed a comprehensive enclosure for battery packs using SolidWorks.
- Researched **chemical** and **thermal properties** of the cell and wrote documentation on the **battery pack**

Shock Absorber Design

- Design shock absorbers in **SolidWorks** tailored for various applications.
- Conducted **Finite Element Analysis (FEA)** within SolidWorks to predict and optimize the shock absorber's performance under varied load conditions.

Director

Western Engineering Competition 2023

Sept 2022 - Jan 2023

- Organized** and **executed** a technical design challenge for a **national level** undergraduate **competition**, exhibiting strong technical insight.
- Managed competition dynamics and facilitated communication between competitors and judges, demonstrating cross-functional collaboration.

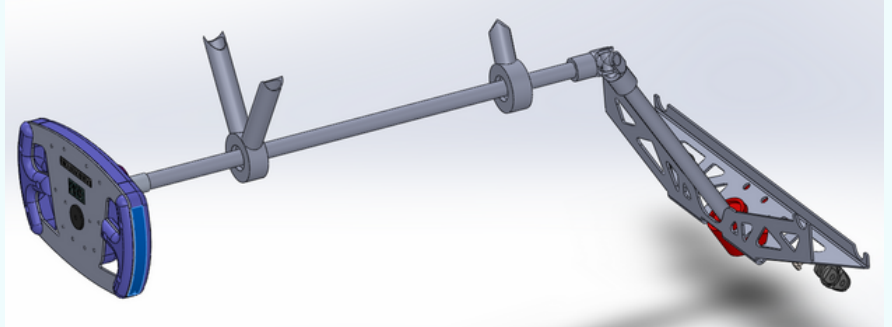
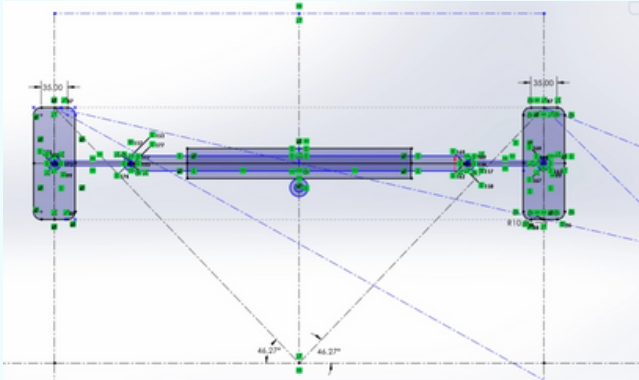
FAIZAN MALIK

MANUFACTURING CONTROLS INTERNSHIP | 3rd YEAR ENGINEERING STUDENT

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FSAE Rack and Pinion

Rack and Pinion Design



What?

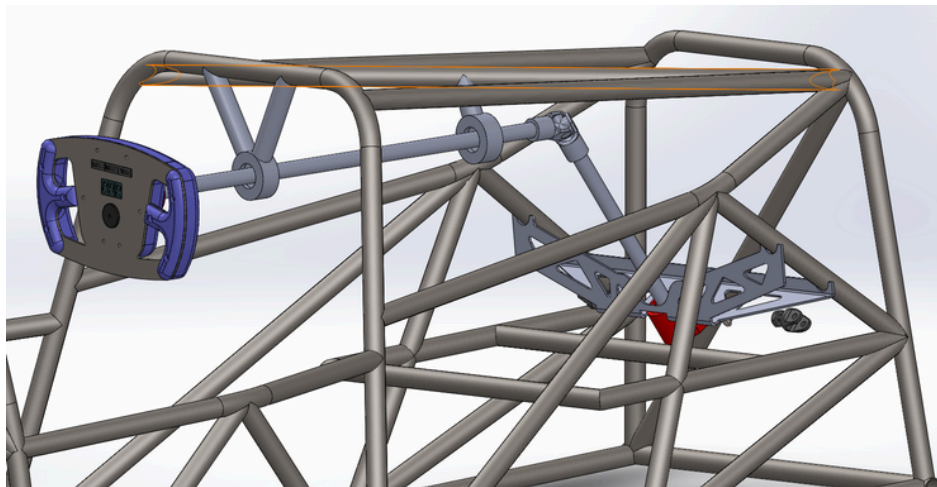
- Designed a **rack and pinion control system** integrated with a steering angle sensor to better the steering accuracy and vehicle dynamics in the Formula SAE vehicle.
- Developed a **closed-loop control system**, where the **driver's input** and **sensor feedback** continuously adjust the steering for **real-time corrections**.
- The project focused on achieving **precise control** through **feedback mechanisms** using the **Raspberry Pi** as a central control unit.

How?

- Modeled the rack and pinion system using SolidWorks, ensuring proper integration with the steering sensor for **feedback control**.
- Implemented an **open-loop system** for initial steering control, where the **driver's input directly affects the steering angle without feedback**.
- Transitioned to a closed-loop control system** by **integrating a Raspberry Pi** to process data from the steering sensor. The **feedback** from the sensor allows **real-time corrections** to the steering angle based on the driver's input.
- Manufactured components with high-precision techniques** to ensure durability, enabling the system to handle feedback-based adjustments under high loads.

Results

- The **closed-loop control system** significantly improved **steering precision** and **vehicle stability** by **continuously adjusting** the steering angle based on **feedback** from the steering sensor and **driver inputs**.
- The Raspberry Pi effectively processed **real-time sensor data**, reducing steering errors and enhancing overall handling.
- The system provided a smooth **transition from open-loop to closed-loop control**, demonstrating better performance, reliability, and responsiveness during testing.



Rack and Pinion System Control Manufacturing Process Flow

