

# Elizabeth Shim

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## SKILLS

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Hardware and Electrical: 3D CAD modelling in Solidworks and AutoCAD, heat setting, drill press usage, soldering, wiring  
Software: Python (Arduino, Serial, Script), C, JavaScript, HTML/CSS, Node.js, Docker, Git, Bash, Linux, MATLAB, Simulink

## EXPERIENCE

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### Advanced Research and Collaboration Engineer for Christie Digital Systems

May 2023 - Aug 2023

- Designed and prototyped a robot that projected focused content while in motion by integrating features such as a lidar depth sensor and dynamic projection mapping
- Utilized an **Arduino** and **servo motors** to implement a **crank lever mechanism** to eliminate the need for manual focus adjustment on a projector, enabling real-time, precise adjustment and **reducing** the time required to locate the optimal focus position of at least **5 seconds**
- Established data transmission between the **Arduino** and the **Jetson Nano** via **serial USB communication**, along with **WebSocket** integration between the Jetson Nano and a backend database, resulting in **immediate** transmission rates and improving data exchange efficiency
- Investigated and integrated an open-source speech-to-text service into the robot's functionality using **Docker**, optimizing voice command recognition and execution and reducing errors by 40% to improve user experience

### Software Developer for Friendlier

Sep 2022 - Dec 2022

- Reconstructed UI/UX customer flow by improving code structure with reusable components and custom class models in Vue.js, **increasing speed of user workflow and efficiency by 35%**
- Optimized solution administration by implementing a notification center with specific error metrics, leading to a faster resolution of critical issues
- Customized payment handling with **Stripe API** to allow customers to **conveniently** create invoices, automate tracking, and securely save credit card information
- Developed **API endpoints** for seamless data manipulation in Firestore, resulting in a 25% improvement in data retrieval speed

## PROJECTS

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### Robotic Car

Sept 2023 - Present

- Assembled an autonomous robot using a **STM32F01 Nucleo 64** board, integrating RGB and IR sensors and implementing motor control and characterization through **PWM modulation**
- Configured the robot's behaviour with the **HAL library** on the microcontroller for **autonomous** navigation and line following

### Nano Case

May 2023 - Aug 2023

- Designed a case to enclose exposed GPIO pins for the Jetson Nano using **Solidworks**
- Optimized** manufacturing with precise **heat setting** of fastener inserts to improve durability and increase consistent alignment reliability by **100%**
- Reduced assembly time by **20%** and significantly minimized number of tools and screws required, resulting in **increased efficiency** and **cost savings**

### Limit Switch Axis Machine

Jan 2023 - Apr 2023

- Utilized **analog-to-digital converters** to acquire sensor data, configuring and integrating analog interfaces within the **STM32 microcontroller** for axis motor characterization
- Integrated polling and global **interrupts** to effectively manage time-sensitive switch inputs, ensuring prompt and accurate responses to **dynamic system** changes, resulting in enhanced system performance

## EDUCATION

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### University of Waterloo - Mechatronics Engineering, Co-op (BASc)

Sep 2020 - Apr 2025

**Relevant Courses:** Graphics and Design, Circuits, Mechanics of Deformable Solids, Microprocessors and Digital Logic, Linear Systems and Signals, Sensors and Instrumentation, Microprocessor Systems and Interfacing, Kinematics and Dynamics of Machines, Actuators and Power Electronics, Electromechanical Machine Design, Automatic Control Systems

**Cumulative GPA:** 3.7/4.0