# James Li

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## Techinical Skills

- **Languages and Frameworks**: C++, C, JavaScript, MATLAB, Ladder Logic, React.js, OpenCV, Arduino, Python
- **Tools and Software**: VSCode, Git, MS Office, SolidWorks, AutoCAD, Rhino 7, React Native, Expo Go, Simulink, SimulationX, Fusion 360, Eagle/Fusion Electrical

## Professional Experience

- **Virtek Vision International** — Waterloo, ON
  *Product Development Engineer* — *September 2023 - December 2023*
  - Completed a 4 month coop on the product development team at Virtek Vision where I lead the development of a mobile app made using React-native, as well as a supplementary motorized mount product with an accompanying electrical box.
  - Implemented key design decisions for the electrical components and communication protocols within the mount.
  - Drafted full technical and electrical drawings using **SolidWorks** and Visio for an electrical box and supplementary cables.
  - Assembled multiple prototypes and completed electrical safety testing at TUV which resulted in **CE certification**.
  - Worked with **RabbitMQ** (STOMP) and **Swagger-API** to elegantly handle back-end data transfer.
  - Fixed various bugs and implemented new features resulting in **3 new version** releases on app stores across all platforms.
- **VCT Group** — Kitchener, ON
  *Process and Design Engineering Intern* — *January 2023 - April 2023*
  - Worked under the Product Manager at VCT Group to learn design processes for solar, EV, and renewable energy products.
  - Independently designed and created a 3D model for a new line of EV charger pedestals in **Rhino 7**, and drafted a full set of technical drawings following **GD&T**, ready to be sent out for production in a 3 week period.
  - Developed various parts, components, and accessories for solar carports and EV chargers with limited timelines to increase overall product development efficiency up to **34%**.
  - Helped lead the design of a **patented** water management system for a solar canopy through iterative design processes.
  - Used a **3D printer** to model and prototype various items and parts over the course of the term.

## Projects

- **Custom USB Macro pad**
  *Python, Arduino, Fusion 360, Eagle* — *May 2024*
  - Designed and built a custom keypad from scratch to streamline productivity with the use of custom macro keys and a knob.
  - Implemented a switch matrix to reduce the pin usage of the keypad by **17%** given limited I/O pins on the Arduino.
  - Used Eagle to design and fabricate a custom PCB, and to learn **PCB design** for my future passion projects.
  - Used **Fusion 360** to design and 3D print the housing for the components as well as the keys and dial knob.
  - Programmed Arduino to support up to **36** macros using 6 key profiles that can be cycled through or selected using the knob.
  - Preformed **cost analysis** in Excel to optimize the performance to cost as well as to maintain a budget of **$100**.
- **Two Axis Stepper Motor Machine**
  *C, STM32F401RE, Nucleo IHM02A1* — *January 2024 - April 2024*
  - Programmed a micro controller to control a two axis machine used in applications like 3D printing and sorting systems.
  - Implemented and evaluated **interrupt** and polling methods to optimize system performance in mechanical applications.
  - Configured an **ADC** within the microcontroller to ensure accurate **signal processing** to control stepper motor speed.
  - Analyzed and validated the performance of the system using **multi-meters**, **oscilloscopes** and **digital readouts**.
  - Utilized **GPIO** pins using **HAL** functions for limit switches as safety stops within machine.
- **Primitive RTOS**
  *C, STM32F411RE* — *April 2023 - August 2023*
  - Designed a basic **real time operating system** on the STM32F411RE micro controller board in **C** to learn embedded C and deepen my knowledge of operating systems and interrupt handling.
  - Designed OS to allocate memory for up to **31** user-defined threads, handle system interrupts, and switch threads.
  - Achieved context switching using system interrupts, software based timers, and a TCB to store thread context.

## Education

- **University of Waterloo** — Waterloo, Canada
  *Currently pursuing a Bachelor of Mechatronics Engineering; cumulative GPA: 3.7* — *2021-2026*

## Hobbies/Clubs

- Competing for the University of Waterloo men's varsity fencing team and won gold in the teams event at the OUA tournament held in Ottawa. My other interests include running, rock-climbing, playing volleyball, table-tennis, and listening to music.