

# Patrick He

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## SKILLS

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- **Languages:** C++, Python, Java, Javascript, HTML, CSS, TypeScript, PHP, SQL
- **Technologies:** React.js, Next.js, Node.js, Laravel, SwiftUI, Arduino, OpenCV
- **Tools:** Git, MySQL, PostgreSQL, Firebase, Heroku, Vercel, AWS S3

## WORK EXPERIENCE

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### Sharkbyte

Jul. 2023 – Aug. 2023

Software Engineering Intern

Ottawa, ON

- Created a full stack application with the **PHP** web framework **Laravel** to assist high school students accessing events and announcements.
- Programmed an automated event scheduling system by integrating **Google Sheets API** to capture announcement requests from teachers, seamlessly syncing with **Google Calendar API** to populate a calendar.
- Integrated **Laravel X-Blades**, achieving a **20%** reduction in overall project size and enhancing code readability.
- Strategically deployed **AWS S3 buckets** for scalable and efficient image storage, significantly **reducing server load**, and resulting in a **17% improvement in website load times**.

### Redoo-Hub

Jul. 2023 – Aug. 2023

Software Engineering Intern

Ottawa, ON

- Developed a social media app to share 3D videos in AR on **Apple Vision Pro** using **SwiftUI** and **VisionOS**.
- Implemented **OpenCV inpainting models** to reconstruct missing parts of videos, creating an immersive 3D effect in videos even with incomplete data.

## PROJECTS

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### Sign Language Translator 🗣 📄 | *Next.js, Typescript, Tailwind CSS, OpenCV, Mediapipe, Scikit-learn, Python*

- Engineered a **Next.js** web application capable of translating sign language to text and converting this text into multidirectional sign languages.
- Utilized **OpenCV** to enable computer vision for data collection and **Mediapipe** to detect **21** hand coordinates.
- Applied the **scikit-learn Python** library to train **2600+** sign language data points to specific letter classifications.

### Custom Smart Speaker 🗣 📄 | *C++, Arduino, Google Cloud APIs, OpenAI API, ESP32*

- Engineered a smart speaker to listen and respond to specific prompts based on a customized user profile.
- Programmed with **Arduino** to connect microcontrollers to **Google Speech-to-Text API** and **OpenAI API**.
- Built a custom **PCB** with a microphone, speaker, amplifier, IR sensor, and two **ESP32 microcontrollers** connected over **UART**.

### Cam-Tag Weapon Detector 🗣 📄 | *Teachable Machine API, Javascript*

- Created a product prototype of a backpack-mounted camera, designed to identify potential threats in the form of weapon-carrying individuals and alert users through an alarm.
- Trained an **ML model** with over **10 000 data points** to detect weapons through a camera.
- Pitched the startup idea at **Toronto Metropolitan University**, placing **1st in a design competition**.

## EDUCATION

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### University of Waterloo

Sep. 2023 – May 2028

Candidate for BAsC in Computer Engineering

Waterloo, ON

- Activities: Electrium Design Team (Firmware)