

Brian Yin

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TECHNICAL SKILLS

Languages: Python, C++, Arduino, Java, JavaScript, TypeScript, SQL, HTML/CSS

Frameworks / Libraries: React, Tailwind, Node.js, Express.js, FastAPI, OpenCV, MediaPipe, Pytest

Tools / Development: Git, VS Code, Linux, Arduino IDE, Supabase

Databases: MySQL, PostgreSQL

EXPERIENCE

UWaterloo Orbital (Design Team)

Sep. 2025 – Present

Waterloo, ON

Full-Stack Software Developer

- Architected a Singleton **Pydantic** configuration manager for UW Orbital's **CubeSat** ground station, replacing hardcoded backend configuration settings with a centralized, type-safe validation system
- Resolved **FastAPI** stream-handling conflict in logger middleware that prevented request body logging, restoring full API request tracking
- Implemented Figma designs for **3 authentication pages** into modular **React** components, building responsive Login, Sign-up, and OTP verification interfaces with **Tailwind CSS**
- Wrote unit tests using **Pytest** and **Monkeypatch** to validate environment variable overrides and configuration integrity across development environments

Explorer Robotics Club

Jul. 2021 – Nov. 2021

Whitby, ON

Python Teaching Assistant

- Taught **15** students core **Python** concepts including data structures, algorithms, and object-oriented programming

PROJECTS

Self-Driving RC Car | *Python, OpenCV, Raspberry Pi*

- Led a team of three to develop an autonomous Raspberry Pi 4 RC car, placing **1st nationally** and **5th internationally** while representing **Team Canada** at the 2024 WRO Future Engineers Final
- Developed a multistage **OpenCV** vision pipeline utilizing LAB thresholding, image blurring and morphological filtering to refine and extract obstacle contours at **30 FPS**
- Designed PD steering controller with dynamic ROI optimization for reliable autonomous wall-following, obstacle avoidance, and parking, resulting in a **95% test run success rate**

Punch Perfect | *React, Node.js, Express.js, Supabase (PostgreSQL), MediaPipe.js*

- Deployed a webcam-based real-time boxing game using **MediaPipe** pose estimation to process body landmarks at **30 FPS** with **sub 150ms** detection latency on consumer hardware
- Engineered a punch-detection pipeline using EMA smoothing, arm landmark angles, and arm positions to classify punches from pose data with **85% accuracy**
- Integrated a **RESTful API** with **Express.js** and **Supabase Auth**, implementing JWT-secured endpoints and **rate limiting** to ensure leaderboard and score integrity
- Architected a modular **React** frontend utilizing custom hooks for computer vision logic, and reusable components for game interfaces, enabling **80% code reuse** across four distinct game modes

2x2 Rubik's Cube Solver | *Python, OpenCV, Arduino, C++*

- Built an automated 2x2 solver combining **OpenCV** color detection with an **Arduino Uno** controlling stepper and servo motors via serial communication
- Implemented hybrid solving algorithm using BFS and the Ortega speedcubing method, generating solutions in under **1 second**
- Achieved end-to-end solve times under **60 seconds** from scanning to completion with **90% solution accuracy**

EDUCATION

University of Waterloo

Waterloo, ON

Bachelor of Computer Science (BCS)

Sep. 2025 – May 2030

- GPA: 4.0 / 4.0