

# David Wu

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## Education

**University of Waterloo** | BAsC Systems Design Engineering, **4x** Dean's List, **4.0/4.0** cGPA

**Expected Apr 2026**

Courses: Mobile Robotics, System Modelling, Machine Learning

## Experience

### dConstruct Robotics

May 2025 – Aug 2025

Research Intern

Singapore, SG

- Implemented multi-modality cues (depth, normal, DiNOv2) in **3D Gaussian Splatting** to improve geometrical reconstruction and final mesh fidelity by **50%**
- Leveraged **GPU PyTorch parallelization** to accelerate 3D Gaussian Splatting pre-processing pipeline (object detection, normal/depth generation) by **300%+**
- Developed a tiling/graph-based hierarchical bundle adjustment pipeline, enabling 3D Gaussian Splatting processing of large scenes with **10+ km trajectories** and **5,000+ images** in less than 60 minutes

### Clearpath Robotics by Rockwell Automation

Sep 2024 – Dec 2024

Perception Engineering Intern

Waterloo, ON

- Developed high-performance **C++** tools for map cropping and zone filtering for robot localization, cutting search times and RAM usage by **10x** in 2M sqft facilities.
- Owned and implemented an end-to-end simulation benchmark and analytics dashboard in Python, optimizing robot parameters using Evolutionary Algorithms and decreasing CPU usage of critical processes by **28%**
- Implemented a Wi-Fi-based triangulation system in **C++**, reducing search areas for robot recovery by **50%**

### Vision and Image Processing Lab

Apr 2024 – Dec 2024

Research Associate under Professor Fieguth

Waterloo, ON

- Led research on applying **self-supervised learning** in **PyTorch** for robust classification and clustering of insects with sparse labels
- Engineered a scalable dataset-generation pipeline with **PySpark**, processing **5M+ records** to enhance phylogenetic diversity research
- Introduced a novel hierarchical **knowledge distillation framework** using parent-teacher momentum models to reduce computational overhead by **25%**

### Clearpath Robotics by Rockwell Automation

Jan 2024 – Apr 2024

Perception Test Engineering Intern

Waterloo, ON

- Independently contributed a high-performance 3D perception testing pipeline in **C++**, compressing **9+ hours** of footage into **8 minutes** while covering **>80%** of regression scenarios
- Built efficient point cloud comparison tools using **C++ K-d trees** for 3D perception algorithms, achieving a **10x speedup** over real-time playback
- Automated test dataset creation with synchronized 3D object labeling in **ROS**, cutting workflow time by **96%**

### Genesys

May 2023 – Aug 2023

Software Engineering Intern

San Francisco, CA

- Developed an integration microservice for synchronous external e-learning webhooks using AWS Lambda, API Gateway, and CloudFormation, resulting in **2 new corporate clients** joining the beta program
- Reduced API costs by **90%** with asynchronous retries and dynamic rate-limiting via **AWS SQS** and **DLQ**

## Projects

**Loop** 🚗 Autonomous outdoor 400 meter lap RC car

- Developed a hybrid lane-keeping and person-following **ROS2** autonomy stack, achieving 100% lap completion and 40% smoother steering in outdoor environments using ZED2 stereo vision

## Skills

**Languages** C++, Python, Java/Kotlin, SQL, Swift

**Technologies** PyTorch, ROS, Docker, AWS, GCP, PySpark, PostgreSQL, MongoDB, Linux, Spring Boot, Flask