

# ALEXANDER WANG

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## SKILLS

**Skills:** Python, C/C++, MATLAB, Simulink, Linux, Shell/Bash, AWS, MySQL/SQL, OracleDB, Git, JIRA, Jenkins

**Testing & Simulation Tools:** CppUTest, Google Test, GMock, pytest, Simulink, Gazebo, RViz

**Embedded Systems:** ROS/ROS2, Raspberry Pi, STM32, Arduino, DE1-SoC FPGA, Moveit2, Turtlebot 3 Waffle Pi

## EDUCATION

**University of Toronto:** cGPA 3.6/4.0

Toronto, ON

*Robotics Engineering*

Sep. 2021 – May 2026

**Certificates:** Private Pilot's License (PPL) || Radio Operator Certificate || Oracle Database SQL Certified Associate

**Courses:** Computer Algor. & Data Structs || Control Systems || Dynamics || Microcontrollers & Embed. Microprocessors

## RESEARCH & PUBLICATIONS

**University of Toronto – Toronto Robotics + AI Lab (TRAIL)** | Python, AWS, OpenStreetMap

May 2024 – Present

*AI & Robotics Researcher – 3D Lane Detection / Labeling for Autonomous Vehicles*

Toronto, ON

- Advancing cutting-edge research on enabling autonomous vehicles to operate in adverse weather (e.g., winter, night).
- Integrated GPS, Camera, and LiDAR data into automated detection / labeling pipeline – **decreasing runtime by 43%**.
- Authoring 2 papers** on a Bayesian Attention-based 3D lane detection model and the development of BoreasLane, the first 3D winter condition lane dataset; targeting submission to the International Conference on Computer Vision (ICCV).

## EXPERIENCE

**General Motors** | MATLAB, Simulink, C++, Python

May 2024 – Present

*Software and Controls Intern – EV Propulsion and Thermal Management*

Markham, ON

- Utilized MATLAB / Simulink to develop thermal control system software for battery, power electronics, and cabin comfort.
- Designed and implemented a novel C++ testing architecture from the ground up with the CppUTest framework.
- Developed a testing and integration pipeline in Python – automating performance analysis from **4-5 days to minutes**.
- Created automated virtual test stands for Software-in-the-Loop co-simulations to validate control algorithms.

**SAE AutoDrive – Toronto Autonomous Vehicle Team (aUToronto)** | C++, Python, ROS2, Linux

Sep. 2023 – Present

*State Estimation Lead, Founder*

Toronto, ON

- Led autonomous vehicle team to win **1ST place** in every competition event at the R2Y3 SAE AutoDrive Challenge.
- Developed C++ multi-sensor fusion algorithms (i.e., Extended Kalman Filter) for state estimation and localization and designed integrity monitoring system against sensor failures (GPS, IMU, Wheel Encoders, LiDARs, and Cameras).
- Programmed a variable L-Band attenuator to simulate GPS signal dropouts through Serial during in-vehicle testing.
- Developed a front end user interface in Python to run offset calibration algorithms – correcting global GPS errors **by 87%**.

**RTX – Pratt & Whitney** | HTML/CSS, JavaScript, React, SQL, OracleDB

May 2022 – Aug 2022 || May 2023 – Aug 2023

*Software Engineering Intern – Control Systems Team*

Mississauga, ON

- Developed multiple scalable full stack software tools with JavaScript and React for project and requirements management – improving the Control Systems team's project delivery times **by 15%**.

## PROJECTS

**TARS-AI – Open Source Community** | Python, Raspberry Pi, Fusion360, GitHub

Dec. 2024 – Present

*Co-Founder*

Global

- Co-founded and led the development of TARS-AI, an open-source community project dedicated to creating the robot TARS from my favourite childhood film Interstellar – growing the community to **50+ members** within **1 month** of launch.
- Designed a modular software architecture for speech, personality, memory, intent classification, vision and servo control.