Alexander Wang

US / Canada Citizen | (613)-617-9897 | alexshuaiwang@gmail.com | linkedin.com/in/alexander-wang03 | github.com/alexander-wang03

SKILLS

Skills: Python, C/C++, AWS, Shell/Bash, MATLAB, Simulink, MySQL/SQL, JavaScript, React, 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 analysis 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 offset calibration algorithms in Python – correcting global GPS position / heading 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%**.

University of Toronto Aerospace Team | *Python, PyTorch, pytest, ROS, Linux* — Sep. 2021 – May 2023
AI Software Developer – Software Team — *Toronto, ON*

- Developed a real-time computer vision program with YOLOv5 using PyTorch to enable drones to autonomously detect landing pads and obstacles – achieving a **85% F1 score** for detection accuracy.
- Designed boundary value and state transition test cases with pytest to validate algorithms in Jenkins pipeline.
- Secured **Top 3** finishes at the Annual Aerial Evolution Association of Canada Student UAS Competition.