

# Daniel Xie

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## Education

### Western University

Bachelor of Engineering Science, Computer Engineering with Co-op  
Dean's Honour List

London, Canada

September 2019 - April 2024

## Work Experience

### General Motors

Active Safety Advanced Development Co-op Student

Markham and Oshawa, Canada

May 2022 - April 2024

- Applied customer-centric design thinking and agile project management methodologies to efficiently develop and refine computer vision and Human Machine Interface (HMI) prototypes for proof-of-concept and concept selection. Leveraged Python and OpenCV to drive rapid iteration and implementation of prototypes integrating micro-controllers, data recorders, and cameras for in-vehicle testing. These prototypes led to the initiation of features in production and a patent filing.
- As part of Virtual by 2025, spearheaded and cross-functionally collaborated with other teams across GM to develop synthetic data generation workflows using, CarMaker with Simulink, Python, and C/C++ to simulate and test sensor perception, vehicle maneuvers, and other scenarios. This reduced time and cost for data acquisition compared to using physical hardware.
- Cross-functionally collaborated with international teams to rapidly bring online an image and ground-truth acquisition platform for several machine learning pipelines using Python, ROS, and C++. Ensured that terabytes of data could be delivered on demand to customer teams.
- As GM Student Social Committee Communications Lead and President, created call-outs to recruit participants for user studies and organized various in-person and virtual professional development and social events.

### Biophysics of Communication Lab

Research Assistant

London, Canada

October 2021-December 2021

- Developed and troubleshooted a custom Windows sound editor and generator application to integrate OCT (Optical Coherence Tomography) imaging system with data acquisition equipment and audio system. Implemented with Python and Matlab.
- Improved workflow, data sampling rate precision and data acquisition efficiency by setting project timelines, prioritized tasks, diagram creation for ideation, and communicated check-in updates to the head researchers.

## Projects Experience

### Western Autonomous Racing (Capstone)

- Led the design of the software architecture of the autonomous vehicle. Developed the perception and Simultaneous Localization and Mapping (SLAM) algorithms based on a visual-inertial sensor suite.
- Implemented SLAM with ORB-SLAM3 and HDBSCAN algorithms using C++, Python and ROS2. Was able to generate a point cloud and localize a vehicle with real-time performance at 30 frames per second (FPS).
- Implemented object detection with a YOLOv8 network and depth camera using C++, Python and ROS2. Was able to detect and measure distances to obstacles in real-time (15-20 FPS) with 15-20 centimetre accuracy.

### Western Formula Racing

Traction/GLV Team Member

London, Canada

September 2019-May 2022

- Designed the DC-DC converter (500V to 12V) and Power Distribution Module PCBs which helped the team earn third place in the Formula SAE North American EV Presentation Event.
- Developing a wireless telemetry system using Arduino, CANBUS and LoRaWAN (Long Range WAN) transceivers (programmed in C/C++) for real-time data acquisition from the VCU.

### Western AI

Summer/Gideon Projects Member

London, Canada

September 2019-May 2021

- Developed and troubleshooted a Long Short-Term Memory neural network model in Python with a business applications team to predict stock prices.
- Developed, trained and troubleshooted VGG16 neural network models (in two teams) in Python that achieved ~95% accuracy in diagnosing different Alzheimer's disease stages from MRI images and achieved ~92% accuracy in diagnosing 14 different diseases X-ray scans.

## Smart Door Lock

- Simulated and designed an Arduino-based smart door lock for a backyard shed using TinkerCAD software.
- Generated BOM and prototyped the smart door lock with BLE capability, stepper motor, and I2C LCD display on breadboard.
- Designed schematic and PCB layout for a custom Arduino shield using Eagle.

## COVID Safety Smart Room Controller

- Developed embedded software in C for an ARMv7 microcontroller to track the number of occupants in a room and enforce COVID-19 safety guidelines.
- Implemented using peripherals such as timers, interrupts, counters and seven-segment displays.

## FPGA CPU with Unified Cache

- Designed control logic for a RISC-based FPGA CPU using an Unified cache to fetch, decode and execute 14 instructions.
- Implemented in VHDL and used components such as up-counters, registers, multiplexers and logic gates. Minimized the amount of clock cycle executions possible to ensure efficiency in execution time.

## Technical Skills

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**Software/Frameworks:** Git, CarMaker, CARLA, OpenCV, PyTorch, Tensorflow, ROS/ROS2, Jupyter Notebook, IntelliJ, Microsoft Visual Studio Code, Microsoft Visual Studio, Google Colaboratory, Jupyter Notebook, Android Studio

**Programming/Scripting Languages:** Python, Java, MATLAB/Simulink, C, C++, VHDL, Rust, Bash, ARM Assembly

**Tools/Skills:** Digital Oscilloscope, Multimeter, Function Generator, Soldering

**Operating Systems:** Windows, Linux, Unix

**CAD/ECAD:** Eagle Autodesk, Saturn PCB Design Toolkit, Onshape, SolidWorks, Cadence Virtuoso

**Prototyping:** Arduino, ESP32, CANBUS, SPI, Breadboard Circuits