

Education

University of Waterloo

Bachelor of Computer Science, Honours, Co-operative Program, AI Specialization *Sept '18 – Apr '23 (expected)*

- 91.26 cumulative GPA, 93.50 major average
 - President's Research Award, President's International Experience Award
 - Six 4-month co-op placements at six distinct companies
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Publications

Sim-to-Real Domain Adaptation for Lane Detection and Classification in Autonomous Driving *June 2022*

- Co-Authored a peer-reviewed [research paper](#) on sim2real lane detection using the CARLA simulator, integrating current GAN research with state-of-the-art lane detection models.
- Presented the paper at a poster board session during the [Intelligent Vehicles 2022 symposium](#).

Application of machine learning for drone classification using radars *April 2021*

- Authored a research paper and presented it at the [SPIE 2021 Conference](#), with a follow-up [peer-reviewed paper](#).
 - Used a convolutional neural network to classify 5 different commercial drones based on a Fourier transform of their noisy RADAR return signal.
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Experience

Cruise

SAN FRANCISCO, CA

Deep Learning Performance Engineer

Sept '22 – Dec '22

- Developed various Python tools to deploy deep learning models on the vehicle, using [ONNX](#), [TensorRT](#), and custom computation graph representations.
- Built a tool to assess numerical divergence between the original PyTorch models and optimized models.
- Built a linter to map ONNX nodes to lines in PyTorch source code, saving model deployment engineers hours.
- Created a tool to manually add outputs to exported ONNX graphs, allowing engineers to inspect intermediate activations while debugging models.

NVIDIA

SANTA CLARA, CA (REMOTE)

Deep Learning Research for Autonomous Vehicles

Jan '22 – Apr '22

- Designed and iterated on multiple experiments for a LiDAR object detection neural network, improving cyclist and pedestrian F-scores by 43% and 15%, respectively.
- Implemented sparse tensor object detectors using [Minkowski Engine](#), outperforming the baseline model while using 70% less memory.
- Integrated confidence predictions into a LiDAR object detection auto-labeling pipeline, allowing human annotators to focus efforts on anomalous and challenging data instances.

DarwinAI

WATERLOO, ON (REMOTE)

Machine Learning Developer

May '21 – Aug '21

- Built and tested defect detection deep learning solutions for clients in the manufacturing industry, focusing on defect detection.
- Implemented the core functionality of Dataset Distillation using the autograd package, to pursue research in low-data machine learning contexts.
- Trained XGBoost and SVR systems to model the relationship between environmental conditions and yield for an agriculture client, achieving 11% median error by weight.
- Created an anomaly detection research repository in PyTorch, for detecting anomalies in images.
- Implemented VAE, VQ-VAE, and VQ-VAE-2 from scratch in PyTorch, evaluating each autoencoder as an anomaly detector.

Huawei

MARKHAM, ON

LiDAR Perception Researcher

Jan '20 – Apr '20

- Built DBLiDARNet and focal loss from scratch in PyTorch to use in semantic segmentation experiments.
 - Implemented key modules from 12 different research papers in PyTorch, summarizing state-of-the-art techniques and enabling further research.
 - Analysed the SemanticKITTI dataset to produce optimal class loss weights, increasing mIoU by 2%.
 - Wrote a data loader to spatially align sequential LiDAR scans for temporal pipelines, based on IMU data.
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Skills

Languages: Python, C++, R, C, LaTeX, Java, Javascript

Frameworks: PyTorch, TensorFlow, NumPy, Pandas, OpenCV, ROS

Tools: Git, Docker, Conda, Bazel, CARLA, VIM, GCP, Linux, TensorRT