

Education

University of Toronto

Master's of Science in Applied Computing, Artificial Intelligence Concentration *Sept '23 – Dec '24 (expected)*
• Vector Scholarship in Artificial Intelligence, worth \$17 500 CAD.

University of Waterloo

Bachelor of Computer Science, Honours, Co-operative Program, AI Specialization *Sept '18 – Apr '23*
• 91.26 cumulative GPA, 93.50 major average
• President's Research Award, President's International Experience Award
• Courses in computer vision, autonomous vehicles, and machine learning

Peer-Reviewed 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*
• Used a convolutional neural network to classify 5 different commercial drones based on a Fourier transform of their noisy RADAR return signal.
• Authored a research paper and presented it at the [SPIE 2021 Conference](#), with a follow-up [peer-reviewed paper](#).
• Created a detailed physics-based simulation of RADAR returns bouncing off of a drone in flight, and used the simulated data to validate classification methods.
• Came 1st place in the [Hack The North 2020++ CANSOFCOM Drone ML challenge](#).

Experience

[Cruise](#)

SAN FRANCISCO, CA

Model Deployment Platform Engineer

Sept '22 – Dec '22

- Developed a set of debugging tools to assist in model deployment, reducing deployment time by days in some cases.
- Built a tool to automatically assess numerical divergence between the original PyTorch models and optimized models using [TensorRT](#) and custom computation graph representations.
- 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 Researcher 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.
- Used internal tools to deploy and monitor experiments on a GPU cluster.

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

Untether AI

TORONTO, ON (REMOTE)

Software Developer

Sept '20 – Dec '20

- Built a customer-facing Python API to optimize, format and quantize TensorFlow computation graphs.
- Designed and implemented Non-Max Suppression for quantized values using only integer operations, allowing single-shot detector pipelines to run on-chip.
- Experimented with different quantization schemes to improve the mAP of an SSD-ResNet-34 by 5%.
- Implemented a lookup table class to represent arbitrary non-linear functions in a quantized space.

Huawei

MARKHAM, ON

LiDAR Perception Researcher

Jan '20 – Apr '20

- Implemented key modules from 12 different research papers in PyTorch, summarizing state-of-the-art techniques and enabling further research.
- Built DBLiDARNet and focal loss from scratch in PyTorch to use in semantic segmentation experiments.
- 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.

Please refer to my [Linkedin profile](#) for a complete list of work experiences.

Skills

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

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

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