Bingqing (Selina) Wan

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Education

University of Pennsylvania, MSE in Robotics — **Exp. Grad.: Jun 2026**
Course work: Computer Vision, Deep Learning, Graphical Neural Networks — Philadelphia, PA, USA

University of Toronto, B.A.Sc., Engineering Science — **Sep 2018 - Jun 2024**
Robotics major, Machine Intelligence minor — Toronto, ON, Canada
Dean's List (2020, 2023), Dean's Merit Award (2018)

Work Experience

Universal Beijing Resort, Beijing, China — May 2023 – Aug 2023
Machine Learning Intern | Strategic and Data Service Team
- Performed various **feature engineering techniques**, and developed Seasonal ARIMA and Prophet models in **Python** for park attendance and call center forecast, improved the existing forecast accuracy by at least 10%
- Conducted weekly business reporting, including ticket sales and admission analysis, ticket pricing parity/integrity report, and competitive hotels pricing monitoring

General Motors, Markham, ON, Canada — Sep 2021 – Dec 2021
Automated Driving and Active Safety Software Engineering Intern | ADAS Map Data Tools Core Team
- Developed map data tools backend functionalities for Super Cruise in **C#**, such as tools-specific exception handler
- Developed frontend features in **JavaScript** to improve user interactivity with the map
- Delivered bi-weekly demonstrations to the team of the developed features

Huawei Technologies Canada Co., Ltd, Markham, ON, Canada — Jan 2021 – Sep 2021
Software Engineering Researcher (R & D) | Centre of Software Excellence
- Conducted research on open-source **machine learning frameworks** (e.g., PyTorch, TensorFlow, scikit-learn)
- Collected academic related ML GitHub repositories from Papers With Code dataset using **MySQL**
- Statically analyzed source codes from over 30,000 open-source repositories of academic publications for feature adoptions using Python

Selected Project

Principles of Deep Learning, University of Pennsylvania — Sep 2024 – Dec 2024
Courseworks
- Implemented and trained a **neural network entirely from scratch** using only Numpy and basic Python. This includes the implementation of forward and backward propagation for linear layers, ReLU activation, and a combined softmax-cross entropy loss layer
- Built and trained a three-layer neural network on the MNIST dataset, **optimizing** with gradient descent and experimenting with and without Nesterov acceleration

Advanced Micro and Nanosystems Laboratory, University of Toronto — Sep 2023 – Aug 2024
Thesis Researcher, Supervised by Prof. Yu Sun
- Created a multi-object tracking system for spermatozoa analysis, utilizing the **YOLOX** detector and a **Kalman filter-based tracking** algorithm to integrate and associate all bounding boxes for accurate data tracking
- Evaluated on a manually labeled microscopic-level dataset, achieving 80% tracking accuracy over the time span
- The final project is **submitted to ICRA 2025**

aUToronto Self-Driving Team, University of Toronto — Aug 2020 - Jan 2023
Localization and Mapping Team Lead, Supervised by Profs. Timothy Barfoot & Steven Waslander
- Managed a team of eight to develop maps and localization method to participate in the SAE AutoDrive Challenge
- Developed the **semantic localization** system using nearest neighbour, ICP, Cauchy M-estimation, and IEKF
- Designed a custom internal map **data structure** in Python to model road networks and assign semantic labels
- Implemented **map data tools** such as the curvature smoother to automate the mapping pipeline

Robotics and Computer Vision Lab, Southern University of Science and Technology — Feb 2022 – Dec 2022
Visiting Researcher, Supervised by Prof. Hong Zhang
- Designed a keyframe selection method with a convolutional neural network for direct method visual simultaneous localization and mapping (**VSLAM**) systems
- Implemented the design on LDSO (direct sparse odometry with loop closure) with monocular camera and a pre-trained FlowNetSimple model in **C++**
- The final work is **accepted and presented at IEEE ROBIO 2022**

Programming Languages: Python, C/C++, C#, Java, JavaScript, MATLAB, SQL
AI & Machine Learning: PyTorch, CUDA, TensorFlow, Scikit-learn, OpenCV
Robotics & Simulation: ROS, JOSM, SLAM, Tracking, Sensor Fusion, Gazebo, Image Processing, Control Systems
Tools: Git, Docker, Linux/Unix environments, Bash, Power Bi
Hardware: LiDAR, Cameras, IMUs, NVIDIA Jetson Nano