Andrew Xie

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Education

Master's of Science, Computer Science — Expected Graduation: May 2026
University of Toronto; Co-advised by David Lindell and Kiriakos Kutulakos — *Toronto, ON*

Bachelor of Applied Science, Engineering Physics Major — Graduated: May 2024
University of British Columbia — *Vancouver, BC*

Publications

(Note: Authors marked with * denotes equal contribution)

D. Black*, J. Gill*, **A. Xie***, B. Liquet, W. Stummer, and E. Suero Molina. *Deep Learning-Based Correction and Unmixing of Hyperspectral Images for Brain Tumor Surgery*. iScience, 2024.

E. Suero Molina, D. Black, **A. Xie**, J. Gill, A. Di Ieva, W. Stummer. *Machine and Deep Learning in Hyperspectral Fluorescence-Guided Brain Tumor Surgery*. Computational Neurosurgery, pp. 245-264, 2024.

Work Experience

Research Assistant — May 2023 – Sept 2023
UBC Robotics and Control Lab — *Vancouver, BC*

- NSERC USRA position in Electrical and Computer Engineering at UBC
- Conducted experiments to research the application of vision transformers as echocardiogram models for measurements such as ejection fraction estimation and how they may be improved through architectural changes, self-supervised pretraining, out-of-distribution detection, and auxiliary losses.
- Successfully demonstrated that by integrating a multitask loss and a specialized training curriculum, an existing model could be adapted to proficiently perform two tasks: ejection fraction estimation and aortic stenosis severity classification

Machine Learning Software Developer Intern — May 2022 – Dec 2022
Ericsson — *Ottawa, ON*

- Researched, developed, and applied semi-supervised machine-learning algorithms to diagnose radio malfunctions using system logs.
- Implemented a transformer model able to detect over 62% of labeled anomalies in sequences of correlated time-series signals and event logs using natural language processing approaches with PyTorch.
- Increased by 94% the performance of converting unstructured text files into machine-readable formats by resolving bottlenecks and optimizing parsing algorithms.
- Integrated and managed an automated big data pipeline for preprocessing, storing, transforming, and streaming data using a Kubernetes cluster.

Software Engineering Intern — Jan. 2021 – May 2021
Promochrom Technologies — *Vancouver, BC*

- Created a computer vision-based rapid error detection system able to raise warning flags for over 87% of known failure modes in lab equipment using deep neural networks in Python.
- Tailored automation software for deployment on a GPU-enabled edge device (NVIDIA Jetson Nano platform).
- Designed a GUI and a remote monitoring service for the new warning system using AWS.

Teaching Assistant — Sept 2020 – Jan 2021
The University of British Columbia — *Vancouver, BC*

- Taught labs as well as marked assignments and exams for the course: Introduction to Computation in Engineering Design: Analysis and simulation, laboratory data acquisition and processing, measurement interfaces, engineering tools, computer systems organization, and programming languages.

Experience

UBC Open Robotics Student Design Team | Lead Software Developer Sept 2020 – Sept 2024

- Led a team designing software for a home service robot for tasks such as taking out the garbage, cleaning the table of dishes, hosting house guests, and serving food, placing 2nd worldwide at Robocup@Home Education 2020.
- Implemented control algorithms and machine vision system for object manipulation with a robotic arm in Python with ROS.
- Developed and maintained computer vision models for a robotic system, overseeing data acquisition and preprocessing, and leveraging deep learning models for robust object detection, object tracking, grasp prediction, and scene understanding in dynamic environments.
- Developed and integrated autonomous navigation modules including SLAM, lidar and RGBD sensors, and autonomous mobile robot control algorithms; and assessed performance using physics simulations.
- Oversaw the integration of robot components from the drivetrain to the arm in software from multiple subteams totaling over 30 people
- Led an interest-based robotics reading group for undergraduate students.
- Co-developed and taught a 7-module team training course, which included lectures, practice exercises, and assessments on practical machine learning and robotics development

Fluorescence Spectroscopy-Guided Neurosurgery Research | *PyTorch, MONAI, OpenCV, Matlab* Sept 2022 – Oct 2024

- Machine learning research project, EECE Department, University of British Columbia
- Researched, implemented, and evaluated novel deep learning models to improve upon the current state-of-the-art spectral analysis methods which correct for optical properties when quantifying fluorescent compounds in brain tissue for the detection of malignant tumors.
- Developed an automated pipeline for analyzing medical device data using computer vision techniques to segment image regions containing a biopsy.

Projects

Self-Driving Robot Competition (UBC) | *Tensorflow, OpenCV, ROS* Dec 2021 – May 2022

- Developed control system with ROS to autonomously steer a simulated vehicle to collect license plate information.
- Trained CNNs for optical character recognition and classification. Applied traditional machine vision algorithms using OpenCV for navigation while obeying traffic laws and avoiding other vehicles and pedestrians.

Fairify: Brand Research Web App | *Flask, React.js* Feb 2022

- Placed 1st overall out of 300+ overall participants at the StormHacks Hackathon.
- Created a web app using React / Python Flask to scrape the web and rate companies by their fair trade practices.
- Utilized natural language processing algorithms to analyze the sentiment of articles and social media posts.

Object Retrieval Robot Competition Feb 2021

- Designed and constructed the mechanical, electrical, and firmware control system using C for a robot to navigate a course and use fine motion to lift and deposit loads .
- Implemented an infrared and ultrasonic sensor system with a PID controller to achieve precise line-following.
- Placed 1st in the competition evaluating the accuracy and speed of the robot out of 60+ participating students.

Awards and Honors

Undergraduate Student Research Award 2023

- Award by the Natural Sciences and Engineering Research Council of Canada (NSERC) to conduct undergraduate research.

Charles and Jane Banks Scholarship 2022, 2023

- Award by the University of British Columbia for academic excellence.

Trek Excellence Scholarship for Continuing Students 2020, 2021

- Award by the University of British Columbia for academic excellence.