

# Ella Majkic

UBC Engineering Physics

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## EDUCATION

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**Engineering Physics, The University of British Columbia**

Sep 2023 - Present

Minor in Honours Mathematics

**Awards:** Trek Excellence Scholarship; Eric P. Newell Engineering Award; Dean's Scholar

**GPA: 90%**

## SKILL SUMMARY

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**Software:** C, C++, Python, Git, Linux, ROS, OpenCV, TensorFlow, MATLAB/Simulink, Java, JavaScript

**Tools:** KiCad, OnShape, LaTeX, CMake, Bash/Linux Shell, Apptainer, GDB, FPGA (VHDL, Quartus)

## EXPERIENCE

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**TRIUMF Particle Accelerator**

Jan 2025 - May 2025

**Research Engineer Co-op, PIONEER Experiment**

- Developed and tested Purity Monitor Assembly (PUMA) calibration for rare pion decay experiment
- Simulated electron drift using COMSOL and C++, validating models against experimental data
- Designed and built a vacuum system for PUMA calibration tests, achieving stable 1e-6 bar
- Led first successful PUMA calibration tests, performing statistical analysis in Python and MATLAB
- Implemented RS-232-based data acquisition for vacuum gauges and detector readout in LabVIEW

**UBC Open Robotics**

Sep 2023 - Mar 2025

**Software Engineer, Navigation Subteam**

- Developed autonomous navigation for service robot competing at international RoboCup@Home
- Used Python to implement ROS-based navigation algorithms and SLAM in dynamic environments
- Designed a robot chassis in Onshape CAD and 3D-printed components for fabrication

## PROJECTS

[\[Portfolio\]](#)

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**Simulated Detective Agent**

*Deep Learning, TensorFlow, ROS, Computer Vision, CNN, Linux*

- Trained and integrated multiple robust machine learning models from scratch to enable a ROS robot agent to autonomously solve a detective-style task in Gazebo simulation
- Designed and trained a convolutional neural network on a custom, augmented 1,000+ image dataset, achieving 99.1% validation accuracy on alphanumeric character recognition
- Used YOLOv8 and OpenCV for dynamic clue board and NPC detection in environment
- Applied imitation learning to train a neural policy achieving perfect driving through course

**Autonomous Robot**

*C++, Electronics Design, Rapid Prototyping, PCB Assembly*

- Developed, prototyped, and built a fully autonomous robot with a team capable of line following through a multi-terrain course while identifying and retrieving pet stuffies
- Designed and soldered electrical systems for motor control, microcontroller integration, and sensing
- Wrote C++ libraries to interface with 2D LiDAR, H-bridges, phototransistor sensors, and dynamic claw, enabling the robot to perceive and interact with its environment

**PID Motor Control**

*Digital Logic, Electronic Hardware, Circuit Design, Counters, Latches*

- Built a fully hardware-implemented PID controller for active motor speed control
- Processed phototransistor speed outputs using Schmitt triggers, DACs, op-amps, and digital logic