Daniel Dubinko

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Education

Queen's Unversity — Kingston, ON
Bachelors of Applied Science in **Mechatronics and Robotics** — 2020–Current

Experience

MDA Space — Brampton, ON
Guidance and Navigation Intern — January 2025–August 2025

- Developed motion primitives for a kinematic bike model to support path planning for a lunar rover, utilizing **RRT*** algorithms to navigate complex 2D environments
- Implemented Dubins curve motion primitives to optimize state-space mapping for wheeled vehicle navigation, directly contributing to the rover's autonomous capabilities
- Engineered and validated a custom pandas-based data processing library with unit testing to streamline machine learning data augmentation pipelines

Maclean Engineering — Collingwood,ON
Autonomy Team Intern — June 2024–December 2024

- Engineered a **C++ ROS2 Node** for wheeled mining vehicle control, utilizing **Gazebo** for simulation-based testing and validation of navigation logic before real-world deployment
- Deployed an **Extended Kalman Filter** in **ROS2**, fusing IMU and wheel odometry data to optimize vehicle state estimation, improving localization accuracy by 70%
- Used **Docker** to streamline ROS2 development and manage dependencies across multiple packages

Ingenuity Labs at Queen's University — Kingston, ON
Undergraduate Research Assistant — Summer 2023

- Architected a real-time integration between Unity VR environments and Kuka robotic arms, utilizing UDP multi-threading in **C#** and **Python** for lag-free performance to create a human robot high five interaction system
- Implemented precise state tracking by fusing Vicon motion capture data with Meta Quest Pro headset inputs via Google Protocol Buffers

Queen's Knights Robotics Team — Kingston, ON
Computer Vision Team Lead — September 2023–September 2024

- Trained a **YOLOv8 model** using Roboflow to enable real-time target recognition on spinning robotic platforms using RealSense depth cameras
- Collaborated with hardware and control sub-teams to ensure seamless integration of vision modules

Projects

Automated Pet Feeder — Kingston, ON

- Developed a web interface with **HTML, CSS, and Node.js** to manage weekly food delivery schedules, hosted on Raspberry Pi and controlled electronic components via Arduino
- Engineered a custom 3D-printed model using OnShape, integrating sensors and motors for precise food delivery

Autonomous CO_2 Robot Kingston, ON

- Developed **C++ ROS Nodes** for autonomous path planning and integrated PID control on Arduino to enable precise navigation and real-time obstacle avoidance, with an operator remote controlled manual fallback mode
- Implemented SLAM to generate spatial heat maps of CO_2 concentrations

Skills

Robotics Specific	ROS2, Gazebo, OpenCV, SLAM
Software Development	C++, Python, MATLAB, Bash, Git, Docker, LaTeX, Azure Devops, Jira, Confluence
Hardware & Tools	UDP/TCP Networking, Vicon Motion Capture, Arduino, Raspberry Pi, OnShape
Languages	English (Fluent), Russian (Fluent), Japanese (N4)

Courses

Autonomous Mobile Robotics, Fall 2025	*Queen's University*
Computer Vision and Deep Learning, Fall 2025	*Queen's University*
Machine Learning and Deep Learning, Fall 2025	*Queen's University*
Introduction to Robotics, Winter 2024	*Queen's University*
Automatic Controls, Fall 2023	*Queen's University*
Probability & Random Processes, Fall 2023	*Queen's University*

Scholarships and Awards

Dean's Scholar	2023–2024
Undergraduate Student Summer Research Fellowship ($12,400)	Summer 2023
Queen's Excellence Scholarship ($2500)	2020–2021

Teaching

Teaching Assistant at Queens's University — Fall 2025
APSC 101

Teaching Assistant at Queens's University (Upcoming) — Winter 2026
MREN 103

Teaching Assistant at Queens's University (Upcoming) — Winter 2026
MREN 203

Extracurricular Activities

Clubs	Queen's Robotics Club (Controls Team), Table Tennis Club
Hobbies	Table Tennis, Ski, Golf, Cooking