Luke Parna-Gile

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Research Interests

- System design for autonomous mobile robots with a particular interest in autonomous planning, navigation and control in applied field robotics
- Mining automation and automation of heavy machinery for industrial applications

Education

Queen's University, BASc. in Mechatronics and Robotics Engineering (Expected Apr 2026)   Sept 2021 – **Present**
- **3rd Year GPA:** 4.07/4.3, **Cumulative GPA:** 3.88/4.3
- **Coursework:** Automatic Control (A+), Sensors and Electric Actuators (A+), Mechatronics and Robotics Design III (A+)

Honours and Achievements

- PEO Simcoe-Muskoka Chapter Professional Engineers Scholarship ($1500)
- Distinction of Dean's Scholar (three-time recipient)
- Principal's Admission Scholarship ($4000)

Presentations

- Git Hooks and Azure Pipeline Usage – Internal, MacLean Engineering   Feb 2025
- MREN318 – Sensors and Actuators Final Project Demonstration (A+)   Mar 2024
- MREN303 – Mechatronics and Robotics Design III Final Project Demonstration (A+)   Mar 2024
- MREN203 – Mechatronics and Robotics Design II Final Project Demonstration (A)   Mar 2023

Professional Experience

Software Engineering Intern, MacLean Engineering   Sept 2024 – **Present**
- Researching, designing, and implementing real-time telemetry systems using CAN, MQTT, and HTTP/HTTPS across one designed-in-house telemetry platform and one pre-purchased telemetry platform
- Integrating on-vehicle systems with Python, C++, and web technologies (Flask, JavaScript) while managing progress and implementing version control with Azure DevOps
- Engineered and deployed a full API and database system using MongoDB, Kubernetes, FastAPI and Docker for tracking assets and vehicle signal definitions, enabling reliable UDP/CAN data acquisition and monitoring

Owner / Software Designer, Luke Parna-Gile Programming   Oct 2024 – **Present**
- Manage all business operations, including client acquisition, contracts, and invoicing for sole proprietorship
- Provided contract-based engineering and design services to Nubi AI startup in South Africa
- Rapidly developed a mobile application for an AI-driven financial advisor from prototype to final product using React Native, reaching a deployable state within 4 weeks

Automation Engineering Intern, Honda of Canada Mfg.   May 2024 – Aug 2024
- Engineered, wrote and debugged PLC programs integrating with sensors, conveyors, robots (Fanuc, Yaskawa), HMI, and MES systems
- Implemented Honda's IIoT Smart Factory project to transition preventive maintenance from time-based schedules to cycle-based metering, reducing costs by over $1.1 million annually

Product Design Intern, Thomson's Metal by Design   June 2023 – Aug 2023
- Designed and fabricated custom metal products and replicated industrial components for clients

- Restructured the company's digital customer management system and project organization, improving operational efficiency
- Developed 3D models and production-level drawings in SolidWorks for 10+ client designs

Production Associate, Honda of Canada Mfg.   June 2023 – Aug 2023

- Assembled and inspected automotive vehicles with precision and attention to detail in a fast-paced manufacturing environment
- Collaborated in a team setting to maintain production quality and efficiency

Competitions

Mechatronics Specialist, Autonomous and Remote-Controlled Robot – Semi-finalist   Jan 2024 – Apr 2024

- Integrated servo, DC-motor, and microcontroller subsystems with embedded C++ control software
- Debugged UDP-based Python communication for reliable real-time remote control

Full-Stack Specialist, FreyHacks (Worldwide Hackathon) – 1st Place, DigitalOcean Category   June 2022

- Developed a social media app called SumFun that processed weather data and recommended activities using Python and open APIs
- Collaborated with a six-member team under tight deadlines to produce a working minimum viable product

International Engineering Def Hacks Worldwide 3.0 – 1st Place, COVID Innovation Category   July 2021

- Engineered a COVID-safety system integrating hardware and web software; awarded **1st place** globally in the COVID Innovation category
- Collaborated in a small, interdisciplinary team through iterative design to deliver a minimum viable prototype

Associations and Affiliations

Auto Navigation Team Member, Queen's Knights Robotics Team   Sept 2025 – **Present**

- Developing a navigation system with a team of 10 people, utilizing Nav2 in ROS2 for a national competition
- Designing a behavior tree for high level planning and control of a mobile robot's actions

Electrical Technical Advisor, Queen's Biomedical Innovation Team   Sept 2025 – **Present**

- Advising and assisting in the design and development process of a point-of-care device for early detection of neonatal jaundice on the BiliQuant electrical sub-team
- Designing and reviewing a light emitting PCB board and an optical reception PCB board with two OPT3002 sensors using KiCAD

Athlete, Queen's Brazilian Jiu Jitsu   Sept 2022 – **Present**

- Compete in tournaments; 4-6 hr/week of training

Aim Bot Team Member, Queen's Knights Robotics Team   Sept 2023 – Apr 2024

- Developed an autonomous targeting system for aiming at a turret a opponent's robots in a competitive robotics competition
- Designed a control system for regulating projectile speed by varying PWM duty cycle to multiple brushless DC motors
- Implemented a CAN network connection to control pitch and yaw of DC motors for turret positioning

Autonomy and System Integration Team Member, Queen's Autodrive   Sept 2022 – Apr 2024

- Programmed algorithms to extract local road data from a predefined map
- Implemented C++ algorithms in a ROS2 node with the goal of autonomous vehicle functionality
- Built a Python-based finite-state machine (FSM) for autonomous startup sequencing for a Chevy Bolt

ADCS Team Member, Queen's Engineering Satellite Team   Sept 2022 – Apr 2023

- Modeled geocentric satellite orbits using Python and C++ for image targeting
- Developed an algorithm for parsing TLE data and utilizing an API to return velocity and position vectors
- Improved runtime performance by approximately $10\times$ following scope revisions

Projects

Automatic Painting Robot Jan 2025 – **Present**

- Modified an Ender-3 V1 3D printer to paint images using a brush and color palette
- Wrote firmware for 3-axis stepper motor motion control on a microcontroller
- Built a ROS2 environment for image processing and serial communication with the microcontroller firmware

3D Puzzle Design Web Application Sept 2024 – Dec 2024

- Designed a browser-based 3D puzzle creator capable of exporting STL files for 3D printing
- Implemented creative design of a user interface using Three.js in JavaScript for 3D object management and rendering
- Gained hands-on experience printing, maintaining and calibrating 3D printers

SDL2 C++ Game Development Project May 2023 – Oct 2024

- Collaborated with a classmate to code a 2D, C++, SDL2 video game with a custom game engine
- Implemented collision detection and input handling using inheritance and polymorphism

Autonomous Mobile Robot for Air-Quality Mapping Jan 2023 – Apr 2023

- Programmed an autonomous robot integrating LiDAR, IMU, and CO_2 sensors via Raspberry Pi with ROS achieving basic autonomous motion with SLAM
- Developed an EDII-considerate full-stack Flask web interface in Python, JavaScript, and HTML capable of translating content into 130 languages

Automatic Pet Feeder Sept 2023 – Dec 2023

- Engineered a device that monitored pet food levels using an ultrasonic sensor, an encoder, and a force sensitive resistor, and monitored pet activity using a camera
- Designed a server-client codebase using Flask, Python, and React Native with a live camera feed for ease-of-use

Technologies and Skills

Languages: Python, C++, C, CMake, JavaScript, HTML/CSS, LaTeX
Frameworks: ROS2, Docker, FastAPI, Beanie, Motor, Flask, React/React Native
Tools and Environments: CAN, Linux, GitHub, MATLAB, Simulink, SolidWorks, MongoDB, Microsoft Suite
Mechanical Skills: MIG welding, soldering, use of industrial power tools, electrical assembly

References

References available upon request.