Julian **Lapenna**

UBC Engineering Physics

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Education

University of British Columbia, Engineering Physics — *Vancouver, BC*

Engineering Physics, BASc — *Sept. 2020 - Dec 2025 (expected)*

- Awarded the Trek Excellence, Donald J. Evans, and Walter H Gage and Elsie M Harvey Scholarships for academic excellence.

ETH Zurich, Electrical Engineering — *Zurich, Switzerland*

Information Technology and Electrical Engineering, BASc — *Sept. 2023 - Feb. 2024*

- Exchange student studying computer and electrical engineering through project based learning.

Technical Skills

Programming Python • Low Level (C, Assembly) • OOP (C++, Java) • Git/GitHub • Linux • MATLAB • Perl • HTML/CSS • SQL

Electrical STM Microcontrollers • Oscilloscope • Multimeter • eCAD (Altium) • Raspberry Pi • Arduino • Soldering

Technical Work Experience

Plasma Research Engineer - Plasma Physics, Mechanical Design & Fabrication, Diagnostics — *San Francisco, CA*

Marathon Fusion — *May 2025 - Aug. 2025*

- Designed and built mounts for plasma centrifuge chambers using CAD, including integration of gas feed lines for separation experiments.
- Developed and validated a control circuit enabling tunable fast-active valve gas sampling with response times ranging from 100µs to 100ms.
- Streamlined the fabrication process for high-power magnets, achieving axial magnetic fields in the 0.5–1T range for use in plasma centrifuges.
- Tested novel techniques to improve hydrogen permeation through metal foils by reduction reactions through applied DC bias.

Systems Engineer - Safety-critical Assurance Cases, Technical Writing, State Machine Design — *Vancouver, BC*

Critical Systems Labs — *May 2024 - Aug. 2024*

- Designed and analysed safety-critical electro-mechanical and software systems for automotive and naval vessels.
- Produced client-ready technical reports, safety assessments and system requirements for client projects.
- Developed assurance cases for rail cars and naval vessels to identify safety hazards and support maintenance decision-making.
- Consulted with clients to evaluate the safety of automotive control software (FMEA, Requirements writing, State Machines/Charts).

Software Engineer - Python, Django, Docker, Database Optimization — *Vancouver, BC*

Plom grading — *May 2023 - Aug. 2023*

- Plom is an open source, ed-tech start up and grading platform that gathers test/grading data with the goal of improving education.
- Developed a dashboard feature for processing and understanding data during and after exams.
- Optimized database queries, for faster client runtimes, improved test suite and pipeline coverage, and tested new features.

Physics Laboratory Teaching Assistant - Leadership, Communication, Time Management — *Vancouver, BC*

UBC Dept. of Physics — *Sept. 2022 - April 2023*

- Taught introductory physics and led a discussion section, currently working as a TA for a physics lab section.
- Leading and teaching problem solving and experimental lab techniques to younger students.

Technical Project Experience

3-Axis Unicycle Robot - Python, Onshape, Controls, Reinforcement Learning — *Vancouver, BC*

UBC Engineering Physics Capstone Project — *Sept. 2023 - Present*

- Mechanical design and construction of an autonomous unicycle robot capable of navigating using classical and RL control in a team of 5.
- Tested and benchmarked modern control algorithms (PID, LQR, MPC), against sim2real machine learning (RL) performance.
- Built OO frameworks and state machines for point-to-point navigation using Lagrangian dynamics and modern controls.

Micro-controller Satellite Image Classification - Python, C/C++, STM32, TensorFlow — *Zurich, Switzerland*

ETH Zurich Programming Project — *Sept. 2023 - Dec. 2023*

- Developed a machine learning model optimized to run on a STM32 micro-controller performing satellite terrain image classification.
- Analyzed STM32 flash and RAM requirements to maximize model size at 563 kB flash size, requiring 68 kB RAM for 81% accuracy.

Additional Projects/Interests:

Treasure Collecting Robot, Analog-to-Digital Converter, Hardware Calculator, Rock Climbing, Writing Short Stories, Guitar