Aaron Lengyel

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Education
University of Calgary
BSc Mathematics; (Sep 2020 - May 2025)

Projects / Research

Student Organization for Aerospace Research (Sep 2020 - May 2023)

- Targeted Architecture STM32 Discovery and Custom Hardware board
- Attempted to reduce instrument error through statistical estimation algorithms.
    - Identified pitfalls in the current build that made the integration impossible which called for a rewrite of the entire project.
- Simplified the data processing on the rocket through a python script which parsed the data into a readily accessible JSON or CSV file.
- Doubled test coverage and automation using GitHub Actions
- Improved both code usability and documentability by aiding in the specification of a new C++ codebase and writing an MVP.

DiscoverYYC (CalgaryHacks Hackathon Project) (February 2024)

- Delivered a fast and reliable web server using Rocket, written in Rust.
- Made finding historical sites in Calgary convenient through an integrated Google Maps window inside of the app.

PURE Summer Research grant ($7500); Quantum Information (May 2023 - Aug 2023)

- Developed a novel bit-like syntax for counting the number of distinguishable states in a non-probabilistic theory of the qubit.
- Made progress on computing the maximum number of distinguishable states using combinatorial and matrix methods.

UniTeX

- Simplified the sending of mathematical notation in text apps through a discord bot which would parse LaTeX code and return appropriate unicode characters.

AI Research School (Jan - May 2024

- Introduction to machine learning methods, including tensorflow, pytorch, and common architectures.
- Completed a small research presentation into the state of the art methods for genre classification.

IBM Quantum Computing Workshop (Nov 2024)

- Workshop on quantum computing hosted by IBM and Quantum City at the University of Calgary
- Completed an introduction to Qiskit workshop.

Honours Thesis

- Generalized Operational Possibilistic Theories
    - Creating novel work generalizing the theory of possibilities in an abstract mathematical setting, with a focus on applications to quantum information theory.

Competitive Programming

(University of Calgary Competitive Programming Club)

Problem Setter (Jan 2022-May 2023)

- Designed, solved, and tested various problems for use in programming competitions hosted at the University of Calgary.

Lecturer (Sep 2022-May 2023)

- Taught important competitive programming topics such as dynamic programming, graphs and basic data structures.

University of Calgary Teaching Assistant (Jan-May 2022)

- Officially employed by the University of Calgary as a teaching assistant for the competitive programming course (special topics CPSC 599).

President (May 2023-May 2024).

- Secured over $12 000 CAD in funding for 2 competitions held each term.
- Advocated for the hosting of official International Competitive Programming Contest (ICPC) competitions at the University of Calgary.
- Saved $400 dollars on food catering through deals with food companies on campus.

ICPC Coach (May 2023)

- Attended the ICPC North American Championship at the University of Central Florida in Orlando as a coach.

Competitor

- Qualified for and competed at the 2023 and 2024 Rocky Mountain Regional Competition for the University of Calgary placing 5th in the region.

Skills

Programming Languages & Technologies

- Rust (4 years)
- Java
- Python (5 years)
- GitHub (4 years)
- Vim (3 years)
- Linux (3 years)

Research Interests and Skills

- Category Theory
- Quantum Information Theory
- Probability Theory
- Excel
- Data Analysis
- Quantum Foundations
- Artificial Intelligence & Statistics
- Data Structures & Algorithms
- Embedded Programming
- Python Scripting
- Bilingual (English and Spanish)

References Available on Request