LOUIS-ROY LANGEVIN

MATH & COMPUTER SCIENCE STUDENT WITH INTERESTS IN PROBLEM SOLVING AND TEACHING

EDUCATION

Master's thesis in Algorithmic Game Theory Sep 2024 - Dec 2025
Prof. Adrian Vetta at McGill University

Bachelor in Honours Math & Computer Science Sep 2021 - Apr 2024
McGill University (3.91/4.0 GPA)

RESEARCH EXPERIENCE

Probabilistic algorithms research (2024)

- Full-time project at McGill University (Montreal Qc) financed by the *NSERC USRA* (8350$).
- Designing root-finding algorithms with high probability in *Attachment Trees*.

Graph theory research (2023)

- Full-time project at McGill University (Montreal Qc) financed by the *NSERC USRA* (8350$).
- Studied the Burning Number conjecture. My final report can be found here.
- Implemented a complex linear program in Python to find lower bounds for various graph's burning numbers in polynomial time and to study the NP-hardness of the conjecture.

Subelliptic operators research (2022)

- Full-time research at Dalhousie University (Halifax NS) funded by the *ISM* (5625$).
- Finding eigenfunctions of the Grushin operator using *MATLAB*. My final report is linked here.

WORK EXPERIENCE

AI trainer in mathematics for *Outlier* (2024)

- Creating and solving math problems to train a large language model (LLM).
- Received the highest paying salary (50$USD/h) after getting full marks on the math training.

McGill's competitive programming camp teacher and organizer (2024)

- Taught important algorithms and data structures to high school and cégep students.
- Prepared activities, slides, food, etc., and maintained the good flow of the camp.

Course assistant and tutor

- Hundreds of cumulated hours of tutoring in math and physics at all levels.
- Course assistant (grader) in real analysis and discrete mathematics for McGill University.

Owner of the company *Cégepien*

- Online resource to help college and high school students with math courses.
- Educational content creator with 15 000 followers on social medias (@le_cegepien).
- Sold and taught private preparation classes for calculus. 25 students registered (1500$+).

LANGUAGES

Fluent in English and French

CONTACT

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https://github.com/LouisRoyLangevin
https://louisroylangevin.github.io/

COMPETITIONS

International Physics Tournament at ETH Zürich (Switzerland, 2024)
Expenses covered + representing Canada

2nd place Hackathon (1375$) at McGill Code.Jam() (2023)
Participated to other hackathons as well

3rd place in Quebec at the COMC math contest (2020)

1st place in Quebec (250$) at the AMQ math contest (2019)

SKILLS

Programming
C / C++ / Rust / Java / Python
LaTeX
HTML / CSS / JavaScript / React

Machine learning
Neural networks / Regression methods / Natural language processing

Mathematics
Deep knowledge in pure and applied math

PROJECTS

String protagonist (team)

- A guitar hero game but with a real guitar, implemented in 36 hours.
- Interactive front-end with animations coded in React and TypeScript.
- Able to detect guitar pitches with fast Fourier transforms, WASM, and a Rust neural network with 90% accuracy (binary cross entropy).

Assembly fractal generator (individual)

- An MIPS assembly program that generates different kinds of fractals depending on the parameters the user gives it using complex numbers.
- Additional feature that uses the randomness of complex square roots to draw the boundary of any given Julia set.

Assembly image matcher (individual)

- An MIPS assembly program that takes one big image and iterates through it to find any occurrence of some given smaller image.
- Implemented in a cache-friendly way to optimize the speed. Adapted to fully-associative and direct mapped caches.

Library free neural network (individual)

- Python script that creates neural networks without using any library.
- Back-propagation and gradient descent all implemented manually.
- Wrote this script after taking a math class applied to machine learning (MATH462) to increase my implementing skills and AI comprehension.