LOUIS-ROY LANGEVIN

MATH & COMPUTER SCIENCE STUDENT WITH INTERESTS IN GAME THEORY, PROBLEM SOLVING, COMPETITIVE PROGRAMMING, AND TEACHING

EDUCATION

Master of Science (M.Sc.) Mathematics and Statistics (Thesis) Sep 2024 - Apr 2026
Algorithmic Game Theory | Prof. Adrian Vetta

(B. Sc.) Honours Mathematics and Computer Science Sep 2021 - Apr 2024
McGill University (3.91/4.0 GPA)

WORK AND VOLUNTEERING

AI trainer for *Outlier* (2024-2025)

LaTeX
LLM

- Training large language models by creating and solving math and coding problems.
- Comparing prompts and writing test cases to improve AI models' programming abilities.
- Achieved full marks on the math training and ranked as a top-tier worker.

Volunteer for McGill's competitive programming summer camp (2024 and 2025)

- Taught important algorithms and data structures to high school and cégep students.
- Took part in the selection committee to carefully choose the students who would participate.
- Prepared activities, slides, food, etc., and maintained the good flow of the camp.

Tutoring + Educational platform online

- Hundreds of hours of tutoring in math and physics at all levels.
- Teaching assistant at McGill University in calculus, real analysis, and discrete math.
- Educational content creator with 16 000 followers on social media (@le_cegepien).
- Sold and taught private preparation classes for calculus with 50+ registered students.

RESEARCH EXPERIENCE (My publications)

Probabilistic analysis of algorithms (2024)

- Full-time project at McGill University financed by the *NSERC USRA*.
- Designing and analyzing probabilistic root-finding algorithms in *Uniform Attachment Trees*.
- Proved and wrote 4 distinct results which directly led to publication.

Graph theory report (2023)

NP-Hardness
C++
Python

- Full-time project at McGill University financed by the *NSERC USRA*.
- Wrote a complete study report of proofs on the Burning Number conjecture.
- Implemented linear programs in **C++** to study the NP-hardness of the conjecture.

Subelliptic operators report (2022)

MATLAB
Maple
Java

- Full-time research at Dalhousie University funded by the *ISM* scholarship.
- Designed clever mathematical tools to find eigenfunctions of the Grushin operator.
- Studied normally distributed Legendre functions using Java to find their zero-sets.

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**.
- Achieved 90% accuracy in pitch detection using **Fast Fourier Transforms**, **Web Assembly**, and a **Rust neural network**.

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 by more than **500%**. Adapted to fully-associative and direct mapped caches.

Library free neural network (individual)

- Python script that creates neural networks without using any library.
- Formulated a unique gradient descent optimization strategy that improves convergence rates with convex optimization.
- Easily implements basic perceptrons and more complex networks.

LANGUAGES

Fluent in English and native in French

CONTACT

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LouisRoyLangevin
louisroylangevin.github.io/

COMPETITIONS

3rd place in ICPC (competitive programming contest) in McGill University (2024)

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

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

Scored 24 on the W. B. **Putnam** math contest (2023)

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

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

SKILLS

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

Machine learning
Neural networks / Regression methods / Natural language processing