Louis-Roy Langevin

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Education

McGill University 2024–Present
M.Sc. in Mathematics and Statistics (Thesis)
Supervisor: Prof. Adrian Vetta
Research Areas: Algorithmic Game Theory, Combinatorial Optimization, Discrete Mathematics
Coursework: Combinatorial Optimization, Probabilistic Analysis of Algorithms, Advanced Probability Theory

McGill University 2021–2024
B.Sc. Honours Mathematics and Computer Science
Graduated with **First Class Honours and Distinction**
GPA: 3.91 / 4.0

Research Experience

Randomized Serial Dictatorship and Envy Bounds (2025)

Improved upper bounds on envy in randomized serial dictatorship mechanisms, closing the gap to known lower bounds. Manuscript in preparation.

Popular Matchings in Preference Graphs (2025)

Investigated conditions for majority satisfaction in preference graphs. Co-authored paper accepted to WINE 2025 (preprint on arXiv).

Elections in Metric Spaces (2025)

Derived new lower bounds on Condorcet-like guarantees under L_p norms. Manuscript in preparation.

NP-Hardness of a Toothpick Rotation Problem (2025)

Proved NP-hardness via reduction from Planar 3-SAT; exploring special-case algorithms. Manuscript in preparation.

Root Detection in Random Recursive Trees (2024)

Resolved an important root recovery problem in uniform attachment trees (preprint on arXiv).

The Rejection Method: Efficiency Bounds (2024)

Analyzed probabilistic bounds on rejection sampling. Presented at MIT URTC 2025 (preprint on arXiv).

Burning Number Conjecture on Graphs (2023)

Worked under Prof. Sergey Norin on cops and robbers and graph burning bounds.

Subelliptic Operators & Legendre Functions (2022)

Studied zeros of linear combinations of Legendre functions (collaboration McGill / Dalhousie).

Publications & Preprints

- *The Popular Dimension of Matchings*
  with with Frank Connor, Ndiamé Ndiaye, Agnès Totschnig, Rohit Vasishta, & Adrian Vetta
  WINE 2025.
- *Optimally revealing bits for rejection sampling*
  with Alex Waese-Perlman
  MIT URTC 2025
- *Optimal root recovery for uniform attachment trees and d-regular growing trees*
  with Louigi Addario-Berry, Catherine Fontaine, Robin Khanfir, & Simone Têtu
  submitted to Annals of Applied probability.

Teaching & Mentoring

- **Teaching Assistant**, McGill University
  - Algorithmic Game Theory (Fall 2025)
  - Calculus 2 (Winter 2025)
  - Calculus 1 (Fall 2024)
- **Course Assistant**, McGill University
  - Discrete Mathematics (Winter 2023)
  - Honours Analysis 1 (Fall 2022)
- **Research Mentor**, McGill Directed Reading Program (Winter 2025)
  Supervised two undergraduates in algorithmic game theory research.
- **Instructor**, McGill Programming Summer Camp (2024, 2025)
  Taught algorithms and data structures to high school students.
- **Founder & Educator**, *Cégepien* Online Platform
  Created online math preparation program; over 50 participants.
  Produced educational videos with 17,000+ followers (@le_cegepien).

Service & Leadership

- Co-Organizer, 27th ISM Graduate Student Colloquium, May 2025.
- Presenter, WINE 2025; MIT URTC 2025; ISM Colloquium 2025.
- Presenter, Seminars in Undergraduate Mathematics in Montreal, 2025.
- Hackathon Judge, Code.jam() 2024 (2nd place winner in 2023).

Scholarships & Grants

- Graduate Excellence Award, McGill University, 2024-25 and 2025-26.

– Kenneth Eade Fellowship, McGill University, 2025-26.

– Lin Graduate Award, McGill University, 2025.

– Undergraduate Student Research Award, NSERC, 2023 and 2024.

– Undergraduate Research Scholarship, ISM, 2022 and 2024.

Honors & Awards

– First Class Honours with Distinction, McGill University, 2024.

– Team Canada Representative, International Physics Tournament, ETH Zürich, 2024.

– W.B. Putnam Competition — Top 600 in North America, 2023.

– Canadian Open Mathematics Challenge — 3rd National, 2020.

– Association Mathématique du Québec Contest — 1st National, 2019