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EDUCATION

McGill University
Doctor of Philosophy (Ph.D), *Physics*

September 2024 - August 2028
Montreal, Quebec, Canada

McGill University
Bachelor of Science, Major Physics and Minor Computer Science

September 2020 - December 2023
Montreal, Quebec, Canada

University of Maryland
Exchange program

January 2023 - May 2023
College Park, Maryland, USA

PROFESSIONAL EXPERIENCE

McGill Department of Mathematics and Statistics
Researcher

September 2025 - Today
Montreal, Quebec, Canada

- Conducting research supervised by Professor Elliot Paquette and Professor Courtney Paquette in Theoretical Machine Learning.
- I am working on Power Law Random Feature models using random matrix theory on Volterra equations, high-dimensional probability, and optimization theory to derive scaling laws for large language models. We are studying how, when anisotropy builds up in the model during training, it affects the learning dynamics.

McGill Physics Department
Doctoral Researcher

September 2024 - Today
Montreal, Quebec, Canada

- Conducting research supervised by Professor Hong Guo in Theoretical Condensed Matter Physics.
- I am working on theoretical and computational aspects of quantum transport theory with the Keldysh non-equilibrium Green function (NEGF) formalism.
- I am investigating the structural, electronic, and carrier transport properties of the CZT semiconductor, an important material for new X-ray detector technology being studied in a collaboration with Professor Oussama Moutanabbir from Polytechnique Montreal, Analogic Canada, and 5N Plus Inc.
- I am developing a new model to study and simulate THz-pump probe experiments by deriving a non-linear response time-dependent quantum transport far from equilibrium theory by adding equilibrium frozen SCBA phonons.
- I am working on improving our in-house SymGF package, which symbolically expands quantum transport properties from the Bogoliubov–Born–Green–Kirkwood–Yvon (BBGKY) hierarchy, using the Heisenberg equation of motion method. We want to symbolically simplify the expressions of the self-energy series with Large Language Models (LLMs). We wish to apply the found expressions to the study of transport in strongly correlated qubit array systems in quantum computing.
- I am developing high-performance computing tools (HPC) to compute properties such as the Fermi-Dirac function for large gapless materials at low temperatures.

McGill Physics Department
Teaching Assistant

September 2024 - Today
Montreal, Quebec, Canada

- Teaching assistant and ANS coordinator for PHYS 102 Introductory Physics - Electromagnetism - Winter 2025, Winter 2026
- Teaching assistant and ANS coordinator for PHYS 142 Electromagnetism and Optics - Winter 2025, Winter 2026
- Teaching assistant and TA coordinator PHYS230: Dynamics of Simple Systems - Fall 2024, Fall 2025 (TA coordinator)
- Graduate Student Course Assistant MATH 271: Linear algebra and partial differential equations - Fall 2025
- Graduate Student Course Assistant MATH 314: Advanced Calculus - Fall 2025
- Grader for MATH 262 Intermediate Calculus - Fall 2024

Kastler Brossel Laboratory
(Sorbonne Université, École Normale Supérieure, Collège de France)
Research internship

January 2024 - July 2024

Paris, France

- Conducted research supervised by Professor Quentin Glorieux at the Quantum Fluid of Light Group in machine learning for quantum optics measurements.

- I trained a machine learning model using theoretical simulations of a quantum fluid of light experimental setup, and then applied the model to recover important parameters from the experiment as an inverse problem.

McGill Tutoring Services
Tutor

September 2022 - April 2024
Montreal, Quebec, Canada

- Worked as a tutor for McGill undergraduate students in Physics, Engineering, and Mathematics in courses such as mechanics, electromagnetism, statistical mechanics, calculus, and linear algebra.

McGill Physics Department
Undergraduate Research Project

September 2023 - December 2023
Montreal, Quebec, Canada

- Conducted research supervised by Professor Michael Hilke at the Quantum Nano Electronics Laboratory (QNEL).
- I designed a protocol to control the topological states by investigating the decoherence dynamics of Qubits coupled to a Su-Schrieffer-Heeger (SSH) chain to probe the topological states of the chain.

Institut national de recherche en informatique et en automatique (INRIA)
Research Intern

May 2022 - June 2022
Nancy, France

- Conducted research supervised by Dr. Marie-Dominique Devignes at the Computational Algorithms for Protein Structures and Interactions (CAPSID) team.
- Worked on applying recursive algorithms to generate, test, and sort new molecules.

PUBLICATIONS

K. Luo, **L. Rossignol**, P. Jakuc, O. Moutanabbir, and Hong Guo (2025) « Alloy Disorder and Partial Order Effects on the Bowing Parameter and Resistivity of CdZnTe Semiconductors » Under review stage.

Rossignol, L., Aladjidi, T., Baker-Rasooli, M., Glorieux, Q. Machine learning approach to single-shot multiparameter estimation for the nonlinear Schrödinger equation. *Eur. Phys. J. D* **80**, 83 (2026). <https://doi.org/10.1140/epjd/s10053-026-01183-2>.

INVITED TALKS

- L. Rossignol « Grain boundaries 101 »
 - Oral presentation at Nanoacademic Technologies (2026)
- K. Luo, L. Rossignol, P. Jakuc, O. Moutanabbir, and Hong Guo (2025) « Alloy Disorder and Partial Order Effects on the Bowing Parameter and Resistivity of CdZnTe Semiconductors ».
 - Oral presentation at McGill Center for the Physics of Materials Student Seminar Series (2025-2026)

CONFERENCES

- K. Luo, L. Rossignol, P. Jakuc, O. Moutanabbir, and Hong Guo (2025) « Alloy Disorder and Partial Order Effects on the Bowing Parameter and Resistivity of CdZnTe Semiconductors ».
 - Poster and oral presentation at the International Sherbrooke Summer School on Computational Quantum Materials (2026)
 - Oral presentation at the Regroupement québécois sur les matériaux de pointe (RQMP) - Axis meeting: Light-matter interaction (2026)
 - Poster presentation at the American Physical Society (APS) March Meeting Global Physics Summit (2026)
 - Poster presentation at the Regroupement québécois sur les matériaux de pointe (RQMP) - Axis meeting: Nanomaterials and biologically inspired materials. (2026).
 - Poster presentation at the INTRIQ - Confetti student winter conference (2026)
 - Poster presentation at the Regroupement québécois sur les matériaux de pointe (RQMP) - Axis meeting: Targeted design of new materials + Emerging quantum phenomena (2025).
 - Oral presentation at the Regroupement québécois sur les matériaux de pointe (RQMP) & Advanced Materials Academy (AMA) - Summer School (2025).
 - Poster and oral presentation at the 2025 Princeton Summer School on Condensed Matter Physics (PSSCMP).
- L. Rossignol (2025) « SymGF+ ». Poster presentation at the McGill Building 21 exhibition.
- L. Rossignol and M. Hilke (2023) « Probing the SSH chain using Decoherence Dynamics » Poster Presentation at the 7th IEEE: Montreal Photonics Networking Event.

ACADEMIC LEADERSHIP

McGill Graduate Association of Physics Students (MGAPS)

Podcast host

June 2026 - Today

Montreal, Quebec, Canada

- I am hosting a physics podcast in order to broadcast the recent papers from the graduate students in the physics department. The idea is to have a better media presence for students to advertise their research and for the general public to learn about the research being conducted and what it is like to be a researcher.

Transdisciplinary Institute for Quantum Information (INTRIQ)

Committee Member

January 2026 - Today

Montreal, Quebec, Canada

- Organized and supported scientific events (Conferences and seminars) to enhance knowledge exchange, collaboration, and coordination among industry, researchers, and students.

McGill Center for the Physics of Materials (CPM)

Committee Member

September 2025 - Today

- Organized and supported scientific events (Conferences and seminars) to enhance knowledge exchange, collaboration, and coordination among researchers and students.
- Created a bi-monthly Student seminar series to bridge the gap between the students from the different groups that are part of the Center for the Physics of Materials.

VOLUNTEERING

- Volunteer staff at McGill Science 24H Fair (2026)
- Volunteer staff at SCES - Conference on Strongly Correlated Electron Systems (2025).

SKILLS

- Programming: C, C++, Python, Java, JavaScript, TypeScript, CSS, HTML, OCaml
- Software: Matlab, Microsoft Office Suite, RESCU, NanoDcal, Device Studio
- Languages: French (Native), English (TOEFL IBT: 98/120), Spanish (high school level), Chinese (Duolingo)