MAX GROSS

PERSONAL INFORMATION

email maxlgross414@gmail.com

website http://www.maxliamgross.com

phone +1 (416) 277-6507

EDUCATION

2022–2026 **Bachelor's in Mathematics and Computer Science**

McGill University

GPA: 3.73/4.0 · *Joint Honours*
Honours Project: *Structural Proto-Quipper*
Description: Mechanisation and enhancement of a linearly-typed quantum circuit description language within the Beluga logical framework
Advisors: Prof. Brigitte Pientka & Prof. Ryan Kavanagh

01–05 2025 **Visiting Informatics Student**

University of Edinburgh

Grade: 71% (First) · *Academic Exchange*
Description: Coursework in quantum programming languages, algorithmic game theory, and artificial intelligence

ACADEMIC EXPERIENCE

2024–Present **Course Assistant**

McGill University

Course Assistant (undergraduate TA) for two consecutive years for *COMP 302: Programming Languages and Paradigms*, a 300+ student course on functional programming taught in OCaml. Duties include holding regular office hours, teaching self-designed tutorials of 30+ students, marking, and advising.
Funding: School of Computer Science, McGill University

05–09 2025 **Summer Research Student**

Dalhousie University

Developed and mechanised categorical semantics for a novel quantum circuit description language as part of the Quantum Computing research group at Dalhousie. Presented at McGill CompLogic group seminar. Contributed to paper under review at ESOP.
Funding: *NSERC Undergraduate Student Research Award*
Supervisors: Prof. Peter Selinger & Prof. Julien Ross

04–08 2024 **Summer Research Student**

Université du Québec à Montréal

Mechanised the meta-theory of a quantum circuit description language in Beluga using a linearity predicate, as proof of concept for a technique adapted from work in concurrency on linear session types. Presented at ECLaPS.
Funding: *NSERC Undergraduate Student Research Award* & *FRQNT* supplement
Supervisor: Prof. Ryan Kavanagh

PRESENTATIONS AND POSTERS

09 2025 **Categorical Semantics and Adjoint Proto-Quipper**

Presentations

Conference of McGill's Epic Programming Language Systems (COMEPLS)
Introduced Proto-Quipper-Adjoint, a foundational calculus that reconstructs Proto-Quipper-M using an explicit adjoint structure between classical and quantum computation, yielding clean circuit reasoning syntax and categorical semantics based on Benton's Linear/Non-Linear model

12 2024 **Structural Proto-Quipper: Mechanization of a Linear Quantum Programming Language in a Structural Setting**

Eastern Canada Logic and Programming Seminar (ECLAPS)
Developed a general technique for mechanizing linearly-typed quantum programming languages in non-linear frameworks by introducing linearity predicates in Beluga, streamlining proofs through higher-order abstract syntax.

09 2024 **Structural Proto-Quipper**

Posters — *Undergraduate Computer Science Research Symposium (UCORE)* & *Quantum Science, Information Technology and Engineering (Q-SITE)*

INDUSTRY EXPERIENCE

05–08 2024 **Data Science Intern**

Propel Holdings — Built XGBoost models for real-time default prediction and used clustering methods to detect fraud rings during a data science internship in the Risk department of a consumer credit company.

OTHER PROJECTS

03 2024 ***The Poet Who Couldn't Know It***

LLCU 255 — Conducted computational analysis of 500+ poems comparing human and AI-generated poetry. Developed custom metrics for measuring semantic ambiguity and metaphorical density using NLP tools in R.

11 2023 ***contwext***

McGill CodeJam 12 — Developed Chrome extension combating misinformation by connecting Twitter/X posts to credible news sources. Implemented BERT-based keyword extraction system identifying relevant news articles and connecting them to the New York Times API to return to users.

MISCELLANEOUS

Awards

2024 · 2025 · *NSERC Undergraduate Student Research Award* · $9,000

2024 · *FRQNT Supplement* · $1,500

2022 · *CodeJam 12 "Best Promotion of Social/Community Wellness"* · $500

2022–2025 · *J.W. McConnell Scholarship* · $3,000/year

Languages — English · Native French · Intermediate

Technical Skills — OCaml · Python · Java · C · Git · Lean · LaTeX · Pandas · NumPy

References

Ryan Kavanagh · Assistant Professor · UQÀM · kavanaghryan@uqam.ca

Brigitte Pientka · Professor · McGill · bpientka@cs.mcgill.ca

Peter Selinger · Professor · Dalhousie · selinger@mathstat.dal.ca

November 4, 2025