MONTE MAHLUM

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EDUCATION

University of Minnesota *Fall 2024 –*
M.Sc. in Mathematics (Ph.D. waitlist)
McGill University *2020 – 2024*
B.S. in Mathematics, Minor in Physics Current GPA: 3.40
Charles University (Univerzita Karlova) *2023*
Semester Abroad Local GPA: "Excellent"
Notable Courses
14+ At honours level
Time Series Analysis
Deterministic Chaos
Honours PDEs
Honours Algebra III (Groups, Rings, Modules)
Honours Analysis III, IV (Measure Theory, Functional Analysis)
Introduction to Lie Group Theory
Theory of Groups and Algebras for Particle Physics
General Theory of Relativity
Honours Quantum Physics I, II
Advanced Concepts In Symmetry
Expected:
Honours Differential Geometry
Honours Groups, Tilings, and Algorithms
Introduction to Stochastic Processes

EXPERIENCE

Mathematics Research Assistant, University of Minnesota, Twin Cities *July 2023 –*
Working to ensure the convergence and well-posedness of a novel deep learning algorithm developed by W. Lee, L. Wang, W. Li. The algorithm, outlined here, trains the neural network from a finite sample of high dimensional data via Wasserstein gradient flow. This role has come with great freedom allowing for the development of my independent research skills and ability to synthesize many diverse data and ideas. For reference, please contact Professor Li Wang (email below).

RELEVANT EMPLOYMENT

Calculus, Probability, and Linear Algebra Tutor, Freelance *November 2023 –*
Beginning in December 2023, tutored at Concordia University for a first-year linear algebra course (also covering elements of probability theory). In 2024, tutoring for Concordia's Calculus I course. Learning to explain abstract concepts to people who are unaccustomed to this way of thinking. Working to frame the material in an intriguing and inviting way.

Calculus Tutor, Jewish Academic Student Support *September 2022 – December 2022*
Tutored for Calculus I course at a Quebec college (CEGEP). Developed important mathematical teaching skills and worked to find creative ways for the student to stay engaged when confronted with confusion. For reference, contact Micheal Calkhoun at micheal@jasstutors.com.

Wilderness Tripping Guide, YMCA Camp Widjiwagan *May 2022 – August 2022,*
Led groups of four to six on extended backpacking and canoeing trips for one to two weeks. The age range of the campers varied on each trip, but was often between 12 and 16. Developed many important skills regarding, leadership, communication, teaching/mentorship, and project management. For reference, please contact karen.pick@ymcamn.org. *May 2021 – August 2021*

PROJECTS

Directed Reading Program *January 2024 –*
Paired with McGill Ph.D. student Alexis Leroux-Lapierre, math.mcgill.ca/alapierre, for a semester-long mentorship. Began by studying the basics of representation theory, categorification, and knot invariants. We have since moved on to the categorification of Fock space representation of the Heisenberg algebra and an explainatory paper is being written. Regular meeting have also been conducted with Professor Yvan Saint-Aubin (UdeM) and Postdoc Chris Raymond (ULaval) to discuss open problems.

Fibrations Podcast *September 2022 –*
Season 1 explores the academic research being conducted at McGill University. Consists of five episodes interviewing researchers in five different fields. Listen at spotify.com/fibrations.

Lecture on Lie Theory With Applications to Quantum Physics *June 2023*
Notes from a lecture given as the final presentation for a Charles University physics course, Advanced Concepts in Symmetry. monte-mahlum.github.io/lie-theory.

25-Hour McGill Physics Hackathon *October 2022*
In a team of two, different numerical solutions to the Laplace Equation with fixed boundary conditions on the unit disc in $\mathbb{R}^2$ were explored and visualized. A novel numerical method was developed. Project submission can be viewed here.

LANGUAGES

English *First*
Spanish *2014 –*
Taken for seven years throughout secondary education. Current level of proficiency is conversational.

SKILLS

Programming Languages
Proficiency in Python, and Latex
Other
Jiu jitsu (since 2021), drums (since 2022), piano (since 2020).

ACADEMIC REFERENCES

Professor Li Wang, University of Minnesota, liwang@umn.edu
Affiliation: research advisor.

Professor Josef Malek, Charles University, malek@karlin.mff.cuni.cz
Affiliation: Functional Analysis course instructor.

Professor Peter Grutter, McGill University, peter.grutter@mcgill.ca
Affiliation: Thermal Physics course instructor, podcast guest.