MONTE MAHLUM

(+1) 612-845-6048
mahlu031@umn.edu
Minneapolis, MN

LinkedIn
Website
GitHub Repository

Reifying advanced mathematics into deployable systems; Built and validated formal ontologies and computational frameworks for complex, safety-critical domains.

EDUCATION

University of Minnesota M.Sc. in Mathematics, Minor in Comp. Sci., GPA: 3.96 *2024 – Dec 2025*
McGill University B.Sc. in Mathematics, Minor in Physics *2020 – 2024*
Univerzita Karlova Semester Abroad *2023*
Relevant Coursework (14+ at honours level)
Alg. & Data Structures, Database Systems, Modern ML, Algebraic Topology & Geometry, Category Theory, Mathematical Logic, Probability, Statistics, Stochastic Processes, Adv. Quantum Physics & Computing.

RELEVANT EXPERIENCE

Applied Category Theorist, NASA Langley Research Center *June 2025 – August 2025*

- Co-designed domain-specific ontology for systems architecture and rigorous mathematical & computational framework thereon; worked collaboratively to test framework on SysML-based architecture of the National Airspace System; for reference, contact supervisor Ian Levitt, PhD (ianl@tapestry-rdi.com).
- Lead author, forthcoming NASA Technical Memorandum; subsequent manuscript in preparation; invited presentation at JMM 2026.

Teaching Assistant, University of Minnesota – Twin Cities *Aug 2024 – Present*

- TA for MATH 4512 (Diff Eq), 2243 (Linear Algebra & Diff Eq), and 1142 (Short Calc); led twice-weekly recitations and office hours, created worksheets, and graded quizzes & exams.

Mathematics Research Assistant, University of Minnesota – Twin Cities *July 2023 – Present*

- Proved convergence of two distinct classes of particle methods for non-linear Wasserstein gradient flow.
- Developed rigorous research skills and ability to synthesize and present diverse data and ideas.
- Lead author, forthcoming manuscript; for reference, contact Professor Li Wang (liwang@umn.edu).

Precalculus, Calculus I, Probability, and Linear Algebra Tutor, Independent *2022 – May 2025*

- Enabled significant academic progress in four students from failure to high passing.

RECENT PROJECTS

Integration of Formally Verified Software *Fall 2025*
Integrating and configuring NASA Langley's formally verified DAIDALUS into a proprietary system.
Database System Consulting *Fall 2025*
Advising ODISEA on architecture for integrating bioinformatics, satellite data, and photogrammetry; designed unified schemas for scalable, high-quality knowledge retrieval.
Implementation of Graph Transformer *Fall 2025*
Re-implemented the HEAL graph transformer; tightly reproduced results, profiled training on >200k protein structures from SWISS-MODEL PDB, and currently authoring a technical report.
Database Development for Query Testing *Fall 2025*
Built scalable vector and SQL system for product specs & reviews; evaluated vector, SQL, and hybrid retrieval on accuracy, latency, and cost; documented findings in a final report.

SKILLS & LANGUAGES

Python (advanced), NumPy, Pandas, PyTorch; Julia (intermediate), AlgebraicJulia; PostgreSQL; Neo4j; C++ (basic).