

MONTE MAHLUM

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[LinkedIn](#)
[Website](#)
[GitHub Repository](#)

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

PROFESSIONAL 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); directed diverse classrooms, integrating many learning styles and personalities.

Mathematics Research Assistant, University of Minnesota – Twin Cities July 2023 – August 2025

- Ensured convergence of two distinct particle methods for general non-linear Wasserstein gradient flow.
- Developed strong research skills and ability to synthesize and present diverse data and ideas; for reference, contact Professor Li Wang (liwang@umn.edu).

Tutor for Undergraduate Mathematics Oct 2022 – May 2025

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

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

Univerzita Karlova Semester Abroad

Relevant Coursework (14+ at honors level)

Alg. & Data Structures, Database Systems, Modern ML, Algebraic Topology & Geometry, Category Theory, Mathematical Logic, Probability, Statistics, Stochastic Processes, Adv. Quantum Physics & Computing

RECENT PROJECTS

Database System Consulting Fall 2025

Advising [ODISEA](#) on architecture for integrating bioinformatics, satellite data, and photogrammetry; designed unified schemas for 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 production-ready vector and SQL system on Google CDB for product specs & reviews; evaluated vector, lexical, and hybrid retrieval on accuracy, latency, and cost; currently documenting findings in a final report.

Directed Reading Program Mentor Fall 2024

Leading a third-year undergraduate in their investigation into representations of compact Lie Groups. Working to explain old concepts in new ways to those lacking the necessary background.

SKILLS & LANGUAGES

C++; Python, NumPy, Pandas, PyTorch; Julia, AlgebraicJulia, Flow, MJL; SQL (Postgres); Neo4j; L^AT_EX