Matt Schwennesen

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Education

Aug 2023 – · · · ·	**University of Wisconsin – Madison** Perusing Ph.D. in Computer Sciences.
Aug 2023 – Dec 2025	**University of Wisconsin – Madison** M.S in Computer Sciences
Aug 2019 – Dec 2022	**Michigan Technological University,** B.Sc. Computer Science Minor in Mathematical Sciences, GPA: 4.00

Teaching Experience

Jan 2024 – Dec 2024	**Head Teaching Assistant,** University of Wisconsin — Madison. CS 400 Programming III
Aug 2023 – Dec 2023	**Teaching Assistant,** University of Wisconsin — Madison. CS 400 Programming III
Aug 2022 – May 2023	**Teaching Assistant,** Michigan Technological University. CS 3411 Systems Programming
Jan 2023 – May 2023	**Lab Instructor,** Michigan Technological University. CS 1121 Introduction to Programming I
Jan 2021 – Dec 2022	**Learning Center Coach,** Michigan Technological University.

Conferences

Nov 22 2024	**Midwest Programming Languages Summit**, University of Chicago
Jun 17–21 2024	**NetSci 2024**, Quebéc City, Canada. Presented during *Software Tools for Network Science* tutorial on cross package network analysis.
Jun 3–13 2024	**Oregon Programming Languages Summer School**, Boston University, Massachusetts. Types, Semantics and Applications

Research

Feb 2025 – · · · ·	**Pollux: Verified Updates to Data Descriptor Formats**

- Currently researching verifiably compatible updates to Protocol Buffer descriptors and JSON messages.
- Exploring formal definitions for update compatibility and constructing a verified compatibility checker.

Aug 2024 – Jan 2025	**Grackle: Proof-Instrumented Marshaling & Unmarshaling.** Independent Study with Tej Chajed.

- Investigated techniques for automating repetitive Rocq proofs using Goose and Perennial.
- Implemented a go program generating marshaling and unmarshaling code for protobuf messages and a Rocq proof of correctness.

Research (continued)

May 2022 – Aug 2022   **Locality Sensitive Hashing of Polygons.**
Research Experiences for Undergraduates – Marquette University.

- Researched uses of locality sensitive hashing to approximate nearest neighbor searches over polygons.
- Implemented a multi-threaded C++ system to perform geometric approximate nearest neighbor searches.

May 2021 – Aug 2021   **Asymmetric Traveling Salesperson Approximation.**
Google Summer of Code – NetworkX.

- Worked with NetworkX to implement approximate asymmetric salesperson algorithm.
- Learned how to manage GitHub within a large open source project.
- Perform critical analysis of relevant graph theory and computer science research papers.

Research Publications

Conference Proceedings

1. B. Kankanamalage, S. Puri, A. Soman, **M. Schwennesen**, and S. K. Prasad, "ShapeToVec: Encoding Polygonal Shapes with Extreme Area Variability for Effective Approximate Jaccard Similarity Queries", to appear in *2025 IEEE International Conference on Big Data (BigData)*, Dec. 2025.

Skills

Mathematics   Proof tactics, mechanized proofs, separation logic, programming languages, graph theory, combinatorics, linear optimization, algorithm design, complexity theory

Programming   Rocq, Go, Python, C, C++, Java, Nix, Haskell, F*, SQL, Lisp, R

Misc.   Academic research, teaching, LaTeX typesetting.

Awards and Achievements

- **Dean's List**, Michigan Technological University, 7 semesters.

Certificates of Merit in:

- **Combinatorics & Graph Theory**. Awarded by Michigan Technological University.
- **Optimization & Graph Algorithms**. Awarded by Michigan Technological University.
- **Statistical Programming**. Awarded by Michigan Technological University.
- **Regression Analysis**. Awarded by Michigan Technological University.
- **Predictive Modeling**. Awarded by Michigan Technological University.