

# 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**, Québec 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 traveling 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.

## 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.