ETHAN MADER

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EDUCATION

Purdue University **Aug 2024 - Present**

Computer Science Ph.D. Program

- Advised by Kent Quanrud and funded by an R.A., Presidential Excellence PhD Award, and Herbold Scholarship
- GPA: 3.93/4.0, member of Theory CS seminar, TCS Reading Group, Chess Club, Purdue Outing Club
- Research areas: Graph algorithms, complexity theory, convex optimization, algorithmic economics

University of California, Santa Barbara **Sep 2020 - June 2024**

B.S. Computer Science, B.S. Mathematics

- GPA: 3.93/4.0, Theta Tau Professional Engineering Fraternity, Chess Club, Math Club
- Key coursework: Graph theory, combinatorics, advanced algorithms, Markov chains, probability, statistics

EXPERIENCE

Purdue Research Assistantship **Sep 2024 - Present**

Graph Algorithms Research

- Learned techniques for undirected expander decompositions from SW21 and HKPW23
- Working to improve the quasi-polynomial runtime for the hypergraph unreliability problem introduced in CLP24

Wyzant **June 2023 – Sep 2024**

Math and Computer Science Tutoring

- Remote instruction on competition math and C++ fundamentals, data structures, and algorithms
- 200+ hours and perfect 5-star rating across 30 reviews with one-time and long-term clients

Polymath Jr. Summer Program **June - Aug 2023**

Combinatorial Geometry Research

- Used computer-assisted techniques for novel case analysis automation in the distinct distances problem
- Collaborated with 10 other undergraduates under the supervision of Adam Sheffer of CUNY

UCSB Programming Languages Lab **Jan - June 2023**

Programming Languages Research

- Developed metaprogramming techniques in Agda and Coq for automated proofs of bisimilarity between superconducting electronic (SCE) circuits which utilized equational reasoning and coinduction
- Motivated the decision to translate Citrus, a newly developed DSL in Agda, to Coq

PROJECTS

AI and ML Programming **May 2022 - May 2024**

- Naïve Bayes classifier from scratch in C++ on 1000 testing files to predict future weather classifications given 28 previous times steps and 17 data values both discrete and continuous
- Improved A-star search to beat an adversary in a variation of Rogue with top 7% class performance
- Convolutional neural network in Python using TensorFlow trained on 40,000 training images to classify clothing images from 10 categories with 92% accuracy on 10,000 test images

SKILLS

- Programming: C++, Python, Java, MATLAB, OCaml, Haskell, Agda, Coq, C
- Tools: NumPy, Matplotlib, pandas, TensorFlow, Mathematica, ChatGPT, Copilot, LaTeX
- Other interests: Quantum computing, DL for math proofs in Lean, Jane Street monthly puzzles