ETHAN MADER

(408) 458-0146 | ethan.mader@gmail.com | linkedin.com/in/ethan-mader | ethan-mader.com

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: Convex optimization, algorithmic economics, graph algorithms, complexity theory

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, Math Club, Chess Club
- Key coursework: Combinatorics, probability, statistics, Markov chains, graph theory, advanced algorithms

EXPERIENCE

Purdue Research Assistantship **Sep 2024 - Present**

Graph Algorithms Research

- Learned algorithmic techniques for undirected expander decompositions and their connection to max flow problem
- Studied recent results in hypergraph unreliability and found evidence against its generalization to matroids
- Surveyed sub-quadratic constant factor approximations for the classic edit distance problem

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**

- Implemented a Naïve Bayes classifier from scratch in C++ on 1000 testing files to predict future weather classifications given prior month's data at 1-day intervals with discrete and continuous variables
- Improved on A-star search to beat an arbitrary adversary in an arcade game with 93rd percentile in my class
- Trained a convolutional neural network in Python via TensorFlow 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
- **Tools**: NumPy, Matplotlib, Pandas, Scikit-learn, TensorFlow, Mathematica, ChatGPT, Copilot, LaTeX
- **Interests**: Jane Street monthly puzzles, quantum computing, DL for math proofs in Lean