

Anna Mauro

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Education

Stanford University

M.S. in Computer Science

planned graduation: December 2024

B.S. in Mathematics with Honors

graduated: June 2023

- Coursework in advanced algorithms, computer architecture and systems, parallel computing, uncertainty quantification and decision-making, optimization, cryptography, blockchain technologies, algebraic error-correcting codes, reinforcement learning, quantum computing, and cybersecurity
- Mathematics coursework in number theory, graph theory, functional and complex analysis, probability theory, differential topology and geometry, partial differential equations, and mechanics and special relativity
- Graduated with honors in mathematics with a thesis titled “Computing Even Moments of the Magnitude of the Characteristic Polynomial for a Random Unitary Matrix”

Technical Skills

Languages and Packages: C++, Python, C, JavaScript, Solidity, CVXPY, NumPy, Julia, SageMath

Tools: gdb, Git, SLURM scheduler, CUDA

Topics: mathematics, decision-making and optimization algorithms, cryptography, parallel computing

Relevant Experience

Cybersecurity and Critical Infrastructure Intern

Lawrence Livermore Natl. Labs, Summer 2024

- Developed distributed software in C++ implementing reliable and scalable computational mathematics solvers
- Collaborated with team members through individual and team meetings and code review in Gitlab

SMALL Summer Research Experience for Undergraduates

Williams College, Summer 2022

- Researched densities of L-function zeros in number theory that extended a seminal paper in the field

Texas A&M Summer Research Experience for Undergraduates

Texas A&M, Summer 2021

- Proved more accurate estimates for the decay of well-studied functions in analytic number theory

MathILy-EST Summer Research Experience for Undergraduates

Bryn Mawr College, Summer 2020

- Collaborated with five others to solve a computational geometry and coordinated motion planning problem

Head/Admin Teaching Assistant, Teaching Assistant

Summer, Fall 2023 Winter, Spring, Fall 2024

- Lead discussion sections and course administration for Stanford’s 450+ person linear algebra and multivariable calculus and mathematical foundations of computing courses

Project Experience

Double ratchet chat client, *Cryptography class*

Winter 2024

- Implemented a secure and efficient end-to-end encrypted chat client using the Double Ratchet Algorithm in Javascript using the SubtleCrypto library

Ethereum payment app and decentralized exchange, *Blockchain Technologies class*

Fall 2023

- Build a decentralized payment application on Ethereum using Solidity and ethers.js

HTTP/S proxy and cache, *Computer systems class*

Spring 2021

- Created a multithreaded proxy in C with HTTP/SSL passthrough, strike-sets, and caching

Web security attacks and defenses, *Cybersecurity class*

Spring 2024

- Developed XSS, CRSF, cookie tampering, SQL injection, and side-channel timing attacks on a locally-hosted website, and implemented defenses including input validation, CSP, client-side validation, and CSFR tokens.

Leadership and Awards

Mathematics Department Distinguished Service Award *Stanford University 2023*
Student Initiated Course “How to Give a Math Talk” founder, instructor *Stanford University Winter 2023*
Peer Advisor *Stanford University Mathematics Department, 2020 - 2023*
President, Financial Officer *Stanford University Mathematics Organization, 2021 - 2023*
President, Financial Officer *Stanford University Swing Dancers, 2022 - 2024*

Publications

Annika Mauro, Jack Miller, Steven J. Miller, “**Extending the support of 1- and 2-level densities for cusp form L-functions under square-root cancellation hypotheses**”, *Acta Arithmetica*, June 2023
G. Moura, A. Keisling, A. Lilly, A. Mauro, S.J. Miller, M. Phang, S.V. Iannuzzelli “**Recurrence relations for S-legal index difference sequences**” *The Fibonacci Quarterly*, September 2023
H. Alpert, R. Barnes, S. Bell, A. Mauro, N. Nevo, N. Tucker, H. Yang “**Routing by matching on convex pieces of grid graphs**” *Computational Geometry*, January 2022
Riad Masri, Annika Mauro, Tanis Nielson, “**The distribution of short orbits of singular moduli**” *Arxiv*, August 2022
Annika Mauro, “**Computing Even Moments of the Magnitude of the Characteristic Polynomial for a Random Unitary Matrix**”, *Honors B.S. Mathematics thesis, Arxiv*, June 2023

Presentations

S-Legal Index Difference Sequences, Joint Mathematics Meetings 2023
An Excised Orthogonal Model for Families of Cusp Forms, Québec-Maine Number Theory Conference 2022
Routing by matching on convex pieces of grid graphs, Joint Mathematics Meetings 2021