Hannah Friedman

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EDUCATION

University of California, Berkeley — Expected May 2028
PhD in Mathematics

Harvey Mudd College — May 2023
BS in Mathematics with High Distinction, Honors in Mathematics
Thesis advised by Michael Orrison

PUBLICATIONS & PRESENTATIONS

Long Increasing Subsequences (advised by Michael Orrison)

- Presented at Harvey Mudd Thesis Presentation Days; see minutes 12:20 to 25:30 of https://tinyurl.com/hmc-senior-thesis-talk

"A New Basis for k-Local Class Functions" (with Michael Orrison)

- Presented a poster at the Claremont Center for the Mathematical Sciences poster session, August 2022
- Presented in the Pi Mu Epsilon Contributed Session on Research by Undergraduates at the 2023 Joint Math Meetings

"An Interpretable Joint Nonnegative Matrix Factorization-Based Point Cloud Distance Measure" (with Amani R. Maina-Kilaas, Julianna Schalkwyk, Hina Ahmed, and Jamie Haddock)

- Presented a poster at the Southern California Applied Mathematics Symposium, June 2022
- Paper submitted to the 57th Annual Conference on Information Science and Systems; see https://arxiv.org/pdf/2207.05112v2.pdf

AWARDS & HONORS

Alvin White Prize, Harvey Mudd College — 2023
Presented to a student or students who have contributed greatly to the humanistic side of the Harvey Mudd College Mathematics Community.

Giovanni Borrelli Mathematics Fellowship, Harvey Mudd College — 2021 - 2022
Conferred on one or two junior mathematics majors in recognition of the ability to complete high quality research independently or in tandem with a faculty advisor.

Courtney S. Coleman Prize, Harvey Mudd College — 2021
Awarded to three rising juniors who excel in mathematics.

RESEARCH EXPERIENCE

Borrelli Fellow, Harvey Mudd College — Summer 2022
INDEPENDENT PROJECT ADVISED BY PROF. MICHAEL ORRISON
Discovered new connections between representation theory, fixed point statistics, and symmetric functions

- Studied permutation statistics through algebraic and harmonic analysis lenses
- Derived a new permutation statistic and related it to existing functions using symmetric function theory
- Conducted literature reviews and developed a computational framework for testing conjectures

Mathematics Department, Harvey Mudd College — Spring 2022
TEAM OF FOUR UNDERGRADUATES ADVISED BY PROF. JAMIE HADDOCK
Created a distance measure for datasets using joint nonnegative matrix factorization

- Modified a supervised machine learning technique to create a distance measure for data sets
- Tested our method on data sets using Python
- Wrote the method and experiment sections of our paper

Mathematics Department, Harvey Mudd College — Fall 2021 - Spring 2022
TEAM OF FOUR UNDERGRADUATES ADVISED BY PROF. HAYDEE LINDO
Investigated relationships between trace ideals and other ideals in commutative rings

- Posed research questions after independently learning background material for research project
- Studied the trace ideals of numerical semigroup rings and how trace carries over primary decomposition
- Used algebraic software to generate examples

Computer Science Department, Harvey Mudd College Summer 2021

TEAM OF THREE UNDERGRADUATES ADVISED BY PROF. LUCAS BANG

Created a new method for performing symbolic execution using linear algebra and graph theory

- Optimized an algorithm that utilizes fast matrix multiplication to perform symbolic execution
- Designed and performed tests comparing matrix symbolic execution method to traditional symbolic execution

LEADERSHIP EXPERIENCE

President, Women in Math, Harvey Mudd College Fall 2022 - Spring 2023

- Support women in mathematics and strengthen the mathematics community by fostering connections between underclassmen, upperclassmen, and alumni (as mentorship coordinator 21-22)
- Recruit new leadership members
- Host math department speakers and organize ushers for speaker events
- Organize social and networking events for women interested in math

Sustainability Director, Harvey Mudd College Student Government Fall 2020 - Spring 2022

- Coordinated and supported teams of undergraduate volunteers on various projects focused on increasing campus sustainability

TEACHING EXPERIENCE

Tutor/Teaching Assistant, Harvey Mudd College Spring 2021 - Spring 2023

- Help students develop intuition and answer questions about Calculus, Linear Algebra, Differential Equations, Discrete Math, Abstract Algebra I, Harmonic Analysis on Finite Groups, Data Science, and Principles of Computer Science

Grader, Harvey Mudd College Fall 2020 - Spring 2023

- Grade weekly or biweekly homework sets for Calculus, Linear Algebra, Abstract Algebra I, and Harmonic Analysis on Finite Groups

SKILLS

Programming Languages: Python, MatLab, Macaulay2, Java, Racket, C++, R,
Languages: English (fluent), German (fluent), Mandarin (proficient), Hebrew (proficient)