Quinn Mayo

Undergraduate Student
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RESEARCH INTERESTS

My primary research interest is Computational Complexity Theory, particularly Concrete Complexity which encompasses the analysis of Boolean Circuits, Branching Programs, and other combinatorial models of computation. I am interested generally in parallel computation and the structural relation between low-level circuit complexity classes which will be the subject of my BSc Honors Thesis. In the future, I also plan to do research on algebraic methods in complexity (Arithmetic Circuits, Polynomial Methods in Circuit Complexity).

EDUCATION

University of Massachusetts Amherst, Amherst, MA — Fall 2022 — Present
BSc (Honors, with Thesis) in Computer Science, Mathematics — Graduation: Spring 2025
Concentration(s): Theory of Computation, Pure Mathematics — Cumulative GPA: 3.9/4.0

RESEARCH EXPERIENCE

BSc Honors Thesis — Amherst, MA
Honors Student — Spring 2024 — Present
Advisors: David A. M. Barrington, Eric Allender

- Studying the relationship between NC^1 and TC^0 and the complexity of Boolean formula evaluation.
- Preliminary reading on circuit uniformity, complete problems for NC^1, TC^0 over Spring, Summer 2024.

Polymath Jr. REU — Online
Research Participant — June 2024 — August 2024
Advisor: Alexandra Seceleanu

- Studied the construction of Macaulay rings and posets in a group of 4 students.
- Gave counter-examples to several conjectures on the tensor product of Macaulay rings, and developed new conjectures.
- Results to be written in a paper later in the Fall.

CICS Undergraduate Research Volunteers — Amherst, MA
Research Participant — December 2023 — February 2024
Advisor: Kyle Doney (PhD student)

- Studied linearly separable Boolean functions and relevant algorithms.
- Wrote code to generate linearly separable Boolean formulas.
- Presented poster at CICS poster session.

SELECTED COURSES

COMPSCI 501 — Formal Language Theory
An introductory graduate course in computability theory and complexity theory.

COMPSCI 466 — Cryptography
An introductory undergraduate course in cryptography, with an emphasis on provable security.

MATH 411, 412 — Abstract Algebra I, II
The undergraduate algebra sequence covering group theory, ring and field theory, and an introduction to Galois theory.

MATH 545 — Advanced Linear Algebra
A second course in undergraduate linear algebra with an abstract-algebraic approach.

SCHOLARSHIPS, AWARDS & HONORS

Dean's Merit Scholarship — 2023
A UMass CICS scholarship awarded to a handful of undergraduates yearly.

Class of 1934 Scholarship 2023
A merit-based scholarship awarded to undergraduates yearly.

Dean's List 2022 — Present