# Holden Mui

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## Education

**Massachusetts Institute of Technology**: class of 2025 *Aug. 2021 - May. 2025*
Mathematics major and physics minor. GPA: 5.0. Selected graduate coursework: Applied Cryptography (A+), Schur Polynomials and Schubert Polynomials (A+), Combinatorics and Geometry (A+), Ramsey Theory (A), Analysis of Boolean Functions (A+), Graph Theory and Additive Combinatorics (A), Probabilistic Methods in Combinatorics (A), Commutative Algebra (A+), Introduction to Representation Theory (A+), Algebraic Topology I (A).

## Technical Proficiencies

- **Languages**: Rust, Python, LaTeX
- **Mathematics**: algebra, combinatorics, cryptography

## Selected preprints

**Coalescence Probabilities of Cycle Products** *Sep. 2024*
Holden Mui. arXiv:2409.01415.

**Flip Graphs on Self-Complementary Ideals of Chain Products** *Jan. 2024*
Serena An, Holden Mui. arXiv:2401.01457.

## Work experience

**0xPARC**: research engineer *Jun. 2025 - present*
I am developing a "cryptographic computer," a computer which enables computation over encrypted data, shifting the paradigm of secure computing from trusted hardware to provable confidentiality. Reference: Albert Ni.

**Supervised UROP**: researcher *Jun. 2022 - Aug. 2022, Jun. 2024 - Aug. 2024*
A research position offered by the MIT math department designed to give MIT undergraduates an opportunity to work on a research project under the guidance of a graduate student mentor. In 2024, I worked with Oriol Solé Pi on computing the probability $1, 2, \ldots, k$ are in the same cycle in a product of two $n$-cycles. In 2022, I worked with Ashwin Sah, Mehtaab Sawhney, and Tomasz Ślusarczyk on characterizing the upper tail of cycle distributions in sparse Erdős-Rényi random graphs. References: Mehtaab Sawhney and Oriol Solé Pi.

**Summer Program for Undergraduate Research**: researcher *Jun. 2023 - Aug. 2023*
Worked with Serena An and Elisabeth Bullock on algebraic combinatorics research. We explored properties of flip graphs on self-dual order ideals in self-dual posets. Reference: Elisabeth Bullock.

## Selected Awards

**Putnam Mathematical Competition**: rank 21st, 14th, 27th *2021, 2022, 2023*

**Mathematical Olympiad Program**: three-time qualifier *2018, 2019, 2020*

## Selected Teaching

**MIT Global Teaching Labs**: instructor *Jan. 2022, Jan. 2023, Jan. 2024, Jan. 2025*
An opportunity to support and train the Ghanaian, Tunisian, Bhutanese, and Rwandan IMO teams. In addition to preparing lectures for each country's top students, I visited several schools to stimulate mathematical interest. Reference: Ari Jacobovits and Megha Hegde.

**Mathematical Olympiad Program**: teaching assistant *Jun. 2022, Jun. 2023, Jun. 2024*
A training program for the USA team at the International Math Olympiad. I graded tests, presented solutions during test review, taught a class, led a singing group, and helped organize social events. Reference: Po-Shen Loh.

**Real Analysis**: undergraduate assistant *Feb. 2023 - May. 2023*
I held office hours, graded homework and exams, and monitored the class Piazza. Reference: Giada Franz.

## Other Experience

**USA Mathematical Olympiad Editorial Board**: problem writer *Apr. 2022 - May. 2025*

**Harvard-MIT Mathematics Tournament**: problem writer *Oct. 2021 - Apr. 2025*

**North Suburban Math League**: contest author *Aug. 2021 - present*

**Curious Cube**: podcast host (68k views) *Dec. 2021 - Aug. 2023*