Maxwell R. Sun

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Education

Massachusetts Institute of Technology **August 2022 - May 2026**

Bachelor's of Science in Mathematics with Computer Science *GPA: 5.0/5.0*

Notable Coursework: Design and Analysis of Algorithms (A+), Fundamentals of Programming (A+), Machine Learning (A+), Stochastic Processes (A+), Graduate Probability Theory (A), Abstract Algebra II (A+)

Awards/Exams

Putnam Honorable Mention (Top 100) **December 2023**

USAMO Qualifier 2019-2021, MOP Participant and ELMO Bronze 2020 **April 2019 - May 2021**

1600 SAT (one attempt) **May 2021**

USAMTS Gold Medal as Freshman, Junior; Silver Medal as Sophomore **September 2018 - May 2021**

Research Experiences and Internships

SMALL REU (Probability and Number Theory Group) **June – August 2023**

- Highly selective, fully funded (by NSF) mathematics REU at Williams College, 9-week intensive research program
- Research in probability, combinatorial geometry, analysis; results presented at Young Mathematicians Conference
- Resulted in three papers, two accepted for publication and one still under review (entries 2-4 in Papers section)

Undergraduate Research Opportunities Program (MIT) **September 2022 – May 2023**

- Conducted paid research in probability, algebra, and combinatorics
- Investigated the two-sided descent over Mallows distributed Coxeter groups, obtained Central Limit Theorem like results
- Worked out proofs and calculations and wrote up results independently; sole author of paper under review (last entry)

AI Engineer Internship (Lendica) **January 2024**

- Four week winter internship at embedded lending start up Lendica
- Creating a bot using OpenAI's products that assists businesses in learning about and becoming a customer of Lendica.
- Created a web application that interacts with users through multiple interfaces, requiring the creation and use of APIs

Research Assistant (Aalto Science Institute) **June-August 2024**

- Machine learning research done solo (under supervision of professor) involving theoretical reasoning and experiments
- Investigating the expressive and generalizability capabilities of state-space models, specifically Mamba

Papers

Dot products in $\mathbb{F}_q^3$ and the Vapnik-Chervonenkis dimension

- Published in *Discrete Mathematics* 346(1), January 2023

Improved bounds for embedding certain configurations in subsets of vector spaces over finite fields

- Submitted

Generalized point configurations in $\mathbb{F}_q^d$

- Accepted for publication in *Finite Fields and Their Applications*

Generalized Continuous and Discrete Stick Fragmentation and Benford's Law

- Accepted for publication in *Journal of Number Theory*

A Central Limit Theorem on Two-Sided Descents of Mallows Distributed Elements of Finite Coxeter Groups

- Submitted

Conferences

Young Mathematicians Conference | Ohio State University **August 2023**

- Gave a 2-person talk for each project done during SMALL. Each was 20 minutes. *Link to Benford's Law talk slides.*
- Two different abstracts were accepted first round (out of 41 total accepted) despite 124 total submissions

Skills

Programming Languages: Python (proficient); Java, JavaScript, C, Assembly
Other Languages/Tools/Frameworks : LaTeX, SageMath, TensorFlow, PyTorch
Languages : English (native), Mandarin Chinese (intermediate), Spanish (beginner)