Andrew Luo

University of Waterloo | Master of Mathematics
Cheriton School of Computer Science

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Waterloo, ON

Education

Master of Mathematics
University of Waterloo — Jan. 2024 - Present
Major in Computer Science.

- Working under the supervision of Stephen Melczer and Eric Schost.
- Research in Symbolic Computing Methods for Analytic Combinatorics in Several Variables

Bachelor of Mathematics
University of Waterloo — Sept. 2018 – Apr. 2024
Triple Majors in Computer Science, Pure Mathematics, and Combinatorics & Optimization

- Graduated with Dean's Honours and a CAV of 95%
- Courses taken or currently taking:
    - Advanced Math – Algebra, Linear Algebra 1 and 2, Calculus 1, 2, and 3, Probability, Combinatorics
    - CO – Intro to Optimization (Advanced Level), Combinatorial Enumeration, Applied Cryptography, The Mathematics of Public Key Cryptography, Algebraic Combinatorics, Continuous Optimization
    - PMATH – Groups and Rings, Fields and Galois Theory, Real Analysis, Complex Analysis, Differential Geometry, Analytic Number Theory, Lebesgue Integration and Fourier Analysis, Algebraic Number Theory, Representation of Finite Groups, Set Theory and Model Theory
    - CS – Designing Functional Programs, Data Structures and Algorithms, Numerical Computation, The Theory of Computation, Algorithm Design and Analysis, Introduction to Machine Learning
- Former Undergraduate Marker for Math 137 and Math 235

Work Experience

Undergraduate Mathematics Research Assistant — May-Aug. 2022
University of Waterloo — Waterloo, ON

- Worked under the supervision of Stephen Melczer and ACSV group B. Hackl, J. Selover, E.Wong to develop a Sage package for computing asymptotics of multivariate generating functions

Full-Stack Software Developer — Jan.-Apr. 2022
Noom — New York City, Y

- Designed and implemented a Natural Language Processing microservice using ApacheNLP, AWS, and Kotlin to detect and classify questions from customers

Undergraduate Mathematics Research Assistant — May-Aug. 2021
University of Waterloo — Waterloo, ON

- Completed a USRA term under the supervision of Professor Yu-Ru Liu
- Studied the most recent progress made in and applications to Waring's Problem and Vinogradov's Mean Value Theorem
- Learned about the Discrete Restriction Problem and its extension into function fields

Full-Stack Microsoft Developer Sept.-Dec. 2020
BDO Mississauga, ON
- Developed webpage and backend logic for the internal resource management tool
- Used Microsoft SQL Server, .NET with Entity Framework Core, and Angular

Backend Software Developer Jan.-Mar. 2020
Wayfair Boston, MA
- Designed and implemented the recommendation engine software in PHP for use by the customer service team

Full-Stack Software Developer May-Aug. 2019
Wish San Francisco, CA
- Developed Python APIs and scripts for monitoring merchant activity
- Extensively refactored existing code to improve readability and run time

Publications

Rigorous Analytic Combinatorics in Several Variables in SageMath. B. Hackl, A. Luo, S. Melczer, J. Selover, and E. Wong. Submitted March 2023. arxiv:2303.09603

Activities and Interests

Canadian Undergraduate Mathematics Conference (CUMC)
Université Laval Aug. 2022
- Presented undergraduate work on the Sage ACSV project for computing asymptotics of multivariate generating functions

Western University Aug. 2021
- Presented a summary of Dr. Trevor Wooley's recent work on Vinogradov's Mean Value Theorem

Canada/USA Mathcamp Summer 2016-2018
USA
- Relevant Courses:
  - Graph Theory and Planarity of Graphs
  - The Travelling Salesman Problem
  - Combinatorial Game Theory
  - Information Theory
  - Applications of Groups and Burnside's Lemma
- Projects:
  - The Iterated Prisoner's Dilemma – developed simulations of the prisoner's dilemma to observe how strategies evolved over time
  - Symmetries of Zome Figures – studied a general method for finding the patterns formed when a Zome geometric figure is spun about one of its axes

Funding and Awards

Graduate Excellence Award in Computer Science
- Computer Science, University of Waterloo (2024)

Mike Vangoch Memorial Scholarship
- Pure Mathematics, University of Waterloo (2023)

NSERC Undergraduate Student Research Award
- Combinatorics and Optimization (2022)
- Pure mathematics (2021)

Putnam Math Competition
- Honour Roll (2018)

Canadian Open Mathematics Challenge
- Canadian Mathematical Olympiad Qualifier (2017, 2018)
- BC Provincial Honour Roll (2018)
- BC Grade 12 Silver Award (2018)

Euclid Math Contest
- Three-time honour roll standing (2017-2018)