

# ANDREW LUO

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## EDUCATION

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### University of Waterloo

Waterloo, Ontario

*Doctor of Philosophy - Computer Science*

*Jan 2024 - Present*

- Conducting research in symbolic computational methods for Analytic Combinatorics in Several Variables under the supervision of Stephen Melczer and Eric Schost
- Enrolled in the Fundamentals of University Teaching program run by the Center for Teaching Excellence to develop pedagogical skills that can be applied in post-secondary teaching
- **Courses:** Computational Complexity, Algebraic Geometry, Algebraic Complexity, Artificial Intelligence, Software Design and Architecture, Computer Networks, Complexity in Commutative Algebra, University Mathematics Teaching Techniques

### University of Waterloo

Waterloo, Ontario

*Bachelor of Mathematics*

*Sept 2018 - Apr 2023*

- Triple majors in Computer Science, Pure Mathematics, and Combinatorics & Optimization
- **Courses:**
  - 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 – Functional Programming, Object Oriented Programming, Data Structures and Algorithms, Numerical Computation, Theory of Computation, Algorithm Design and Analysis, Machine Learning
  - CO – Intro to Optimization (Advanced Level), Combinatorial Enumeration, Applied Cryptography, Mathematics of Public Key Cryptography, Algebraic Combinatorics, Continuous Optimization

## PUBLICATIONS

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A SageMath Package for Analytic Combinatorics in Several Variables: Beyond the Smooth Case.  
B. Hackl, A. Luo, S. Melczer, E. Schost. Submitted March 2025.

[FPSAC Link](#)

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

[FPSAC Link](#)

## PRESENTATIONS

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A SageMath Package for Analytic Combinatorics in Several Variables, SageDays 2025,  
Hokkaido University

Sapporo, Japan

A SageMath Package for Analytic Combinatorics in Several Variables: Beyond the Smooth  
Case (Code Demo), FPSAC 2025, Hokkaido University

Sapporo, Japan

Automatically Computing Asymptotics of Sequences with Multivariate Rational Generating  
Functions, AofA 2025, Fields Institute

Toronto, ON

A Brief Introduction to Computational Analytic Combinatorics, Canadian Undergraduate  
Mathematics Conference, Université Laval

Québec City, QC

An Introduction to Vinogradov's Mean Value Theorem, Canadian Undergraduate Mathe-  
matics Conference, Western University

London, ON

## ACADEMIC EXPERIENCE

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### Graduate Teaching Assistant

University of Waterloo

Waterloo, ON

Jan 2024 - Present

- Conducted office hours, tutorials, responses to student inquiries on piazza, and grading of assignments and exams for CS 370: Numerical Computation

### Instructional Apprentice

University of Waterloo

Waterloo, ON

Sept 2024 - Dec 2024

- Conducted weekly tutorials and office hours for CS 245: Logic and Computation

### Undergraduate Teaching Assistant

University of Waterloo

Waterloo, ON

Sept 2019 - Dec 2022

- Conducted grading and feedback for undergraduate mathematics courses including Math 136 and Math 235

### Undergraduate Mathematics Research Assistant

University of Waterloo

Waterloo, ON

May - Aug 2022

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

University of Waterloo

May - Aug 2021

- Surveyed the most recent progress made in and applications to the asymptotic results of Waring's Problem and Vinogradov's Mean Value Theorem under supervision of Professor Yu-Ru Liu

## EXTRACURRICULAR EXPERIENCE

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### Directed Reading Project Mentor

University of Waterloo

Waterloo, ON

Jan 2026 - Present

- Mentoring undergraduate students on a mathematical reading project run by the Women in Mathematics committee to study algorithms for polynomial system solving

### Euclid Math Contest Marker

Center of Education for Mathematics and Computing

Waterloo, ON

April 2024, 2025

- Assisted in the grading of Euclid Math Contest paper submissions

### SPARCS volunteer

Center of Education for Mathematics and Computing

Waterloo, ON

May 2024

- Assisted workshop speakers by guiding students through interactive activities, answering questions, and assisting with set-up

## PROFESSIONAL EXPERIENCE

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### Part-Time Mathematics Tutor

Cloudtimes Education

Mississauga, ON

Feb 2023 - June 2024

- Tutored students in high school on topics varying from algebra to math contest preparation

### Full-Stack Software Developer Intern

Noom

New York City, NY

Jan - Apr 2022

- Used the Apache OpenNLP library to develop a Natural Language Processing pipeline for processing and triage of user messages and help requests

**Full-Stack Developer Intern***BDO*

Mississauga, ON

*Sep - Dec 2020*

- Developed an interactive scheduling web app in Angular, .NET, and Microsoft SQL Server for visualizing and modifying allocation of resources

**Backend Developer Intern***Wayfair*

Boston, MA

*Jan - Apr 2020*

- Implemented backend business logic using PHP and Microsoft SQL Server, ensuring correctness by creating extensive unit and integration tests covering all cases of the business logic

**Full-Stack Software Developer Intern***Wish*

San Francisco, CA

*May - Aug 2019*

- Wrote Python and SQL scripts to monitor merchant fraud lifecycle
- Extensively refactored legacy code and eliminated large amounts of technical debt

**HONOURS AND AWARDS**

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<b>Canada Graduate Scholarship - Master's</b>   NSERC	2025
<b>Queen Elizabeth II Scholarship in Science &amp; Technology</b>   University of Waterloo	2024
<b>Graduate Excellence Award in Computer Science</b>   University of Waterloo	2024
<b>Mike Vangoch Memorial Scholarship</b>   University of Waterloo	2023
<b>NSERC Undergraduate Student Research Award</b>   NSERC	2022
<b>President's Research Award</b>   University of Waterloo	2021
<b>NSERC Undergraduate Student Research Award</b>   NSERC	2021
<b>President's International Experience Award</b>   University of Waterloo	2021
<b>Faculty of Mathematics Entrance Scholarship</b>   University of Waterloo	2018
<b>Putnam Math Competition Honour Roll (Top 500)</b>   Mathematical Association of America	2018