

Alexander Paul Kroitor

Education

- 2024–Present **PhD in Mathematics**, *University of Toronto*, Toronto, Canada
- **Advisor:** Prof. Tristan Collins.
- 2022–2024 **M.Math. in Combinatorics and Optimization**, *University of Waterloo*, Waterloo, Canada
- **Advisor:** Prof. Stephen Melczer.
 - **Thesis:** Non-Generic Analytic Combinatorics in Several Variables and Lattice Path Asymptotics
- 2019–2022 **B.Sc. in Honours Mathematics**, *McGill University*, Montréal, Canada
- Minor in Computer Science.
 - Graduated with First Class Honours.

Publications

1. Alexander Kroitor and Stephen Melczer. Completing the Asymptotic Classification of Mostly Symmetric Short Step Walks in an Orthant. *Annals of Combinatorics*, December 2024.
2. Alexander Kroitor. A first result in complex approximation. *Notes from the Margin*, XIV, 2023.

Research Interests

- Geometry, analysis on surfaces, PDEs.
- Complex analysis in one and several variables.

Conference Talks

- Dec 2023 **Restricted Lattice Walks using Analytic Combinatorics in Several Variables**, *Canadian Mathematical Society Winter Meeting*

Seminar Talks

- Oct 2025 **Gromov-Hausdorff limits of Kahler manifolds**, *Informal Complex Geometry and PDE Seminar*
- Oct 2025 **Miracle on $\zeta(3)$ 'rd Street**, *UofT Student Seminar*
- Mar 2025 **Hormander's L2 Estimates Part 2**, *Informal Complex Geometry and PDE Seminar*
- Mar 2025 **Lattice Path Enumeration Through ACSV**, *UofT Student Seminar*,
- Mar 2025 **Hormander's L2 Estimates Part 1**, *Informal Complex Geometry and PDE Seminar*
- Nov 2024 **A New Proof of Narasimhan and Seshadri**, *Informal Complex Geometry and PDE Seminar*
- Apr 2024 **Lattice Path Enumeration Through ACSV**, *Algebraic Enumeration Seminar*,
- Jan 2024 **Speaker**, *Waterloo Crystals Learning Seminar*
- Nov 2023 **Speaker**, *Waterloo Causal Set Theory Learning Seminar*
- Oct 2023 **Speaker**, *Waterloo Toric Varieties Learning Seminar*
- Sep 2023 **Speaker**, *Waterloo Chip Firing Learning Seminar*
- Jul 2023 **Speaker**, *Waterloo Bott and Tu Learning Seminar*

- Jun 2023 **Analytic Combinatorics via Fourier-like Integrals**, *Algebraic Enumeration Seminar*
- May 2023 **Speaker**, *Waterloo Morse Theory Learning Seminar*
- Nov 2022 **Speaker**, *Waterloo Grad Seminar*

Conferences and Seminars Organized

- Nov 2025 - **Bird's Eye Conference Principal Organizer**, *University of Toronto*, Toronto
Present One of the principal organizers of the 2026 rendition of the Bird's Eye Conference hosted at UofT.
- Oct 2025 - **Monge-Ampere Regularity Seminar co-Organizer**, *University of Toronto*, Toronto
Present Organized a UofT seminar focusing on regularity results for the Monge-Ampere equation.
- May 2025 **OGMC Committee Member**, *University of Toronto*, Toronto
On the organizing committee for the 2025 rendition of the Ontario Graduate Mathematics Conference.
- Mar 2025 **Bird's Eye Conference Committee Member**, *University of Toronto*, Toronto
On the organizing committee for the 2025 rendition of the Bird's Eye Conference hosted at UofT.

Outreach and Public Service

- Sep 2025 - **MGSA Social Committee Chair**, *University of Toronto*, Toronto
Present Elected as a executive member of the UofT Math Graduate Student Council. Organized a team of volunteer graduate students to plan and run events for the UofT graduate student body. Participated in student governance and discourse between the administration and the graduate student body as part of the executive council.
- Nov 2024 - **Putnam Preparation Session Organizer**, *University of Toronto*, Toronto
Nov 2025 Ran problem sessions for undergraduates taking the Putnam exam, a role usually reserved for faculty members. Done both in 2024 and 2025.
- Sep 2024 - **MGSA Social Committee Event Coordinator**, *University of Toronto*, Toronto
Sep 2025 Planned and ran events for the UofT graduate student body as a member of the Math Graduate Student Association (MGSA) council.
- Jan 2025 - **Directed Reading Program Mentor**, *University of Toronto*, Toronto
Jan 2026 Participated in the UofT Directed Reading Program as a mentor, meeting with undergraduate students weekly. Done in both 2025 and 2026
- Mar 2025 **UofT Math Department Open House**, *University of Toronto*, Toronto
Spoke at the UofT open house for incoming math undergraduate students.
- Jan 2025 **Math Mentorship Mentor**, *University of Toronto*, Toronto
Participating in the 2025 rendition of the UofT Math Mentorship program, meeting weekly with paired high school students.
- July 2023 **Teaching Assistant**, *Université Paris-Saclay*, Paris
Ran an exercise session at the 2023 *Mathematical Summer in Paris*, a Summer school for advanced high school students.
- Feb 2023 **Speaker**, *Vanier College*, Montréal
Gave a talk at Vanier College's 2023 *Science Week* to pre-university students.

Awards

- 2024–2029 **Faculty of Arts and Science Top Doctoral Fellowship**, *University of Toronto*, Toronto
Merit-based fellowship awarded to two incoming doctoral students in the department of mathematics, eliminating the need to TA.
- Fall 2024 **Faculty of Arts and Science Doctoral Recruitment Award**, *University of Toronto*, Toronto
- Fall 2024 **Blyth Fellowship**, *University of Toronto*, Toronto
- Summer 2022 **Science Undergraduate Research Award**, *McGill University*, Montréal
- Summer 2022 **ISM Undergraduate Summer Scholarship**, *McGill University*, Montréal
- declined
- Summer 2021 **ISM Undergraduate Summer Scholarship**, *McGill University*, Montréal

Teaching Experience

- 2024–Present **Teaching Assistant**, *University of Toronto*, Toronto
- MAT425/MAT1340: Differential Topology (W25) [crosslisted undergrad/grad]
 - MAT454/MAT1002: Complex Analysis (W25) [crosslisted undergrad/grad]
 - MAT354: Complex Analysis (F25)
 - MAT1060: Partial Differential Equations (F25) [graduate]
 - APM346: Partial Differential Equations (S25)
 - MAT246: Concepts in Abstract Mathematics (S25)
 - MAT334: Complex Variables (W25)
 - MAT223: Linear Algebra 1 (F24)
- 2022–2024 **Teaching Assistant**, *University of Waterloo*, Waterloo
- Math 239: Introduction to Combinatorics (W24, F23, S22, W22)
 - Math 135: Algebra for Honours Mathematics (F22)
- 2021–2022 **Undergraduate Teaching Assistant**, *McGill University*, Montréal
- MATH 235: Algebra 1 (F21)

Schools and Workshops

- Aug 2025 **Summer School on Singular Kählerian Metrics and Hermitian Geometry**, *Budapest, Hungary*
offered through and funded by the *Alfréd Rényi Institute of Mathematics*
- Aug 2025 **Invitation to Complex Geometry**, *Budapest, Hungary*
offered through and funded by the *Alfréd Rényi Institute of Mathematics*
- Feb 2025 **Southern California Geometric Analysis Winter School**, *Irvine, California*
offered through and funded by the *University of California, Irvine*
- Jun 2024 **Summer School on Special Geometric Structures and Analysis**, *Moraga, California*
offered through and funded by the *Simons Laufer Mathematical Sciences Institute* (formerly MSRI)

Conferences

- Jun 2025 **Topics in Differential Geometry**, *Providence*
- Feb 2025 **Southern California Geometric Analysis Seminar**, *Irvine*
- Dec 2023 **Canadian Mathematical Society Winter Meeting**, *Montréal*
- June 2023 **Canadian Mathematical Society Summer Meeting**, *Ottawa*
- Jan 2023 **Combinatorial Algebra meets Algebraic Combinatorics**, *Waterloo*
- Dec 2022 **Canadian Mathematical Society Winter Meeting**, *Toronto*
- June 2022 **Canadian Mathematical Society Summer Meeting**, *St. John's*

Interests

I enjoy playing guitar and singing.

- Choir **University of Toronto Spirit Singers**, *Sept 2025 - Present*
- Choir **Waterloo University Choir**, *Sept 2022 - Aug 2024*
- Choir **Orchestre Philharmonique et Choeur des Mélomanes**, *Sept 2021 - Sept 2022*