Alex Cowan

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| ACADEMIC POSITIONS | 2024 – Present | University of Waterloo, Postdoc (mentors: Rubinstein, Wang) |
| | 2019 – 2024 | Harvard University, Research Scientist (mentor: Elkies) |

| EDUCATION | 2013 – 2019 | Columbia University, PhD in pure mathematics (advisor: Goldfeld) |
| | 2010 – 2013 | McGill University, BSc honours math and physics, linguistics minor |

RESEARCH

I do analytic number theory, computational number theory, and arithmetic statistics.

PUBLICATIONS

13. Alex Cowan. Murmurations and ratios conjectures, 2024. arXiv 2408.12723

12. Alex Cowan. Conductor distributions of elliptic curves, 2024. arXiv 2408.09745

11. Alex Cowan, Sam Frengley, and Kimball Martin. Generic models for genus 2 curves with real multiplication, 2024. arXiv 2403.03191

10. Alex Cowan. Murmurations and explicit formulas, 2023. arXiv 2306.10425

9. Alex Cowan. A twisted additive divisor problem. *Journal of Number Theory*, 266:1–32, 2025. arXiv 2304.12572

8. Alex Cowan. Paired comparisons for games of chance, 2023. arXiv 2303.14857

7. Alex Cowan and Kimball Martin. Counting modular forms by rationality field, 2023. arXiv 2301.10357

6. Alex Cowan and Kimball Martin. Moduli for rational genus 2 curves with real multiplication for discriminant 5. *Journal de théorie des nombres de Bordeaux*, 36(2):493–525, 2024. arXiv 2206.05752

5. Alex Cowan. Computing newforms using supersingular isogeny graphs. *Res. Number Theory*, 8(4):Paper No. 96, 2022. arXiv 2010.10745

4. Alex Cowan. Non-random behavior in sums of modular symbols. *Int. J. Number Theory*, 18(4):879–903, 2022. arXiv 1905.10743

3. Alex Cowan. Conjecture: 100% of elliptic surfaces over $\mathbb{Q}$ have rank zero. In *Arithmetic geometry, number theory, and computation*, Simons Symp., pages 335–342. Springer, Cham, [2021] ©2021. arXiv 2009.08622

2. Alex Cowan. The distribution of multiples of real points on an elliptic curve. *J. Number Theory*, 211:530–544, 2020. arXiv 1901.10656

1. Renee Bell, Clifford Blakestad, Alina Carmen Cojocaru, Alexander Cowan, Nathan Jones, Vlad Matei, Geoffrey Smith, and Isabel Vogt. Constants in Titchmarsh divisor problems for elliptic curves. *Res. Number Theory*, 6(1):Paper No. 1, 24, 2020. arXiv 1706.03422

TEACHING

- Differential equations for engineers, Fall 2024, Waterloo
- Topics in analytic number theory: Automorphic forms and arithmetic statistics, Fall 2023, Harvard
- Calculus 1, Spring 2019, Columbia
- Calculus 1, Fall 2015, Columbia
- TA, Fall 2014 – Fall 2018, Columbia

INVITED TALKS

- December 2024, University of Toronto.
- November 2024, Murmurations in Arithmetic Geometry and Related Topics, Stony Brook.
- September 2024, University of Waterloo.
- September 2024, Mathematics and Machine Learning Program, Harvard CMSA.
- April 2024, SERMON.
- February 2024, University of Waterloo.
- August 2023, Ohio State University.
- July 2023, Murmurations in Arithmetic, ICERM.
- May 2023, Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation.
- May 2023, Columbia University.
- April 2023, Conference on Arithmetic Statistics, Automorphic Forms and Ergodic Methods, Max Planck.
- November 2022, MIT.
- August 2022, ANTS XV.
- March 2022, Five College number theory seminar.
- February 2022, COGENT.
- February 2022, Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation.
- February 2021, UC Irvine.
- February 2021, Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation.
- March 2020, Harvard University.
- January 2020, Joint Mathematics Meetings.
- December 2019, Snapshots of math at Harvard.
- October 2019, Five College number theory seminar.
- September 2019, Johns Hopkins University.
- March 2016, University of Arizona.
- November 2015, Undergraduate Math Society, Columbia University.
- September 2015, Undergraduate Math Society, Columbia University.
- October 2013, Graduate student seminar, Columbia University.
- May 2012, Undergraduate Student Symposium, McGill University.
- October 2011, Marianopolis College.