

Justin Ko

Department of Statistics and Actuarial Science — University of Waterloo
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Research	High-dimensional probability, spin glasses, random matrices.	
Employment	University of Waterloo	2023
	<ul style="list-style-type: none">• Postdoctoral Researcher• Supervisors: Aukosh Jagannath	
	École Normale Supérieure de Lyon	2020 - 2023
	<ul style="list-style-type: none">• Postdoctoral Researcher• Supervisors: Alice Guionnet, Florent Krzakala, and Lenka Zdeborová	
Education	University of Toronto	2015 - 2020
	<ul style="list-style-type: none">• PhD Mathematics• Thesis: The Free Energy of Spherical Vector Spin Glasses• Advisor: Dmitry Panchenko	
	University of Toronto	2014 - 2015
	<ul style="list-style-type: none">• MSc Mathematics• Research Project: Diluted spin glass models	
	University of British Columbia	2009 - 2014
	<ul style="list-style-type: none">• Bachelor of Commerce, Finance Co-op, Minor Mathematics	
Papers	<ol style="list-style-type: none">1. A multiscale cavity method for sublinear-rank symmetric matrix factorization. (with Jean Barbier and Anas Rahman) <i>International Zurich Seminar on Information and Communication (IZS 2024)</i>2. Fundamental limits of Non-Linear Low-Rank Matrix Estimation. (with Florent Krzakala, Pierre Mergny and Lenka Zdeborová) <i>Proceedings of Thirty Seventh Conference on Learning Theory (COLT 2024)</i>, PMLR 247:3873-38733. Spectral Phase Transition and Optimal PCA in Block-Structured Spiked models. (with Florent Krzakala and Pierre Mergny) <i>Proceedings of the 41st International Conference on Machine Learning (ICML 2024)</i>, PMLR 235:35470-354914. Spectral Phase Transitions in Non-Linear Wigner Spiked Models. (with Alice Guionnet, Florent Krzakala, Pierre Mergny and Lenka Zdeborová) arXiv:2310.14055 (2023)5. Estimating rank-one matrices with mismatched prior and noise: universality and large deviations. (with Alice Guionnet, Florent Krzakala and Lenka Zdeborová) arXiv:2306.09283 (2023) <i>Submitted. Revisions at Communications in Mathematical Physics</i>6. TAP variational principle for the constrained multiple spherical SK model. (with David Belius and Leon Fröber) arXiv:2304.04031 (2023) <i>Submitted. Major Revisions at the Annals of Applied Probability</i>7. Optimal Algorithms for the Inhomogeneous Spiked Wigner Model (with Aleksandr Pak, and Florent Krzakala) <i>Advances in Neural Information Processing Systems 36 (NeurIPS 2023)</i>	

8. Low-rank Matrix Estimation with Inhomogeneous Noise (with Alice Guionnet, Florent Krzakala and Lenka Zdeborová) arXiv:2208.05918 (2022) *Submitted. Major Revisions at Information and Inference*
9. Spherical Integrals of Sublinear Rank (with Jonathan Husson) arXiv:2208.03642 (2022) *Submitted.*
10. The Crisanti–Sommers Formula for Spherical Spin Glasses with Vector Spins, arXiv:1911.04355 (2019) *Submitted.*
11. Free Energy of Multiple Systems of Spherical Spin Glasses with Constrained Overlaps, Electron. J. Probab. 2020, Vol. 25, No. 28, 1-34
12. MAX κ -CUT and the inhomogeneous Potts spin glass (with Aukosh Jagannath and Subhabrata Sen), Ann. Appl. Probab. 2018, Vol. 28, No. 3, 1536-1572

Invited Talks

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| 1. Georgia Tech Stochastic Seminar | Sept 2024 |
| 2. Rockin' AI Conference in Roccella | Sept 2024 |
| 3. Conference on Learning Theory (COLT) 2024 | June 2024 |
| 4. CMS Winter Session on Random Matrix Theory | Dec 2023 |
| 5. Northwestern University Probability Seminar | Oct 2023 |
| 6. Waterloo Probability Seminar | Oct 2023 |
| 7. Cargese Summer School: Statistical physics and machine learning | August 2023 |
| 8. ICTP Learning and Inference from Structured Data | July 2023 |
| 9. LN-UMN Joint Probability Seminar | February 2023 |
| 10. LPSM Probability Seminar | February 2023 |
| 11. Grenoble-Lyon-Geneva Probability Meeting | November 2022 |
| 12. Les Diablerets Spin Glass Workshop | October 2022 |
| 13. St Flour Probability School | July 2022 |
| 14. ICTP Youth In High Dimensions | June 2022 |
| 15. University of Toulouse III Probability Seminar | June 2021 |
| 16. University of Waterloo Probability Seminar | March 2021 |
| 17. University of Basel Probability Seminar | March 2020 |

Teaching

Course Instructor Positions

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| • ACTSC 624 | 2025 |
| • STAT 230 | 2023 - 2024 |
| • MAT186, APM346 | 2019 - 2020 |
| • MAT186, MAT136 | 2018 - 2019 |

Teaching Assistant Positions

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| • MAT377, MAT1600, APM346 | 2019 - 2020 |
| • MAT377, APM346 | 2018 - 2019 |
| • MAT1600, MAT1601, MAT133, MAT223, APM346 | 2017 - 2018 |
| • MAT457, MAT236, MAT267, MAT244, MAT232, APM346 | 2016 - 2017 |
| • MAT133, MAT237, MATA35, STAB52, STA256 | 2015 - 2016 |
| • MAT135, MAT136, MAT133 | 2014 - 2015 |

Awards	1. Ida Bulat Teaching Award for Graduate Students, UofT	2020
	2. Queen Elizabeth II Graduate Scholarship, UofT	2019 - 2020
	3. Scotiabank Scholarship, UBC	2009 - 2013
	4. Sauder School of Business Dean's Scholarship, UBC	2010
Conferences & Seminars Organized	1. Waterloo Probability Seminar (Co-organizer)	2023
	• Waterloo, Canada	
	2. High Dimensional Statistics and Random Matrices (Co-organizer)	2023
	• Porquerolles, France	
	3. Large Deviations and Random Matrices Working Group	2022-2023
	• Lyon, France	
Work Experience	Economist (SmartWay Program)	2013 - 2014
	• Natural Resources Canada, Ottawa, On	