Duncan Dauvergne

CONTACT INFORMATION

Department of Mathematics
University of Toronto
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EDUCATION

University of Toronto, Toronto, ON Canada

Ph.D., Mathematics 2015-2019
Thesis: Random sorting networks, the directed landscape, and random polynomials
Supervisor: Bálint Virág

M.Sc., Mathematics 2014-2015
Research Topic: D-spaces and the Lindelöf-D problem
Supervisor: William Weiss

University of British Columbia, Vancouver, BC Canada

B.Sc., Honours Mathematics 2010-2014

EMPLOYMENT

Assistant Professor 08/2021-present
University of Toronto - Mississauga, Department of Mathematical and Computational Sciences

Postdoctoral Fellow (Instructor) 09/2019-07/2021
Princeton University Department of Mathematics

– Held concurrently with an NSERC postdoctoral fellowship

RESEARCH INTERESTS

Probability, KPZ universality, combinatorial probability, last passage percolation, interacting particle systems and spread of infection models, sorting networks, random polynomials, potential theory

PUBLICATIONS

1. Dauvergne, D. and Zhang, L. (2024). Disjoint optimizers and the directed landscape. *Memoirs of the American Mathematical Society (303)*, no. 1524. 103 pp.
2. Dauvergne, D. (2024). Wiener densities for the Airy line ensemble. *Proceeedings of the London Mathematical Society, 129*(4), Article e12638, 57 pp.
3. Dauvergne, D. (2024). Non-uniqueness times for the maximizer of the KPZ fixed point. *Advances in Mathematics, 442*, Article 109550, 41 pp.
4. Dauvergne, D., Nica, M., and Virág, B. (2023). Uniform convergence to the Airy line ensemble. *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques, 59*(4), 2220-2256.
5. Dauvergne, D., and Sly, A. (2023). Spread of infections in a heterogeneous moving population. *Probability Theory and Related Fields, 187*, 73-131.
6. Dauvergne, D. (2023). Last passage isometries for the directed landscape. *Probability Theory and Related Fields, 186*, 391-437.
7. Dauvergne, D., Ortmann, J., and Virág, B. (2022). The directed landscape. *Acta Mathematica, 299*(2), 201-285.

8. Dauvergne, D., Sarkar, S., and Virág, B. (2022). Three-halves variation of geodesics in the directed landscape. *Annals of Probability, 50*(5), 1947-1985.
9. Dauvergne, D. (2022). Hidden invariance of last passage percolation and directed polymers. *Annals of Probability, 50*(1), 18-60.
10. Dauvergne, D., Nica, M., and Virág, B. (2022). RSK in last passage percolation: a unified approach. *Probability Surveys 19*, 65-112.
11. Dauvergne, D. (2022). The Archimedean limit of random sorting networks. *Journal of the American Mathematical Society, 35*, 1215-1267.
12. Dauvergne, D. (2021). A necessary and sufficient condition for global convergence of the zeros of random polynomials. *Advances in Mathematics, 384*, article 107691.
13. Dauvergne, D. and Virág, B. (2021). Bulk properties of the Airy line ensemble. *Annals of Probability, 49*(4), 1738-1777.
14. Dauvergne, D. and Virág, B. (2020). Circular support in random sorting networks. *Transactions of the American Mathematical Society, 373*, 1529-1553.
15. Bloom, T. and Dauvergne D. (2019). Asymptotic zero distribution of random orthogonal polynomials. *Annals of Probability, 47*(5), 3202-3230.
16. Angel, O., Dauvergne, D., Holroyd, A.E., and Virág, B. (2019). The local limit of random sorting networks, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques, 55*(1), 412-440.
17. Dauvergne, D. (2016). Not every transitively D-space is D. *Topology and its Applications, 209*, 115-119.
18. Dauvergne, D. and Edelstein-Keshet, L. (2015). Application of quasi-steady state methods to molecular motor transport on microtubules in fungal hyphae. *Journal of Theoretical Biology, 379*, 47-58.

Electronic Preprints

1. Dauvergne, D. and Virág. The directed landscape from Brownian motion. 84 pp. https://arxiv.org/pdf/2405.00194.
2. Das, S, Dauvergne, D., and Virág, B. Upper tail large deviations of the directed landscape. 62 pp. https://arxiv.org/pdf/2405.14924.
3. Dauvergne, D. The 27 geodesic networks in the directed landscape. 77 pp. https://arxiv.org/pdf/2302.07802.
4. Dauvergne, D., and Sly, A. The SIR model in a moving population: propagation of infection and herd immunity. 68 pp. https://arxiv.org/pdf/2209.06037.pdf.
5. Dauvergne, D. and Virág, B. The scaling limit of the longest increasing subsequence. 109 pp. https://arxiv.org/abs/2104.08210.

Awards

- Cathleen Synge Morawetz Prize (with B. Virág) 2024
- Rollo Davidson Prize 2023
- Sloan Research Fellowship 2023
- Annales de l'Institut Henri Poincaré, Probabilités et Statistiques best paper prize for the period 2018-2019 2020

  - Awarded for the paper 'The local limit of random sorting networks' with O. Angel, A. Holroyd, and B. Virág

- Princeton University Department of Mathematics Teaching Award 2020
- Canadian Mathematical Society Doctoral Prize 2020
- University of Toronto Malcolm Slingsby Robertson Prize 2019

Research Grants and awards

- Sloan Fellowship ($75,000 USD/ 2 years) 2023
- NSERC Discovery Grant ($160,000 CAD/ 5 years) 2022
- NSERC Discovery Grants Program Discovery Launch Supplement ($12,500 CAD/ 1 yr) 2022
- NSERC Postdoctoral Fellowship ($90,000 CAD/ 2 years) 2019
- NSERC CGS D Scholarhsip ($105,000 CAD/ 3 years) 2016

Teaching Experience

- **University of Toronto**

MAT 102 - Introduction to Proofs	Fall 2024
MAT 1600 - Graduate Probability I	Fall 2023
MAT 377 - Mathematical Probability	Fall 2023
MAT 334 - Complex Analysis	Fall 2022
MAT 402 - Classical Geometries	Spring 2022
MAT 1600 - Graduate Probability I	Fall 2021

- **Princeton University**

MAT 104 - Calculus II	Spring 2021
MAT 104 - Calculus II	Fall 2020
MAT 202 - Linear Algebra and Applications	Spring 2020
MAT 202 - Linear Algebra and Applications	Fall 2019

- **University of Toronto**

MAT 137 - Calculus! (Course coordinator)	Summer 2018
MAT 223 - Linear Algebra I	Winter 2018

Supervision

Ph.D. students

- Fardin Syed (University of Toronto, started Fall 2022)
- Oliver Pankratz (University of Toronto, started Summer 2023)

M.Sc. students

- Shilong Yu (University of Toronto, started 2023, co-supervised with Ben Landon)
- Xue Ji Zhao (University of Toronto, started 2023)
- Fardin Syed (University of Toronto, 2022)
- Daniel Zhou (University of Toronto, 2022)

Undergraduate students

- Victoria Valeeva (UTEA Undergraduate Summer Research Award, University of Toronto, Summer 2023)
- Zhanghan Yin (NSERC Undergraduate Summer Research Award, University of Toronto, Summer 2022)
- Yuxi Zheng (Undergraduate summer research program, Princeton University, Summer 2021)
- Vydhourie Thiyageswaran (Undergraduate senior thesis student, Princeton University, 2020-2021)
- George Bentley (Undergraduate summer research program, Princeton University, Summer 2020)