Duncan Dauvergne

CONTACT INFORMATION

Department of Mathematics
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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., Nica, M., and Virág, B. (2023+). Uniform convergence to the Airy line ensemble. To appear in *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques*.
2. Dauvergne, D. and Zhang, L. (2023+). Disjoint optimizers and the directed landscape. To appear in *Memoirs of the American Mathematical Society*.
3. Dauvergne, D. (2022). Last passage isometries for the directed landscape. *Probability Theory and Related Fields*, https://doi.org/10.1007/s00440-022-01173-6.
4. Dauvergne, D., Ortmann, J., and Virág, B. (2022). The directed landscape. *Acta Mathematica, 299*(2), pp. 201-285.
5. Dauvergne, D., Sarkar, S., and Virág, B. (2022). Three-halves variation of geodesics in the directed landscape. *Annals of Probability, 50*(5), pp. 1947-1985.
6. Dauvergne, D. (2022). Hidden invariance of last passage percolation and directed polymers. *Annals of Probability, 50*(1), pp. 18-60.
7. Dauvergne, D., Nica, M., and Virág, B. (2022). RSK in last passage percolation: a unified approach. *Probability Surveys 19*, pp. 65-112.

8. Dauvergne, D. (2022). The Archimedean limit of random sorting networks. *Journal of the American Mathematical Society, 35*, 1215-1267.
9. Dauvergne, D. (2021). A necessary and sufficient condition for global convergence of the zeros of random polynomials. *Advances in Mathematics, 384*, article 107691.
10. Dauvergne, D. and Virág, B. (2021). Bulk properties of the Airy line ensemble. *Annals of Probability, 49*(4), 1738-1777.
11. Dauvergne, D. and Virág, B. (2020). Circular support in random sorting networks. *Transactions of the American Mathematical Society, 373*, 1529-1553.
12. Bloom, T. and Dauvergne D. (2019). Asymptotic zero distribution of random orthogonal polynomials. *Annals of Probability, 47*(5), 3202-3230.
13. 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.
14. Dauvergne, D. (2016). Not every transitively D-space is D. *Topology and its Applications, 209*, 115-119.
15. 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. The 27 geodesic networks in the directed landscape. 77 pp. https://arxiv.org/pdf/2302.07802.
2. Dauvergne, D. Wiener densities for the Airy line ensemble. 51 pp. https://arxiv.org/abs/2302.00097.
3. 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.
4. Dauvergne, D. Non-uniqueness times for the maximizer of the KPZ fixed point. 33 pp. https://arxiv.org/pdf/2202.01700.
5. Dauvergne, D., and Sly, A. Spread of infections in a heterogeneous moving population. 55 pp. https://arxiv.org/pdf/2105.11947.
6. Dauvergne, D. and Virág, B. The scaling limit of the longest increasing subsequence. 109 pp. https://arxiv.org/abs/2104.08210.

Awards

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

Research Grants

- NSERC Discovery Grant ($160,000 CAD/ 5 years) 2022
- NSERC Discovery Grants Program Discovery Launch Supplement ($12,500 CAD/ 1 yr) 2022

Fellowships and Scholarships

- Sloan Research Fellowship ($75,000 USD/ 2 yrs) 2023
- NSERC Postdoctoral Fellowship ($90,000 CAD/ 2 yrs) 2019
- NSERC Canada Graduate Scholarship ($105,000 CAD/ 3 yrs) 2016
- U. of Toronto J.R.G. Smyth Mathematics Scholarship ($4,294 CAD/ 1 yr) 2015
- U. of Toronto Alumni and Friends Graduate Scholarship ($7,000 CAD/ 1 yr) 2015
- NSERC Undergraduate Research Award (USRA) ($5,740 CAD/ 4 mths) 2014
- Various UBC undergraduate entrance and in-course performance scholarships (total $23,500) 2010-2014

Teaching Experience

- **Course Instructor and Coordinator, University of Toronto**

MAT 334 - Complex Analysis	Fall 2022
MAT 402 - Classical Geometries	Spring 2022
MAT 1600 - Graduate Probability I	Fall 2021

- **Course Instructor and Coordinator, Princeton University**

MAT 104 - Calculus II	Spring 2021
MAT 104 - Calculus II (Course coordinator)	Fall 2020
MAT 202 - Linear Algebra and Applications	Spring 2020
MAT 202 - Linear Algebra and Applications	Fall 2019

- **Course Instructor and Coordinator, University of Toronto St. George**

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)

M.Sc. students

- 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)