Academic CV

Colin Desmarais

PostDoc at Vienna University of Technology (TU Wien)
Institute of Discrete Mathematics and Geometry
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Research interests
Probability and Combinatorics: limits of random networks and trees
Population Genetics: coalescence and spatial fitness models

Employment

PostDoc at Vienna University of Technology (TU Wien)
 October 2024 – present
 Topic: limits of random graphs
 Advisor: Benedikt Stufler

PostDoc at the University of Vienna
 October 2022 – September 2024
 Topic: population genetics
 Advisor: Emmanuel Schertzer

Academic Background

PhD in Mathematics from Uppsala University
 September 2017 – August 2022
 Supervisors: Cecilia Holmgren and Svante Janson
 Thesis title: *Decorating trees grown in urns*

Affiliated PhD Student in the WASP AI Graduate School
 December 2018 – August 2022
 Swedish artificial intelligence research program

M.Sc. in Mathematics from the University of Manitoba
 September 2015 – August 2017
 Supervisor: David S. Gunderson
 Thesis title: *On partition regular systems*

B.Sc. Honours in Mathematics from the University of Manitoba
 September 2010 – December 2014
 Honours project title: *Applications of finite geometries to extremal graph theory*

Journal Publications and Preprints

1. (with Emmanuel Schertzer and Zsófia Talyigás) K-Branching random walk with noisy selection: large population limits and phase transitions, arXiv:2509.26254, submitted (2025).

2. Depths in random recursive metric spaces, *Journal of Applied Probability* **64** (2024), 1448–1462.

3. (with Cecilia Holmgren and Stephan Wagner) Broadcasting-induced colorings of preferential attachment trees, *Random Structures & Algorithms* **63** (2023), 363–405.

4. (with Hosam Mahmoud) Depths in hooking networks, *Probability in the Engineering and Informational Sciences* **36** (2022), 941–949.

5. (with Cecilia Holmgren) Normal limit laws for vertex degrees in randomly grown hooking networks and bipolar networks, *Electronic Journal of Combinatorics* **27** (2020), P2.45.

6. (with Adam Clay and Patrick Naylor) Testing bi-orderability of knot groups, *Canadian Math Bulletin* **59** (2016), 472–482.

Conference Proceedings

7. (with Cecilia Holmgren and Stephan Wagner) The root cluster after percolation on preferential attachment trees, in *Proceedings of the 12th European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB'23)*, 343–348, MUNI Journals, 2023.

8. (with Olga Sunneborn Gudnadottir, Daniel Gedon, Karl Bengtsson Bernander, Raazesh Sainudiin, and Rebeca Gonzalez Suarez) Distributed training and scalability for the particle clustering method UCluster, in *EPJ Web of Conferences (CHEP 2021)* **251** EDP Sciences, article 02054, 2021.

9. (with Cecilia Holmgren) Degree distributions of generalized hooking networks, in *2019 Proceedings of the Sixteenth Workshop on Analytic Algorithms and Combinatorics (ANALCO)*, 103–110, SIAM, 2019.

Talks

Seminar Talks
   Vienna Discrete Mathematics Working Group Seminar, April '24
   Vienna (Not So) Informal Probability Seminar, March '24
   University of Manitoba Combinatorics Seminar, February '24
   Vienna Probability Seminar, January '24
   Uppsala University Probability and Combinatorics Seminar, November '21
   University of Manitoba Combinatorics Seminar, November '21
   Emory University Discrete Mathematics Seminar, April '21
   McGill University Probability Seminar, January '20
   University of Manitoba Combinatorics Seminar, September '18
   University of Manitoba Combinatorics Seminar, March '17
   University of Manitoba Combinatorics Seminar, November '15

Conference Talks
   Annual ÖMG-DMV Meeting – Linz Austria, September '25
   Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA) – Toronto Canada, May '25
   Journées ALEA – Marseille France, March '25
   Stochastic Sauna – Espoo Finland, December '24
   Stochastic Processes in Evolutionary Biology – Marseille France, May '24
   European Conference on Combinatorics, Graph Theory and Applications – Prague Czechia, August '23
   Midwinter Meeting in Discrete Probability – Umeå Sweden, January '23
   Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA) – Marseille France, June '19
   Analytic Algorithms and Combinatorics (ANALCO19) – San Diego USA, January '19
   Mostly Manitoba, Michigan, Minnesota Graduate Student Combinatorics Workshop – Winnipeg Canada, April '16
   Spring Sectional Meeting of the AMS – Fargo USA, April '16
   Mostly Manitoba, Michigan, Minnesota Graduate Student Combinatorics Workshop – Houghton USA, April '15
   Canadian Undergraduate Mathematics Conference – Ottawa Canada, July '14

Teaching Activities

2024–present: Teaching Assistant at Vienna University of Technology
   Discrete Mathematics (Masters level) (104.272)
   Analysis for Computer Science (104.634)
2022–2024: Teaching Assistant at University of Vienna
   Analysis 1 (250011)
   Linear Algebra 2 (250083)
2020–2022: Instructor and Course Coordinator at Uppsala University
   Combinatorics (1MA020)
2017–2022: Teaching Assistant at Uppsala University
   Transform Methods (1MA034)
   Several Variables Calculus (1MA016)
   Linear Algebra 2 (1MA024)
2015–2017: Teaching Assistant at University of Manitoba
   Elements of Discrete Mathematics (MATH 1240)
   Techniques of Classical and Linear Algebra (MATH 1210)
   Graph Theory 1 (MATH 2070)

Student Supervision

2024: Mete Gül – Bachelors Thesis: *Combinatorics of multidimensional Tic Tac Toe*
2020: Victor Wikström – Bachelors Thesis: *History and properties of random recursive trees*

Other Research Experience

Summer 2015 and Summer 2014
    Undergraduate summer research
    Supervisor: Adam Clay
    Knot theory, group theory, computer programming
Winter 2015
    Part time researcher
    Supervisor: David S. Gunderson
    Extremal hypergraph theory
Summer 2013
    Undergraduate summer research
    Supervisor: Robert Craigen
    Combinatorial Matrix Theory

Grants, Fellowships, and Awards

2020: Liljewalchs Resestipendium/Travel Scholarship (cancelled due to pandemic)
    Issued by: Uppsala University
2019: Anna Maria Lundin Resestipendium/Travel Scholarship
    Issued by: Smålands Nation i Uppsala
2016–2017: Research Manitoba Graduate Scholarship
    Issued by: Government of Manitoba
2016: Dr. Gupta Scholarship in Mathematics
    Issued by: Private scholarship
2015–2016: Manitoba Graduate Scholarship
    Issued by: Government of Manitoba
2015–2016: University of Manitoba Graduate Fellowship (declined)
    Issued by: University of Manitoba
2015: Undergraduate Research Award (declined)
    Issued by: University of Manitoba, Faculty of Science
2013: Undergraduate Summer Research Award
    Issued by: University of Manitoba

Languages and Skills

Languages
    English: Fluent (native)
    French: Fluent (native)
    Swedish: Limited (reading and writing)
    German: Basic (reading)

Programming
    Python (including PyTorch and TensorFlow), Julia, R, Scala, MATLAB, Mathematica, Maple, C, Java

Service

2020–2022: Mathematics representative on the Faculty of Science and Technology PhD Student Council (TNDR), Uppsala University

2019–2020: Co-organizer of the Probability and Statistics Seminar, Uppsala University

2018–2019: PhD Student representative on the Mathematics Department Board, Uppsala University