

Emma Hogan

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Education

University of Oxford – DPhil in Mathematics

October 2023 – Present

Research interests: extremal and probabilistic combinatorics, graph theory, and matroid theory

Supervisor: Professor Alex Scott

Expected completion: 2027

University of Canterbury – Master of Mathematical Sciences

February 2022 – June 2023

Thesis title: Subclasses of Transversal Matroids

Supervisor: Professor Charles Semple

Graduated with Distinction, GPA: 9.00 / 9.00

University of Canterbury - BSc Mathematics and Computer Science

2019 – 2021

GPA: 8.96 / 9.00

Publications

The excluded minors for the class of spike minors

2026

Sam Bastida, Nick Brettell, Rutger Campbell, George Drummond, **Emma Hogan**, Charles Semple, and Gerry Toft, *Advances in Applied Mathematics*.

Tight Bounds for Hypercube Minor-Universality

2026

Emma Hogan, Lukas Michel, Alex Scott, Youri Tamitegama, Jane Tan, and Dmitry Tsarev, *Journal of Graph Theory*.

Exponential odd-distance sets under the Manhattan metric

2025

Alberto Espuny Díaz, **Emma Hogan**, Freddie Illingworth, Lukas Michel, Julien Portier, and Jun Yan, *The Electronic Journal of Combinatorics*.

The excluded minors for the intersection of bicircular and lattice path matroids

2024

Emma Hogan and Charles Semple, *European Journal of Combinatorics*.

A Note on Graphs of k -Colourings

2024

Emma Hogan, Alex Scott, Youri Tamitegama, and Jane Tan, *The Electronic Journal of Combinatorics*.

Preprints

Colour-balanced subgraphs

2026

Emma Hogan, Alex Scott, and Dmitry Tsarev, *arXiv preprint arXiv:2604.09449*.

Sharp bounds for covering with large cliques and independent sets

2026

Veronica Bitonti, **Emma Hogan**, and Tommy Walker Mackay, *arXiv preprint arXiv:2604.20962*.

Infinite Schnyder Woods

2025

Louigi Addario-Berry, **Emma Hogan**, Lukas Michel, and Alex Scott, *arXiv preprint arXiv:2511.07601*.

Invited Talks

Almost representative subgraphs – Warwick Combinatorics Seminar

2026

Colour-balanced matchings – Birmingham Combinatorics Seminar

2026

Colour-balanced matchings – QMUL Combinatorics Study Group

2026

Colouring graphs and generalised chromatic polynomials – UCL Combinatorics Seminar

2025

Contributed Talks

Sidorenko-type questions beyond tournaments – British Combinatorics Conference

2026

Representative forests – Structure in Matroids, Embedded Graphs and Graphs ICMS workshop

2026

Almost colour-balanced subgraphs – UK Postgraduate Combinatorial Conference

2026

Colour-balanced perfect matchings – Australasian Combinatorics Conference	2025
CMSA Anne Penfold Street Student Prize – best student presentation	
Characterising a class of transversal matroids – UK Postgraduate Combinatorial Conference	2024
Bicircular and lattice path matroids – New Zealand Mathematical Society Colloquium	2023
Aitken Prize – best student presentation	

Teaching

University of Oxford – Tutor and Teaching Assistant	2023 – Present
Departmental Tutor: Part C Probabilistic Combinatorics, 2026; Part C Combinatorics, 2025; Part B Graph Theory, 2024. Merton College Teaching Assistant: Prelims Analysis I, II and III, 2023–24 and 2024–25. Departmental Teaching Assistant: Part B Graph Theory, 2023.	
University of Canterbury – Lecturer	2023
Lecturer for second-year Graph Theory at the University of Canterbury.	
University of Canterbury – Tutor	2021 – 2023
Tutor for undergraduate courses in Discrete Mathematics, Graph Theory, Analysis and Engineering Mathematics.	

Service & Outreach

Journal Refereeing	2023 – Present
Referee for: Advances in Applied Mathematics, Discrete Mathematics, Graphs and Combinatorics, European Journal of Combinatorics.	
Co-organiser, Magdalen Maths Meets	2025 – Present
Co-organiser of a termly seminar for mathematics students studying at Magdalen College.	
MATH199 – Advancing in Mathematical Sciences	2020 – 2023
Tutored distance and in-person classes for the University of Canterbury programme for gifted high school mathematics students, and organised its annual workshop. Organised and delivered mathematics outreach presentations at schools across New Zealand.	
Professor Harry Messel International Science School	2019, 2022, 2023
Student leader and Residential Assistant for the in-person programme in 2019; organiser and leader for the online programme in 2022. Program Officer in 2023, coordinating logistics for the in-person programme.	
MathsCraft Outreach Volunteer	2017, 2018, 2021, 2022
Volunteered at public mathematics outreach events for MathsCraft, a mathematics communication non-profit. Engaged with members of the public of all ages, explaining mathematical ideas and facilitating activities.	

Prizes

CMSA Anne Penfold Street Student Prize	2025
Awarded for the best student talk at the 2025 Australasian Combinatorics Conference for presentation “Almost colour-balanced perfect matchings”.	
Sir George Grey Scholarship (First overall in class, Bachelor of Science)	2022
Awarded to the highest ranking Bachelor of Science graduate at the University of Canterbury in the class of 2021.	
New Zealand Mathematical Society Aitken Prize	2022
Awarded for the best student talk at the 2022 NZMS Colloquium for presentation “The intersection of bicircular and lattice path matroids”.	
Page Memorial Prize	2021
Awarded for excellence in 300-level mathematics.	
Helen Wily Prize	2020
Awarded for excellence by a female student in 300- or 400-level mathematics.	
Gordon M. Peterson Memorial Prize	2019
Awarded for excellence in 200-level pure mathematics.	

Scholarships

EPSRC Doctoral Scholarship	2023 – Present
UC Mathematics and Statistics Scholarship	2020 – 2022
UC College of Engineering Mathematics and Statistics STAR Scholarship	2019 – 2021
Graduate Women Canterbury (Inc.) Trust Board Scholarship	2021
Tait Communications Undergraduate Scholarship	2021
UC Undergraduate Entrance Scholarship	2019
UC Emerging Leaders Scholarship	2019
UC High Achiever's Scholarship for Mathematics	2019
UC High Achiever's Scholarship for Computer Science	2019

Invited Conferences and Workshops

ICMS Workshop on Structure in Matroids, Embedded Graphs and Graphs	2026
New Zealand Workshop on Graphs and Matroids	2025
ICMS Extremal and Probabilistic Combinatorics Workshop	2025
Barbados Graph Theory Workshop	2025
Oberwolfach Graph Theory Workshop	2025
BIRS Workshop: New Perspectives in Colouring and Structure	2024
3rd New Zealand Workshop on Matroids and Discrete Mathematics	2022
2nd New Zealand Workshop on Matroids and Discrete Mathematics	2021