

BAILEY WHITBREAD

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EDUCATION

Doctor of Philosophy

The University of Sydney

Advisor: Geordie Williamson.

2025 -

Sydney, Australia

Master of Philosophy

The University of Queensland

Advisors: Masoud Kamgarpour, Ole Warnaar.

Thesis: Arithmetic geometry of character varieties.

Awards: Bernhard H. Neumann prize, hon. men.

Scholarship: UQ Research Training Program scholarship.

2022 - 2024

Brisbane, Australia

Bachelor of Mathematics

The University of Queensland

Advisors: Masoud Kamgarpour, Anna Puskás.

Thesis: Hecke algebras and Gelfand pairs in representation theory.

Awards: UQ Dean's Commendations for Academic Excellence.

Scholarships: UQ Academic Merit, UQ Link, and Smith Family Tertiary scholarships.

2017 - 2021

Brisbane, Australia

PUBLICATIONS

Counting points on generic character varieties

Masoud Kamgarpour, GyeongHyeon Nam, Bailey Whitbread, Stefano Giannini

arXiv:2409.04735

2024

To appear in *Math. Res. Lett.*

CharacterVarieties.jl

A package for computing E-polynomials of character varieties

github.com/baileywhitbread/CharacterVarieties.jl

2024

Julia

WORK

Exam marker

The University of Queensland

First and second year algebra and analysis final exams.

2021 - 2025

Brisbane, Australia

Lead tutor and lecture tutor

The University of Queensland

MATH3303 Abstract Algebra & Number theory (lead tutor, 5 years)

MATH2401 Advanced Real Analysis (lead tutor, 2 years)

MATH1071 Advanced Calculus & Linear Algebra I (lead tutor, 2 years)

MATH1061 Discrete Mathematics (lead tutor and lecture tutor, 2 years)

2019 - 2025

Brisbane, Australia

Some evaluations written by students of MATH3303:

'Bailey was extremely knowledgeable in the subject, easily approachable, and is among one of the best tutors I've ever had during my time at UQ. From him, I have learnt not only course content, but how to be an effective educator.'

'Bailey has been hands-down the best maths tutor I have had. He was extremely approachable, and always encouraged questions. He would explain the theory very clearly and always made sure you had a good understanding of the concepts. This course would have been a lot harder without him as a tutor!'

'Bailey was very helpful and professional in the tutorials. He offered excellent help to all students and explained the challenging assignment questions with great clarity and insight.'

Competition marker

Simon Marais Mathematics Competition

International competition for undergraduates, coordinated by Sean Gardiner.

2022, 2025

Online

SERVICE

Co-organiser	2023 - 2024
<i>UQ Maths Graduate Student Seminar</i>	Brisbane, Australia
Funded by Cecilia Gonzalez Tokman and Ramiro Lafuente.	
Co-organiser	2023
<i>Weil Conjectures Lecture Series</i>	Online
Organised by Masoud Kamgarpour and Angus McAndrew.	
Question drafter	2021 - 2025
<i>UQ Maths Relay</i>	Brisbane, Australia
Welcome event for undergraduates.	
Volunteer tutor	2019
<i>UQ Queensland Mathematics Summer School</i>	Brisbane, Australia
Summer school for senior high school students.	
President and vice president	2017 - 2019
<i>UQ Mathematics Students Society</i>	Brisbane, Australia
Undergraduate student society.	

TALKS

Spectroscopy for knots	Dec 2025
<i>69th Annual Meeting of the Australian Mathematical Society</i>	Melbourne, Australia
Knots, Braids, Jones, Burau and Birman	Oct 2025
<i>Informal Friday Seminar</i>	Sydney, Australia
A purity conjecture for character varieties	Jun 2025
<i>Representation Theory Down Under</i>	Sydney, Australia
What is the Jones polynomial?	May 2025
<i>Informal Thursday Seminar</i>	Brisbane, Australia
Counting points on character varieties	Dec 2024
<i>Joint Meeting of the NZMS, AustMS and AMS</i>	Auckland, New Zealand
Character varieties	Aug 2024
<i>Australian Postgraduate Algebra Colloquium</i>	Online
Polynomials in the variable p	Jan 2024
<i>AMSI Summer School</i>	Canberra, Australia
Character varieties in arbitrary type	Dec 2023
<i>67th Annual Meeting of the Australian Mathematical Society</i>	Brisbane, Australia
Arithmetic geometry of representation spaces	Sep 2023
<i>University of Glasgow Algebra and Number Theory Seminar</i>	Glasgow, Scotland
Counting points on representation varieties	Dec 2022
<i>66th Annual Meeting of the Australian Mathematical Society</i>	Sydney, Australia
Hecke algebras and Gelfand pairs in representation theory	May 2021
<i>Honours final talk</i>	Brisbane, Australia
The twin prime and Elliot-Halberstam conjectures	Oct 2020
<i>Undergraduate coursework</i>	Brisbane, Australia

CONFERENCES, SEMINARS, WORKSHOPS, ETC.

Character varieties and Higgs bundles	Feb 2026
69th Annual Meeting of the Australian Mathematical Society	Brisbane, Australia Dec 2025
9th Australian Algebra Conference	Melbourne, Australia Nov 2025
MATRIX-MFO Tandem Workshop: Machine Learning and AI for Mathematics	Melbourne, Australia Sep 2025
Olefest (A conference celebrating Ole Warnaar's Mathematics)	Creswick, Australia Jul 2025
Representation Theory Down Under	Brisbane, Australia Jun 2025
AMSI Summer School 2025	Sydney, Australia Jan 2025
Joint Meeting of the NZMS, AustMS and AMS	Sydney, Australia Dec 2024
Australian AI Safety Forum 2024	Auckland, New Zealand Nov 2024
Geometry Day @ UQ	Sydney, Australia Aug 2024
AMSI Summer School 2024	Brisbane, Australia Jan 2024
67th Annual Meeting of the Australian Mathematical Society	Canberra, Australia Dec 2023
Categorified Enumerative Geometry and Representation Theory	Brisbane, Australia Sep 2023
UQ Flag Varieties Seminar	Lausanne, Switzerland Jun - Aug 2023
Differential Geometry Days @ UQ	Brisbane, Australia Feb 2023
66th Annual Meeting of the Australian Mathematical Society	Brisbane, Australia Dec 2022
Number Theory Down Under 10	Sydney, Australia Sep 2022
AMSI Winter School: New Directions in Representation Theory	Brisbane, Australia Jun 2022
Character Varieties, E-Polynomials and Representation Zeta Functions	Brisbane, Australia Feb 2022
Stradbroke Island Workshop on Character Varieties	Online Dec 2021
Heron Island Workshop on Geometry and Representation Theory	Brisbane, Australia Jun 2021
Stradbroke Island Workshop on Representation Theory	Gladstone, Australia Feb 2021
UQ 'What is...?' Seminar	Brisbane, Australia 2021 - 2022
AMSI Summer School 2021	Online Jan 2021