

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

WORK

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

TALKS

Braids, Burau and Birman

Informal Friday Seminar

October 2025
Sydney, Australia

A purity conjecture for character varieties

Representation Theory Down Under

June 2025

What is the Jones polynomial?

Informal Thursday Seminar

Sydney, Australia

Counting points on character varieties

Joint Meeting of the NZMS, AustMS and AMS

May 2025

Character varieties

Australian Postgraduate Algebra Colloquium

Brisbane, Australia

Polynomials in the variable p

AMSI Summer School

Dec 2024

Character varieties in arbitrary type

67th Annual Meeting of the Australian Mathematical Society

Auckland, New Zealand

Arithmetic geometry of representation spaces

University of Glasgow Algebra and Number Theory Seminar

Aug 2024

Counting points on representation varieties

66th Annual Meeting of the Australian Mathematical Society

Online

Hecke algebras and Gelfand pairs in representation theory

Honours final talk

Jan 2024

The twin prime and Elliot–Halberstam conjectures

Undergraduate coursework

Canberra, Australia

Dec 2023

Brisbane, Australia

Sep 2023

Glasgow, Scotland

Dec 2022

Sydney, Australia

May 2021

Brisbane, Australia

Oct 2020

Brisbane, Australia

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.'

'Bailey is really good at putting different ideas into a wider context in algebra which can help guide intuition and also helps students gain a wider appreciation of what we are studying.'

SERVICE

Co-organisier

UQ Maths Graduate Student Seminar

Co-organised with Madeline Nurcombe, Alistair Falconer, and Alexander Lim.

Funded by Cecilia Gonzalez Tokman and Ramiro Lafuente.

2023 - 2024
Brisbane, Australia

Co-organisier

Weil Conjectures Lecture Series

Organised by Masoud Kamgarpour and Angus McAndrew.

2023
Online

Competition marker

Simon Marais Mathematics Competition + UQ/QAMT Problem Solving Competition

International competition for undergraduates + state competition for high school students.

Coordinated by Sean Gardiner (Simon Marais) + Michael Bulmer (UQ/QAMT).

2022
Online

Question drafter

UQ Maths Relay

Welcome event for undergraduates.

Coordinated by Ramiro Lafuente, Ole Warnaar and Masoud Kamgarpour.

2021 - 2025
Brisbane, Australia

Volunteer tutor

UQ Queensland Mathematics Summer School

Summer school for senior high school students.

Coordinated by Andrew Stephenson.

2019
Brisbane, Australia

President and vice president

UQ Mathematics Students Society

Undergraduate student society.

2017 - 2019
Brisbane, Australia

CONFERENCES, SEMINARS, WORKSHOPS, ETC.

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