

# Yeeka Yau

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Nationality: Australian

[Personal webpage](#)

Learning Hub (mathematics)

The University of Sydney, Australia

## Education

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**Ph.D. in Pure Mathematics**, *The University of Sydney, Australia* 2017–2021

- Advisor: [A/Prof. James Parkinson](#)
- Thesis: Automatic Structures for Coxeter Groups ([link](#))

**BS.c. (Adv Maths) Honours in Pure Mathematics**, *The University of Sydney, Australia* 2012–2016

- Grade: Honours Class I
- Advisor: A/Prof. James Parkinson
- Thesis: Automata for Coxeter Groups

## Employment History

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**Learning Success Advisor (Mathematics)** 2024 - Current

*Learning Hub Mathematics, The University of Sydney, Australia*

**Assistant Professor (Tenure-track)** July 2023 - Dec 2023

*University of North Carolina Asheville, Asheville, North Carolina, USA*

**Visiting Assistant Professor** 2022 - 2023

*Furman University, Greenville, South Carolina, USA*

**Postdoctoral Research Associate** 2021-2022

*The University of Sydney, Australia*

**Associate Lecturer** 2019-2020

*Mathematics Learning Centre, The University of Sydney, Australia*

**Summer Intensive Lecturer** 2018, 2020

*The University of Sydney, Australia*

## Visiting Positions

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**Visiting Researcher** April/May 2022

*LaCIM Université du Québec à Montréal, Canada*

Mentor: [Professor Christophe Hohlweg](#)

## Publications and Preprints

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**A pair of Garside shadows** 2023

([P. Przytycki](#) and Y. Yau) [pdf](#)

(Submitted)

<b>An artificial neural network approach to finding the key length of the Vigenère cipher.</b> (C. Millichap, Y. Yau) <a href="#">pdf</a> <i>To appear in Cryptologia</i>	2023
<b>Modifying twist algorithms for determining the key length of a Vigenère cipher.</b> (C. Millichap, Y. Yau, A. Pate and M. Carns) <a href="#">online version</a> <i>Cryptologia</i>	2023
<b>Cone types, automata and regular partitions in Coxeter groups</b> (J. Parkinson and Y. Yau) <a href="#">online version</a> <i>Advances in Mathematics</i> , vol 398, 2022	2022
<b>Coxeter Systems for which the Brink-Howlett automaton is minimal</b> (J. Parkinson and Y. Yau) <a href="#">online version</a> <i>Journal of Algebra</i> , vol 527, p437-446	2019

## Research Grants and Funding

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<b>Functional Identities, Nilpotent Rings and Garside Shadows</b> NSF LEAPS-MPS Award: \$197,154 USD Jordan Bounds (Primary Investigator) Yeeka Yau (Primary collaborator and Senior Personnel)	2023-2025
<b>Start up Funding</b> <i>UNC Asheville</i> : \$13,000 USD	2023

## Awards

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– <b>T.G. Room Medal</b> for most outstanding Pure Mathematics PhD thesis <i>University of Sydney, Australia</i>	2021
– <b>Australian Government Research Training Stipend (PhD) Full Scholarship</b>	2017-2021
– <b>The David G A Jackson Prize</b> for originality and creativity in Pure Mathematics <i>University of Sydney, Australia</i>	2016
– <b>Norbert Quirk Prize No. IV</b> for best essay by an Honours student <i>University of Sydney, Australia</i>	2016
– <b>The Rolf Adams Prize</b> for best Pure Mathematics Honours presentation <i>University of Sydney, Australia</i>	2016

## Teaching Experience

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As a Learning Success Advisor (mathematics) I am currently teaching the following Supplementary Learning Tutorials:

– DATA1001/1901 - Foundations of Data Science	Sem 1 - 2024
– PSYC2012 - Statistics and Research Methods for Psychology	Sem 1 - 2024

### Courses taught at UNC Asheville:

- STAT225 - Calculus-Based Statistics Fall 2023
- MATH167 - Precalculus Fall 2023

### Courses taught at Furman University:

- MTH120 - Introduction to Statistics 2022, 2023
- MTH150 - Calculus I 2022
- MTH145 - Calculus for Management, Life and Social Sciences 2023

### Courses taught at The University of Sydney:

- MATH1002 Linear Algebra (1st year) 2020 Summer School
- MATH1004 Discrete Mathematics (1st year) 2018 Summer School

As an Associate Lecturer in the Mathematics Learning Centre at the University of Sydney, I have also taught the following courses as small group workshops (10-15 students) covering theory and example problems:

- Statistics Bridging course (preparatory course for students embarking on statistics intensive degrees)
- MATH1013 Mathematical Modelling (1st year)
- MATH1004 Discrete Mathematics (1st year)
- MATH1014 Intro to Linear Algebra (1st year)
- MATH1111 Intro to Calculus (1st year)

I have been a tutor/teaching assistant for the following courses at the University of Sydney (duties include leading tutorial and practice classes, explaining homework problems and solutions and marking assignments):

- MATH1014 Intro to Linear Algebra (1st year Fundamental) 2016
- MATH1003 Integral Calculus and Modelling (1st year) 2016 Summer School
- MATH1002 Linear Algebra (1st year) 2017
- MATH1001 Differential Calculus (1st year) 2017
- MATH2968 Discrete Maths and Graph Theory (2nd year Advanced) 2017
- MATH2022 Abstract and Linear Algebra (2nd year) 2018, 2019
- MATH2023 Analysis (2nd year) 2018
- MATH3069 Geometry and Topology (3rd year) 2018
- MATH3066 Algebra and Logic (3rd year) 2019
- MATH1023 Multivariable Calculus and Modelling (1st year) 2019
- MATH1013 Mathematical Modelling (1st year Fundamental) 2019

## Students Supervised

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Regan Richardson and Sam Dayton (joint with Jordan Bounds) 2023-ongoing  
***Functional Identities, Nilpotent Rings and Garside Shadows***  
*Furman University, SC, USA*

Alyssa Pate and Morgan Carns Summer 2023  
***Finding the key length of Vigenère ciphers***  
*Furman University, SC, USA*

## Selected Talks

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<b>Modifying twist algorithms for determining the key length of a Vigenère cipher.</b> <i>Cryptology Educators Seminar, online</i>	Nov 2023
<b>The Mathematics of Hearing</b> Math & Munchies Series <i>Furman University</i>	Nov 2022
<b>Cone Types, Automata and Regular Partitions in Coxeter groups</b> Spring Topology and Dynamics Conference <i>Rhodes College (online)</i>	Mar 2023
Algebra and Combinatorics Seminar <i>LaCIM Université du Québec à Montréal, Canada</i>	Apr 2022
Groups and Geometries ( <a href="#">MATRIX Conference</a> ) Australia	Dec 2021
<b>Coxeter Systems for which the Brink-Howlett automaton is minimal</b> Symmetries in Newcastle (invited) <i>University of Newcastle, Australia</i>	May 2020
Algebra and Combinatorics Seminar <i>North Carolina State University, USA</i>	Feb 2019
62nd Annual Meeting of the Australian Mathematics Society <i>University of Adelaide, South Australia</i>	Dec 2018
<b>Introduction to Automatic Groups</b> Student Algebra Seminar <i>University of Sydney</i>	Apr 2019
<b>The classification of finite Coxeter groups</b> Student Algebra Seminar <i>University of Sydney</i>	Aug 2018
<b>Automata for Coxeter Groups</b> Postgraduate Student Seminar Series <i>University of Sydney</i>	Oct 2017

## Service

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- Referee for Rocky Mountain Journal of Mathematics
- Committee member for Diversity, Equity and Inclusion in the Department of Mathematics & Statistics, UNC Asheville.
- Co-founder and faculty advisor for the Data Science and Machine Learning club, Furman University.
- Committee member for Diversity, Equity and Inclusion in the Department of Mathematics, Furman University.

## Technical Skills

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**Programming Languages:** Python, SageMath, Magma, Bash/Shell, R, SQL, LaTeX, HTML, CSS

**Other Interests/Skills:** Undergraduate mathematics education, cryptology, statistics and machine learning.