

# Yeeka Yau

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Nationality: Australian

[Personal webpage](#)

Learning Hub (Mathematics)

The University of Sydney, Australia

## Employment History

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<b>Learning Success Advisor (Mathematics)</b> <i>Learning Hub (Mathematics), The University of Sydney, Australia</i>	2024 - Current
<b>Assistant Professor (Tenure-track)</b> <i>University of North Carolina Asheville, Asheville, North Carolina, USA</i>	July 2023 - Dec 2023
<b>Visiting Assistant Professor</b> <i>Furman University, Greenville, South Carolina, USA</i>	2022 - 2023
<b>Postdoctoral Research Associate</b> <i>The University of Sydney, Australia</i>	2021 - 2022
<b>Associate Lecturer</b> <i>Mathematics Learning Centre, The University of Sydney, Australia</i>	2019 - 2020
<b>Summer Intensive Lecturer</b> <i>The University of Sydney, Australia</i>	2018, 2020

## Visiting Positions

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<b>Visiting Researcher</b> <i>LaCIM Université du Québec à Montréal, Canada</i> Mentor: <a href="#">Professor Christophe Hohlweg</a>	April/May 2022
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## Education

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<b>PhD in Pure Mathematics</b> , <i>The University of Sydney, Australia</i> – Advisor: <a href="#">A/Prof. James Parkinson</a> – Thesis: Automatic Structures for Coxeter Groups ( <a href="#">link</a> )	2017 - 2021
<b>BSc (Adv Maths) Honours in Pure Mathematics</b> , <i>The University of Sydney, Australia</i> – Grade: Honours Class I – Advisor: A/Prof. James Parkinson – Thesis: Automata for Coxeter Groups	2012 - 2016

# Educational Leadership & Innovation

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## Curriculum Design & Innovation

- (2022 - 2023) Led curriculum design efforts at Furman University and UNC Asheville. Integrated innovative teaching techniques, such as interactive in-class simulations and bootstrapping in introductory and second year calculus-based statistics courses.
- (2022 - 2023) Founded and advised the Data Science and Machine Learning Club at Furman University, fostering leadership and interdisciplinary collaboration for students.

## Active Learning Strategies

- (Current) Regularly implement active learning techniques such as collaborative problem solving and peer assessment, interactive simulations, and hands-on activities to enhance student engagement in both theoretical and applied courses.

## Teaching Experience

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- **The University of Sydney (2024 - Current) :**
  - MATH1062<sup>^</sup> - Mathematics 1B (Calculus & Statistics) 2024
  - DATA001/1901<sup>^</sup> - Foundations of Data Science 2024
  - PSYC2012<sup>^</sup> - Statistics and Research Methods for Psychology 2024
- **UNC Asheville (2023):**
  - STAT225 - Calculus-based Statistics (second year) Fall 2023
  - MATH167 - Precalculus Fall 2023
- **Furman University (2022 - 2023):**
  - MTH120 - Introduction to Statistics 2022, 2023
  - MTH150 - Calculus I 2022
  - MTH145 - Calculus for Management, Life and Social Sciences 2023
- **The University of Sydney (2016 - 2020):**
  - MATH1002 Linear Algebra (1st year) 2020 Summer School
  - MATH1004 Discrete Mathematics (1st year) 2018 Summer School
  - MATH1013<sup>^</sup> Mathematical Modelling (1st year) 2020
  - MATH1004<sup>^</sup> Discrete Mathematics (1st year) 2020
  - MATH1014<sup>^</sup> Intro to Linear Algebra (1st year) 2020
  - MATH1111<sup>^</sup> Intro to Calculus (1st year) 2019
  - Statistics Bridging course<sup>^</sup> 2019
  - 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

- \* Indicates courses taught as a tutor.
- ^ Indicates weekly supplementary learning tutorials; duties include creating additional problem sets and solutions, coding tutorials in R, and detailed explanation of theory and tutorial problems.

## Students Supervised

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Devin Bryant, Sam Housand, Regan Richardson and Sam Dayton (joint with [Jordan Bounds](#)) 2023 - ongoing  
***Functional Identities, Nilpotent Rings and Garside Shadows***  
*Furman University*

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

## Publications and Preprints

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**A pair of Garside shadows** 2024  
([P. Przytycki](#) and Y. Yau) [pdf](#)  
(accepted) To appear in *Algebraic Combinatorics*

**An artificial neural network approach to finding the key length of the Vigenère cipher.** 2023  
([C. Millichap](#), Y. Yau) [online version](#)  
*Cryptologia*, 1-17, 2024

**Modifying twist algorithms for determining the key length of a Vigenère cipher.** 2023  
(C. Millichap, Y. Yau, A. Pate and M. Carns) [online version](#)  
*Cryptologia*, 1-16, 2023

**Cone types, automata and regular partitions in Coxeter groups** 2022  
(J. Parkinson and Y. Yau) [online version](#)  
*Advances in Mathematics*, vol 398, 2022

**Coxeter Systems for which the Brink-Howlett automaton is minimal** 2019  
(J. Parkinson and Y. Yau) [online version](#)  
*Journal of Algebra*, vol 527, p437-446

## Research Grants and Funding

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**Functional Identities, Nilpotent Rings and Garside Shadows** 2023 - 2025  
National Science Foundation LEAPS-MPS Award: \$197,154 USD  
Jordan Bounds (Primary Investigator)  
Yeeka Yau (Primary Collaborator and Senior Personnel)

**Start-up Funding** 2023  
*UNC Asheville*: \$13,000 USD

## Awards

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

## Selected Talks

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- A pair of Garside shadows.** Dec 2024  
*Joint meeting of the AMS, NZMS and AustMS, University of Auckland, NZ*
- Modifying twist algorithms for determining the key length of a Vigenère cipher.** Nov 2023  
*Cryptology Educators Seminar, online*
- Coxeter groups and word problems** Nov 2023  
New Faculty Presentations  
*UNC Asheville*
- The Mathematics of Hearing** Nov 2022  
Math & Munchies Series  
*Furman University*
- Cone Types, Automata and Regular Partitions in Coxeter groups**  
Spring Topology and Dynamics Conference Mar 2023  
*Rhodes College (online)*  
Algebra and Combinatorics Seminar Apr 2022  
*LaCIM Université du Québec à Montréal, Canada*  
Groups and Geometries ([MATRIX Conference](#)) Dec 2021  
Australia
- Coxeter Systems for which the Brink-Howlett automaton is minimal**  
Symmetries in Newcastle (invited) May 2020  
*University of Newcastle, Australia*  
Algebra and Combinatorics Seminar Feb 2019  
*North Carolina State University, USA*  
62nd Annual Meeting of the Australian Mathematics Society Dec 2018  
*The University of Adelaide, South Australia*
- Introduction to Automatic Groups** Apr 2019  
Student Algebra Seminar  
*The University of Sydney*

## **The classification of finite Coxeter groups**

Aug 2018

Student Algebra Seminar

*The University of Sydney*

## **Automata for Coxeter Groups**

Oct 2017

Postgraduate Student Seminar Series

*The University of Sydney*

## **Service**

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- Accredited PASS (Peer assisted study session) supervisor
- 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, R, SageMath, Magma, Bash/Shell, SQL, LaTeX, HTML, CSS

**General Interests/Skills:** Tertiary mathematics and statistics education, statistics and machine learning, historical cryptography.