

Yeeka Yau

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Nationality: Australian

[Personal webpage](#)

Learning Hub (mathematics)

The University of Sydney, Australia

Education

Ph.D. in Pure Mathematics, *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, *University of Sydney, Australia* 2012–2016

– Grade: Honours Class I

– Advisor: A/Prof. James Parkinson

– Thesis: Automata for Coxeter Groups

Employment History

Assistant Professor July 2023 - Dec 2023

UNC Asheville, Asheville, North Carolina, USA

Visiting Assistant Professor 2022 - 2023

Furman University, Greenville, South Carolina, USA

Postdoctoral Research Associate 2021-2022

University of Sydney, Australia

Associate Lecturer 2019-2020

Mathematics Learning Centre, University of Sydney, Australia

Summer Intensive Lecturer 2018, 2020

University of Sydney, Australia

Visiting Positions

Visiting Researcher April/May 2022

LaCIM Université du Québec à Montréal, Canada

Mentor: [Professor Christophe Hohlweg](#)

Publications and Preprints

An artificial neural network approach to finding the key length of the Vigenère cipher. 2023

(C. Millichap, Y. Yau) [pdf](#)

(Submitted)

A pair of Garside shadows 2023

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

(Submitted)

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

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

Awards

- **T.G. Room Medal** for most outstanding Pure Mathematics PhD thesis 2021
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
University of Sydney, Australia
- **Norbert Quirk Prize No. IV** for best essay by an Honours student 2016
University of Sydney, Australia
- **The Rolf Adams Prize** for best Pure Mathematics Honours presentation 2016
University of Sydney, Australia

Students Supervised

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

Teaching Experience

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

Selected Talks

Modifying twist algorithms for determining the key length of a Vigenère cipher. Nov 2023
Cryptology Educators Seminar, online

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
University of Adelaide, South Australia

Introduction to Automatic Groups

Student Algebra Seminar

University of Sydney

Apr 2019

The classification of finite Coxeter groups

Student Algebra Seminar

University of Sydney

Aug 2018

Automata for Coxeter Groups

Postgraduate Student Seminar Series

University of Sydney

Oct 2017

Service

- 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.

Other Professional Experience

Data Analyst (Customer Data Science Team)

Zip Co., Sydney, Australia

Mar - May 2021

- Developed new quantitative metrics for the Customer data science team.
- Built a proof of concept recommendation engine for the Zip mobile app.

Data Analyst (Part-time)

The Shepherd Centre for Deaf Children, Sydney, Australia

2012–2017

- Support senior management with actionable statistical data insights across fundraising and clinical business, present insights and build decision tools using Python, R and SQL.

Technical Skills

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

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