FYiMaths 2024

What maths and stats do students need to learn for success in the future?

Thursday 26 June 2024	
Time	**Presentation**
10:30 – 10:45	Welcome and Introduction
10:45 – 11:30	The mathematics quiz as the study, not (just) a test Rosie Cameron
11:30 – 11:45	Morning tea
11:45 – 12.30	Online Computer Labs: Is Anyone There? Amanda Shaker & Rupert Kuveke
12:30 – 13:00	Peer instructions voting to teach concepts in statistical disciplines and beyond Karol Binkowski
13:00 – 14:00	Lunch (at own cost)
14:00 – 15:00	What is the impact of AI on curriculum design? Stuart Johnson
15:00 – 15:45	Targeted resourcing and additional support – what do the data tell us? Leanne Rylands
15:45 – 16:00	Afternoon tea
16:00 – 17:00	A pathway to a student-worded definition of limits at the secondary-tertiary transition Renaud Chorlay
17:00 –	Dinner (at own cost)

Friday 27 June 2024	
Time	**Presentation**
10:00 – 10:45	**What maths and stats do students need to know to be successful in the future?** **Merryn Horrocks**
10:45 – 11:30	**Is Mathematics and Statistics Support Worth the Money?** **Don Shearman, Merryn Horrocks, Adelle Colbourn & Susan McGlynn**
11:30 – 11:45	**Break**
11:45 – 12:15	**Mathematical Logic** **Usha Sridhar**
12:15 – 13:00	**What do we teach in first year: a comparison across G08** **R. Nazim Khan**
13:00 – 13:45	**Lunch (at own cost)**
13:45 – 15:00	**First-year exams at UNSW: large scale, invigilated and with software provided** **Jonathan Kress, Dominic Vella, Kevin Limanta & Nathan Jackson**
15:00 –	**Discussion and finish**

The workshop will be held at **UNSW Anita B Lawrence East 4082** (see map below).

The Zoom details for the workshop are: https://unsw.zoom.us/j/85847466647
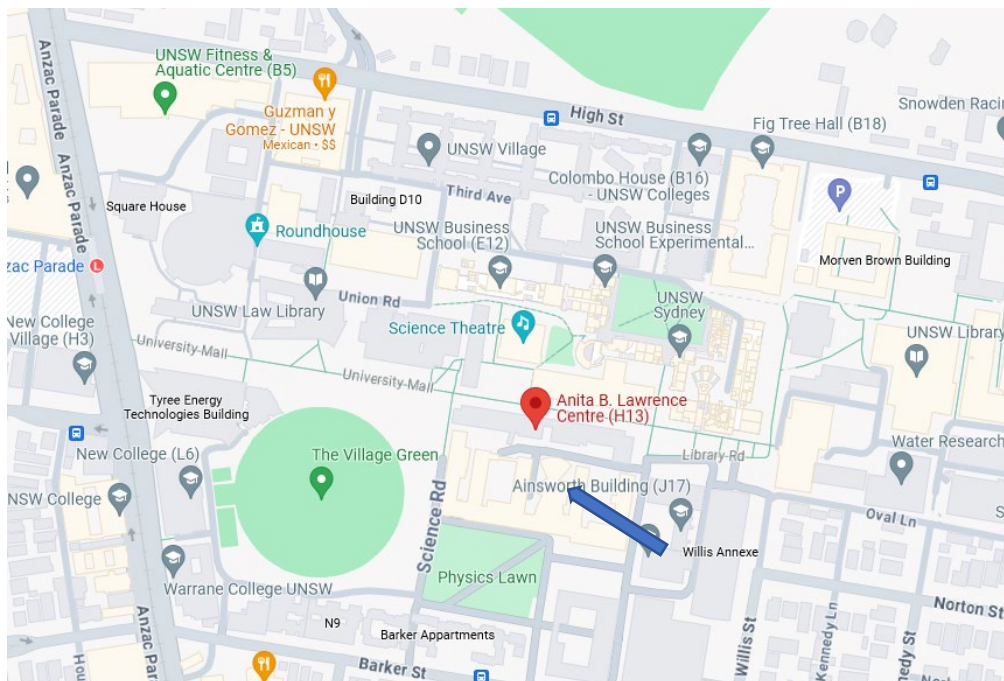
Abstracts (in presentation order)

Thursday

Rosie Cameron

The mathematics quiz as the study, not (just) a test

Online mathematics quizzes are common assessments in undergraduate mathematics courses, often imitating a traditional test while allowing automatic marking. A quiz can give students feedback on their attempt at point of submission; ideal because prompt, informative feedback is beneficial to learning. Recently, these quizzes in several engineering mathematics courses at the University of Canterbury have shifted to an immediate feedback model that delivers feedback at point of question submission, rather than a deferred feedback model with feedback only after the whole quiz attempt. We use a Resources-Orientations-Goals framework to examine how this decision was made and uncover the values and goals that instructors prioritised in making this decision. We examine how the technological affordances of the quiz system (STACK) facilitated the change in thinking. This research is still in a preliminary phase so the talk will present some initial findings and reflections.

Amanda Shaker & Rupert Kuveke

Online Computer Labs: Is Anyone There?

At the 2023 FYiMaths National workshop, a talk was given called "UQ SCIE1000: A case study" (Timms, Jessop, Hampson, 2023), where the speakers described their approach to teaching computer labs online. The approach was designed to address issues related to students being unclear of learning objectives and lack of student engagement in the online environment. Elements of the design included adding structure to the class by including different study modes and even using emojis to help clarify to students what was expected from them at different stages of the computer lab. Many of the elements included were based on pedagogical concepts such as nudging, expectation management and engagement, which are key elements of the conceptual framework of enhanced online learning discussed by Brown et al. (2022).

Inspired by the talk in 2023, we updated the online computer labs in a large first-year introductory statistics subject in 2024 to include additional structure, nudging and expectation management. Lesson plans for online teaching staff were also developed. To evaluate the approach, questionnaires were distributed to both online students and online teaching staff. In this talk, we discuss the changes made to enhance the online learning experience for students, and provide results of the evaluation from the student and staff perspective.

Karol Binkowski

Peer instructions voting to teach concepts in statistical disciplines and beyond
The first-year Introductory Statistics large enrolment service unit is available to students pursuing various Bachelor of Science degree majors. We examine students' participation in live hybrid lecture sessions and the impact of the Peer Instruction (PI) method, which utilises a voting mechanism to teach statistical concepts. The discussion also provides a concise overview of the method.

Stuart Johnson
What is the impact of AI on curriculum design?

How does AI change what we should teach in first year maths and how we should teach it? This is obviously a big question that we need to answer to inform our own teaching practice, but also one that others may decide on in ways that affect us, through changes to assessment policies, or changes in requirements for service teaching.

There are dangers in continuing practices just because it's what we've done in the past, but also in rejecting well established and successful practices in favour of a new trend. We all need to navigate our way on the correct path between these extremes.

I'd like to survey the landscape on how AI impacts first year maths, put up some of my own ideas to be challenged and open up a general discussion on this important topic.

Leanne Rylands

Targeted resourcing and additional support – what do the data tell us?

Universities in Australia collect a considerable amount of demographic data about their students. We present some results of analysing over 5000 records from ten mathematics and statistics subjects with high failure rates. We consider what information these data provided, especially in the context of informing decisions on targeted resourcing or additional support with the goal of improving students' marks.

Renaud Chorlay (lecturer in history and didactics of mathematics, Sorbonne Université (France))

A pathway to a student-worded definition of limits at the secondary-tertiary transition

https://link.springer.com/article/10.1007/s40753-019-00094-5

Friday

Merryn Horrocks

What maths and stats do students need to know to be successful in the future?

This session will consist of a brief presentation to set the scene, followed by a discussion on the topic.

Don Shearman, Merryn Horrocks, Adelle Colbourn & Susan McGlynn

Is Mathematics and Statistics Support Worth the Money?

In a challenging economic climate for higher education, math and statistics support centres must demonstrate a positive impact for stakeholders. The Mathematics Education Support Hub (MESH) at

Western Sydney University has previously shown improved final marks for students using its services (Intepe, Shearman & Rylands 2019) but student retention has not been examined.

This study collected results and demographics for students completing subjects with MESH workshop support between 2016 and 2022, along with their enrolment history. After removing opt-outs, 22,856 students and 39,538 enrolments were included. With the addition of MESH data on workshop attendance and drop-in help usage, the study found that students who did not use MESH support were 1.5 times more likely to leave the university than those who utilized MESH services. This increased to an odds ratio of 2.56 for students identifying as Aboriginal and Torres Strait Islander.

Our presentation will delve into the study results, examining the effects of demographics, study area, and year of study. We will also discuss the economic implications for the institution.

References
Intepe, G., Shearman, D., & Rylands, L. (2019). Workshop Support for First-Year Mathematics and Statistics. In Pettigrew, J., Rylands, L., Shearman, D. & Yeong, A. (Eds.) Swan Delta 2019: Proceedings of the Twelfth Southern Hemisphere Delta Conference on the Teaching and Learning of Undergraduate Mathematics and Statistics: Reflections of Change (pp 40–51).

Usha Sridhar

Mathematical Logic

Mathematical Logic in its basic form is noted as one of the most important tools that can help in the thinking and analysing process. This helps to create an argument for a solution to a problem under consideration. Especially crucial is the number logic that becomes a lifelong skillset to deal with data related sciences.

R. Nazim Khan

What do we teach in first year: a comparison across G08

In this presentation we look at what we teach in the first year of mathematics and statistics degrees in Australia. We focus on the G08 universities, since they all have departments of mathematics and a bachelors degree in mathematics and statistics. The interest is in determining how similar or different the first-year offerings are. This in turn indicates how different the actual degrees are. This has implications in particular for students who seek to undertake higher research degrees.

Jonathan Kress, Dominic Vella, Kevin Limanta & Nathan Jackson

First-year exams at UNSW: large scale, invigilated and with software provided

First-year exams at UNSW: large scale, invigilated and with software provided". This talk could cover the logistics of running tests during the term and final exams for more than 5000 students in one term, and how we design questions to assess understanding while providing Maple, Matlab, Mathematica, RStudio and Python.