Workshop 3

Tuesday 3rd October, 1545

Workshop summary

W3A	Preparing for the Future: Transition from High School to University: Debating Technology (NZ Maths Society Panel)	Cami Sawyer, Julia Novak
W3B	What is actually important about the quadratic?	Anthony Harradine
W3C	What are key practices for students to apply when developing statistical habits of mind?	Chris Franklin
W3D	Your students are unique. Personalise their learning with Mathspace.	Pantea Jouliany, Erin Gallagher
W3E	The NZ Experience in the Toughest Maths Competition in the World	Phil Truesdale, Alan Parris
W3F	All models are wrong, but some are more wrong than others: Informally assessing the fit of probability distribution models (AS91586)	Anna Fergusson
W3G	Sneaky Teaching	Vicky Walker, Charlotte Walker
W3H	Accelerating the progression of students who are 'below' and 'well below' the national standard	Jane Gray
W3I	The Perfect Modelling Tool for Teachers and Independent Learners - Workshop A	Volker Schroeter
W3J	Describing Statistical Relationships in Bivariate Data	Bernard Frankpitt
W3K	reSolve to maintain Dimensions in a TEMPEST: online resources from the Australian Association of Mathematics Teachers	Kate Manuel
W3L	If dancers create performances, and artists create paintings, what kinds of works do mathematicians create?	Caroline Yoon

W3A

Preparing for the Future: Transition from High School to University: Debating Technology (NZ Maths Society Panel)

Cami Sawyer, Julia Novak

In this presentation we will use discussion and debate in order to delve into some of the issues related to the use of technology at High Schools and Universities in NZ. We will investigate how technology is used in the teaching, learning, and assessment of mathematics. Paying particular attention to the effects on students who transition from school to university we will consider present practice and what the future holds.

Our presentation will focus on the following three key points:· Technology is used differently in the secondary and tertiary sectors. We aim to develop an understanding for the reasons around this and the issues that it may cause.· How and when technology is and should be used. Investigating different practices from across our discipline, including successes and failures at different levels.· Expanding our understanding of the advantages and disadvantages of using different technologies. Technology can be distracting as well as productive in the classroom, what is the key to getting it right?

Recommended Audience: Year 11 – 13 Teachers

Cami Sawyer and Julia Novak are both actively involved in the NZMS Education Group. Cami is a senior tutor at Massey University, where she recently received the VC Teaching Excellence Award. Julia is a professional teaching fellow at the University of Auckland and the Associate Dean (Teaching and Learning) for the Faculty of Science.

W3B

What is actually important about the quadratic?

Anthony Harradine

Positive means happy face?

Negative means sad face?
+2 means 2 to the left?
y-intercept of ...
Nope.
Come along and experience a learning journey that gets to the heart of why this often-maligned creature is actually a true gem.
It may change the way you teach the quadratic forever - big call! ☺

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers

Anthony began teaching mathematics in 1984. Currently Director of the Potts-Baker Institute at Prince Alfred College, he has spent the last thirteen years trying to better understand his 'failures' of the previous twenty. His many mentors have taught him a lot about mathematics and statistics, doing mathematics and statistics, and research. He likes nothing better than sharing ideas with anyone silly enough to have a conversation with him. He really likes mathematics and statistics.

W3C

What are key practices for students to apply when developing statistical habits of mind?
Chris Franklin

In the US, students and teachers are expected to use eight mathematical practices that help them with the habits of mind necessary to acquire and apply mathematical knowledge. These also guide teachers lesson planning and formative assessment, and when viewed through a statistical lens they can reinforce well formed statistical thinking. In this workshop we'll explore how the mathematical practices could be used within NZ classrooms to promote sounds habits of mind for both mathematical and statistical reasoning.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers

Christine (Chris) Franklin is the Lothar Tresp Honoratus Honors Professor and Senior Lecturer Emeritus in Statistics at the University of Georgia and a Fellow of the American Statistical Association. She has been recognized with numerous teaching and advising awards at UGA. She is the co-author of an Introductory Statistics textbook with Alan Agresti and Bernhard Klingenberg, co-author of the textbook Statistics Reasoning in Sports with Josh Tabor and has published more than 50 journal articles and book chapters. Chris was the lead writer for the American Statistical Association Pre-K-12 Guidelines for the Assessment and Instruction in Statistics Education (GAISE) Framework. She chaired the writing team of the ASA Statistical Education of Teachers (SET) report.

W3D

Your students are unique. Personalise their learning with mathspace
Pantea Jouliany, Erin Gallagher

What is Mathspace? Mathspace is an adaptive learning platform that helps teachers to tailor mathematics programs for individual students. No two students are the same, which is why personalised maths education is essential in improving numeracy outcomes. We are a group of passionate educators. We believe that every student can excel in maths, with the right help at the right time. We believe the power of adaptive learning technology can help teachers to create truly differentiated learning experiences for their students. What do we do? Mathspace is the holy grail of online maths resources, with: • Formative step-by-step feedback• Adaptive learning - allowing students to work at their own level and pace• Handwriting recognition - students can write mathematics in a natural and intuitive method• Lessons and investigations exploring conceptual ideas • Video lessons and explanations, created by in-house teachers
Mathspace is already used across Australia, Hong Kong, the US and the UK . This week is the official launch of Mathspace in NZ. Get real insights into the world of data-driven teaching and learn how adaptive technology can help you to differentiate your maths classroom. See Mathspace in action, receive a free trial, and chat about all things maths!
This workshop is presented by one of our GOLD Sponsors.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Pantea is the Lead Content Developer for Mathspace. Erin also works for Mathspace.

W3E

The NZ Experience in the Toughest Maths Competition in the World

Phil Truesdale, Alan Parris

NZ has been sending teams to the International Mathematical Olympiad each year since 1988. This workshop will explain how students are selected, what they have to do, the timeline, how teachers can support them as well as show some highlights of past Olympiad experiences and introduce the NZ Mathematical Olympiad Students Association. Alan Parris has organised the Olympiad January training camps since 1986 as well as taking teams to 7 Olympiads and Phil Truesdale has taken over from Alan and taken the team to Hong Kong in 2016 and Brazil in 2017. While not every school has students good enough to make the NZ Team, the resources available can help teachers meet the needs of gifted and talented students.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers, Other

Alan, now retired was HOD Mathematics at Linwood College in Christchurch where he has been for 43 years. He was President of NZAMT for 8 years and is still on the Executive. He oversaw the NZ contract for Gifted and Talented Mathematics and has organised the Mathematics Olympiad camp continuously from 1986 and has taken the NZ team to the IMO in seven different countries. Apart from all his many mathematical activities he is President of the NZ Billiards and Snooker Association and restores vintage cars.

Phil is HOD Mathematics at Papanui High School in Christchurch. He is on the Executive of NZAMT where he looks after the technical material on the website and is a Resource Coordinator. He has been involved in the Olympiad programme for the last 4 years, taking NZ teams to the IMO in the last 2 years and taking over as Camp director this year.

W3F

All models are wrong, but some are more wrong than others: Informally assessing the fit of probability distribution models (AS91586)

Anna Fergusson

We have a clear learning progression for how "to make a call" when making comparisons, but how do we make a call about whether a probability distribution model is a good model? As we place a greater emphasis on the use of real data in our statistical investigations, we need to build on sampling variation ideas and use these within our teaching of probability in ways that allow for key concepts to be linked but not confused. Last year I undertook research into teachers' knowledge of probability distribution modelling. I will share what I learned from this research, and will also share a new free online modelling tool and activities I have developed that allow students to use informal inferential reasoning to test the fit of probability distribution models. You will need to bring a web-enabled device along to the workshop as we will be using online resources/tools as part of the workshop.

Recommended Audience: Year 11 – 13 Teachers

Anna Fergusson teaches intro-level statistics at the University of Auckland. She is interested in statistical education, in particular curriculum and assessment design, and enjoys facilitating workshops to support professional development of statistics teachers. Anna has also worked with the New Zealand Ministry of Education and the New Zealand Qualifications Authority on the development of national assessment standards, tasks and teaching resources for statistics. She also runs a blog for statistics teachers: teaching statistics is awesome

W3G

Sneaky Teaching

Vicky Walker, Charlotte Walker

Mathematics beyond the textbook. Two experienced teachers will share ideas accumulated during their combined 30 years of teaching. The presentation will include ways of using the teaching environment and different activities to enhance mathematical learning. Also included will be the use of coding using Scratch for teaching Geometry.
Bring a laptop to participate in coding. a tablet/ipad won't allow you to participate fully.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers

Vicky is a retired teacher with 20 years' experience, who still takes a keen interest in mathematics education. Charlotte is currently inflicting her experimental teaching ideas on a number of young minds at various year levels.

W3H

Accelerating the progression of students who are 'below' and 'well below' the national standard

Jane Gray

My school has completed two years in the ALiM programme and is currently involved in the first year of MST and it's first year of the new PLD 'funding'. I will share about the journey so far, exciting results, hopes for the future, and recommendations

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers

Jane is HOD Mathematics at Hillmorton High School

W3I

The Perfect Modelling Tool for Teachers and Independent Learners - Workshop A
Volker Schroeter

GeoGebra is a powerful modelling tool for teachers. It enables teachers to model mathematical and statistical problems at all levels of the New Zealand Curriculum. GeoGebra is also suitable as a learning tool for students. It enables curious students to discover properties of mathematical models through interaction with the model.

The GeoGebra Commercial - A show of use cases
In this session participants will see a variety of dynamic examples.
Used cases include:

- Geometry and Measurement
- Numeracy Visualisations
- Statistical Modelling
- Algebra Support• Coordinate Geometry
- Geometric Reasoning
- Functions and Graphs
- 3D Models
- A bit of Wizardry

Participation is best described by "look-listen-ask".
Bring: curiosity, a relaxed attitude towards computer technology
This is the first workshop in a series of 3 workshops. Delegates are welcome to attend all 3 or individual workshops.

Recommended Audience: Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers

Volker Schroeter has 19 years of teaching experience in secondary and tertiary education in New Zealand. He has been using GeoGebra since 2010. Over the past seven years Volker has developed over 800 GeoGebra files, covering all Mathematics strands at all year levels.
This year Volker is using GeoGebra for his inquiry into independent learning.

Note: Part B, Workshop 8

W3J

Describing Statistical Relationships in Bivariate Data
Bernard Frankpitt

This workshop will focus on teaching a richer understanding of relationships in Bivariate Data. It will review the language that students already use to describe univariate distributions, and from this base develop the language and concepts that students need to give satisfactory reponses to instructions like:

"Discuss the Statistical relationship between two variables in a multivariate dataset". The workshop will explain how to link the description of the statistical relationship to regression models for bivariate data.

Recommended Audience: Year 9 – 10 Teachers, Year 11 – 13 Teachers

Bernard studied mathematics and engineering at The University of Canterbury and The University of Maryland, College Park. He has worked as an engineer, and has been teaching secondary mathematics for the last 11 years.

W3K

reSolve to maintain Dimensions in a TEMPEST: online resources from the Australian Association of Mathematics Teachers

Kate Manuel

AAMT, in conjunction with universities and other educational entities, is developing a comprehensive suite of free online resources for teachers of mathematics. Kate Manuel, Manager of National Projects, will present a tantalising sample.
Why are bees wearing backpacks? Eight year levels in one maths class: really?! What symmetries can be found in footprints in the sand? And just what does a storm have to do with all of this?

Recommended Audience: Other

Kate Manuel joined the Australian Association of Mathematics Teachers as a professional officer in the middle of 2010, after a career as a teacher of mathematics and science in South Australian schools, most recently as Head of Mathematics at a secondary college. Kate was also a senior years' moderator of mathematics for many years and Chief Assessor for Mathematical Applications. In her current role with AAMT, Kate manages national projects involving the provision of teaching resources to the mathematics community. She holds a keen interest in architecture, modern art and AFL football (Port Power!)

W3L

If dancers create performances, and artists create paintings, what kinds of works do mathematicians create?

Caroline Yoon

This hands on, interactive workshop will review different kinds of mathematical tasks, including the LEMMA tasks (www.nzcer.org.nz/lemma), modelling activities, word problems, and investigations. We will explore the kinds of mathematical activity students are invited to experience in these diverse tasks, and through this will explore the questions below:
How much do/should our students struggle?
What kinds of struggle are useful for learning?
What kinds of struggle are mathematical?
How can we design tasks that encourage useful mathematical struggle?

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers, Year 9 – 10 Teachers, Year 11 – 13 Teachers

Caroline spends a lot of her time trying to come up with good mathematics tasks. She approaches this using the only method she knows: surrounding herself with teachers, students, researchers and mathematicians who can bring diverse perspectives to the challenge.