WORKSHOP SUMMARY – INCLUDING ABSTRACTS

Current as at 16 August

K indicates the workshop is being presented by a Keynote Speaker
S indicates the workshop is being presented by a Featured Spotlight Speaker

Workshop 1

Tuesday 3rd October, 1300

Workshop summary

W1A-2A	Great Math Lessons on Digital Devices (double workshop)	Dan Meyer **(K)**
W1B-2B	Developing Statistical Thinking: Theory and Practice (double workshop: theory and practice)	Christopher Niles
W1C	Statistical Literacy - what is it at NCEA, Level 3?	Derek Smith
W1D	Engineering Education to Employment and Secondary Tertiary Partnership (Removing invisible walls on a Journey Back to the Future Ka Mua Ka Muri)	Nigel Studdart, Mirko Wojnowski, Haggis Henderson
W1E	Math with a Road Safety Message	Beverley Sue-Tang
W1F	Using Presentations to Assess L3 Statistics Internals	David Lear
W1G	Using software to help students learn to solve equations	Daphne Robson
W1H	Assessing using multi-standard projects (Level 1)	Katy Thorne
W1I	Musings on engaging 2E (twice exceptional) and struggling students in a maths classroom, a symphony of thoughts collected during my European adventure	Sue Scott
W1J	Using the Eikosogram to teach conditional and joint probability	Malia Puloka
W1K	Google Suite and Electronic Assessments	James Bowater

W1A-2A (double session)
Great Math Lessons on Digital Devices
Dan Meyer **Dbl workshop**

The free Desmos Activity Builder allows teachers to create interesting and educational math experiences for secondary students on digital devices. We'll learn how to use existing lessons from the Desmos user community, how to adapt your existing worksheets, and how to create our own lessons from scratch.

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

Dan Meyer taught high school math to students who didn't like high school math. He has advocated for better math instruction on CNN, Good Morning America, Everyday with Rachel Ray, and TED.com. He earned his doctorate from Stanford University in math education and is the Chief Academic Officer at Desmos where he explores the future of math textbooks. He speaks internationally and was named one of Tech & Learning's 30 Leaders of the Future. He lives in Mountain View, CA.

W1B- 2B (double session)
Developing Statistical Thinking: Theory and Practice (2 part workshop: theory and practice)
Christopher Niles **Dbl workshop**

Part 1: The classroom theory for developing statistical thinking
Have you ever thought that teaching statistics and mathematics are not that similar but haven't clearly developed why? In this workshop we will explore some key distinctions between statistical and mathematical thinking. Additionally, theories and practices in mathematics will be critically reviewed to identify a few deep issues that could result in practices that serve to inhibit the development of statistical thinking. Drawing from general theories of learning (such as self regulated learning, assessment for Learning and feedback) may serve to illuminate ways in which teachers can promote the development of deep thinking in statistics. The second workshop looks at practical strategies for the 'what next' part. (I am currently working on a masters thesis at Auckland University on this topic).

Part 2: Some strategies for developing statistical thinking
After several years of enculturation in school mathematics, developing statistical thinking at NCEA L2 and L3 is indeed a huge task. Applying classroom practices associated with self-regulated learning (SRL) support the investigative cycle of statistical thinking (PPDAC), so how do we embed these practices in statistics classrooms? In this workshop we will look at a theory for embedding SRL in the statistics programme and some explicit strategies that may cultivate a theory necessary for efficient and effective development of statistical thinking.

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

Christopher Niles has been a teacher in Mathematics and Statistics for five years and has been in charge of NCEA Level 2 statistics for three of those years. He has presented at various Auckland Mathematical Association workshops and also at Conference in 2015. As part of the Auckland Central Community of Schools last year, he co-lead a cross-curricular professional learning group on Assessment for Learning and student agency. This year he has won a study award to research the influence of peer feedback on self-regulated learning in Statistics for the purpose of developing more efficient and effective learning programmes for all students in mathematics generally and statistics specifically. His case study delves into student experience of peer feedback in classrooms and some of the results of this study may be discussed during the workshop.

W1C
Statistical Literacy - what is it at NCEA, Level 3?
Derek Smith

Unpacking Achievement Standard: 91584 Evaluate statistically based reports. Why is it not a popular external Achievement Standard? What is it all about?

Recommended Audience: Year 11 – 13 Teachers

Derek is currently on contract to the University of Otago as a Mathematics and Statistics (Central South) Facilitator (Secondary). He has taught Mathematics and Statistics at secondary schools in the Wellington region for 28 years holding HOD positions and a position as senior lecturer at VUWCE, in Mathematics Education.

W1D
Engineering Education to Employment and Secondary Tertiary Partnership (Removing invisible walls on a Journey Back to the Future Ka Mua Ka Muri)
Nigel Studdart, Mirko Wojnowski, Haggis Henderson

NorthTec and others are engaged and funded by TEC in an Engineering to Employment Programme as part of a Secondary Tertiary Partnership (STP), integrating subjects across silos and secondary and tertiary learning.
Engineering is the science of the possible, building solutions to the challenges of today while solving the problems of the future. By its very nature that means engineers think outside the box. Solutions to problems cannot simply be applied in a mechanistic fashion. Much of past learning was taught by transmission, which does not engender transformation. This produces students who can solve yesterday's problems well. Tomorrows' dilemmas in an increasingly complex world require a deep understanding of the foundations and tools of mathematics so that our students can apply them with confidence across silos and fields in an environment of constant change.
Fixed mind-sets in mathematics and subject silos in education disrupt thought integration in engineering and may not provide innovative solutions we need. As we consider this we reflect that we walk in the

steps of our ancestors who adapted to change from cultivation to industrialisation, building solutions from the ground up. Ka Mua, Ka Muri.

Key Points;

- The Engineering Education to Employment (EE2E) initiative "Making the World" and overview of projects in scope and underway
- The impact of developing a growth mind-set on removing invisible walls and inspiring the students journey
- STP, Tertiary working collaboratively with the school sector across subject boundaries.
- Increasing relevance for mathematics by contextualisation and experimentation

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

Nigel Studdart leads innovative solutions with a passion for transformational technology, problem solving, and making the world a better place to live. In 2016 Nigel received the CITRENZ award for Best Educational Innovation & Northland DHB award for Best innovation creating social wellbeing for MĀori. Mirko Wojnowski is NorthTec Project lead for engineering Secondary Tertiary Partnerships. A maths foundation specialist his passion is to break through superficiality to a deeper understanding of principles. He engages students' logic and reasoning as intelligent people, motivating them to mastery of the foundations of mathematics.
Born on an army base, Haggis trained and worked as a Civil Engineer and found visiting teenagers at schools during Engineering Outreach such fun that he became a Physics Teacher. He teaches teens for a living and lives on a life-sentence block which necessitates him to use creative engineering solutions to make the place work. He finds life fun.

W1E
Math with a Road Safety Message
Beverley Sue-Tang

Want to teach Mathematics that is real and relevant now and in the future? Want to use some FREE resources and also have a ready answer to that age old question "When am I ever gonna use this?" There are some great online editable Mathematics and Statistics resources developed for NZTA and busy teachers by Dr Sarah Howell. The benefit is to help develop a student's sense of community while doing some real maths for the real world. In this workshop we will explore these online resources, consider how to adapt them for use in your classroom as well as look at some other ideas for sharing the important Road safety message.

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

Bev Sue-Tang is passionate about Mathematics Education. Currently HOF Mathematics and Statistics at Rangiora High School, she has over 20 years of teaching experience in Canterbury, Central Otago and overseas.

W1F
Using Presentations to Assess L3 Statistics Internals
David Lear

1 Why use presentations to assess L3 Internals
Marking reports, students clearly use phrases they have been given or follow a template to tick the required creteria but do they understand the content?
2 My presentation of a Level 3 Internal
This showed me the problems students have and the problems we, as teachers, have in persuading students to do a presentation
3 How to get students to do a presentation properly
This involved a change in teaching from practising skills and doing a report as a class and fitting it to the PPDAC to using the PPDAC to produce a presentation.

Recommended Audience: Year 11 – 13 Teachers

David has taught in and been Head of Faculty in England and New Zealand in a variety of schools and is at present Head of Faculty at Diocesan in Auckland

He has been trying to develop different ways in which to use and assess standards in the NZ curriculum and has shared many of his resources with other schools

W1G

Using software to help students learn to solve equations
Daphne Robson

Although many teachers love equation solving, students can find it difficult. Some students just want to find a correct solution but other students are ready to learn several strategies and hence deepen their understanding of algebra and equations. In this session, I will summarise the research into how students learn equation solving and how I applied this to the design of new mobile software. The software is available to you and your students to use for free.

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

Daphne Robson is a maths teacher who likes to use technology in innovative ways to help students learn. Her philosophy and research interests are to use the features of technology to enhance the use of well-known pedagogies. Daphne is Programme Leader of Mathematics at Ara Institute of Canterbury and has a Master's degree in Educational Technology. Her research combines her interest in technology with her interest in how students learn.

W1H

Assessing using multi-standard projects (Level 1)
Katy Thorne

How can a single relatable context provide the mathematics for six plus Level 1 Maths Standards as well as providing links to cross-curricular subjects and beyond?
How can that same context engage and cater for a range of abilities, creative strengths and future pathways?
After our second year working on extended Year 11 projects, hear about the positives and the pitfalls of our Level 1 Mathematics design journey, as well as some of the fabulous outcomes

Recommended Audience: Year 11 – 13 Teachers

Katy is a Mathematics Teacher at Papamoa College

W1I

Musings on engaging 2E (twice exceptional) and struggling students in a maths classroom, a symphony of thoughts collected during my European adventure.
Sue Scott

When awarded a Woolf Fisher fellowship for 2017 I saw it as my opportunity to attend conferences and visit schools overseas, with the aim of finding out how teachers in other countries work with their 2E (twice exceptional) students - those who are gifted but also have learning difficulties, and how they motivate and achieve success with students who come to high school struggling with mathematics.
The schools I visited included an American School for gifted students, and a high-achieving school in England who have a specialist Asperger's unit, and also successfully integrate their students into regular classrooms. I will share the ideas I gained from the conferences I attended while in Europe, which covered a wide range of topics, including promoting student's creativity and motivation.

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

Sue Scott is a maths teacher from Dunedin, who has been the organiser of the Senior Mathematics competition for the past two years. Her two main areas of interest are struggling learners and gifted students, and how to give them the best experience at school. She was awarded a Woolf Fisher fellowship for 2017 which enabled her to travel to America and Europe to attend conferences and visit some schools, to investigate how other teachers maximise the potential of these students, with a focus on 2E students. Sue teaches year 9-13, and in recent years has worked with the struggling students, taking the same students in both year 9 and 10, giving them continuity. She often sees students who have ability, but it is masked by a learning disability, and her challenge is to help them to succeed.

W1J

Using the Eikosogram to teach conditional and joint probability.
Malia Puloka

In this workshop we will learn how we can teach the concepts of conditional and joint probability using the Eikosogram. Equally important is the interpretation and verbalisation of proportion and probability statements and the posing of questions, which we will also look at. This session is based on my research with some Year 13 students. The Eikosogram is a new computer visualisation tool for displaying two-way table information. This session is ideal for the two Probability Externals AS 91267 and AS 91585. The Eikosogram will be accessed online in this workshop, so please bring a laptop.

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

My name is Malia Puloka. I am originally from Tonga but moved here ten years ago. Since then I have been teaching mathematics at secondary school until recently when I joined the Mathematics Department at the University of Auckland as a one-on-one mathematics tutor for Maori and Pasifika students.

W1K
Google Suite and Electronic Assessments
James Bowater

My experience using Google's platform to electronically assess and grade assessements. Google Classroom, Doctopus, AutoCrat, Goobrics and OneNote. I will be discussing the merits and pitfalls, possible policies and issues around NZQA rules and regs, authenticity and more.

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

James Bowater has been teaching for fourteen years now. Prior to this he was in a variety of industries including IT. James brings these skills to his classroom practice and today he will bring this experience to share how he makes it all happen.

Workshop 2

Tuesday 3rd October, 1445

Workshop summary

W2C	Teaching research skills for NCEA L2 and L3 Statistics	Marion Steel
W2D	BYOD in the maths classroom	John Mitchell
W2E	Underground Mathematics	Ingrid Rinsma
W2F	Positive financial futures for our young people	Jane Watson, Yolande Rosario
W2G	Is it possible that mathematics is not as perfect as we have been always told? Or unique learning opportunities that mathematical discrepancies entail	Igor Kontorovich
W2H	Personalised Learning in Year 11	Liz Sneddon
W2J	Behaving like a mathematician	Gillian Frankcom
W2K	Risk Activities for the classroom	Lorraine O'Carroll

W2C

Teaching research skills for NCEA L2 and L3 Statistics

Marion Steel

Research is now a required part of the statistics standards both at NCEA L2 and L3. We are all beginners in teaching students how to do research and include it in reports, so this is an opportunity to share what is working in the classroom. I will bring the experience of running our large L2 and L3 Statistics courses, with the resources and teaching ideas which we have found helpful. Please bring questions, ideas and successes to share.

Recommended Audience: Year 11 – 13 Teachers

Marion is currently HOD Statistics at Epsom Girls Grammar School. Her other interests include gifted and talented education in maths, kayaking and cooking.

W2D

BYOD in the maths classroom

John Mitchell

Many schools are introducing BYOD into their schools. It appears that there is a dearth of research on achievement and engagement in the effect of BYOD in maths classrooms. My research looked into the achievements and engagement of two year 9 classes in a couple of schools. It involved visiting several schools both in the Wellington area and the UK. I intend to share with you some of my findings and introduce some of the things I now incorporate in my lessons. This is not a resource session.

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

I started teaching in 1998 after completing 22 years in the Royal Air Force. I taught in two schools in the UK and was Head of Maths at a boys grammar school in Kent. In 2009 I immigrated to New Zealand and have taught at two schools in Wellington. Current Assistant HOD at Hutt Valley High School. I was on study leave in 2016, working on a thesis for a Masters of Education.

W2E

Underground Mathematics

Ingrid Rinsma

From this year the new GCSE and A level Mathematics Examinations in England have a focus on problem solving, while the A level also includes mathematical argument and proof. This talk will concentrate mainly on the Underground Mathematics project, which has rich resources suitable for Year13 but also some for Year 12. These resources have been developed with teachers and help students to see the connected nature of Mathematics and promote discussion while deepening their understanding.

Recommended Audience: Year 12 – 13 Teachers

Ingrid is currently teaching at Hillcrest High School. She has recently returned from the UK where she learnt about Underground Math and how it can be used as problem solving material for our senior students

W2F

Positive financial futures for our young people

Jane Watson, Yolande Rosario

Financial Capability is a core life skill for participating in society – it creates an important foundation for future learning, attitudes and behaviours to be developed. The mathematics classroom provides important opportunities to deliver Financial Capability and to make a real difference in improving financial outcomes for young people over their lifetime.

The mathematics classroom can play a part in helping students make smart decisions about money by equipping them with the right tools, skills and information to navigate through increasingly complex and sophisticated financial products.

This presentation will:

- provide suggestions for the integration of Financial Capability into the Statistics and Mathematics matrices
- showcase resources, including assessments, that teachers of Mathematics can use for the delivery of Financial Capability
- explore opportunities to provide evidence for the measurement, statistics and number components of numeracy.
- Share case studies of how schools have implemented Financial Education in different Mathematics courses
- be interactive and engaging with resources to take away ready for use in the classroom

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

Jane is a Roaming Teacher at Young Enterprise Trust. She provides personalised professional development for teachers, and works with them on curriculum planning, course development, assessment delivery and moderation of assessments.

Jane was on the Advisory Group for qualifications relating to the Financial Capability project undertaken by Core Education on behalf of the Ministry of Education in New Zealand to re-write the Financial Capability progressions. She works with the New Zealand Qualifications Authority to review and write assessments standards in Financial Capability for the National Qualifications Framework.

Yolande is Head of Curriculum for Young Enterprise Trust and takes responsibility for the development of programmes and resources in the areas of both Financial Education and Enterprise Education. Her focus is on ensuring that learning materials created are engaging and aligned to the curriculum. Yolande recently developed a tailored financial capability programme for young mums attending Teen Parent Units.

W2G

Is it possible that mathematics is not as perfect as we have been always told? Or unique learning opportunities that mathematical discrepancies entail

Igor Kontorovich

My presentation will consist of three parts: In the first part, I will argue that while mathematics has been often presented as a coherent and well-connected structure, it is saturated with discrepancies and inconsistencies of different sorts. Illustrations will be used in the second part for demonstrating that even students who are well-versed with school mathematics may be not aware of the imperfect nature of the discipline. Specifically, when encountering discrepancies, students can infer that they are the ones to make a mistake and some of them even renounce their perfectly valid ways of thinking for achieving at least temporary coherence.

In the last part of the presentation, I will propose that multiple discrepancies can be detected in curricular mathematics, which provides unique opportunities for developing meta-ways of thinking. The meta-ways of thinking can serve as useful points of reference for students when coping with new concepts and non-routine problems. Furthermore, developing meta-ways of thinking may have a positive impact on students' image of mathematics as a discipline. My presentation will contain ideas for activities that can be used in elementary, secondary and high-school classrooms for developing meta-ways of thinking among all students.

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

I am a researcher in the Mathematics Education Unit, Department of Mathematics, the University of Auckland. My research is aimed at promoting excellence in mathematics educations among all students and teachers. I concentrate on learning/teaching processes in which knowledge of a specific content can be deepened and enriched as well as in developing powerful ways of thinking that are useful in multiple mathematical domains. I believe in the power of these processes to prepare students for future math-related jobs and university studies.

W2H
Personalised Learning in Year 11
Liz Sneddon

This year I have set up a Year 11 course that is extremely flexible, both with the choice of Achievement Standards, and the assessments that students complete. The key has been designing assessments that can be completed as a project, managing the authenticity and validity through randomisation, and allowing and encouraging students to engage with and understand topics before they sit the assessment. Multiple pathways means that each student is developing their own personalised learning programme for the year. Come along and find out about the innovative assessment ideas and structures we have designed to track students' progress.

Recommended Audience: Year 11 – 13 Teachers

Liz Sneddon is a mathematics and statistics teacher, who has been fortunate to be granted a Ernest Duncan Award in 2015 for the workbooks and resources she developed for teaching statistics to junior classes. She is passionate about teaching and learning, and building relationships with students is a core philosophy. Personalising learning is a strand that she has been working on for a few years now, in order to enable students to work on topics that interest them and work at their own pace.

W2J
Behaving like a mathematician
Gillian Frankcom

The NCEA has brought the word investigations much more into the centre of the different pedagogies that maths teachers use to teach mathematics. We begin quite closed, then open out the activities with What If.... At the end of the workshop we will discuss the difficulties associated with changing our teaching style, and how to spot low floor high ceiling activities. Bring your laptop.

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

Gillian is an Initial Teacher Educator at Auckland University

W2K
Risk Activities for the classroom
Lorraine O'Carroll

Risk is one of the most important concepts we can teach our students; topics such as insurance and weighing up health risks will be a part of their working life. This workshop will include a range of teaching activities that introduce concepts of risk, not just relative risk.

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

Lorraine is currently the Head of the Mathematics Department at Reporoa College in the central North Island. In 2014 she completed her Masters in Professional Studies, with a dissertation that looked at Year 13's Statistical understanding of Risk.

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 **(S)**
W3C	What are key practices for students to apply when developing statistical habits of mind?	Chris Franklin **(K)**
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.

Workshop 4

Wednesday 4th October, 1040

Workshop summary

W4A-5A	Posing investigative questions	Pip Arnold **(S)**
W4B-5B	Present day BYOD experiences with Year 9 and 10 - Student driven learning	Priscilla Allan
W4C-5C	How can we transform our students' thinking?	Marina Krijgsman, Wendy Gibbs
W4D	Collaborative Teaching in Mathematics	Dave Phillipps, Angela Frampton, Kiri Dillon
W4E	Nurturing Mathematical Talent	Alan Parris
W4F	Creating a problem-focussed maths classroom	Helen Adams
W4G	"Here's a little article about Maths" - how I got my juniors to read, with pleasure, about Maths history	Jane Gray
W4H	Fusion - A year 9/10 course covering Maths, Social Science & Technology	Tara Egerton, Dave Woodcock, Justin Thompson
W4I	STEM Online NZ - a free interactive teaching and learning resource for NCEA external standards in STEM subjects.	Peter Radonich, Andrea Lamb
W4J	Maximising mathematics learning and engagement using culturally responsive practices	Robin Averill **(K)**
W4K	Classify it!	Robyn Headifen
W4L	Using GeoGebra for student-centred investigations	Stephen McConnachie

W4A-5A (double session)

Posing investigative questions

Pip Arnold

In this workshop we will explore in-depth the material that Pip developed in her PhD research. This will include activities trialled with students and activities for supporting teacher content knowledge development. Posing investigative questions are fundamental to good statistical investigations. This workshop will be hands-on in Pip's usual fashion.

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

Presenter Bio:
Pip has been involved in mathematics and statistics education for a wee while now. Her current interests besides posing statistical investigative questions include looking at statistics in authentic use in other curriculum areas.

W4B-5B (double session)

Present day BYOD experiences with Year 9 and 10 - Student driven learning

Priscilla Allan

I aim to harness students positive emotions to increase their mathematical engagement & future mathematical success.
The BYOD environment allows students to experience mathematics in an interactive and dynamic way. This year my students each created a New Google Site which they are building throughout the year. It is their portfolio of learning, and evidence of homework. They submitted the site link through Google Classroom, and I have editing rights. Come and see some example student sites, and the sites I find engage students in learning.
https://sites.google.com/view/2017math is my site which students use most lessons.
https://sites.google.com/view/2017math/apn has notes from my presentations at Pakuranga College.
The workshop may include: (subject to change depending on what people want on the day).

- creating your own "New" Google Site
- inserting links, text, images & files into your site
- adding multiple pages to your site
- creating a DESMOS graph and inserting it into your site
- doing some TRANSUM activities and inserting your trophy cabinet link into your site
- looking at sample student sites
- making an animation using DESMOS
- sharing of other sites math teachers are using and loving

A 30 minute presentation will be followed by a 90 minute BYOD workshop.

Recommended Audience: Year 9 – 10 Teachers

Priscilla has taught mathematics for over ten years, gaining her Masters of Professional Studies in 2015. This year she is teaching 2 year 9 classes and 2 year 10 classes. This has allowed her to focus all her creative and planning energy on engaging multi-ability junior math classes in a BYOD environment.

W4C-5C (double session)
How can we transform our students' thinking?
Marina Krijgsman, Wendy Gibbs

Ever asked yourself:
- My students know about growth mind-set but how come it's not sticking?
- How can I address the disconnect that some students have between what they think they need to do to succeed and what they actually need to do?
- How can I get my students to be more resilient and not give up so easily? Or just even try something that looks difficult?
- How can I take all that research and knowledge I have from Boaler, Dweck, Hattie etc and build it into something that actually works in my classroom?

In this workshop we will share the journey that we have been on over the last few years to try and find some answers to these questions. This will include sharing some of our ideas, some of the strategies that we have tried and some of the results we have seen.

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

Marina and Wendy teach Y9-13 Mathematics at Rangiora New Life School.: a small integrated Yr1-13 school that has a diverse range of learners.

W4D
Collaborative Teaching in Mathematics
Dave Phillipps, Angela Frampton, Kiri Dillon

How do we create a culture of collaboration in the Secondary Teaching Environment? In this workshop we will look at how over the last 4 years we have transformed our practice and created a collaborative Mathematics teaching environment. We will share how we plan and work together, making the most of our open learning space.

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

Dave Phillipps is currently HOLA Mathematics at Lincoln High School. He has also been a Secondary Mathematics & Numeracy advisor. He strongly believes in the importance of developing students as thinkers and problem solvers within the NZ Curriculum.

Angela Frampton has been teaching at Lincoln HS for many years and has worked as both a Tutor and Assistant HOLA. She believes that for students to learn they must talk and think about what they are doing – there are no silent rooms in our collaborative teaching spaces!

Kiri has worked in a variety of different schools and has been enjoying the chance to be able to take the ideas of a traditional Math classroom and apply them a collaborative environment. She is currently one of the Assistant HOLA's at Lincoln High School

W4E

Nurturing Mathematical Talent

Alan Parris

Alan Parris, NZ Director for Australian Mathematics competition will address some key questions - what do we mean by enrichment, who is it for, what is available?How to use the AMC? Techniques of problem solving. This workshop will give examples and problems for participants to have a go.

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

Alan Parris is the NZ Director for the AMC. He has been involved with the NZ Olympiad programme from many years and is passionate about enriching our students especially by using these competitions.

W4F

Creating a problem-focussed maths classroom

Helen Adams

The problems that are asked and answered in a traditional maths classroom tend to be: contrived, closed, of no relevance or connection to the real world, and can be answered within 2 or 3 minutes.
I have been developing and trialling a problem-focussed classroom based on 'Singapore Maths' combined with 'Bobbie Maths'. The focus of the class is on solving a big problem, using students' internal understanding and knowledge of mathematics and of the world around them. The big theme is about 'discovering' some element of mathematics or link, rather than being told it explicitly.
In this classroom there is still time and place for regular drills and skills and students are encouraged to self-manage. Whole class teaching is also relevant and has its place.
Students are empowered to be self-determining and self-directing. The teacher becomes more of a resource than a central figure.
In this workshop I will be explaining how the classroom is managed and sharing some ideas and 'big' problems that can be used in any junior classroom.

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

I am an experienced teacher of mathematics and am always looking for ways to improve my practice. I have been head of faculty in two schools but am now a regular classroom teacher which has given me more time to reflect on the changing face of Education, and to further develop some of my pet ideas about student learning and understanding.

W4G

"Here's a little article about Maths" - how I got my juniors to read, with pleasure, about Maths history

Jane Gray

Literacy in Maths-how we used Pappas' book The Joy of Mathematics for reading comprehension of general mathematical knowledge. Includes over 65 short articles in electronic form.

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

Jane Gray is HOD Mathematics at Hillmorton High School

W4H

Fusion - A year 9/10 course covering Maths, Social Science & Technology

Tara Egerton, Dave Woodcock, Justin Thompson

Key Learning Points:
Collaboration: between 3 staff members. How have we made this work? What have we learnt from it?
Cross-Curricular: How we have managed to combine our subjects. The structures we use, and how the introduction of SOLO at our school has affected it.
MLE v Traditional classroom: How we have made the journey from the 'Traditional Classroom' to our new MLE space. What effects this has had, and why not to be put off when you haven't got an MLE space.

Fusion is a compulsory course at Oxford Area School. It is taught to the whole of our year 9 & 10 cohort. It is timetabled for 8 hours a week, and has 3 teachers each lesson. We strive to teach in a cross-curricular, project based learning style. Our core subjects are Mathematics, Social Sciences and Technology, although we encompass others when we can. We are in our second year of teaching this, and will share our journey, the good and bad, and the structure we use, which is based on a Cross-curricular Matrix.

Recommended Audience: Year 9 – 10 Teachers

Tara Egerton is the HOD Mathematics at Oxford Area School. She is joined by Dave Woodcock who is the HOD Technology, also at Oxford. Tara has been teaching Mathematics at Oxford for the past 4 years, and is one of the key teachers behind Fusion, which is now in its second year.

W4I

STEM Online NZ - a free interactive teaching and learning resource for NCEA external standards in STEM subjects

Peter Radonich, Andrea Lamb

STEM Online NZ is a free interactive teaching and learning resource that currently covers Mathematics level 1 Tables, Equations and Graphs and Algebra as well as Physics Mechanics level 1 and 2. The aim is to increase the number of secondary school students successfully completing NCEA external standards in STEM (Science, Technology, Engineering and Mathematics) subjects, starting with Mathematics and Physics.
During this presentation you will be introduced to the online learning materials your students would use if you choose to use the resource in your school. The University of Auckland is responding to a New Zealand-wide specialist teacher shortage by harnessing technology in an innovative new way to compensate for STEM teaching shortages. These highly interactive online teaching and learning resources will help teachers, particularly those who are not subject specialists, teach STEM subjects. They do not replace teachers, but are designed to support teachers and engage students with content that is relevant, contextual and exciting.
STEM Online NZ is about using technology to provide an accessible, relevant and high-quality learning resource, so that every student has the opportunity to pursue a study pathway in STEM subjects through to the tertiary level.
STEM Online NZ will be freely available to every secondary school, teacher and student in NZ. By early 2018 further Mathematics externally assessed standards will be complete. We believe this resource will provide valuable support to teachers and that it will have a huge impact on the learning outcomes of the secondary school students using it.

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

Peter Radonich has been promoting the virtues of Mathematics in classrooms for almost 20 years, and despite the constant trouble this has caused, continues to do so with a smile. He is currently HOD of Mathematics at Northcote College, a role held since 2015. Peter is also currently the Mathematics Content Specialist for STEM online NZ, author of Maths resources, presenter and according to his Nana; Maths teaching-know-it-all.

W4J

Maximising mathematics learning and engagement using culturally responsive practices

Robin Averill

In this interactive and invigorating workshop we will examine effective mathematics teaching using three frameworks for culturally responsive practice (Tatāiako, values form the Pasifika Education Plan, and the whare tapa wha). We will do this by having fun exploring together a range of rich mathematical activities suitable for curriculum levels 3-7. Nau mai, haere mai!

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

Robin is Associate Dean (Teacher Education) at Victoria University of Wellington, Te Whare Wānanga o Te Ūpoko o Te Ika a Māui. Robin has worked extensively in primary and secondary mathematics teacher education and contributed to many mathematics books and resources. Robin's research in culturally

responsive teaching and equitable learning opportunities is grounded in teachers' and students' views and practice. Robin believes that excellent mathematics teaching develops all students' learning, and their curiosity and thirst for more.

W4K
Classify it!
Robyn Headifen

Using ideas from the late Malcolm Swann we will explore how students can be encouraged to develop their mathematical language and thinking by devising their own classification systems, how they can develop convincing arguments and engage in rich mathematical discussion

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

Robyn is an Accredited Facilitator from The University of Auckland. She was previously the Auckland regional mathematics & statistics facilitator for the Secondary Student Achievement professional learning and development contract. The role involved working with schools to improve the engagement of students through changing of pedagogical practices.

W4L
Using GeoGebra for student-centred investigations
Stephen McConnachie

If you've seen GeoGebra, you'll know that it's a powerful (and free!) tool for building applets that allow either the teacher to demonstrate a concept, or - better - for students to explore and investigate concepts themselves. This practical session will unpack some general design tips, some intermediate to advanced GeoGebra tips, and some exemplar activities to get you started. We'll also have a look at some classroom activities and investigations where students might use your applets or - better - build their own.
This session is probably not suitable for absolute beginners in GeoGebra.

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

Stephen is the e-Learning Coordinator and a Mathematics teacher at Middleton Grange School in Christchurch, specialising in Calculus and Scholarship Calculus. He is the Vice-President of the Canterbury Mathematical Association, and is passionate about equipping teachers in the region to use e-learning effectively. He also loves drinking coffee and playing music.

Workshop 5

Wednesday 4th October, 1155

Workshop summary

W5D	Doing Mathematics Like a Research Mathematician	Anthony Harradine **(S)**
W5E	What technologies can we use when triangulating teaching, learning and assessment to the Mathematics Achievement Standards?	Derek Smith
W5F	Numerics in the Bible	Murray Hamilton
W5G	Stimulating simulations through code: Harnessing the power of statistical and algorithmic thinking (AS91628)	Anna Fergusson
W5H	Getting Started with Flipped Learning - making your own videos	Stephen McConnachie
W5I	Developing problem solving skills levels 3 to 5 - Ideas to support teaching and learning across the strands.	Sandra Cathcart
W5J	Raising engagement and achievement in Mathematics and Statistics through BYOD	Misbah Sadat
W5K	Activities for building strong relationships	Grant Ritchie, Michelle Dalrymple
W5L	Developing Statistical Thinking through Year 7 - 10	Dave Phillipps

W5D

Doing Mathematics Like a Research Mathematician

Anthony Harradine

Sounds hard, hey!Well it is not, and it might just be the answer to some of your prayers.If you can add-up, take-away and do a few other lowly mathematical processes you'll be sweet-as.Intrigue, surprise, OMG-moments - while doing mathematics? Well yes, but like a research mathematician does it - just with simpler tools.It will be fintastic (sic) fun, and you will get a few gems to take back to the classroom; you'll be chuffed. Comes and see the mathematical beauty that was born when lazy Ms. Dillon set 'funny' homework' and how striking out numbers leads to mathematical thinking that comes from 'nowhere', just like migic (sic).
Seriously, come along, do some maths, and take it back to your students - they will love it. Suitable for all teachers of upper primary, secondary and beyond.

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.

W5E

What technologies can we use when triangulating teaching, learning and assessment to the Mathematics Achievement Standards?
Derek Smith

Unpacking the Levels 1-3 Mathematics Achievement Standards. What technology should/could/can I use to support my teaching programmes for junior and NCEA classes?

This workshop is presented to you by CASIO our Platinum Sponsor

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

Derek is currently on contract to the University of Otago as a Mathematics and Statistics (Central South) Facilitator (Secondary). He has taught mathematics and statistics at secondary schools in the Wellington region for 28 years holding HOD positions and a position as senior lecturer at VUWCE, in Mathematics Education.

W5F

Numerics in the Bible
Murray Hamilton

Ancient Hebrew has each letter also representing a number, thus the value of words and sentences can be calculated. Russian Mathematician Dr Ivan Panin (1855 - 1942) published books on his extensive life's work on this. The value of Pi and e in the scriptures? The number patterns in the opening verse of the Bible will also be investigated. Dr Panin was also a reader of Greek, which also has numerical values represented by letters. Some interesting number patterns in the words of Jesus will be demonstated.
Other topics: Pascal's wager, 666 and triangular numbers of the popes' titles, prophetic accuracy of Daniel 2 or chance? This workshop will be of interest to anyone with an open mind and prepared to have their beliefs either challenged (or strengthened) by the mathematics in the Bible.

Recommended Audience: Other

Murray Hamilton has had over 30 years of experience of teaching Mathematics in NZ schools. Currently he is the Curriculum Leader of Westmount School. He is also a Christian who has found the Mathematics in the Bible to be amazing and faith building.

W5G

Stimulating simulations through code: Harnessing the power of statistical and algorithmic thinking (AS91628)
Anna Fergusson

Do your students graph and discuss the distribution of their simulation results? Have you tried using spreadsheets for simulations not got frustrated with the associated constraints or learning issues? Do you know how to include data science capabilities in your teaching of statistics? If you've answered no to any of these questions, then this workshop is (highly likely to be) for you! This workshop will explore simulations with a focus on probability modelling and coding. We'll identify the key statistical ideas and concepts that we need to develop, and how coding can support the development of these ideas and concepts. I will share a new tool I have developed using CODAP (Common Online Data Analysis Platform), which allows students to generate and explore data from a simulation designed with code. 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

W5H

Getting Started with Flipped Learning - making your own videos
Stephen McConnachie

This is a practical workshop looking at how to make flipped learning videos for Maths. There will be a bit of an overview of the Flipped Learning model and the associated research, but the learning objective is to be able to create your own Maths videos to flip your own classroom. Expect practical video-making tips and the opportunity to make your own during the workshop. This session is suitable for beginners.

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

Stephen is the e-Learning Coordinator and a Mathematics teacher at Middleton Grange School in Christchurch, specialising in Calculus and Scholarship Calculus. He is the Vice-President of the Canterbury Mathematical Association, and is passionate about equipping teachers in the region to use e-learning effectively. He also loves drinking coffee and playing music.

W5I

Developing problem solving skills levels 3 to 5 - Ideas to support teaching and learning across the strands.
Sandra Cathcart

Students in the junior school need to develop the problem-solving and literacy skills that prepare them for NCEA. In this workshop there will be an opportunity to experience some hands-on activities and resources which you can use in your classroom now, which allow students to think outside skill based activities and develop a more curious mindset.

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

For the last 5 years Sandra Cathcart has been a Facilitator and National Co-ordinator for Mathematics and Statistics in the Secondary Student Achievement Professional Learning and Development initiative, focused on raising student achievement in secondary schools.
This work focused on change leadership with teachers, middle leaders and senior leaders in a range of schools, involving the facilitation of in-depth professional learning and development centred on teaching and learning. In addition to the work in schools, Sandra has facilitated a number of workshops and clusters, has written a series of national newsletters and a range of online materials and has supported her regional mathematics association.

W5J

Raising engagement and achievement in Mathematics and Statistics through BYOD
Misbah Sadat

This workshop is about sharing my "learning" journey in digital assessments. It is quite specifically geared towards teachers struggling to engage students, particularly boys, in statistics standards.
This presentation covers areas regarding engagement, BYOD, collaboration and raising achievement for our low level learners. This will be an interactive workshop because experimenting in digital assessments have raised quite a few paedegogical questions that I would love to discuss with colleagues that may attend the workshop.

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

Misbah Sadat is the current Head of Mathematics Faculty at Horowhenua College. She has a B.SC in Mathematics from University of Maryland, USA and a graduate diploma in Teaching specialising in Math Education from Victoria University. She taught Mathematics at Paraparaumu College from 2011 to 2016 and moved to her current position in 2017.

W5K

Activities for building strong relationships

Grant Ritchie, Michelle Dalrymple

Does building strong relationships in the classroom happen by chance? What can we do to foster the development of student-teacher and student-student relationships within our curriculum activities? Grant and Michelle will share a few of the activities that they have used successfully in their classes. Come prepared to play, laugh and enjoy being a "student" in their class.

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

Michelle and Grant are both currently teaching at Cashmere High School in Christchurch. Both are passionate teachers who love working creatively with their students to achieve the best outcomes possible.

W5L

Developing Statistical Thinking through Year 7 - 10

Dave Phillipps

In Years 7 to 10 we have so much freedom in what we can teach - we're not bound by high stakes assessment and parental expectations of what that means. It's the ideal time to nurture and grow statistical thinking. Yet, Statistics is often the poor cousin in many school's Yr 7-10 schemes. In this workshop we will explore this issue and how we may utilise this prime learning time better.

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

Dave Phillipps is currently HOLA Mathematics at Lincoln High School. He has also been a Secondary Mathematics & Numeracy advisor. He strongly believes in the importance of developing students as thinkers and problem solvers within the NZ Curriculum.

Workshop 6

Wednesday 4th October, 1555

Workshop summary

W6A	Teaching Extension Mathematics to bright students of Years 6, 7, 8, 9, 10.	Bill Ellwood
W6B	Teaching is not Telling	Paul Cliffe
W6C	Teaching Mathematics to Enrich Lives beyond NCEA	Ray Spence
	Autograph software is worth paying for.	Tim Harrison
	BYOD in the maths classroom	John Mitchell
W6D	Practical Application of Mathematics in the Electrical Industry	Tina Coombes
W6E	Making sense of Algebra	Helen Adams
W6F	Oral assessment for Level 1 Measurement (AS91030)	Alan Carman, Holly Hueston, Margaret Priest
W6G	Preparing for the future by changing the way we teach now	Craig Grant
W6H	Taking the textbook online with Education Perfect!	James Santure
W6I	Learning with Sphero Robots 1	Subash Chandar K
W6J	How do we get the skill, will and thrill into learning Mathematics? Applying 'Visible Learning Plus' to Mathematics teaching	Mitchell Howard
W6K	A dialogue about the future of statistics education in NZ	Anne Lawrence, Pip Arnold, Anna-Marie Fergusson, Mark Hooper, Alasdair Noble, Michelle Dalrymple
W6L	The Baby and the Bathwater	Dianne Scouller

W6A

Teaching Extension Mathematics to bright students of Years 6, 7, 8, 9, 10.

Bill Ellwood

Extension Mathematics includes extra useful material for all classes to complement their normal curriculum programmes. How I introduce topics Fibonacci Sequence, Golden Ratio, Pascal's Triangle, Number Partitions, the square root of 2, large Prime Numbers, Perfect Numbers, Lunes and Pythagoras Theorem. Also "codebreaker" starter to your lesson!
The emphasis is on teaching and introducing these topics to classes of different years. Making mathematics interesting and useful.
Bring your "BYOD" or at least a calculator!

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

Life member NZAMT.
Life member CMA.
HOD Maths Burnside High School 1974 - 2006.
Maths teacher Westburn Primary School part-time 2006 to present.
Writer of NZAMT Mathsweek 2006 to present. (250,000+ student registrations this year!)
Jim Campbell Teaching Award, Woolf Fisher Fellowship 1990.
Author Maths Digest since 1987.
Co-author 7 Maths Text-books.
Invited speaker at NCTM conference in Boston 1991. Subject "Extension Math".
Former President NZAMT.

W6B

Teaching is not Telling

Paul Cliffe

Do you believe that discovery or inquiry-based learning would be the best way to help students understand Mathematics, but find this approach difficult to implement in the classroom? How often do students say they understand but in reality they have just learned a technique or algorithm for doing something that can be forgotten just as quickly as it was "learned". This workshop will address the conditions needed to foster an environment of student investigation and discovery that will bring meaning and foundation back into student learning. This approach can be used from Year 9 to Year 13 so come along prepared to be challenged.

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

My name is Paul Cliffe. I have and Engineering degree from Auckland University and 28 years of teaching experience. When I went through Teachers College the mantra there was "Teaching is not Telling" and for the last 2 decades this has been my goal as a Mathematics teacher. My belief when teaching Mathematics is that "Everything comes from somewhere. Everything makes sense and can be understood".

W6C.1 (Quickfire)
Teaching Mathematics to Enrich Lives beyond NCEA
Ray Spence

The New Zealand Curriculum Framework document is the envy of many countries allowing considerable freedom for schools to develop community-based programmes and its emphasis on the importance of the process of learning through the Key Competencies.

In practice there is, for many, a preoccupation with complying to a particular assessment mode,NCEA, perhaps to the detriment of learning as suggested by "The Finnish Schools Experience."

In this presentation it is proposed that rich, community based experiences are still possible, and even vital if we wish to develop life-long learners, within the constraints of NCEA. This argument is illustrated by the example of the relationship developed between a number of mathematics classes at Bayfield High School and a local residential care hospital.

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

Ray is an experienced mathematics teacher of more than forty years and is currently employed part-time at Bayfield High School. He has taught mathematics in Australia and Scotland, Drama in Lithuania and has had the privilege of serving as mathematics advisor and HOD of mathematics. Ray has also taught a range of other subjects including, Economics, Drama and ESOL as well as being an author of children's books. He has a strong sense of the importance of having fun and finds ample expression of this being the proud "Grumpa" of two little girls.

W6C.2 (Quickfire)
Autograph software is worth paying for.
Tim Harrison

In the session, a number of examples will be presented where Autograph can show mathematical ideas and solutions in a dynamic and particularly clear way:

- Drawing diagrams that are clear, useful and a good basis for discussion and development.
- Forming illustrative renditions of 3D problems included volumes, vectors and planes.
- Data handling, plots and statistical investigation.

It is hoped that these examples will show the strengths of this software. While just criticising other software does not necessarily imply the worth of this package, some comparisons will be made with other standard packages (including free ones), two of which I regularly use and admire. The emphasis is on demonstration and discussion that lead to understand and success, rather than the immediate solution of problems.
As time permits, reference will also be made to Autograph version 4

(Note: I have no commercial connexion to Autograph. I am happy to provide more detail and diagrams on request)

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

I have taught Mathematics at Canberra Grammar School for 35 years. In that time I have taught the NSW syllabus at all secondary levels and all courses, and in that time have become increasingly interested in the use of technology. In recent years I have also been involved with the IB program which emphasises technology.

W6C.3 (Quickfire)
BYOD in the maths classroom
John Mitchell

Many schools are introducing BYOD into their schools. It appears that there is a dearth of research on achievement and engagement in the affect of BYOD in maths classrooms. My research looked into the achievements and engagement of two year 9 classes in a couple of schools. It involved visiting several schools both in the Wellington area and the UK. I intend to share with you some of my findings and introduce some of the things I now incorporate in my lessons. This is not a resource session.

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

I started teaching in 1998 after completing 22 years in the Royal Air Force. I taught in two schools in the UK and was Head of Maths at a boys grammar school in Kent. In 2009 I immigrated to New Zealand and have taught at two schools in Wellington. Current Assistant HOD at Hutt Valley High School. I was on study leave in 2016, working on a thesis for a Masters of Education.

W6D
Practical Applications of Mathematics in the Electrical Industry
Tina Coombes

A tutor from The Electrical Training Company (etco) will present the following:

- The key mathematical requirements you will need to be an Electrician
- The reason maths is so important within the industry
- The application of maths required with many examples
- What level of Maths is required to gain an electrical apprenticeship with The Electrical Training Company
- Why University is not the only option if you are good at maths
- Handout of practical maths that can be used in the classroom.

This workshop is presented by one of our GOLD Sponsors.

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

Some of the very passionate tutors at ETCO and are excited to be given the opportunity to present to NZAMT2017 about practical application of Math outside the classroom.

W6E
Making sense of Algebra
Helen Adams

In traditional text books and teaching, the topics of Number and Algebra are treated as separate units. In reality algebra is just the generalisation of number. I have been working to help students (and teachers) see the link between the two. Students often struggle with algebra as it does not seem to relate to any other mathematics that they have done before. I have developed some techniques and strategies that I hope will make clear links between number and algebra, and make more sense of the algebra that we teach.
This is a hands-on workshop and is suitable for teachers of year 7 through to year 11.

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

I am an experienced teacher of mathematics and am always looking for ways to improve my practice. I have been head of faculty in two schools but am now a regular classroom teacher which has given me more

time to reflect on the changing face of Education, and to further develop some of my pet ideas about student learning and understanding.

W6F

Oral assessment for Level 1 Measurement (AS91030)
Alan Carman, Holly Hueston, Margaret Priest

In 2016 the Wellington Girls' College Mathematics Department trialled a new form of assessment for the Level 1 Measurement Achievement Standard in response to the comparatively poor assessment performance of students.
The presentation charts the course three teachers took with support from Neil Marshall (National Assessment Moderator) to make the assessment of this Achievement Standard a meaningful and deep learning experience for the students.

Recommended Audience: Year 11 – 13 Teachers

Alan Carman, Holly Hueston and Margaret Priest, all Mathematics teachers at Wellington Girls' College, have a particular interest in ensuring that assessments measure what students know rather than what they don't know. All three have taught Mathematics in the Wellington region for a considerable period of time, with Holly also teaching in the United Kingdom for some years.

W6G

Preparing for the future by changing the way we teach now
Craig Grant

Students learning can be accelerated by connecting concrete concepts to key mathematical concepts at the start of each lesson. Students work on graded question sequences that finish with a low level and a high level extension questions. At the end of each sequence all questions are reviewed thoroughly. Then all students start the first question of the next sequence together. Slower students have repeated chances to succeed and the fast trackers have the high level extension keep them occupied. Each question sequence covers new ground and old ground. A planned series of question sequences can also be altered to improve outcomes using the feedback from the reviews.

No student is left behind or held back and the collective achievement of students is optimised.

If you think of a lesson as a stair case for students, the one I have outlined has a concrete concept as a foundation. You cannot build much of a staircase if you don't have solid foundations. The concrete concept anchors the key concept which is a pillar. This pillar supports an adjustable spiralling staircase that contains a number of reviewing landings.

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

I taught in five secondary schools and one primary school, spending most of my time in boys schools. During this time I created the Parallel School Certificate Maths paper, writing most of them, and set up a tape based learning system at WBHS where my maths class scored 52.5% of the school's A grades in School Certificate during my final year there. Now I'm teaching teachers and writing maths material for teachers here and overseas.

W6H

Taking the textbook online with Education Perfect!
James Santure

Are you looking to take advantage of the latest in technological advancements, while ensuring that your students' learning needs are addressed and your pedagogy remains effective? Education Perfect is designed as a replacement for the traditional textbook and presents a flipped classroom, allowing your students to gain an understanding of topics through rich images and video. World-class reporting gives you meaningful insights into students' learning journeys and the latest in Direct Integration with LMS, live monitoring, and customisable content (aligned with the New Zealand curriculum) is incorporated into this intuitive platform.
Come along to this session to learn more about how you can implement Education Perfect in your classroom and make the most of this exciting and engaging program today!
This workshop is presented by one of our GOLD Sponsors.

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

James was the Head of Mathematics at Samuel Marsden Collegiate, Wellington. When it was announced that Education Perfect was hosting New Zealand's first online Maths Exam for the New Zealand Qualifications Authority, James jumped at the opportunity to oversee the assessment from Education Perfect's end, as well as to work with our team to manage the Maths content strategy moving forward. James now heads up the full process of content development across Education Perfect as Head of Content.

W6I

Learning with Sphero Robots 1

Subash Chandar K

Inspired by Jared Hockly in 2016, our department invested in 4 of the Sphero robots. In this workshop I would like to share our department's journey in using these robots in an exciting context for learning. These robots were used for assessing AS 1.4 Linear Algebra in term 1 and AS 1.7 Right Angled Triangles in term 2. You will drive the robots in this session using a smartphone and complete a couple of tasks relating to Level 1 and 2 Trigonometry. Please have the app (Sphero EDU or SPRK Lightning Lab - available in iOS & Google Play) installed in your smart device for this session. See the robots in action @ https://youtu.be/e_3XY1abRtQ
An advanced workshop on using Sphero Robots in the math classroom with run later in the conference

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

Subash Chandar K is the curriculum leader of Mathematics and Statistics at Ormiston Senior College. He is the owner of the YouTube channel infinityplusone for which he was recognized with an Ernest Duncan Award in 2016. He is a regular contributor to the Auckland Mathematics Association events since 2014. He is in constant pursuit of engaging and challenging students at their levels with the use of innovative techniques.

W6J

How do we get the skill, will and thrill into learning Mathematics? Applying 'Visible Learning Plus' to Mathematics teaching

Mitchell Howard

The Visible Learning Plus model for learning is an attempt to weave together the findings of John Hattie's meta-analysis of what works best in learning and provide a framework of how this can be implemented. A pleasing implication is that it is not a completely new way to approach teaching as it pulls together many of the various threads we have been exposed to over the last decade or so. How do Learning Intentions, Success Criteria, SOLO taxonomy, feedback, open ended tasks, fluency and growth mindset fit together? In this presentation, Mitchell will present a summary of the Visible Learning Plus model through the lens of a Mathematics and Statistics teacher. He will draw from his participation in a Visible Learning Plus workshop with John Hattie earlier this year and his experience in the classroom.

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

Mitchell has taught Mathematics in NSW, UK, ACT, Victoria and NZ over the past 20 years. He is currently the Head of Mathematics and Statistics St Andrew's College and previously the HOLA at Lincoln High School and Vice President of the Canterbury Mathematics Association (CMA). He has been a regular presenter of workshops at NZAMT conferences (since 2008) and for the CMA. Mitchell was awarded a Jim Campbell award in 2015, has published a Book on SOLO Taxonomy in Mathematics with Pam Hook and contributed a chapter to Robin Averill's Mathematic and Statistics in the Middle Years: Evidence and Practice.

W6K

A dialogue about the future of statistics education in NZ

Anne Lawrence, Pip Arnold, Anna-Marie Fergusson, Mark Hooper, Alasdair Noble, Michelle Dalrymple

The Education Committee of the NZ Statistical Association has a strong interest in the future of statistics education in NZ schools. Feedback from teachers and the wider community led us to the realisation that we needed to be more selective in the way we worked in order to better support teachers and influence statistics education. For 2017, the committee interrogated the issue, and agreed to focus on

four priority areas:• statistics education in the primary sector• establishing an online statistics teaching journal for NZ • datasets that can be used for learning and assessment and engage students• the future of our school statistics curriculum.
We begin with a brief introduction to the Education Committee's aims. A panel of priority-area leaders chaired by Anne Lawrence will then describe each of our four priority areas and our current plans for them, and seek dialogue with you about them.

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

All presenters are members of the NZ Statistical Association's Education committee. Anne taught mathematics and statistics at secondary schools before becoming an adviser and is now a tutor with the Statistics Group at Massey University. Pip has been a member of the NZSA for a number of years; her interests include posing and answering investigative questions. Anna teaches introductory-level statistics at the University of Auckland. She taught secondary school level and was involved in developing national assessment standards, tasks and teaching resources for statistics. Michelle is a passionate teacher who loves working creatively with her students to achieve the best possible outcomes. Mark was UK born, trained and first part of career, but has been teaching at secondary school in NZ since he saw the light of the southern hemisphere 12 years ago. Alasdair used to be a mathematics teacher and is now a senior statistician at AgResearch.

W6L
The Baby and the Bathwater
Dianne Scouller

Following the dramatically entitled article in the NZ Herald on March 18th, claiming that our education system is 'dumbing down' our young people, this presentation suggests that reforms in the teaching and learning of mathematics in NZ have rejected much of great value in traditional approaches. Potential risks to deep learning predicted by Emeritus Professor Elley and others earlier this century are now apparently being evidenced by PISA results. Ways in which successful approaches from the past can be incorporated with modern methods to provide rich learning experiences will be discussed. Is it possible to have 'the best of both worlds'?

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Dr Scouller has been a dedicated teacher of mathematics for over 40 years in both secondary and tertiary sectors. She is currently involved in pre-service teacher education at Laidlaw College, in the Bachelor of Teaching programme. Her interests include finding ways to incorporate the best of traditional approaches with the best of modern learning environments and technologies.

Workshop 7

Thursday 5th October, 1040

Workshop summary

W7A-8A	Seeing the future: First Year Mathematics at University, the challenges faced by lecturers and students in an ever-changing landscape	Julia Novak, Cami Sawyer
W7B-8B	Introducing Coding into Mathematics Education	Benjamin Hilliam
W7C	A cure for fraction-angst?	Anthony Harradine **(S)**
W7D	Data science - a new frontier?	Pip Arnold **(S)**
W7E	What is this PAT information telling me about my own practice and my students?	Julie Roberts
W7F	How can I blend the graphic calculator with the teaching of curriculum content linked to NCEA external examinations.	Derek Smith
W7G-8G	What mathematicians do – encouraging engagement in Primary maths	Nicola Petty
W7H	Place value - a report on action research	Dan Green
W7I	Connecting Mathematical Learning Across ECE and Year 1 of School	Niki Stephenson, Kirsten Mackay, Jane McChesney, Becs Thomas
W7J	Keeping Up - how you can access the latest and most acknowledged research on the teaching of Maths, why you should and how many do	Jane Gray
W7K	Check the Clues: Cooperative Group Word Problem Solving	David Dunstan
W7L	Challenging Tasks: Multiplicative thinking	Sharyn Livy, Ann Downton
W7M	Teaching Math Effectively for Middle Schoolers.	Lakshmi Saravanan

W7A-8A (Double session)

Seeing the future: First Year Mathematics at University, the challenges faced by lecturers and students in an ever-changing landscape

Julia Novak, Cami Sawyer

First Year in Maths (FYiMaths) is a network of mathematicians teaching in universities in Australia and New Zealand. The network was established in Australia more than five years ago and this is the first gathering of the New Zealand sub-group. All interested parties are welcome to join us. The goal of the group is to improve outcomes for students in undergraduate mathematics courses by sharing and developing teaching practices and building connections between secondary schools and universities. In this session we will have presentations on innovative teaching of first year university students and have discussions exploring the issues faced by students and teachers. Key points that will be addressed: forming a community of undergraduate mathematics teachers, explorations of improved learning experiences in university mathematics, and encouraging the awareness of changes in NCEA to help the universities to prepare and respond appropriately.

Recommended Audience: Year 11 – 13 Teachers, Other

Julia Novak and Cami Sawyer are starting the NZ group of FYiMaths because they are interested in furthering conversations around teaching and learning. Julia is a professional teaching fellow at the University of Auckland and the Associate Dean (Teaching and Learning) for the Faculty of Science. Cami is a senior tutor at Massey University where she recently received the VC Teaching Excellence Award.

W7B-8B (Double session)

Introducing Coding into Mathematics Education

Benjamin Hilliam

The notion of coding or programming becoming the new "literacy" in the 21st century is gaining momentum within our society. How do we integrate this new skill into the classroom? I will be presenting on how I have attempted to integrate this into my maths classes. No previous knowledge of coding or programming is necessary. Having a computer with you may make involvement more fulfilling.

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

Ben is a Maths teacher from St Andrew's College, Christchurch, where he has been teaching for the last four years. His ongoing interest is technology has had him recognised by Microsoft as an Expert Educator and he participated in the E2 Global Educator conference at Microsoft HQ in Seattle, USA in 2015. He draws on this experience to develop innovative programs of learning within the Maths classroom.

W7C

A cure for fraction-angst?

Anthony Harradine

a) If asked how you think about the fraction three-quarters, what is your answer? Do you have more than one way to think about three-quarters?
b) If asked how you think about three-quarters multiplied by eight-elevenths, what is your answer? Do you have more than one way to think about three-quarters multiplied by eight-elevens?
c) If asked how you would calculate three-quarters multiplied by eight-elevenths, what is your answer?

Were your answers to b) and c) different?

It turns out there are a number of ways of thinking about fractions, all good, but one better than the others when it comes to moving one's think past the trivial starting points that young minds first meet. Come along and hear about a flow of ideas that can be developed with students that has the potential to change, dramatically, a student's success with fractions at school.
The flow of ideas has been developed into a set of uncomplicated, but engaging activities for students.

Recommended Audience: Year 1 – 6 Teachers, 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.

W7D

Data science - a new frontier?

Pip Arnold

In February this year Pip attended the Data Science Education Technology conference in San Francisco. Data science encompasses the broader fields of mathematics and statistics, content knowledge and computing and data skills. The conference was hosted by the Concord Consortium www.concord.org, the developers of the common online data analysis platform CODAP www.concord.org/projects/codap. This session will address Pip's latest thinking on data science seven and a bit months on. She will also give you a hitch hikers guide to CODAP and the other teaching and learning activities that the Concord Consortium have been working on. These are not restricted to statistics, but include mathematics and science learning activities.

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

Pip was a project director for the primary mathematics contract for the North Island from 2012–2016. She led a team of 45 facilitators who collectively worked annually in over 100 schools providing in-depth tailored mathematics PLD. She has led the data collection and collation process to ensure accurate diagnosis of primary presenting needs and accurate and focused reporting of impact. Pip has previous experience in curriculum and assessment development. She was a member of the mathematics and statistics curriculum writing team and has been involved in achievement standard development. Pip led the development of the secondary senior guides for mathematics and statistics on TKI. Formerly Pip was head of mathematics at Auckland Girls Grammar School, followed by work as a secondary mathematics advisor before joining Cognition in 2010. Pip completed her PhD in statistics education in 2013, her thesis topic was posing and answering statistical investigative questions.

W7E

What is this PAT information telling me about my own practice and my students?

Julie Roberts

Do you wonder where to begin with the reports created from the PAT: Mathematics assessment? This workshop will explore how you can consider your own practice and your students' strengths and next learning steps. Included will be discussions on scale score vs stanines, differentiating assessments, conceptual progression through the tests and exploring the reports.
Key learning points from the workshop include:

- Understanding scale scores can give you a new perspective on thinking about progress
- Differentiating assessments enable finding where students are working at within the NZC
- Analysing reports will support inquiring into teaching practice

Bring a laptop of tablet to explore the NZCER demo site.

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

Julie joined NZCER as an Education Advisor / Researcher in 2017. Julie is an experienced mathematics facilitator and primary teacher. For the last nine years she has worked in a range of capacities delivering mathematics professional learning support in schools and clusters. She has strengths in mentoring and coaching leadership, effective assessment practices, and strategies to accelerate learning outcomes.

W7F

How can I blend the graphic calculator with the teaching of curriculum content linked to NCEA external examinations.

Derek Smith

Merging the GC into learning activities. Let's experiment and investigate with the graphic calculator. A range of activities to explore coordinate geometry, algebra, calculus, graphing and probability.

This workshop is presented to you by CASIO our Platinum Sponsor

Recommended Audience: Year 11 – 13 Teachers

Derek is currently on contract to the University of Otago as a Mathematics and Statistics (Central South) Facilitator (Secondary). He has taught mathematics and statistics at secondary schools in the Wellington region for 28 years holding HOD positions and a position as senior lecturer at VUWCE, in Mathematics Education.

W7G – 8G (Double session)

What mathematicians do – encouraging engagement in Primary maths
Nicola Petty

Teachers need to experience the fun and possibilities of being a mathematician. This workshop lets teachers participate in their version of an event for students aimed at increasing engagement in mathematics. Participants will practise being mathematicians and develop teaching practices for rich lessons.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Dr Nicola Petty (Dr Nic) is well known for her innovative and engaging approaches to teaching statistics and mathematics. She has spent the past 25 years developing online and physical learning resources for primary, secondary and university students. Nicola is a qualified high school mathematics teacher with additional experience teaching innovative primary school mathematics lessons and running mathematics events. Nicola writes a well-respected statistics learning and teaching blog and keeps current with thinking and research about mathematics education through reading and participating in the MathTwitterBlogosphere. She is co-director of Statistics Learning Centre, a social enterprise with a mission to invent, create and disseminate resources and ideas to enable people to learn and teach mathematics and statistics in a more enjoyable way.

W7H

Place value - a report on action research
Dan Green

* Reflections on my understanding of teaching place value* Cultural/social aspect of place value* Further study for improving teacher quality

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Until recently Dan as been an Assistant Headteacher in the U.K. He has had responsibility for mathematics and provided training in his school, across a cluster of schools and to trainee teachers as part of his role. He completed the MAST Primary specialist teacher course and is going to share one of his projects. He has recently moved to NZ and intends to set up his own consultancy on Maths PD.

W7I

Connecting Mathematical Learning Across ECE and Year 1 of School
Niki Stephenson, Kirsten Mackay, Jane McChesney, Becs Thomas

Continuity of mathematical learning is important for children when they transition across the different educational settings in the early years. This paper reports on the first half of a Teacher-led Innovation Fund (TLIF) Project titled Connecting mathematical learning across ECE and Year 1 of school which is a collaboration between Kidsfirst Diamond Harbour Early Learning Centre and Diamond Harbour School. This project aims to expand the teaching focus of mathematical learning, with particular references to children's mathematical language, confidence in mathematics and mathematics to be found in play-based opportunities. Our focus on children's rich mathematical language assumes that language is a tool for expressing thinking, for naming mathematical entities and describing processes of action and reasoning. The teachers will present their interim findings, providing a set of criteria that will describe the connections we have between our school and kindergarten. We will share findings from data so far, including the materials and language we use in common that we have also presented to whānau to encourage consistent connections with childrens' mathematical learning and with the centre's and school's mathematics programmes.

Recommended Audience: Year 1 – 6 Teachers

Kirsten is the Acting Head Teacher at Kidsfirst Diamond Harbour Early Learning Centre, and Niki Stephenson is Junior Syndicate Leader at Diamond Harbour School, and both are teacher/researchers

involved in the TLIF project. Jane and Becs are also involved in the TLIF, and Becs and Niki have co-presented at the Canterbury Primary Mathematics Symposium.

W7J

Keeping Up - how you can access the latest and most acknowledged research on the teaching of Maths, why you should and how many do
Jane Gray

Are you keen to successfully extend your practice of the skills of teaching Maths? Do you have access to the latest research on what works? How to follow the national and international researchers via Google Scholar, and some data on how many of us do.

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

Jane is HOD Mathematics at Hillmorton High School

W7K

Check the Clues: Cooperative Group Word Problem Solving
David Dunstan

The Problem Solving and Reasoning proficiencies are key aspects of the mathematics curriculum. Polya's four step problem solving model is used for the "Check the Clues" tasks.
This session will highlight the role that mathematical language and reasoning play in solving word problems. Working in groups of four, participants will use Clue Cards, Solution Cards and tools such as number charts to solve problems for various mathematical content strands.
In each "Family" of tasks, there are eight similar problems that link to the curriculum. Teacher guidance is provided for the curriculum links, mathematical and contextual language, a "Prior to" and "Where to" section for teacher planning prompts and importantly, the answers.
Dr Paul Swan and David Dunstan, co-created the "Check the Clues" suite of resources, suitable for pre-primary to year 10 students. The booklet "Check the Clues: Find My Number", can be freely downloaded from drpaulswan.com.au

David has successfully presented this workshop at the AAMT, MAV and MAWA conferences in Australia. Three key features are:-

- Engaging cooperative learning pedagogy;
- Using problem solving tasks to promote understanding and reasoning through student dialogue;
- Developing graphical literacy fluency.

Recommended Audience: Year 1 – 6 Teachers

David Dunstan is a Numeracy Coordinator, who has worked for the Association of Independent Schools of Western Australia as a consultant for seven years. He taught mathematics to rural students in WA for 28 years. David regularly presents 'hands-on' workshops, which includes fractions and engaging with problem solving and reasoning tasks. In 2017, he co-presented the Principals as Numeracy Leaders Project in Perth, Darwin and Canberra. In collaboration with Dr Paul Swan, David is a co-author of the "Check the Clues" series and the Playing with Place Value Yearly Planner and resources.

W7L

Challenging Tasks: Multiplicative thinking
Sharyn Livy, Ann Downton

Challenging tasks can be adapted to a variety of levels and provide opportunities for all learners to engage in mathematical learning. Multiplicative thinking can be described as the relationship between multiplication and division and is a critical stage of children's mathematical development during their primary years of schooling. Our workshop will present some tasks on the topic of multiplicative thinking. We will share our experiences of how primary aged students apply themselves when solving these tasks and discuss the role of the teacher when facilitating these lessons.

Recommended Audience: Year 1 – 6 Teachers

Dr Sharyn Livy and Dr Ann Downton enjoy teaching primary mathematics teacher education at Monash University in Melbourne. Last year they worked together on a project, Encouraging Persistence, Maintaining Challenge. Today Sharyn and Ann will share the tasks they have trialled with teachers related to multiplicative thinking as part of this research project.

W7M

Teaching Math Effectively for Middle Schoolers.

Lakshmi Saravanan

Math is appreciated when students understand the concepts and math knowledge is attained when they apply what they have learnt. Students achieve a higher level of understanding when they have multiple approaches to solve a problem and that integrates more than one topic. When tasks have low threshold but high ceiling, students' interests are triggered. In this workshop, you will look at some tasks that will trigger the interest of students by connecting it to real life and that has multiple approaches to arrive at a solution. Participants will have opportunities to practice some of the tasks using different approaches and tools. By the end of this workshop, participants will have an idea of creating problems with multiple approaches and that connects to real life.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Lakshmi Saravanan is a middle school math teacher currently teaching in American Internationsl School, Chennai, India. Her experience includes 10 years of teaching in California, USA, Lecturer at Notre Dame University, Califronia, USA, Trainer for Santa Clara County teachers, California, USA. Lakshmi works towards the whys and hows of math in her teaching.

Workshop 8

Thursday 5th October, 1155

Workshop summary

W8C	Using open questions to create open students	Marian Small **(K)**
W8D	Conceptualising Variation from the Mean: Evolving from 'Number of Steps' to the 'SAD' to the 'MAD' to the 'Standard Deviation'	Chris Franklin **(K)**
W8E	Leading from the Middle – How am I doing?	Robyn Headifen
W8F	Cooperative Learning: Getting your students talking mathematics.	Gillian Frankcom
W8H	A Better Future for students with Dyscalculia and other learning difficulties	Margi Leech
W8I	Flipped Learning in senior Maths - what to do in the classroom	Stephen McConnachie
W8J	Teacher Desmos	Subash Chandar K
W8K	The Perfect Modelling Tool for Teachers and Independent Learners - Workshop B (Hands-on Tutorial)	Volker Schroeter

W8C

Using open questions to create open students

Marian Small

Sometimes students are streamed for mathematics and sometimes not. But in any classroom, there is always a spread of student readiness for the mathematics we offer. For that reason alone, it is important to use more open-ended questions that aim at a broader audience. But there is an added bonus. Not only do open-ended questions help us differentiate, they also provide much richer and more multi-layered understanding of mathematics for all students, from the weakest to the strongest. Lots and lots of examples you can use immediately will be provided, as will strategies to create your own.

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

Marian Small, the former Dean of Education at the University of New Brunswick in Canada, writes and speaks about K-12 math around the world. Her focus is on teacher questioning to get at the important math, to include all students, and to focus on critical thinking and creativity.

W8D

Conceptualising Variation from the Mean: Evolving from 'Number of Steps' to the 'SAD' to the 'MAD' to the 'Standard Deviation'

Chris Franklin

Wouldn't it be wonderful if every student who graduated secondary school understands, "What it means to be two standard deviations away from the mean?" Our teaching experience demonstrates that students more often than not can't conceptualize what the standard deviation is measuring; instead, the students are too focused on getting the number, full stop! This workshop will share interactively how conceptual understanding of the standard deviation is being promoted across grade levels in the US.

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.

W8E

Leading from the Middle – How am I doing?

Robyn Headifen

By identifying strengths and areas for development as a leader you can better plan for next steps to improve leadership practices that positively impact on both teachers and students in your department

During this workshop you will be introduced to a simple framework developed from 'Leading from the Middle' and other key documents. The framework will help you to evaluate your current practice as an instructional leader and plan some next steps.

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

Robyn is an Accredited Facilitator from The University of Auckland. She was previously the Auckland regional mathematics & statistics facilitator for the Secondary Student Achievement professional learning and development contract. The role involved working with middle leaders to improve outcomes for students with a particular focus on priority students.

W8F
Cooperative Learning: Getting your students talking mathematics.
Gillian Frankcom

If you want your students to talk to each other, to make conjectures and to take part in mathematical conversations, this is one pedagogy that might be able to deliver. First this workshop will give you opportunity to take part in problem-solving using this method - then talk to others about how to implement this in your classroom. Finally I shall suggest some readings you might find useful. Bring your laptop.

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

Gillian is an Initial Teacher Educator at Auckland University

W8H
A Better Future for students with Dyscalculia and other learning difficulties
Margi Leech

We as teachers do not often realise the impact of maths learning difficulties. This workshop will explore these learning difficulties including dyscalculia and provide a variety of ways of supporting these often 'bright' students in their learning and problem-solving towards a better future.

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

Margi Works for Numicon

W8I
Flipped Learning in senior Maths - what to do in the classroom
Stephen McConnachie

Flipped learning is not about replacing the teacher. It's about transforming the classroom - using face-to-face time for interaction, rich problem solving, discussion, for building relational and extended abstract thinking. What does this look in senior Mathematics? In this workshop we will look at the principles of flipped learning, and explore some activities and resources for transforming all that extra classroom time.

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

Stephen is the e-Learning Coordinator and a Mathematics teacher at Middleton Grange School in Christchurch, specialising in Calculus and Scholarship Calculus. He is the Vice-President of the Canterbury Mathematical Association, and is passionate about equipping teachers in the region to use e-learning effectively. He also loves drinking coffee and playing music.

W8J

Teacher Desmos
Subash Chandar K

What is Teacher Desmos? It is an online resource where Desmos in conjunction with teachers have created engaging tasks for students. In this session I will be sharing some of my experiences with using and creating custom tasks in Teacher Desmos. I shall start with the basics of how to create your own custom tasks in Teacher Desmos and aim to have a completed custom task created by you by the end of session.
Please bring a laptop or any tablet with an internet browser. Note: DESMOS App is different to Teacher Desmos.

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

Subash Chandar K is the curriculum leader of Mathematics and Statistics at Ormiston Senior College. He is the owner of the YouTube channel infinityplusone for which he was recognized with an Ernest Duncan Award in 2016. He is a regular contributor to the Auckland Mathematics Association events since 2014. He is in constant pursuit of engaging and challenging students at their levels with the use of innovative techniques.

W8K
The Perfect Modelling Tool for Teachers and Independent Learners - Workshop B (Hands-on Tutorial)
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.
GeoGebra DIY - A hands-on tutorial In this session participants will begin to develop their own teaching tools. Content and direction of this session will evolve from the interests, wishes and goals of those ready to give GeoGebra a go.
Participation is best described by "all hands on the keyboard". No prior knowledge required.Bring: a laptop with GeoGebra installed
This is the second 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.

Part A: Worskshop 3I

Workshop 9

Thursday 5th October, 1510

Workshop summary

W9A	Take an open-ended task, add a pinch of imagination and/or a dollop of collaboration....	Sarah Cobb
W9B	We can count on more than Frank: Using picture books to engage students in mathematics	Tracey Muir, Jill Wells, Sharyn Livy
W9C	PAT: Mathematics Adaptive Assessment	Julie Roberts
W9D	Your classroom. Your choice. How to take control and use eLearning tools to suit your teaching style.	Charlene Macrae
W9E	Teaching Coding for Engaging, Rich and Creative learning	Jared Hockly
W9F	A BLAST from the PAST really works!	Margi Leech
W9G	Little Secrets of Statistical Inference	Marina Alexander, Nugzar Nachkebia
W9H	"Senior Maths in a modern learning environment on 2 periods a week"	Murray Hamitlon
W9J	Using video in maths classrooms	John Mitchell
W9L	Reciprocal Teaching, Math mindsets and other stuff	John Walker
W9M	Increasing discussion and interaction in mathematics classes.	Nicola Petty
W9N	Regional Math Association Executive Forum	Rachel Passmore

W9A

Take an open-ended task, add a pinch of imagination and/or a dollop of collaboration....
Sarah Cobb

A mathematically worthwhile task is one that has some (or all) of the following elements: it is open-ended, accessible to all, has different entry and exit points, invites risk-taking, decision-making and creativity, encourages conjectures, testing, proving, explaining and interpreting, and may lead in different directions.
This workshop introduces a seemingly straightforward open-ended task (adding consecutive numbers) in order to explore the features of mathematically worthwhile tasks. Participants will investigate ways of solving this problem, possible solutions and the wonderings and conjectures that students may have. The workshop will then focus on how the problem can be extended and expanded, including investigating Gauss's strategy for summing an arithmetic series, and links that can be made to algebra and measurement. Participants will be encouraged to create visual representations of their solutions, which are so important in enabling students to engage with and understand mathematical ideas (and also to emphasize the fact that when mathematicians work, they represent their ideas in many different ways - that is not all about numbers and answers).
Finally, the workshop will discuss ways tasks such as this one can be used to support the development of collaborative practice, whatever the environment teachers are working in.
Jo Boaler describes mathematics excitement as being a combination of 'curiosity, connection making, challenge...creativity and...collaboration' (Mathematical Mindsets). This workshop offers opportunities for participants to experience all these. The workshop is suitable for teachers with students working at Levels 1-4.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Sarah Cobb is a Primary Mathematics and Statistics Facilitator at University of Canterbury, Education Plus. She has many years of successful classroom experience teaching at all levels of the primary school. Sarah is passionate about maths education, particularly supporting teachers and students to see themselves as confident, capable mathematicians who take risks, engage in mathematical discourse, effectively use tools and representations and, most importantly, enjoy maths.

W9B

We can count on more than Frank: Using picture books to engage students in mathematics
Tracey Muir, Jill Wells, Sharyn Livy

Engaging children in mathematics through the use of children's literature has become increasingly popular. The benefits of integrating literature into mathematics lessons include its potential to motivate children, to help them learn mathematical concepts and skills, to provide them with a meaningful context for learning mathematics and to facilitate the development and use of mathematical language and communication.

This workshop will identify many of the reasons for using picture books in the classroom to develop students' mathematical interest and understanding. We will share some of our favourite picture books and demonstrate examples of mathematical concepts and activities that can be developed from the books. Picture books that are not explicitly mathematical in nature are particularly useful for engaging students in stimulating conversation about potential mathematical content, and we will provide a number of examples of these. Participants will be provided with practical suggestions on how to structure mathematical lessons based on children's literature, with a particular focus on the early years. It is anticipated that all participants to leave the workshop with lots of practical ways to incorporate picture books into mathematics.

Recommended Audience: Year 1 – 6 Teachers

Tracey Muir is a Senior Lecturer in Mathematics Education at the University of Tasmania where she works with early childhood and primary pre-service teachers. Her research interests include effective teaching for numeracy, teachers' pedagogical content knowledge, engaging students in mathematics and teachers' use of ICT in the mathematics classroom.
Jill Wells is a Research Fellow at the University of Queensland. Formerly a classroom teacher with a passion for mathematical inquiry, her research interests include children's use of evidence and reasoning in mathematics, student engagement, and inquiry based learning.
Sharyn Livy is a Lecturer at Monash University where she teaches pre-service teacher education courses. She regularly works alongside practicing teachers in their classrooms to enhance their practice and is an experienced provider of professional learning.
All presenters have a particular interest in utilising children's literature to teach mathematical concepts and have recently co-authored 'Engaging with mathematics through picture books'.

W9C
PAT: Mathematics Adaptive Assessment
Julie Roberts

This year NZCER introduced the PAT: Mathematics Adaptive assessment. This new assessment tool is an online computer adaptive version of a PAT: Mathematics test. In a PAT: Mathematics Adaptive test the computer selects the questions for each student based on the responses they have given to previous questions in the test. Differentiated assessment underpins this tool to find a student's best-fit within the NZC. This workshop will explore this new approach with opportunity to explore an assessment and the reports that are generated online.
Key learning points from the workshop include:

- PAT: Mathematics adaptive assessment enables finding where a student is working at within the NZC
- Adaptive online assessments can engage and motivate learners
- Analysing reports will support inquiring into teaching practice

Bring a laptop or tablet to explore the online assessment tool.

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

Julie joined NZCER as an Education Advisor / Researcher in 2017. Julie is an experienced mathematics facilitator and primary teacher. For the last nine years she has worked in a range of capacities delivering mathematics professional learning support in schools and clusters. She has strengths in mentoring and coaching leadership, effective assessment practices, and strategies to accelerate learning outcomes.

W9D

Your classroom. Your choice. How to take control and use eLearning tools to suit your teaching style.

Charlene Macrae

A good eLearning program can no longer just engage students with their maths homework - most of them do that.
The true value of an eLearning program is its enablement of teachers, through accurate reporting and teaching tools, to effectively and accurately use data to drive teaching and learning practices. Whilst also empowering teachers to decide on the balance of teacher-led instruction and student-driven learning that they want for their students and classroom.
During the session we'll look at how Mathletics is empowering teachers to meet the diverse needs (and level of guidance) of their individual students, through teaching tools that enable blended learning.
The session will also introduce you to Mathletics' extensive real-time reporting, which can be used to quickly and accurately drive data-driven teaching practices. Whether its overall classroom progress or focusing on an individual student's strengths and weaknesses, you choose the level of data you want to use.

This workshop is presented by one of our GOLD Sponsors.

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

Charlene is a Regional Manager at 3P Learning, the company that supports Mathletics, Reading Eggs and Spellodrome.
She is passionate about the supporting teachers and students to use Mathletics effectively in the classroom to enhance learning.

W9E

Teaching Coding for Engaging, Rich and Creative learning

Jared Hockly

Coding is a tool that is valuable for our students to learn and connect with Maths and Stats. It has the potential to:

create a context for students to want to learn our subject content,
a modern form of teaching problem solving,
and a way for student to be creative with our subject area
We'll look at using Scratch (free online coding developed by MIT) with students. We'll have a good play with a mathematical coding task (Flash enable device required - i.e most phones and tablets will not work). You'll get a good sense of how to code and what a good task can look like.
We will consider how to develop coding ability with our students as they move up the levels, and some other platforms that we can use.

Recommended Audience: Year 9 – 10 Teachers

Jared Hockly is HOD at Western Spring College. Has been involved in finding meaningful ways for Maths and Stats students to learn more deeply with digital technologies. He has presented a range of workshops at Auckland Maths Associations Statistics and Calculus days over the last 4 years. He has fond memories of the last NZAMT conference in Christchurch.

W9F

A BLAST from the PAST really works!

Margi Leech

Place value, fractions, reasoning with strategies - all supported with manipulatives! Explore how to use a variety of structured manipulatives (Cuisenaire, Numicon, Place Value blocks, Pattern blocks, Counting Sticks and Multilink cubes) to help children make connections in maths. You will take away ways of improving student understanding and attainment along with appreciation for evidence and research using manipulatives, an understanding of how to use them, and explore a different approach to use in your classroom.

Recommended Audience: Year 1 – 6 Teachers, Year 7 – 8 Teachers

Margi Leech works for Numicon

W9G
Little Secrets of Statistical Inference
Marina Alexander, Nugzar Nachkebia

If you have been teaching statistical Inference at Level 1 and 2 but still have questions or desire to know little bit more than students need; or you would like to learn how to create quality resources for practices and internal assessments yourself; or you would like to see how others are teaching these standards; or have not been teaching these standards but want to give it a go, then this presentation is for you.
We will try to answer questions you may have and unpack some concepts; We will run a practical session - hands on activity to create contexts and data sets for statistical tasks. Also, we will share with you resources for internal assessments. You may find useful to bring your laptop for the practical session. Key points:• Linking informal inference with formal statistical concepts;• Creating resources for AS1.10 and AS2.9 standards;• Useful hints for writing reports and marking schedules;

Recommended Audience: Year 11 – 13 Teachers

Dr Marina Alexander, PHD in Physics and Mathematics. She has been teaching Mathematics at Woodford House since 2005 and has been leading the Mathematics department past 5 years. She has been an external NCEA marker for 9 years.

W9H
"Senior Maths in a modern learning environment on 2 periods a week"
Murray Hamitlon

Westmount School is a private school with 15 different sites from Kerikeri to Invercargill. The motto for Westmount is "Learning to learn". Westmount is progressive, moving towards flipped classrooms, self-directed learning, use of technology (devices provided by the school to the students) and a 2 by 2 model for Years 11-13 with Canvas as the student management tool. The 2 by 2 idea is that the students get two periods of teaching a week in the classroom with the Maths teacher and the other two periods they are in the learning centre and students approach the teacher if they require help. For 2017, I get two 50 minute periods with my YR 11 students and one of them is Friday last period! At this workshop I will share the Westmount experience with its successes and pitfalls!

Recommended Audience: Year 11 – 13 Teachers

Murray Hamilton is current Curriculum Leader at Westmount School. He has had over 30 years of teaching experience in NZ schools. His methods of teaching have had to adapt to a modern learning environment to ensure students learn and cover the curriculum on average, less than two 50 minute periods a week.

W9J
Using video in maths classrooms
John Mitchell

I have been using videos and mimio slides in my classroom for about four years. In studying for an MEd I saw video learning is becoming used more in the classroom. This is an introduction to examsolutions an English site with many videos and how I have used them. What are the benefits of using videos in both teaching and learning.

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

I started teaching in 1998 after completing 22 years in the Royal Air Force. I taught in two schools in the UK and was Head of Maths at a boys grammar school in Kent. In 2009 I immigrated to New Zealand and have taught at two schools in Wellington. Current Assistant HOD at Hutt Valley High School. I was on study leave in 2016, working on a thesis for a Masters of Education.

W9L

Reciprocal Teaching, Math mindsets and other stuff

John Walker

Last year I was awarded a Woolf Fisher Fellowship to enable me to travel to Australia and visit schools. In the July school holidays this year I took up the opportunity to have 5 weeks of R n R along with some school visits.
A highlight for me was the Jo Boaler day at Emmanuel College on the Gold Coast. Mathematical Mindsets is a big focus for the Nayland College maths staff in the way we are slowly shifting our pedagogy. Sharing the gems from this whole day of discovering Mindset Maths will form a large part of my workshop.
In Melbourne I visited Sacred Heart College where they have been working on the Mindsets approach for some time and I will share what works for them in the classroom.
Also in Melbourne I visited Sunshine College who are running a very innovative Mathematics programme based on Reciprocal Teaching. From their website, "Our approach to teaching is to guide students on their individual pathways of learning in a student centred environment".
I am hopeful that what I bring back to Aotearoa will be useful and interesting and applicable to our classrooms.
I am overwhelmingly grateful to the Woolf Fisher Trust for this opportunity.

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

As a Secondary Mathematics Teacher for nearly 30 years I have been a Head of Learning area at Nayland College in Nelson and Lytton High School in Gisborne. Receiving a Woolf Fisher Fellowship last year was certainly a career highlight and reward for all that time as a struggling teacher.
While I in no way claim to be an expert I hope that what I am able to share will be of use to someone in their attempts to make learning a better experience for their students.

W9M

Increasing discussion and interaction in mathematics classes.

Nicola Petty

This workshop includes an examination of why discussion helps learning, and techniques for encouraging discussion. Traditional mathematics teaching did not involve a great deal of discussion and consequently some teachers find this challenging. In this fun, hands-on workshop we will explore strategies to improve classroom discussion to help learning statistics and mathematics and look at common pitfalls and how to deal with them. We will also share sources of great ideas from the Maths Twitter Blogosphere and from Primary teaching professional development.

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

Dr Nicola Petty (Dr Nic) is well known for her innovative and engaging approaches to teaching statistics and mathematics. She has spent the past 25 years developing online and physical learning resources for primary, secondary and university students. Nicola is a qualified high school mathematics teacher with additional experience teaching innovative primary school mathematics lessons and running mathematics events. Nicola writes a well-respected statistics learning and teaching blog and keeps current with thinking and research about mathematics education through reading and participating in the MathTwitterBlogosphere. She is co-director of Statistics Learning Centre, a social enterprise with a mission to invent, create and disseminate resources and ideas to enable people to learn and teach mathematics and statistics in a more enjoyable way.

W9N

Regional Math Association Executive Forum

Rachel Passmore

This forum is for the Executive members of the Regional Associations to meet and discuss issues they are currently facing

Recommended Audience: Other

Rachel Passmore is the current AMA President

Workshop 10
Friday 6th October, 0900

Workshop summary

W10A	Learning to love Maths	Jake Main
W10B	Geometry and Number with a sprinkle of algebra dust!	Derek Smith
W10C	Assessing the thinking curriculum using SOLO	Dave Phillipps
	The Three "C"'s - Collaborating through Cohesive Curriculum	Jill MacDonald
	Piece of Pi - Tackling Maths Anxiety in Young Women	Kerry Newnham
W10D	Data and probability OR probability and data? Using data to teach probability modelling (AS91585)	Anna Fergusson
W10E	"Good" e-learning - what is it, and how do we do it?	Stephen McConnachie
W10F	It's Friday, it must be Carcasonne! - my two favourite games for use in class and out	Jane Gray
W10G	The Perfect Modelling Tool for Teachers and Independent Learners - Workshop 3 (Advanced Uses of Geogebra)	Volker Schroeter
W10H	Engaging year 9 and 10 students at the end of the year in a meaningful way.	Sandra Cathcart
W10I	Learning with Sphero Robots 2	Subash Chandar K
W10K	Learning intentions, Success criteria and Teacher Clarity	Mitchell Howard
W10L	What do we really want with NCEA?	Jan Wallace, NZAMT Exec

W10A
Learning to love Maths
Jake Main

Why are more students disengaged in Maths classes than other subjects? With the proliferation of technology in young people's lives, there is a need for educators to adapt and explore using technology in their teaching. In this presentation, we will explore opportunities to reverse this trend of disengagement using Mangahigh as the vehicle. As a teacher, I have experience using Mangahigh as an online resource to improve student engagement and learning outcomes. Using an online resource effectively empowers teachers and places vital information on their students' progress at their fingertips. I will share with you how teachers can build a growth mindset and encourage resilience in students that leads to on-going success. This is a commercial presentation.
This workshop is presented by one of our GOLD Sponsors.

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

Jake Main, QLD & NZ Area Manager

W10B
Geometry and Number with a sprinkle of algebra dust!
Derek Smith

A hands on workshop looking at the structure of geometry via paper folding, visuals, unpacking its language and demands on student learning progressions in CL3-6.

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

Derek is currently on contract to the University of Otago as a Mathematics and Statistics (Central South) Facilitator (Secondary). He has taught mathematics and statistics at secondary schools in the Wellington region for 28 years holding HOD positions and a position as senior lecturer at VUWCE, in Mathematics Education.

W10C.1 (Quickfire)
Assessing the thinking curriculum using SOLO
Dave Phillipps

As Year 9 & 10 teachers, we are required to report to the curriculum level our students are working at, but these are so broad it is hard to clearly identify where students are truly at. Some teachers have developed their own "standards" and have assigned Achieved, Merit & Excellence grades to student work. Others have assigned grades similar to eAsttle's Basic, Proficient and Advanced system. But the problem is that the distinction of grades is arbitrarily set. In this quickfire session we will look at how the Lincoln High School Mathematics department has explored marrying curriculum levels and depth of thinking using the SOLO Taxonomy, to provide more meaningful assessment grades for the work completed by our students.

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

Dave Phillipps is currently HOLA Mathematics at Lincoln High School. He has also been a Secondary Mathematics & Numeracy advisor. He strongly believes in the importance of developing students as thinkers and problem solvers within the NZ Curriculum.

W10C.2 (Quickfire)
The Three "C"'s - Collaborating through Cohesive Curriculum
Jill MacDonald

As part of setting up the new Hobsonville Point Secondary School, their Learning Design Leaders deconstructed the New Zealand Curriculum. This process led to both the development of a Design Thinking Learning Model and a Conceptual curriculum framework. The team focused upon the concepts and contexts contained within the New Zealand Curriculum taking into account page 16 of the NZC which states:
All learning should make use of the natural connections that exist between learning areas and that link learning areas to the values and key competencies.
The team then looked for the authentic links between these concepts. The most powerful of these connections are the big concepts that frame the Hobsonville Point Secondary School curriculum.
This presentation will explore how our curriculum structure allows for breath and depth - allowing for the potential to go deeper into mathematical ideas for learners paving the way to open/authentic tasks for NCEA Level 1 and the implications for other mathematics departments looking to transform their pedagogy.

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

Jill MacDonald is a Learning Design Leader and Numeracy Coordinator at Hobsonville Point Secondary School - a brand new secondary school that opened at the start of 2014. Jill started teaching in New Zealand in 2010 and has been TiC and Assistant HoD at her previous schools in Auckland. She has worked passionately on integrating mathematics into other learning areas to make authentic connections for her learners.

W10C.3 (Quickfire)
Piece of Pi - Tackling Maths Anxiety in Young Women
Kerry Newnham

As a nation we are missing out on a rich pool of talent for a number of career paths, particularly, but not limited to, those in Science, Technology, Engineering and Mathematics (STEM) due to a condition known as Math(s) Anxiety. It is a specific anxiety which seems to affect females more than males and creates a disproportionate dread of the subject matter, ultimately leading to avoidance and lack of achievement. Because of the cumulative learning process involved in maths, once a student's learning has been impacted by the anxiety it is subsequently very difficult to recover. It can lead to the view "I can't do maths" when the student actually does have the intellectual capability but is being hindered by her emotional reaction. Anxiety impacts the working memory. Cultivating a growth mindset in students is an integral part to addressing this condition, as it takes some focus away getting the right answer which in most cases initiates the anxiety. Putting emphasis into the process of problem-solving at the heart of mathematics develops a deeper connectivity to the subject matter and allows more opportunity for reward and praise. The confidence which comes from this experience encourages the student to persevere which leads to an increased level of achievement.

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

Kerry is an Investment Analyst and former Engineer who has previously tutored undergraduate finance at the University of Otago School of Business. A lifetime lover of maths she was surprised to find the abject horror experienced by some of her students when presented with an unfamiliar problem or even in some cases, a calculator. She researched what she had observed and found it had a name "Math Anxiety". As a result she has developed a programme for high school students to address this issue with the view to ensuring no desired future is out of reach for any student who has the capability to achieve it.

W10D

Data and probability OR probability and data? Using data to teach probability modelling (AS91585)

Anna Fergusson

When teaching probability concepts related to experimental probability, data is often generated using spinners, dice, cards, "balls in urns" or other game-like activities like Pass the pigs. But what about data that has been collected from an ongoing real-world system or process? Can we treat this data the same as data generated by rolling a dice? After a review of the "new" types of questions used to assess AS91585 Apply probability concepts in solving problems, this workshop will focus on the use of a range of types of data to teach probability modelling. We'll look at the different ways we can use probability models, including prediction models, and then have a go using these models to explore real problems. We'll also discuss the possible challenges of teaching both theory-driven probability modelling and data-driven probability modelling alongside each other. 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

W10E

"Good" e-learning - what is it, and how do we do it?

Stephen McConnachie

What makes a learning activity "authentic"? In particular, what does an authentic digital learning activity look like? The answer to this question has many facets, both subjective and objective. We will explore this concept in Mathematics, unpack some frameworks for evaluating and improving authentic engagement in an e-learning context, and look at some practical strategies for designing your own authentic digital learning activities.

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

Stephen is the e-Learning Coordinator and a Mathematics teacher at Middleton Grange School in Christchurch, specialising in Calculus and Scholarship Calculus. He is the Vice-President of the Canterbury Mathematical Association, and is passionate about equipping teachers in the region to use e-learning effectively. He also loves drinking coffee and playing music.

W10F

It's Friday, it must be Carcasonne! - my two favourite games for use in class and out

Jane Gray

1. A board game I used to lure the top Year 9 boys, to develop a special relationship with a new Calculus class, to check the the mathematical thinking of 'well below' Year 7's..... - Carcasonne2. A card game for 2, 3 or 4 players that I have adapted for whole class use (max 32 players) - Crib (4 million+ people per week can't be wrong!)

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

Jane is HOD Mathematics at Hillmorton High School

W10G

The Perfect Modelling Tool for Teachers and Independent Learners - Workshop 3 (Advanced Uses of Geogebra)

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.

GeoGebra Challenge - A power user session. In this session participants will develop an interactive teaching tool. Content of this session will be decided by the participants. On the first day of the conference, participants who have enrolled for this session are invited to submit a Maths/Stats problem they wish to explore using GeoGebra.
Participation is best described by "share your experience". Basic knowledge of GeoGebra is required.
Bring: a laptop with GeoGebra installed
This is the third 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.

W10H

Engaging year 9 and 10 students at the end of the year in a meaningful way.

Sandra Cathcart

Those last two or three weeks of the year can be challenging.
In this workshop we will look at some "tried and true" activities to make those last periods of the year worthwhile for you and your students.

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

For the last 5 years Sandra Cathcart has been a Facilitator and National Co-ordinator for Mathematics and Statistics in the Secondary Student Achievement Professional Learning and Development initiative, focused on raising student achievement in secondary schools.
This work focused on change leadership with teachers, middle leaders and senior leaders in a range of schools, involving the facilitation of in-depth professional learning and development centred on teaching and learning. In addition to the work in schools, Sandra has facilitated a number of workshops and clusters, has written a series of national newsletters and a range of online materials and has supported her regional mathematics association.
Sandra is currently a registered facilitator for professional learning and development.

W10I

Learning with Sphero Robots 2

Subash Chandar K

A continuation of Learning with Sphero Robots 1 that ran earlier in the conference.
In this workshop I would like to share some of our success stories and challenges of using these robots. We will be looking at using these robots in the field of Statistics and building homemade chariots. The session will end with a short discussion on strategies and ideas of how you could bring these robots into your classrooms. It is highly recommended that you attend Learning with Sphero Robots 1 to gain further knowledge of these robots. Please have the app (Sphero EDU or SPRK Lightning Lab - available in iOS & Google Play) installed in your smart device for this session

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

Subash Chandar K is the curriculum leader of Mathematics and Statistics at Ormiston Senior College. He is the owner of the YouTube channel infinityplusone for which he was recognized with an Ernest Duncan Award in 2016. He is a regular contributor to the Auckland Mathematics Association events since 2014. He is in constant pursuit of engaging and challenging students at their levels with the use of innovative techniques.

W10K

Learning intentions, Success criteria and Teacher Clarity
Mitchell Howard

When students are provided with clarity they can confidently answer the following questions: Where am I going? How am I doing? And where to next? There was a time when schools were mandating that staff have Learning Intentions and Success Criteria provided for each lesson. How is this sustainable and what should it really look like? Where does this leave the Investigative lessons and rich tasks? Can't there still be a little element of the magical mystery tour? In this workshop we will explore, discuss and develop our thinking in this area and hopefully walk away with some examples to apply to our teaching in Term 4 and beyond.

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

Mitchell has taught Mathematics in NSW, UK, ACT, Victoria and NZ over the past 20 years. He is currently the Head of Mathematics and Statistics St Andrew's College and previously the HOLA at Lincoln High School and Vice President of the Canterbury Mathematics Association (CMA). He has been a regular presenter of workshops at NZAMT conferences (since 2008) and for the CMA. Mitchell was awarded a Jim Campbell award in 2015, has published a Book on SOLO Taxonomy in Mathematics with Pam Hook and contributed a chapter to Robin Averill's Mathematics and Statistics in the Middle Years: Evidence and Practice.

W10L

What do we really want with NCEA?
Jan Wallace, NZAMT Exec

The NCEA will be reviewed in 2018 and the next year the standards are up for review. It is never too early to begin to start thinking about what it is we would like. We can then carry on the discussions in our regions and be prepared when we are asked for our opinion which so often seems to happy when we are all flat out with other things in school. There may be some issues that you would ask NZAMT to get an indication of what the teachers opinions are so as we can respond on behalf of the teachers.

Recommended Audience: Year 11 – 13 Teachers

NZAMT Executive represent the thoughts and feelings of NZ Math Teachers