



**The  
Canberra  
Mathematical  
Association**

The CMA is an affiliated association of  
The Australian Association of Mathematics Teachers Inc.

# Fifty-Fifty

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**Australian  
Catholic  
University**

8:30	Registration					
9:00 Session 1	Welcome and Introduction Speakers – Room B10 ..... <b>What is “Connect With Maths”? – Renee Hoareau (AAMT)</b> <b>Who are the “Mathematicians in Schools”? – Camille Rogers (CSIRO)</b>					
<b>Room</b>	<b>B11</b>	<b>B8</b>	<b>B7</b>	<b>Computer Lab</b>	<b>B6</b>	<b>B5</b>
9:30 Session 2	The Most Engaging Digital Maths Resource For Your Classroom: Mangahigh.com  <b>Darryl van Leerdam Mangahigh.com (M, S)</b>	Multiplication for Primary classes  <b>Greg Taylor and Deb Sayers University of Canberra/Harrison P-10 School (P)</b>	Digital Resources Explained  <b>Sharon Laws Nelson Cengage Learning (S, C)</b>	Mathspace  <b>Room – B10 NB – not Lab</b>  <b>Erin Gallagher Mathspace (S)</b>	Tell Me a Story, Shakespeare in Maths - integrating Literacy into High School Mathematics  <b>Stephen Hood UC High School (S, C)</b>	A Smorgasbord of Statistics  <b>Russell Brown Texas Instruments (C)</b>
10:30	Morning Tea – outside B11 (Morning Tea sponsored by Texas Instruments)					
11:15 Session 3	Napier’s constant/Euler’s Number (e); Is it better than pi ?  <b>Kevin McMenamin Casio (S, C)</b>	Authentic Inquiry Maths – Making it happen in the primary classroom  <b>Bruce Ferrington Radford College (P)</b>	Connect with Maths, your new online community support resource  <b>Renee Hoareau AAMT Project Officer (P, S, C)</b>	Resourcing Financial Literacy  <b>Anne Nunan Financial Basics Foundation (S)</b>	Interesting physics applications for trigonometry  <b>Wayne Semmens Canberra College (S, C)</b>	Fermi Problems and Four Fours: Who is asking the Questions?  <b>Valerie Barker (M, S, C)</b>
12:15	Lunch and Prize Draw – outside B11					

1:30 Session 4	Keynote Speaker – Room B10  <b>When are we going to use this? – Mike Clapper (University of Canberra)</b>					
<b>Room</b>	<b>B11</b>	<b>B8</b>	<b>B7</b>	<b>Computer Lab</b>	<b>B6</b>	<b>B5</b>
2:30 Session 5	The Mechanics of the ACT College Scaling System – <i>What are they doing with my scores?</i>  <b>Ed Staples (C)</b>	Take a Chance  <b>Theresa Shellshear ACU (P)</b>	Enrichment Opportunities in ACT region  <b>John Carty Australian Mathematics Olympiad (M, S, C)</b>	A pedagogical journey through Differential Calculus using technology  <b>Russell Brown Texas Instruments (C)</b>	Mathematicians in Schools  <b>Camille Rogers CSIRO (P, S, C)</b>	Pigs Might Fly  <b>Sue Wilson ACU (M, S)</b>
3:30	Afternoon Tea and Prize Draw – outside B11					
4:00 Session 6	Extension and Enrichment ideas and opportunities.  <b>Kevin McMenamin Casio (S, C)</b>	PAT Maths  <b>Terri Cornish ACER (P)</b>	Algebra as Story-telling  <b>Mike Clapper University of Canberra (UP, M, S)</b>	Becoming interactive.  <b>Tony Collison School Software (P, M, S)</b>	Quadrilaterals – a paper folding workshop  <b>Anna Hyslop CGGS (P, M, S)</b>	BYOD – Apps share  <b>Erin Gallagher CMA (P, S, C)</b>
5:00	Closing Comments - Room B10					
5:30	Informal Drinks and Nibbles – Room B10 If you are free in the evening, please join us for dinner					

**Key**

A = All

P = Primary School

M = Middle School

S = Secondary School

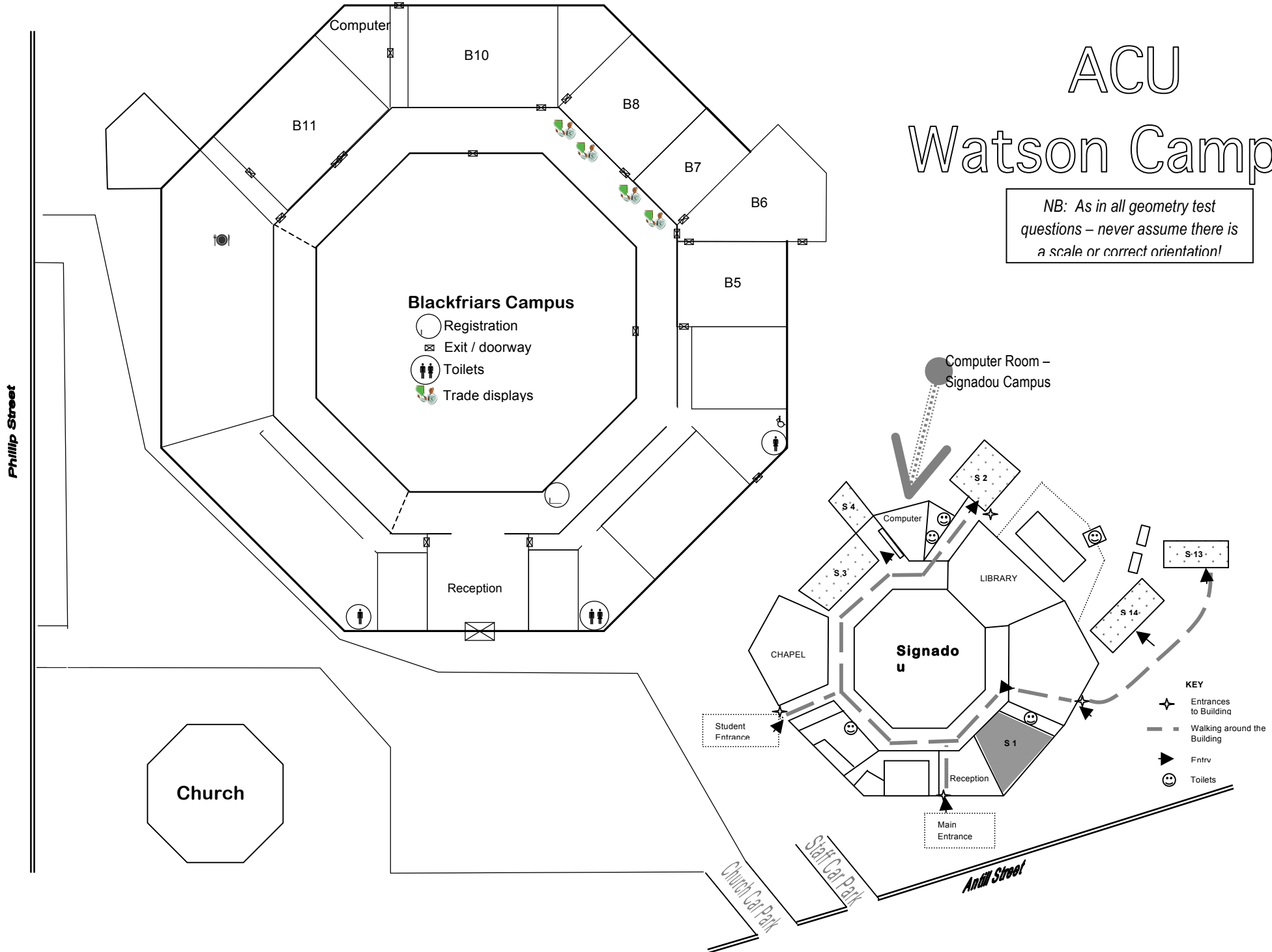
C = College

CL = Computer Lab

# ACU

## Watson Campus

NB: As in all geometry test questions – never assume there is a scale or correct orientation!



# Session Descriptions

## Keynote Address

### When Are We Going to Use This?

**Mike Clapper – Australian Maths Trust**

As maths teachers we are all familiar with this question. In this talk, I will explore whether it is a fair question and suggest a variety of possible responses, drawing on some mathematical examples to justify these.

We cannot pretend that this is not a real issue, when statistics suggest that the number of students pursuing mathematics at the senior level is in decline, particularly amongst girls. However, I don't think that the answer lies in any facile attempt to introduce 'relevance' into what we teach. We must look deeper than this - to the mode of thinking which good mathematics teaching should encourage, the capacity to think logically and to generalise.

Part of our problem may lie on the fact that many maths textbooks place a heavy emphasis on the development of technical skills to the possible detriment of problem formation and the development of mathematical intuition.

## Workshops

### Fermi Problems and Four Fours: Who is asking the Questions?

**Val Barker**

The Australian Curriculum: Mathematics has Reasoning and Problem Solving as two of its Proficiency Strands. In this workshop we shall explore some practical and fun approaches to shifting the focus of questioning from the teacher to the student, to encourage our students to ask questions, develop their own problems and justify their responses.

### PAT Maths

**Terri Cornish – ACER**

The ACER Progressive Achievement Tests Maths (PATMaths) are Australian normed tests designed to provide objective information to teachers about the level of achievement attained by their students in the skills and understandings of mathematics. The tests are available in both print and online format. This presentation will focus on ways that PAT Maths data can be used to identify specific areas of need in mathematics learning for individual students and whole classes.

The presentation will also show delegates how, by using PAT Maths they can :

- Provide meaningful achievement data for schools, districts and education departments for analysis and discussion
- Help inform teaching practice
- Evaluate effective teaching methods across achievement bands
- Inform the targeted use of resources
- Track progress across year levels

## A Smorgasbord of Statistics

**Russell Brown – Texas Instruments**

In this hands-on session explore a smorgasbord of statistics – fifty fifty univariate and bivariate. Cover areas on current courses and the new Australian Curriculum such as comparative box plots, dot plots, the effect an outlier has on measures of centre, regression lines and residuals. Use a fun algebraic modelling task for the bivariate analysis. Many aspects covered in this session can be covered in the classroom using several software packages such as MS Excel and TI-Nspire. TI-Nspire handhelds will be used in this session.

Russell is an Educational Consultant who has presented widely in both Australia and overseas on the use of Computer Algebra Systems (CAS) technology in the classroom. He currently mentors several schools in Victoria and NSW in using CAS technology for teaching and learning.

## A pedagogical journey through Differential Calculus using technology

**Russell Brown – Texas Instruments**

In this hands-on session you will cover differential calculus in a fun and meaningful way. Includes calculus by first principles, limits, developing general rules of differentiation and creating gradient graphs in real time plus heaps more using the fully integrated TI-Nspire CAS software. This software allows teachers and students to also explore non- algorithmic approaches to all topics, particularly dynamic graphical based investigations that support the standard algebraic functionality (CAS). Trial TI-Nspire CAS software will be available after the session.

## Enrichment Activities in the ACT Region

**John Carty – Australian Mathematics Olympiad**

In this talk John wishes to point out the opportunities for Enrichment that are available in Canberra/ACT region.

John is the former ACT Director of the Australian Mathematics Olympiad Committee (AMOC). He carried out this role for 16 years.

## Algebra As Storytelling

**Mike Clapper – Australian Mathematics Trust**

This presentation describes a framework for the introduction and development of algebraic thinking which develops in students the understanding that algebra is about 'things that happen to numbers' in a narrative context. Whilst it draws on some well-understood pre-algebraic pedagogies such as machine games and back-tracking, it develops these into a fuller picture of algebraic processes using the technique of 'unambiguous labelling' which relates every algebraic expression (or equation) to the story which it tells about numbers. Many examples will be given of practical activities which will allow students to use their emerging algebraic skills to explore patterns and develop algebraic thinking.

## Becoming interactive.

**Tony Collison – School Software**

How to make software that only prints on paper, interactive and self marking on a computer screen. Neat trick if you can do it. Of course it still prints on paper.

Tony is a seller of software, including Maths Resource Studio 5 and also of hardware. Formally a HT PDHPE teacher in NSW schools, he is now, a retrained Maths teacher entering his 4th year.

## Authentic Inquiry Maths – Making it happen in the Primary classroom

**Bruce Ferrington – Radford College Junior School**

The inquiry process is central to engaging students in their own learning. Mathematics offers a multitude of opportunities for students to explore and make sense of the world around them. Starting with a theoretical exploration of the inquiry process, this workshop will have a practical emphasis and provide a range of ideas and activities that can be used in the primary classroom.

We will be looking at the inquiry process and doing some fun investigation of our own. Starting with triangles, we will progress to squares and pentagons and, if we are very lucky, even have a go with some hexagons. Be warned - this will be a practical session and will definitely involve some serious cutting and pasting.

Bruce Ferrington is a Year 6 teacher at Radford College in Canberra. He was awarded a Churchill Fellowship in 2012 to study the teaching of mathematics in the USA, Japan and Singapore. His blog "Authentic Inquiry Maths" (<http://authenticinquirymaths.blogspot.com.au>) has been described as one of the best maths blogs for primary teachers on the internet.

### **Mathspace**

#### ***Erin Gallagher - Mathspace***

Imagine if you didn't have to worry about tediously marking homework - if marking could be done automatically, so you could focus on teaching. Imagine being able to snapshot each of your students' strengths and weaknesses in a few seconds. Imagine an online maths tool that taught students how to set out their working, and where they still had to write all the mathematics by hand! Mathspace is a structured and thorough math teaching and learning tool suite, not a simple multiple choice game. It allows students to input FULL working for algebra, geometric proofs and reasoning, and even allows students to easily draw probability trees and their own graphs, all on the one page. Most people would know Erin's absolute passion for mathematics and quality mathematics teaching, this product really enables any teacher, or a team of teachers to explore flexibility and personalisation of learning in the classroom. Bring your iPad along to experience the next generation in e-learning tools. (although an iPad is not essential as it also operates on a standard PC)

### **Connect with Maths – Your New Online Community Support Resource**

#### ***Renee Hoareau – AAMT Project Officer, Connect With Maths***

The Connect with Maths Project aims to build a dynamic education community to support Australian teachers of mathematics in intuitive, personalised and flexible ways. Teachers will access a range of networks and activities that support quality contemporary learning in the context of implementation of mathematics in the Australian Curriculum. The Connect with Maths project is funded by the Australian Government Department of Education, Employment and Workplace Relations through the Mathematics and Science Participation Program.

For more information go to: <http://www.aamt.edu.au/Activities-and-projects/Connect-with-Maths>

Renee Hoareau is the Project Manager of the Online Teacher Support project with the Australian Association of Mathematics Teachers (AAMT) Inc. She has been a teacher for over 19 years and has worked in the education industry for the last 15 years. Her current role as Project Manager oversees the implementation of an online support platform for mathematics teachers.

### **Tell Me a Story, Shakespeare in Maths - integrating Literacy into High School Mathematics**

#### ***Stephen Hood – University of Canberra High School, Kaleen***

After briefly exploring broad principles of effective literacy in the mathematics classroom, this workshop demonstrates development of skills, knowledge and fluency using two activities, one from the bank of lessons created under the Mathematics Curriculum and Teaching Program (MCTP) in 1993 and another from the Scootle digital object repository.

The aim of the first activity is to stimulate students to develop interpretive and descriptive skills about a graph and then to stimulate creative writing skills in a group recount of the many stories that the graph represents. The second activity is based around the Scootle learning object "Hamlet Happens". The activity opens with a brief review of Shakespeare's famous soliloquy from Hamlet and then develops fluency and skills in experimental and theoretical relative frequency and calculation of probabilities. The activity also describes opportunities the activity presents to students to record and analyse a data set in a systematic way.

Stephen is a classroom teacher at the University of Canberra High School Kaleen, teaching Mathematics, but he has also taught Financial Literacy and Information Technology. He is the ICT Coordinator and a member of the ACT ETD ICT Network Planning Committee. With a previous professional life both as a Naval Officer and Senior Manager specialising in Information Technology, Stephen has a great vision for effective integration of ICT resources and capability in the Mathematics classroom.

## Quadrilaterals – A Paper Folding Workshop

**Anna Hyslop – Canberra Girls Grammar School**

In this workshop participants will have the opportunity to create a parallelogram star. On the way we will explore some special quadrilaterals and their properties. A hands on activity that can be adapted to a diverse range of student groups.

Anna is a mathematics teacher with 10 years experience teaching students of all abilities from Year 7 to Year 12 in the ACT. She is currently teaching at Canberra Girls Grammar School.

## Digital Resources Explained

**Sharon Laws - *Secondary Sales Representative from Nelson Cengage Learning***

With the rapidly evolving digital resources available to schools, there is so much more than just textbooks; however there is still some confusion in the market as to how it all fits together.

The aim of this session is to explain and demonstrate:

- An interactive e-book (NelsonNetBook)
- Digital teacher platform (NelsonNet)
- ExamView test generator software
- How the 4 access codes work and how long they last
- What is on the teacher platform and how to get access
- Digital options available to schools

Teachers are encouraged to bring along a laptop or iPad, as they will receive a free copy of New Century Maths 7 and have the opportunity to set up a NelsonNet account and access the interactive e-book and student resources and activities.

## Napier's constant/Euler's Number (e); Is it better than pi ?

**Kevin McMenamin – Casio**

This transcendental number ranks alongside 0, 1, i and pi as one of the five most important constants in mathematics and gave rise to the identity  $e^{i\pi} = -1$ . But it is seldom introduced in school mathematics until very late. Compound interest, throwing darts at a dart board, optimising quotient/divisor for a given value and areas under a

graph are just a few of the simple and straight forward possibilities that require middle school mathematics knowledge only. Explore the definitions of this fascinating number and the different ways you could introduce it into your classroom.

## Extension and Enrichment ideas and opportunities.

**Kevin McMenamin – Casio**

student problem solving abilities via its many competitions. Filtering through these questions finds an assortment of opportunities in which your students can engage and experience some level of success. These questions fit nicely into the application of problem solving skills which are an integral part of the new Australian Curriculum. This session will provide good examples of questions that will inspire you to use them in your classroom and then create your own.

## Resourcing Financial Literacy

**Anne Nunan – *Financial Basics Foundation***

The focus of this presentation is a practical workshop tour of our online game ESSI Money. This is an engaging digital resource (free of charge to all Australian schools) which provides an opportunity for middle school students to learn how to better manage personal finances. The game has direct application to the "Money and Financial Literacy" sub strand in Number and Algebra.

Strategies around using financial literacy as a context for Mathematics and the development of numeracy skills (in the context of General Capabilities) will also be addressed. Participants will be able to personally explore the game during this presentation. Our other free resource "Operation Financial Literacy" will also be discussed.

Financial Basics Foundations is a not for profit organisation established to help educate secondary students about the credit system and responsible financial management practices. Anne's current responsibilities are resource development and teacher education. Her professional background is secondary teaching. She was formerly Head of Department in Business & Information Technology at a large Queensland state secondary school.

## **Maths Partnerships Really Count**

### **Camille Rogers – CSIRO**

Mathematicians in Schools is a free national program supporting long-term, professional partnerships between practising mathematicians and teachers across Australia. Learn how Mathematicians in Schools partnerships have enhanced classroom learning and engaged teachers and students with contemporary research, applications and careers. Discover other CSIRO resources you and your students can use to provide a window into the exciting world of maths in action.

Camille Rogers, Scientists and Mathematicians in Schools Project Officer for ACT and south-east NSW. Prior to joining SMiS in 2012, Camille worked as a Medical Scientist in Immunology and Haematology with Queensland Medical Laboratories for 8 years. In 2005 she moved to Canberra and while completing a Graduate Diploma in Education from QUT, worked as the Australian Deputy Recalls Coordinator for the Therapeutic Goods Administration. Camille then worked as a maths and science teacher at Belconnen High School and Amaroo School for 4 years. Since joining CSIRO Education Camille has worked towards increasing school involvement in Scientists and Mathematicians in Schools throughout Canberra.

## **Interesting Applications of Maths to Astronomy.**

### **Wayne Semmens – Canberra College**

In this presentation we will look at:

- (i) using basic trigonometry to derive distance formula of stars
- (ii) using basic algebra, the Doppler effect to calculate the velocity of galaxies receding from our own galaxy
- (iii) using the above two as well as basic graphing skills to find the age of the universe.
- (iv) Interactive internet sites with data for students to obtain measurements from will also be provided.

Wayne has been teaching Maths at college level for over 13 years. Currently he is drawing upon astronomical and historical examples of maths to make lessons more engaging.

## **Take a Chance**

### **Theresa Shellshear – Australian Catholic University**

Dice, cards, spinners and dominoes are all resources that entail an element of chance. These resources can be effectively implemented into a wide range of tasks in the primary classroom. While addressing various skills, the elements of chance can be explored. This is a participatory workshop using these resources to explore chance while addressing computation.

Theresa is currently a lecturer in primary mathematics for Early Childhood and Primary pre-service teachers on the Canberra campus of ACU. She has a wide experience in primary school education, both in class and on school executive. She has participated in many mathematical projects and has implemented current maths programs in primary schools. Provision of professional development for primary teachers and parent workshops are a current interest as is supporting students with learning difficulties.

## **The Mechanics of the ACT College Scaling System – What are they doing with my scores?**

### **Ed Staples**

The Office of the Board of Senior Secondary Studies in the ACT introduced a more robust scaling system for the new millennium, but the move came at a price. What was an easily understandable regime became technically complex and dynamic and mathematically difficult to describe. This workshop is designed to assist stakeholders' with their understanding of the scaling regime, including a description of method of moments linear scaling that sits at the heart of it all. The workshop will also cover insights around Z scores, linear scaling and skewed distributions, which all impact sharply on the quality of ATAR results.

Ed Staples is a recently retired ACT Secondary College Mathematics Teacher. Over many years he has taken a pivotal role in developing effective teaching strategies for the modern Mathematics classroom, including a number of significant ICT initiatives and the establishment of the Fertile Question at his home college. Over many years he has conducted workshops at local, interstate and national conferences. Just recently, Ed has become involved in promoting discussion around the ACT senior secondary scaling regime, and to this end has written a discussion paper for the Canberra Mathematics Association (see CMA Website).



## Multiplication for Primary Classes

**Greg Taylor and Deb Sayers – *ACT Education and Training***

This workshop will have participants explore the concept of multiplication through discovering patterns in multiplication and then extending these beyond the traditional 10x10 times table. This workshop, aimed for primary school teachers, will look at a suggested order to teaching the basic facts; how to extend these to more complex multiplication; explore commutativity; and engage in activities to use in the classroom. Participants will receive a set of lesson ideas and templates for each of the strategies that are explored during the workshop.

Greg has been teaching in the ACT for the last ten years. He has taught in both Primary and Middle school settings working with low level through to specialist G&T classes. Early last year Greg moved to the ACT Education and Training Directorate to take up a position of Numeracy Executive officer where he enjoyed working with schools to improve mathematics pedagogy. This semester he has taken a position at the University of Canberra as a Clinical Teaching Specialist where he is working with pre service teachers in maths and technology units.

Deb is a committed teacher of mathematics who spends her days getting kids excited about the possibilities that mathematical understanding will provide. She has worked in 4 ACT primary schools and is now the Numeracy Coach at Harrison P – 10 school. Teaching students ranging in age from 4 to 15 Deb is able to bring her knowledge of Middle Years Mental Computation (MYMC) to every classroom to develop the critical lifelong understanding of this important skill. Deb specialises in engaging the disengaged and enthusing the unenthused.

## The Most Engaging Digital Maths Resource For Your Classroom: Mangahigh.com

**Darryl Van Leerdam – *Mangahigh.com***

Mangahigh has revolutionised the way we engage students in our maths classrooms. With interactive games and clever adaptive quizzes, all mapped to the Australian Curriculum, you will see dramatic improvements in your students' attitudes towards learning maths! Mangahigh offers a proven games-based approach that encourages procedural fluency without sacrificing rigorous pedagogy and concept development. Students of all ability levels are enthusiastic to learn fractions, master trigonometry, and perfect their skills in factorising quadratics, thriving on the healthy competition between students and schools that is inherent in the Mangahigh platform. Come and join us in this session to see how this is all possible, and receive your FREE 30-day trial!

A former secondary Maths and Science teacher, Darryl has been involved in the delivery of mathematical resources and sales for the last 5 years. He has been with Mangahigh.com for the last 6 months and is thrilled to be representing a product that really works in engagement of students and the breaking down of the poor attitudes so often exhibited toward mathematics.



AUSTRALIAN MATHEMATICS TRUST



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