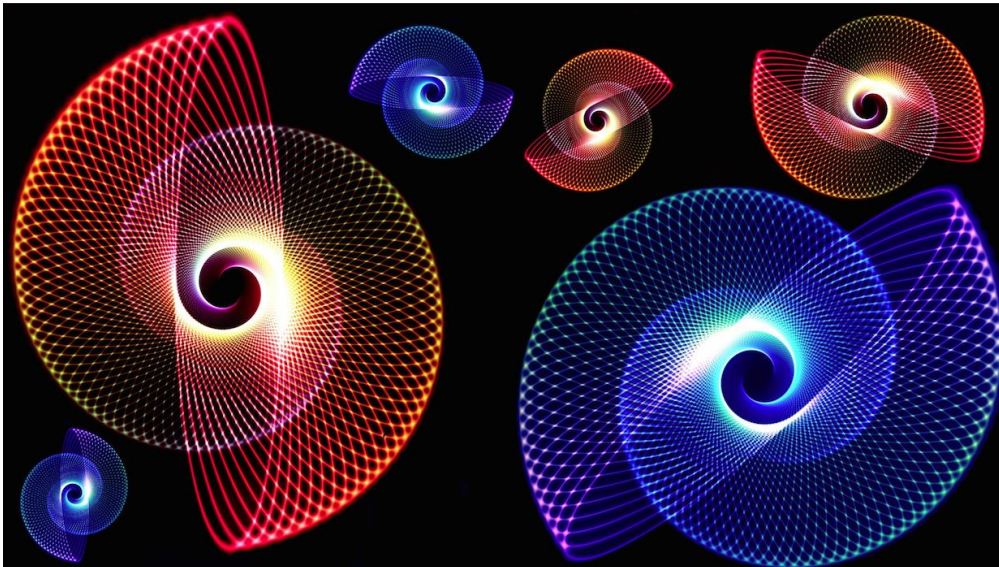




THE UNIVERSITY OF
SYDNEY



STEM INTO ACTION: PREPARING FOR THE CLASSROOM

Friday 30 September 2016
9am – 3pm

Aerial Function Centre, UTS
Building 10 Level 7
Jones St Ultimo

FINAL PROGRAM

This **one day conference for Mathematics and Science pre-service teachers** is supported by a grant from the Office of the Chief Scientist through the IMSITE (*Inspiring Mathematics and Science Initial Teacher Education*) project. It is designed to connect Mathematics and Science pre-service teachers with Mathematicians and Scientists from across the Sydney region.

The aim of the conference is to **prepare pre-service teachers for their first appointment** in secondary schools by addressing the eternal question posed by secondary students:

When are we ever going to use this?

During the keynote and workshops, scientists and mathematicians will examine the many ways their research links to the secondary school curriculum enabling pre-service teachers to consider how they can make lessons more interesting and engaging for their students.

8.30 am	Registrations
9 am	Welcome and introductions – Assoc. Prof. Judy Anderson and Assoc. Prof. Anne Prescott
9.15 am	<p>Keynote addresses</p> <p>The Science of Body Farms – Prof. Shari Forbes, the University of Technology, Sydney</p> <p>There are an increasing number of scientific facilities in the USA – and now Australia – that study death and the process of decomposition in a natural environment. These facilities are colloquially referred to as 'body farms' and are integral for forensic scientists to understanding the death and decay processes. While body farms may seem gruesome, they play a valuable role in criminal investigations. The findings from these facilities can assist police by estimating time since death or identifying victim remains. This information may be essential for locating and recovering missing persons, victims of homicide or mass disaster victims.</p> <p>The hidden science of latent fingerprints. Dr Xanthe Spindler, the University of Technology Sydney</p> <p>Fingerprints have been one of the pillars of forensic science casework for over 110 years. Forensic scientists now have an arsenal of techniques for detecting latent fingerprints beyond traditional powdering. The continual drive to develop more powerful techniques has not only required a global research effort spanning the enabling sciences such as physics and chemistry, but has also uncovered just how little we know about the science behind these invisible traces.</p>
10.15 am	Networking
10.30 am	Morning tea
11.00 am	<p>Seeing maths for real – Dr Mary Coupland, The University of Technology, Sydney</p> <p>When I had a serious interruption to my vision I decided to find out all the mathematics I could that was relevant to the way that our retinas work, and how they can be repaired. I was surprised to find applications for calculus, for statistics, for measurement and even inverse trig functions.</p>
11.00 am	<p>What can a chemical engineer do with a nuclear reactor? – Dr Stuart Prescott, UNSW</p> <p>Designing new consumer products like shampoos and paints combines science and maths in intriguing ways. We learn how molecules will stick to surfaces and change surface tension by looking at their chemistry, we measure these properties using neutrons from a nuclear reactor and we use maths to calculate, predict and optimise the performance. We'll look at the experiments we perform, how we analyse the results and how that lets us develop better products.</p>
11.00 am	Cuberider , the University of NSW
12.00 pm	<p>Tessellations in Art, Nature and Technology – Assoc. Prof. Leon Poladian, The University of Sydney</p> <p>We will explore the mathematics behind tessellations starting with some of the architecture from the Alhambra in Spain, and in the art of M.C. Escher. We will have a look at periodic structures that occur inside biological structures (such as iridescent butterfly wings) and also in crystals and minerals. Finally we will look at some modern technology that relies on periodic structures.</p>
12.00 pm	<p>Adventures in biology: How “When are we ever going to use this?” became “why didn’t I learn this?” – Assoc. Prof. Dieter Hochuli, The University of Sydney</p> <p>The interdisciplinary nature of cutting-edge science has created a need for graduates who can work across traditional disciplines. I will outline examples of how seemingly esoteric themes from chemistry, maths, physics and even the social sciences have impacted upon my biological research and the diverse career destinations of my students. I will also show how scientific literacy at a broader level enhances opportunities for students in an uncertain future, where the shifting nature of employment will value problem-solvers with the ability to work across disciplinary boundaries.</p>

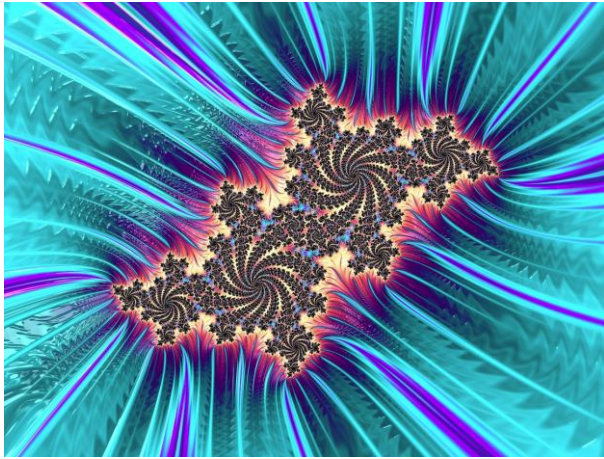
12.00 pm	<p>You gotta teach it, so it may as well be fun...Statistics - Peter Howley, The University of Newcastle</p> <p>Statistics isn't simply analysis of someone's data. Consider the question 'upon how many people must we test a new medication to identify it is a success?' – statistical methods answer this when designing clinical trials! Statistics is key within the design, execution, collection, analysis, identification and communication of conclusions surrounding an investigation addressing a problem. Significantly, Statistics in practice is undertaken with a problem at hand and a context within which an investigation (from design to conclusion) is conducted to ultimately support decision-making, whether it be in health, economics, business, science, social sciences, forensic anthropology, and so on. The National Schools Poster Competition enables teams of students to engage in such practice; this project-based learning activity will be described and discussed.</p>
1.00 pm	Lunch
2.00 pm	<p>Modelling infectious disease - Professor Jim Denier, Macquarie University</p> <p>In this talk I'll give an example of a very simple mathematical model that can be used to explore some of the ideas behind the spread of diseases. By considering a population in which people are split into three classes, those who are susceptible to the disease, those who have the disease or those who have recovered, we can start to explore whether a vaccination program will work in eradicating the disease. The talk will use a little bit of algebra, linked in with some discussion of rates of change, to provide some predictions as to how hard it might be to eradicate some common diseases such as measles or whooping cough.</p>
2.00 pm	<p>Bees with Backpacks – Assoc. Prof. Anne Prescott, The University of Technology, Sydney</p> <p>Globally, bee populations are in serious decline and, since our agriculture is dependent on them, we need to know more about how they live. How do scientists research bees and how can we use their research in the classroom? This workshop will illustrate several ways that teachers can use these ideas in the classroom.</p>
2.00 pm	Jurgen Shulte, the University of Technology Sydney
3.00 pm	Evaluation and Certificate of Attendance
3.10 pm	Optional extra (20 places only) – visit the UTS Data Arena (30 minutes)

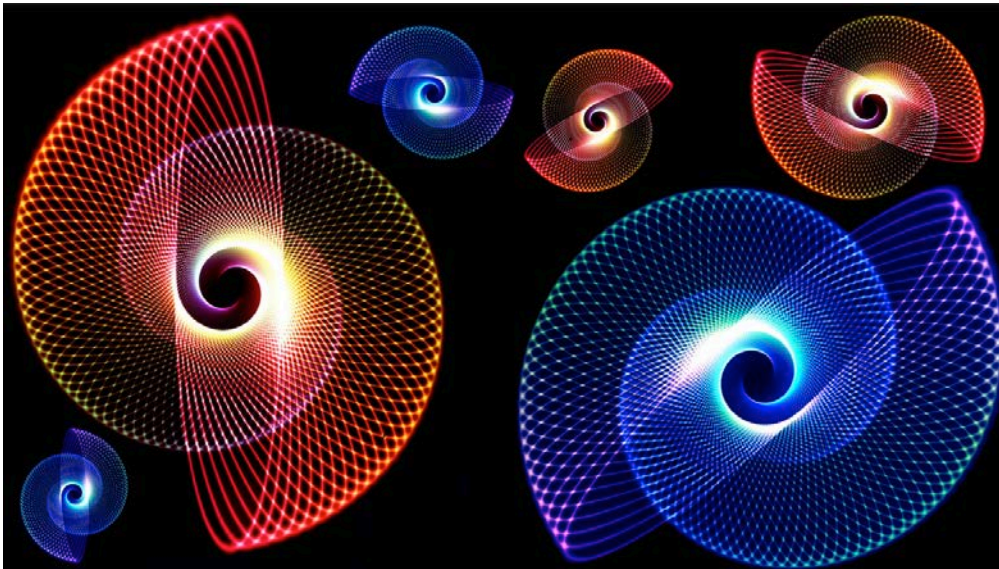
During the day, you will also be able to browse displays from education providers including:

- The Mathematical Association of NSW
- The Science Teachers association of NSW
- The Department of Education
- Casio Education

We look forward to meeting you on the day.

Assoc. Prof. Judy Anderson, (Uni of Sydney) & Assoc. Prof. Anne Prescott (UTS, Sydney)





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Pre-service mathematics and science teachers from the Sydney-based universities are invited to attend but the numbers are **strictly limited to 120 places**. Register now and pay \$20 to secure your place. Upon arrival at the conference venue, you will receive a 'teacher starter kit' valued at over \$50. **Morning tea and lunch will be provided at no extra cost.**

The link to register for the *STEM into Action: Preparing for the Classroom Pre-service Teacher Conference* on Friday 30 September 2016 is:

http://www.sydney.nicheit.com.au/education_social_work/register.php?wsid=ws0711

Your \$20 payment must be made by Credit/Debit Card to confirm a place

Here is the plan for the day:

8.30 am	Registrations		
9 am	Welcome and introductions		
9.15 am	Keynote address		
10.15 am	Networking		
10.30 am	Morning tea		
11.00 am	Workshop A1	Workshop A2	Workshop A3
12.00 pm	Workshop B1	Workshop B2	Workshop B3
1.00 pm	Lunch		
2.00 pm	Workshop C1	Workshop C2	Workshop C3
3.00 pm	Evaluation and Certificate of Attendance		
3.10 pm	Optional extra (20 places only) – visit the UTS Data Arena (30 minutes)		

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When the program has been finalized, it will be emailed to you.

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