# STERA STERA Conference 26 November 2021 Underdale High School





The Mathematical Association of South Australia Inc

# Conference Program

How does STEM help us battle threats to our world?

Sponsored by:



## Timetable

8.15am	Registration   Tea & Coffee	Performing Arts Foyer
8.45am - 9.00am	Welcome & Housekeeping	Theatre
9.00am - 10.00am	Keynote Presentation	Theatre
10.10am - 10.35am	Morning Tea	Performing Arts Foyer
10.40am - 11.40am	Workshop Session 1	Building 2A
11.45am - 12.45pm	Workshop Session 2	Building 2A
12.45pm - 1.45pm	Lunch	Performing Arts Foyer
1.50pm - 2.50pm	Workshop Session 3	Building 2A
2.55pm - 3.55pm	Workshop Session 4	Building 2A
4.00pm - 5.00pm	Happy Hour	Performing Arts Foyer

## **Keynote Presentation**

#### **Doctor Melanie Farrier**

Assistant Director of Inclusion, Defence Science Technology Group

Dr. Melanie Farrier is a Biomedical Nanotechnologist and Combat Engineer Officer and is currently working with Defence Science Technology Group managing their Science in Australia Gender Equity (SAGE) Program.

Melanie's PhD led to a new concept for formulating nanomeshes as an effective drug delivery platform of antibiotics, reducing dosages of antibiotics and preventing infection. Her work has potential implications in the treatment of burns victims as well as the remote treatment of wounds.

Melanie has received the Kelly Services SA Young Scientist of the Year Award (2019), has been a finalist twice in the Women in Innovation Award (2015, 2016), received the Prince of Wales Award (2018) and was a finalist in the SA Young Achiever Awards (2020), among others.

Melanie is the Secretary for the Women in Chemistry group as part of the Royal Australian Chemistry Institute in South Australia.

## **Environmental Impact**

#### Catering

The caterers will provide bamboo compostable plates and cutlery for the event to reduce the amount of waste being sent to landfill. Please be sure to place these items in the green/organic bins provided around the venue.

#### Printing

All conference information will be available online this year, including the program. Delegates will have wi-fi access at the conference so please bring along a device to access these details.

We have also encouraged presenters to consider electronic distribution of workshop resources to reduce the amount of printing and paper used at the conference.

The conference evaluation will be sent electronically after the conference and a PDF copy of your certificate will be sent via email the week following the conference.

#### Satchel inserts

Delegates will be provided with a satchel which will include information from SASTA, MASA, sponsors, trade displays and others – whose support is vital to conferences such as this. Please take this information back to your school for the interest of colleagues before recycling material.

#### **Creating Impact in STEM**

Education plays a significant role in students choosing their direction for future study as well as their careers. By year 10, 60% of students have already chosen a broad area of study which aligns with their desired career path. With teachers helping to shape their students futures, how can we have the most impact on assisting students to consider STEM as a career? Research also shows that girls and young women are less likely to choose STEM subjects, and that teachers and parents heavily influence their perceptions of STEM. So what can we do to encourage more young girls and women to follow a STEM path? I'd like to share my journey through STEM, the influences that led me to my career path and how I think you can make an impact on your students.

## Workshop Sessions 1 & 2

	Session	Title	Presenter/s	Learning Area(s)
10.40am - 11.40am	1.01	Engaging students in STEM through the power of film	Jennifer Chalmers, The Royal Institution of Australia	Mathematics, Science (years 6-11)
	1.02	Engineering Education	David Dempsey, Analytic Business Partners	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)
	1.03	Dogball	Alastair Lupton, Adelaide Botanic High School	Mathematics (years 10-11)
	1.04	Where does theory start? Practical approaches to learning and assessing Science Understanding	Dr Alix Verdon & Savin Sindhu, ASMS	Science (years 6-11)
	1.05	SHE: The Task and Writing Questions	Jason Greenslade, Westminster School	Science (years 10-11)
	1.06	Climate change, mathematics and graphics calculators	Barry Kissane, Murdoch University	Mathematics, Science (years 10-11)
	<del>1.07D</del>	Understanding and communicating malaria biology to engage people in the battle against infectious diseases SESSION CANCELLED	<del>Dr Danny Wilson, The University of</del> Adelaide	Science (years 6-11)
	1.08D	Sticking the facts: Communicating Science Information to a Broad Audience (DOUBLE Session - Part 1)	Jeanne Young Kirby, Flinders University	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)

11.45am - 12.45pm	2.01	School Connections - Building Partnerships between STEM Research and STEM Learning	Michelle McLeod, The University of Adelaide	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)
	2.02	Modelling as a creative narrative tool in STEM	Colin Chapman, Caroline Chisholm Catholic College	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)
	2.03	Creating Open Problems in Numeracy	Stefania Pulford & Mike Jones, Thebarton Senior College	Mathematics (years 6-11)
	2.04	GLOBE, NASA's citizen science program. What might it look like in your classroom?	Bill Flynn, CSIRO Education and Outreach	Mathematics, science (years 6-11)
	2.05	The Science of Indigenous Art: Pigments from the past	Sonya Arnold, Trevor Stephenson & Andrew Ayliffe, Seymour College	Science (years 6-9)
	2.06	Using open access bioinformatic tools to explore biological questions	Masha Smallhorn, Flinders University	Science (years 10-11)
	2.08D	Sticking the facts: Communicating Science Information to a Broad Audience (DOUBLE Session - Part 2)	Jeanne Young Kirby, Flinders University	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)

## Workshop Sessions 3 & 4

1.50pm - 2.50pm	Session	Title	Presenter/s	Learning Area(s)
	3.01	An introduction to ANSTO's data set resources	Bridget Murphy, ANSTO	Digital Technologies, Science (years 6-11)
	3.02	Practical advice on developing and implementing inquiry-based learning	Masha Smallhorn, Flinders University	Science (years 6-11)
	3.03	Carbon capture and storage	Phillip Lemon, James Sobey & Romi Branajaya, Society of Petroleum Engineers	Science (years 6-11)
	3.04	Integrating numeracy in science using hands on science activities.	Tan Sood & Ana Marques Britto, Playford International College	Mathematics, Science (years 6-11)
	<del>3.05</del>	Critical thinking and creativity in assessing maths learning SESSION CANCELLED	<del>Dr Matt Verdon &amp; Dr Andy Stone, ASMS</del>	Mathematics, Science (years 6-11)
	<del>3.06</del>	Strategies for supporting early career teachers' personal & professional wellbeing SESSION CANCELLED	Lizzy Mann, Sacred Heart College	<del>Design &amp; Technologies, Digital Technologies,</del> <del>Mathematics, Science (years 6-11)</del>
	3.07	Making Connections Mathematics as a Human Endeavour	Amber Tomas, ASMS	Mathematics (years 10-11)
	3.08D	SA Science Year 7 to 10 scope and sequence and Science units workshop. (DOUBLE Session - Part 1)	Katrina Elliott, ACARA / Department for Education	Science (years 6-9)
2.55pm - 3.55pm	4.01	Wolfram Research	Kelly Lean, Wolfram Research	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)
	4.02	Escape Rooms – Utilising escape rooms to combat deficiencies in capabilities and the potential within STEM - SESSION FULL	Ross Riach, Escape Education	Design & Technologies, Digital Technologies, Mathematics, Science (years 6-11)
	4.03	Connecting Maths and Biology to Model Disease Spread	Hayden Tronnolone, Flinders University	Mathematics, Science (years 10-11)
	4.04	Llamas, sharks & Covid 19 - what's the connection?	Ann Ruckert, Open Access College	Mathematics, Science (years 6-11)
	4.05	UniSA Connect and Mathematics enables STEM Innovation	Vanessa Gorman, University of South Australia	Mathematics, Science (years 6-9)
	4.06	She teaches SHE	Bianca Warnock, Sciren Pty Ltd	Science (years 6-11)
	4.07	Climate Change for Year 10 Science SESSION CANCELLED	<del>Kelly Sharrad, Geoscience Pathways- Project</del>	Science (years 10-11)
	4.08D	SA Science Year 7 to 10 scope and sequence and Science units workshop. (DOUBLE Session - Part 2)	Katrina Elliott, ACARA / Department for Education	Science (years 6-9)

## Workshop

#### **Session 1** 10.40am - 11.40am

## 1.01 Engaging students in STEM through the power of film

Jennifer Chalmers, The Royal Institution of Australia

Learn how to use films from the 2021 SCINEMA International Science Film Festival in your classroom to engage students in STEM, make realworld connections and become critical thinkers. Encourage students with a passion for STEM to communicate and share their interest by making films and discover how this can be used in the classroom, and map to the science curriculum. It's science education in a creative way.

#### **1.02 Engineering Education**

David Dempsey, Analytic Business Partners

Relevance, Value, Interest & Alignment affect engagement in the classroom, and can be found in real world problems.

Connecting with STEM professionals opens opportunities for skill transfer, career advice, and a wealth of real-world problems, solutions, data, and motivation. CSIRO STEM professionals are not curriculum nor classroom specialists, but aim to help students find a love for sciences through you, their educators.

Real world problems inspire students showing why material is taught. Learning is valued as it allows power over a valuable real-world problem. Students can find a part of the problem in alignment with their individual genius and interest. Problems are 'messy' requiring multiple approaches to solve.

System Engineering covers Analysis, M&S, Planning, Accounting, Psychology, Technical Reading,

optimisation, trade-offs, system synthesis, test etc. True STEAM learning.

Through examples, I will show you ways to inspire and enthuse your students to greater success.

#### 1.03 Dogball

Alastair Lupton, Adelaide Botanic High School

Dogball - a study in bounce

Come along and get to know Dogball - the unofficial mascot of this year's STEM conference. He is quite the enigma, a bouncy toy exterior hides the rich yet accessible modelling task within; a delicious intersection of maths and science, a potential folio task for Unit 2 Maths Methods with low floor, high ceiling and room for unique student responses, and just a great bit of maths.

This workshop will share the adventures of Dogball via a freely available video introduction. It will give you a chance to think about how a simple physical situation leads to some thought-provoking data and to think about how the functions studied in Stage 1 Mathematical Methods could be used to model such data. You will have access to the video materials, complete data set, support materials demonstrating some deft use of technology as a modelling tool, and even an assessment task sheet!

## 1.04 Where does theory start? Practical approaches to learning and assessing Science Understanding

Dr Alix Verdon & Savin Sindhu, Australian Science and Mathematics School

As a discipline, Science is empirical, so our understanding is based on our observations from practical inquiry. When learning Physics many concepts are counter-intuitive and remain very abstract to students. In this workshop we explore how we can use practical inquiry with students to collaboratively develop their understanding of concepts in Physics and build a new intuition. We also explore how individual and collaborative practical activities can be used in assessment in the senior years to surface evidence of student learning of Science Understanding to complement the learning demonstrated through more traditional formats. Participants will have time to explore hands on activities and discuss how they could apply this approach in their teaching either to other concepts in Physics, or more broadly in Science.

#### 1.05 SHE: The Task and Writing Questions

Jason Greenslade, Westminster School

An exploration of the SHE concepts as they relate to the SHE task in Science Stage I and II.

The structure and execution of this task will be explored and task sheets and options will be discussed.

We will then discuss how to write appropriate SHE questions for tests and examinations.

## 1.06 Climate change, mathematics and graphics calculators

Barry Kissane, Murdoch University

We have become accustomed recently to 'recordbreaking' years regarding climate measures, such as those related to temperatures, and then accustomed to the inevitable conversations about the influence or existence of climate change when such records are announced. But how often would records of these kinds be achieved, even with a relatively static climate? In this hands-on workshop, we will consider a mathematical model to consider this scientific question and make use of the technology of graphics calculators to explore the model. We well also verify the model with some available BOM climate data. Bring your graphics calculator with you, although samples and help will be available for those who are new to this technology.

1.07D Understanding and communicating malaria biology to engage people in the battle against infectious diseases (DOUBLE SESSION)

Dr Danny Wilson, The University of Adel ide P Mosquito borne malaria paragraphic is repeated bouts of debilitating ill essentiate death of 450,000 children unger than 5 every year. Spread a stance to our best antimalarials in Sources Asia is of great concern and new ways o combating these parasites is urgently needed. Malaria parasites are fascinating microscopic organisms. They are constantly evolving, ready to cause outbreaks in new communities and are always finding ways to circumvent our best control strategies. Their amazing underlying biology is complex and a lot of research is directed at understanding this complexity so we can design better treatments. Importantly, we use art to help both scientists and the public visualise exactly what makes them tick in a simple and engaging way.

This workshop will describe the burden of malaria parasites, historically and currently one of the most devastating infectious diseases globally, and provide a hands-on opportunity to model its complex biology using claymations.

#### 1.08D Sticking the facts: Communicating Science Information to a Broad Audience (DOUBLE SESSION)

Jeanne Young Kirby, Flinders University

Contributors: Dr Jeanne Young Kirby, Dr Liu Fei Tan, Dr Dylan Irvine

Communicating scientific information in a meaningful and memorable way to a broad audience is challenging for science and nonscience professionals. Nurturing effective science communication skills from an early age is becoming increasingly important to our learners and our community as the incidence of fake and misleading news stories are becoming more prevalent sources of 'go to' information for the general population. Developing these types of communication skills boosts students' ability and confidence to express themselves and their science, as well as prompting learners to consider information presented by others more carefully. Our workshop introduces a fun, interactive and creative way to engage learners in developing their skills at converting some 'unsticky' scientific facts into memorable and relatable snippets for a broad audience.

### **Session 2** 11.45am - 12.45pm

#### 2.01 School Connections - Building Partnerships between STEM Research and STEM Learning

Michelle McLeod, The University of Adelaide (Teacher in Residence Faculty of Engineering, Computer & Mathematical Sciences)

Looking to enhance STEM teaching and learning opportunities through the introduction of partnership with STEM academics, tertiary student mentors and research examples? This workshop will introduce the University of Adelaide's School Connections Pilot Project.

School Connections will allow teachers to build collaborative partnerships with speciality STEM areas from our Faculty of Engineering, Computer and Mathematical Sciences. Linking teachers and students with STEM academics, researchers and students to foster the development of integrated, curriculum linked STEM learning experiences, connected with tangible examples of current, future and emerging STEM research and innovation. Providing a short overview of the School Connections Pilot Project, showcasing examples of STEM curriculum connected teaching and learning resources developed in conjunction with STEM researchers and academics, as well as resources that are available for loan.

## 2.02 Modelling as a creative narrative tool in STEM

Colin Chapman, Caroline Chisholm Catholic College

The Computation, modelling and statistical tools are emerging as a key concern for the Australian Curriculum in Science, Technology, Engineering and Mathematics.

The workshop integrates Wolfram SystemModeler and Mathematica to visualise Susceptible Infected Recovered models in pandemic modelling. Interactions between curves describing susceptible individuals, recovered individuals and the logistic curve that describes the infected individuals in a population will be explored. Explorations will be enabled using manipulatives in the models.

The logistic curve will be investigated beyond pandemic modelling, in contexts such as misinformation, technology take-up, learning and 'crazes'.

Key concepts to be explored include, comparisons of exponential growth with the logistic function, inflection points as the key idea behind 'flattening the curve', reductionism and complexity in modelling activities, idealised and 'realistic' features in models and agile sensibilities in modelling.

## 2.03 Creating Open Problems in Numeracy

Stefania Pulford & Mike Jones, Thebarton Senior College

Open ended problems encourage higher order thinking skills, reveal student thinking and uncover misunderstandings. This workshop offers teachers an opportunity to develop classroom practices to promote higher order thinking & learner created knowledge and allow students to engage in mathematical thinking at any level. The session discusses techniques to support students making their own connections with content and focuses on techniques for questioning, problem solving, creating knowledge & facilitating classroom discussions. There will be a workshop element where teachers have the opportunity to develop their own open questions as well.

#### 2.04 GLOBE, NASA's citizen science program. What might it look like in your classroom?

Bill Flynn, CSIRO Education and Outreach

GLOBE The Global Learning and Observations to Benefit the Environment (GLOBE) Program. Is an international science and education program that provides students and the public worldwide with the opportunity to participate in data collection and the scientific process and contribute meaningfully to our understanding of the Earth system and global environment. The program provides cross curricular activities and investigations about the atmosphere, biosphere, hydrosphere, and soil/ pedosphere, which have been developed by the scientific community and validated by teachers. During the workshop we will look at some of the activities available through GLOBE and complete the introductory GLOBE module.

NOTE - Please bring a laptop or tablet to the workshop to access GLOBE through the venue wifi.

For teachers attending this workshop, if at possible please register to GLOBE before the workshop. This will speed up the process on the day. <u>https://www.globe.gov</u>

#### 2.05 The Science of Indigenous Art: Pigments from the past

Sonya Arnold, Trevor Stephenson & Andrew Ayliffe, Seymour College

It has lasted through ice ages, ocean rises and falls, bush fires and other calamities. How has Aboriginal Rock Art lasted so long? To answer this question, we delve into the chemistry of ancient pigments, binders, and fixatives with a focus on red ochre and its chemical properties. We will explain how you can make ancient paints in the classroom and we will showcase our middle school scientific experiment that tests modern paint against ancient pigments with very interesting results! Come and see how we authentically integrated the new Aboriginal and Torres Strait islander cross-curriculum priorities for science.

## 2.06 Using open access bioinformatic tools to explore biological questions

Masha Smallhorn, Flinders University

In the era of COVID-19, we often hear the terms 'genomic sequencing', 'variant' and 'mutation'. These biological terms are central to the field of bioinformatics, the use of computational resources to understand and draw meaning from scientific data. Whilst bioinformatics is an emerging discipline in education, there is evidence in the literature. that learning to use bioinformatic resources in high school can improve scientific literacy and foster enthusiasm for a career in STEM. In this workshop, we will discuss the skills and foundational knowledge students require so that they can confidently tackle basic bioinformatics. We will look at how bioinformatics can be incorporated into the SACE Stage 1 Biology curriculum. Finally, the workshop will introduce participants to open

access databases and software which can be used by participants to explore basic bioinformatics with their students.

### **Session 3** 1.50pm - 2.50pm

## **3.01 An introduction to ANSTO's data set resources**

Bridget Murphy, ANSTO

ANSTO is home to Australia's expertise for science at the atomic scale. ANSTO scientists have released a selection of their research data for use in the classroom. The data is sourced directly from real scientific investigations. Each data set is accompanied by a worksheet that can form the basis of a series of classroom activities.

Teachers can find ANSTO's data set resources online (https://www.ansto.gov.au/education/ resources/data-sets) and can email the Discovery Centre (education@ansto.gov.au) for a copy of the answers.

In this workshop, we will guide you through one of our data set resources, including an outline of the worksheet and data sheet, links to the Australian Curriculum, and work through some of the graphing and problem-solving activities with you.

## **3.02 Practical advice on developing and implementing inquiry-based learning**

Masha Smallhorn, Flinders University

Inquiry has been described as a teaching method which combines student-centred, hands-on activities with discovery. The educator acts as a facilitator of the learning activity, promoting student discussion and providing guidance rather than directing the activity. Based on the principles of the scientific method, in inquirybased learning students observe a phenomenon. synthesise research questions, test these questions in a repeatable manner and finally analyse and communicate their findings. Inquiry-based practicals have been shown to improve students' engagement with scientific content and overall academic success. In this workshop, we will explore the key elements of inquiry-based learning and discuss how existing traditional practicals can be developed into inquiry-based practicals following some modifications. Advice will be given on overcoming the challenges associated with inquirybased practicals.

#### 3.03 Carbon capture and storage

Phillip Lemon, James Sobey & Romi Branajaya, Society of Petroleum Engineers

Carbon capture and storage (CCS) is gaining increased interest from government and industry as a method to help reduce carbon dioxide emissions. But how do we safely store carbon dioxide underground? This workshop will use hands-on activities to investigate some of the key concepts and science behind CCS. The workshop will also introduce the Energy4me program, created by the Society of Petroleum Engineers to provide accessible information on the energy industry and resources for teachers.

## **3.04 Integrating numeracy in science using hands on science activities**

Tan Sood & Ana Marques Britto, Playford International College

Numeracy is an integral part of the science and math curriculum.

Numeracy involves understanding how data is analysed, described, and presented in graphs, charts, and tables. There is a wide range of knowledge, skills, behaviours, and dispositions relevant to science that is enhanced through developing numeracy.

The science activities created for this session uses 21st century pedagogy to show the connection between skills developed in math and their application to numerical science.

## **3.05 Critical thinking and creativity in assessing maths learning**

Dr Matt Verdon & Dr Andy Stone, Australian Science and Mathematics School

When students think of mathematics seement, minds quickly turn to test. The paper-based or online. At the ASM of the exploring a range of different way of the ASM of the exploring a range of different way of the ASM of the exploring a range of multice of the ASM of the exploring a range of multice of the ASM of the exploring a range of different way of the ASM of the exploring a range of multice of the ASM of the exploring a range of multice of the ASM of the exploring a range of multice of the ASM of the exploring the explore and challenges developed with our Year 10 and Year 11 classes, including portfolio evidence and the use of feedback. We invite participants to explore and create ideas for non-traditional numeracy and mathematics assessment within their own contexts, especially within the STEM areas.

## **3.06 Strategies for supporting early career teachers' personal & professional wellbeing.**

Lizzy Mann, Sacred Heart College

Navigating a successful transition into the reacting profession is essential, especially for the reacting wellbeing and reducing stress to be & Byrom, 2017). However, a significant number of early career teachers experience unnout in their first 8 months (Godal Cooperation and their first 8 months (Godal Cooperation and their first 8 months) (Godal Cooperation and the profession are critical, therefore it is essential to support early career teachers to flourish and thrive, and not languish or barely cope.

This workshop will present both evidence-based strategies to support the professional and personal wellbeing of early career teachers, as well as the teaching experiences of two early career Science teachers, sharing the factors that have helped and hindered their wellbeing.

## **3.07 Making Connections -- Mathematics as a Human Endeavour**

Amber Tomas, Australian Science and Mathematics School

Students often end high school with little idea of career paths in maths, how maths contributes to our society and influences our daily lives, or the relevance of what they're learning. Ultimately this affects Australia's capability to support mathematical innovation in the future.

At the ASMS we have purposefully been incorporating the concept of 'Maths as a Human Endeavour' (MHE) into our learning activities and assessments. Similar in intent to SHE, there is no reason why science should get to have all the fun! The goals of our MHE program are for students to be more aware of the role of mathematics in society, and motivated to follow a career that will see them using maths to solve societal challenges. This workshop will introduce participants to MHE through discussion and hands-on activities. We'll discuss connections to curriculum and results. We hope you will leave having learnt something, had a lot of fun, and being motivated to consider MHE in your teaching!

#### 3.08D SA Science Year 7 to 10 scope and sequence and Science units workshop (DOUBLE SESSION)

Katrina Elliott, ACARA / Department for Education

SA Department for Education has translated the Australian Curriculum into relevant, conceptual and contextual resources. This workshop will focus on the Year 7 to 10 Science scope and sequence, and science units of work and teaching and learning resources.

In this workshop we will explain how content and concepts develop, with specific references to our South Australian context, aligned to the Australian Curriculum to support teachers in their curriculum planning and programming. The science scope and sequence sets out the depth, breadth and rigor students are expected to learn in their year level. In this workshop we will delve into Year 7 to 10 science units and unpack the research used to write them.

#### **Session 4** 2.55pm - 3.55pm

#### 4.01 Wolfram Research

Kelly Lean, Wolfram Research

The knowledge-base that is Wolfram Alpha, has been incorporated for a higher level of education and thinking across a variety of STEM disciplines. From math and science to social studies and music, W|A helps students grasp difficult-to-understand concepts to engage in constantly changing data. Workshop aims to breakdown ways in which students can utilize W|A technology to inject real-world data and explore relevant examples in their understanding of investigative learning. By demonstrating several real-world concepts through the means and curated data of W|A, we will then look at how to access thousands of builtin mathematical functions and datasets, step-bystep exploration, to create interactive documents and presentations suitable to STEM classrooms. Key insights will include; how to access real-world data and how to explore analytical skills through computational thinking.

#### 4.02 Escape Rooms – Utilising escape rooms to combat deficiencies in capabilities and the potential within STEM

Ross Riach, Escape Education

Escape rooms have become highly topular both in the social world but also more dentity for their educational, PBL and Onderlefits.

Escape **Second** Second Second

Personal & Social Capacity capabilities as well as a plethora of highly differentiable STEM opportunities.

Furthermore, they provide a safe and controlled environment to push students out of their comfort zone in a time-constrained, potentially stressful situation to develop resilience and coping skills for a challenging world beyond school.

Escape Rooms provide the opportunity for covert learning where students can develop high-level STEM capabilities and content without ever feeling like they are "doing school". These "working under pressure" and critical thinking skills have vast applications to engineering, defence and a range of other STEM-linked pathways.

This workshop addresses the components and characteristics of a successful escape room for learning and assessment and discusses the various pathways for highly effective STEM integration through conventional approaches to digital technology integration.

#### 4.03 Connecting Maths and Biology to Model Disease Spread

Hayden Tronnolone, Flinders University

Since early 2020, our lives have been affected by COVID-19 and, importantly, the models used to predict its spread. These models combine biology and mathematics to make predictions that will protect people and our health system. Rather than esoteric objects, these models can be made accessible to students in both disciplines. This workshop will introduce a model for disease spread and an implementation of this model in Excel. We will explore how this model can be used to understanding disease modelling and provoke inquiry. This can be used within SACE Stage 1 Biology topic on infectious diseases, exposing

students to concepts from numeracy, and several topics within SACE Stage 1 mathematics.

## 4.04 Llamas, sharks & Covid 19 - what's the connection?

Ann Ruckert, Open Access College

Extensive research has been carried out into camelid (llamas, alpacas & the camels) and shark antibodies since the late 1980s. It has been discovered that these are effective in the fight against a number of viruses, including HIV and coronavirus. Workshop participants will be introduced to the rather quirky background and invited to collaboratively plan a STEM (mainly science & maths, utilising engineering design processes) unit based on the information shared.

## 4.05 UniSA Connect and Mathematics enables STEM Innovation

Vanessa Gorman, University of South Australia

Using explicit cognitive and metacognitive approaches to problem solving is required by all professionals working in STEM areas. Specifically, using mathematical understanding is a requirement when developing all new STEM initiatives.

Teachers need to prepare students to understand 'how' and 'when' to apply their learning to unfamiliar problems. Research suggests that building capacity of students to become selfregulated learners (SRL) assists their academic development. In this workshop we will explore how students' SRL can be developed by linking mathematics and science concepts in a hands-on activity. Year 6-8.

#### 4.06 She teaches SHE

Bianca Warnock, Sciren Pty Ltd

How do teachers engage students in Science as a Human Endeavour (SHE) tasks in a biology class? What exactly does it mean and how do you keep it relevant? Dr Bianca and Dr Deborah of Sciren will be your link to real scientists, research and concepts that seem mysterious to those not from a research lab. Coming from Plant Biotechnology labs in Adelaide, Sciren will provide teachers a chance to engage with the face of science research and help build your understanding of SHE based knowledge.

#### 4.07 Climate Change for Year 10 Science

#### Kelly Sharrad, Geoscence Pathways Project

This workshop will feature the launch of a neuroit on Climate Change developed by a team of the experienced SA curriculum writes. The motion of the Science Curriculum and features local SA content. The workshop of the so provide a brief overview of the so provi





Program correct as of 23 November 2021 but may be subject to change without notice.

#### Thank you to our generous sponsors

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#### **Trade Displays**









# modern teaching aids

#### **Satchel Inserts**

**Essential Assessment** 



#### Venue Map - Underdale High School

**Riverview Dr (access to back of Oval for parking)** 

