



Annual Conference

Our sense of Place

15-16 April 2024
St Peter's Girls' School

Program

sponsored by



anzuk.education

Program overview

Monday 15 April	
7.30 am	Registration & light breakfast
8.50 am	Welcome & Awards Presentation
9.30 am	Keynote Presentation
10.35 am	Morning Tea & Exhibition
11.15 am	Workshop Session 1
12.20 pm	Workshop Session 2
1.20 pm	Lunch & Exhibition
2.15 pm	Workshop Session 3
3.20 pm	Workshop Session 4
4.20 pm	Happy Hour

Tuesday 16 April	
8.30 am	Registration
8.50 am	Welcome & Awards Presentation
9.10 am	Keynote Presentation
10.10 am	SASTA Annual General Meeting
10.40 am	Morning Tea & Exhibition
11.15 am	Cutting Edge Session 1
12.20 pm	Cutting Edge Session 2
1.20 pm	Lunch & Exhibition
2.10 pm	Workshop Session 5
3.15 pm	Workshop Session 6
4.15 pm	Happy Hour

8.50 am

Welcome & Awards Presentation (Chapel)

9.30 am

sponsored by



Keynote Presentation 1 (Chapel)

Knowing Country and walking with First Nations to enrich Education

Tiahni Adamson, Lead Community Engagement Officer - CH4 Global, Young Australian of the Year (SA)

Tiahni Adamson is a Kaurareg woman and a passionate wildlife conservation biologist.

She is a proponent for the participation of First Nations people and women in STEM careers and was recognised as one of Science and Technology Australia's Superstars of STEM and an InDaily South Australian 40 Under 40 for 2023.

Tiahni has worked with the CSIRO on Indigenous education programs, trained under Al Gore as a Climate Reality Leader in 2019, works as a lecturer and tutor at the University of South Australia, is on the National Leadership Team for Seed Mob (Australia's only First Nations led youth climate justice group), was a youth dialogue member for the Uluru Statement from the Heart, and is currently improving sustainable aquaculture production in her role as the Lead Community Engagement Officer at CH4Global.

Tiahni has received the Dr Kay Price AM Award for demonstrated excellence in and ambassadorship for STEM, and was also one of two students to be awarded the inaugural Indigenous Time at Sea Scholarship from CSIRO's Marine National Facility.

Tiahni was also announced as this year's 2024 South Australian 'Young Australian of the Year'.



10.35 am

Morning Tea & Exhibition (Performing Arts Centre)

11.15 am

Workshop Session 1

1.01 Student Agency in Primary Science (Room: CW301)

Alexandra Fowler, Woomera Area School

primary, middle

This session focusses on how we have embedded student Agency in a multi-aged Lower Primary Science class. It will explore what we are doing and how we are working with students at Woomera Area School to encourage student agency in their learning while meeting curriculum requirements and providing students opportunities for stretch. This session will have real-world examples of what has been done so far as well as reflections on going ahead. It will be a time when teachers can swap ideas and strategies while also reflecting on what might work within individual contexts. There will be flexibility to explore what student agency is, connect with like-minded teachers and develop possibilities.

1.02 Pigments from the Past (Room: SC301)

Trevor Stephenson, Seymour College

middle

This workshop looks at a scientific inquiry into how and why Aboriginal Rock Art has lasted tens of thousands of years, while modern house paint lasts closer to 10 years. To do this we looked at the chemistry of paints, including traditional pigments-based paint. Students made their own paints and devised an experiment to test them under various environmental conditions. The students use an assortment of modern and traditional fixatives, binders and substrates to answer their own hypotheses and provide evidence-based conclusions.

1.03 STEM Explorers: Design Challenges for Real-World Learning (Room: CW303)

Claire Hughes, The University of Adelaide

primary, middle

In this dynamic workshop, educators will explore the power of design challenges in incorporating real-world contexts into STEM lessons, discovering their potential to engage students authentically. Participants will explore how design challenges can spark creativity, critical thinking, and collaboration while addressing authentic problems in society. Through hands-on activities and interactive discussions, educators will explore the principles of effective design challenges and learn how to structure them to align with curriculum goals.

Join us for an inspiring exploration of how design challenges can foster a sense of purpose and relevance in STEM education, providing students with the tools and mindset they need to thrive in an ever-changing world.

1.04 The Science of the Ridiculous (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

The every day, all around us, is filled with so much wonder that we are flooded by it. We make the extraordinary normal. We forget to take time to play, to be silly, and to find the little sparks that turn it back into the extraordinary, the ridiculous.

In this workshop, we will start playing with science (if necessary, applying it to the curriculum). Fun will be had with (but potentially not limited to):

- People and their reactions
- The mind and what it can hold
- Colours
- And Food

1.05 Innovations in Assessment: a place for all students in evidence of learning (Room: CW305)

Lara Lang, ASMS

middle, senior

Our curriculum documents tell us what students should know and do - but how do you assess that? How do you support every student to find success in their learning, track progress (not just achievement at points in time), celebrate a continuous journey of discovery that's unique for each student, and build reflective learners that have agency in their own learning? We will showcase our explorations and experiences with Natural Evidence of Learning where students curate evidence of their learning over time, with feedback through personalisable rubrics for each student.

1.06 Making Senior Science Accessible for All Students (Room: CW306)

Stefania Pulford, Thebarton Senior College

senior

How people process information depends on the specific wiring of our individual brains and the implications these processes have for how our students can access classroom instructions and content are often difficult for teachers to navigate. This workshop explores a variety of innovative teaching and learning strategies that can be used to engage all students, including multisensory scaffolding and activities to improve higher-order thinking.

The workshop will model these strategies and provide teachers with practical solutions to engage a diverse range of learners and is ideal for teachers who are looking for new ways to engage their students and help them achieve their full potential.

1.07 Mozzie Monitors in Schools (Room: SC303)

Craig Williams and Christie Byrne, University of South Australia

primary, middle, senior, lab officers

Mozzie Monitors introduces students to the world of Medical Entomology. Following an initial discovery of existing student knowledge, students are then introduced to the range of medically important insects, ticks and lice. Students then do activities to develop knowledge of mosquito biology, anatomy and diversity, and gain practice in observation of wild caught insects and identifying key features. Finally, students are shown how mosquito traps work and how anyone can contribute to mosquito studies through citizen science around their own homes. An additional optional program feature is for teachers to join the Mozzie Monitors program, obtaining a trap and instructions for use with their class in the following weeks.

12.20 pm Workshop Session 2

2.01 Effective learning in science (Room: SC301)

Katrina Elliott

primary

Designing creative and curious science learners. We know curiosity disappears when the focus is on right/wrong answers, but is best when it's 'almost knowing'. Creativity includes risk taking, playfulness, using imagination and intuition in learning. Collectively we will consider: How can we design tasks that includes how learners feel, think, learn with others and manage the process of learning? How can we design tasks which stretch, require resilience and 'having a go'? Effective learning dispositions support children to deal with change and challenges throughout life as well as being engaged to learn science.

2.02 Encouraging student understanding of Indigenous Australians by incorporating highly engaging pedagogies (Room: CW301)

Danielle Pedler, St Columba College

middle

The First Nations people of Australia have a vast knowledge and understanding of the world around them. Cultural understanding has been passed down through generations as the First Nations communities of Australia maintain a deep connection to, and responsibility for, the land, sea, sky and waterways they hold connection to.

Young scientists today can learn from these practices and traditions and develop a greater understanding of the world around them if exposed to highly engaging, and innovative teaching practices and dynamic learning experiences. This workshop will explore a dedicated unit of work that focusses on the practices of the First Nations People and their understanding of the world, and how this ties in with students' own cultural traditions in a highly diverse school community.

2.03 Chemistry Capers - Exploring High School Chemistry (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

Are you looking for ways of collecting data related to experiments in the Australian Curriculum - Chemistry (Especially when experimenting at home)?

This workshop explores Chemistry using a variety of Vernier Dataloggers and probes.

Multiple workstations will be used for participants to experiment with support from our presenter. Some of the topics covered will be:

- Chemistry at home
- pH and household chemicals
- Boyle's Law
- Guy-Lussac's Law
- Beer's Law

2.04 Back to Basics - Tracker software for Physics and Chemistry (Room: CW302)

Paul Gavini, Modbury High School

middle, senior, tertiary

This workshop focuses on the utilisation of the free, cross platform 'Tracker' software for use in Physics and Chemistry practicals. The session is designed for educators and students to gain proficiency in integrating this technology into their scientific pedagogy and research.

In the physics module, participants will engage with 'Tracker' to analyse motion in videos, deriving quantitative insights into distance, velocity, and acceleration and other measuring tools suitable for Mathematics. The workshop will demonstrate the software's capability in graph construction, extrapolation, and mathematical modelling within the data tool, thus enhancing the comprehension of physical phenomena through visual and numerical representations.

Transitioning to chemistry, the session will explore 'Tracker's application in measuring reaction rates and conducting colourimetric analysis. Attendees will learn to employ the software for real-time monitoring and quantification of chemical reactions, offering a deeper understanding of reaction kinetics and colour changes as indicative markers in chemical processes.

The workshop intends that participants leave with a concrete understanding of 'Tracker's functionality in scientific experiments.

2.05 Doing Data Science with Astronomy (Room: CW303)

Robert Hollow, CSIRO, Space and Astronomy

senior

Astronomy is a discipline in which real scientific data is freely and easily accessible, making it an ideal area for first-hand and second-hand student investigations and engaging projects. Local and international datasets, where to access and how to use them to engage and challenge students are introduced. Topics from exoplanets, pulsars and galaxy classification are explored, with key databases and science tools being identified. Participants will work through examples of some datasets and use online tools for data analysis that they can readily implement in their classrooms. Participants will need to bring a device to work on.

2.06 Innovation in the Dumbest Places (Room: CW304)

Teresa Janowski, Stem Fasttrack

primary, middle, senior, lab officers, tertiary

Join Teresa for an engaging hour of exploration into the realm of wacky innovations. In this session, participants will discover that the journey of ideation, from conception to realization, holds far greater significance than the end product itself. Through captivating anecdotes and interactive exercises, Teresa illuminates the inherent value of the creative process, emphasizing the power of thinking outside the box, brainstorming freely, and fearlessly testing unconventional ideas.

Throughout the session, attendees will be inspired to embrace experimentation and cultivate a mindset that celebrates failure as a stepping stone to success. By debunking the myth of the 'perfect idea' and championing the importance of iteration and refinement, Teresa empowers individuals to unleash their creativity and unlock their full innovative potential.

Whether you're a seasoned innovator or just embarking on your creative journey, Teresa's insights will challenge your preconceptions, spark your imagination, and equip you with practical strategies to approach problem-solving with renewed vigour and enthusiasm. Prepare to be entertained, enlightened, and inspired as Teresa guides you on a whimsical adventure through the fascinating world of wacky innovations.

2.07 Educating Australia's Renewable Future with STELR (Room: SC303)

Graham Stock, Australian Academy of Technological Sciences and Engineering

primary, middle, senior, lab officers

In this workshop, learn how to apply the suite of STELR resources available from the Academy of Technological Sciences and Engineering in your classroom. STELR resources are focused on renewable energy, with kits relating to wind, solar and hydro energy generation, as well as solar powered electric vehicles and sustainable house design.

This workshop is suitable for both primary and secondary teachers, from all levels of experience in science education.

1.20 pm

Lunch & Exhibition (Performing Arts Centre)

2.15 pm

Workshop Session 3

3.01 Enlivening your classroom

David Le Cornu, Nature Education Centre

primary, middle

This session will introduce you to the range of resources and activities that the Nature Education Centre can provide for you to enhance your learning environment. Meet some of our animals and specimens that are available for short-term loans. Explore some of our kits that are linked to the national curriculum and experience some of the animals that we use for talks and presentations.

CANCELLED

3.02 Changes to the Australian Curriculum version 9: the hidden gems within the curriculum from one of the writers (Room: CW303)

Katrina Elliott

primary, middle

The Australian Curriculum is based on research and uses a conceptual framework to engage students to think and act scientifically. The new core concepts were developed in version 9 for Science as a Human Endeavour and Science Practices (Inquiry) to build on the dispositions, understanding, and skills of learning science. The Key Ideas have been woven throughout the content descriptions and Year level descriptions to support the application and interconnection of scientific concepts. The conceptual progression within each strand enables students to learn content relevant for their context.

3.03 A Healthy Land - Measuring the environment with Vernier dataloggers (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

The natural world is made-up of many complex systems that connect together.

This workshop will look at using datalogging to measure various environmental conditions in plants, the soil and water.

- Looking at chlorophyll in plants
- Investigating plant photosynthesis
- Investigating respiration
- Abiotic conditions
- Water analysis

3.04 Exploring the Cosmos: Integrating Dark Matter Science into Classroom Curriculum (Room: CW301)

Jackie Bondell, University of Melbourne / Dark Matter Centre

middle, senior, tertiary

In 2024 the SABRE Dark Matter experiment takes residence one kilometre beneath the Earth's surface at the Stawell Underground Physics Lab, setting the stage for unparalleled scientific exploration. The ARC Centre of Excellence for Dark Matter Particle Physics leads this initiative, fostering collaboration among experts to unveil dark matter secrets and cultivate future science and engineering leaders.

In this workshop, teachers engage in hands-on activities featuring curriculum-aligned activities spanning Years 7-10 and Physics. Explore topics like scientific inquiry, gravity, and elementary particles like muons, seamlessly integrating dark matter detection into lessons. This unique opportunity showcases cutting-edge Australian science, enriching teaching and learning experiences.

By participating, educators elevate their students' education and contribute to disseminating Australia's latest scientific advancements. The workshop empowers teachers to adopt an innovative approach to science education, actively shaping the integration of dark matter science into the national curriculum.

3.05 Understanding Our Sense of Place Through Earth and Environmental Science (Room: CW302)

Kelly Sharrad, Geoscience Pathways Project

senior

This workshop focuses on providing students with a sense of Place through the SACE Earth and Environmental Science subject. The world is currently facing a climate crisis and understanding our impact on the planet we call home and our role as part of the solution is integral to our future.

SACE Earth and Environmental Science (EES) allows students to explore new sustainable solutions when using Earth's resources. It also increases their awareness of the interconnectedness of Earth through the four spheres; biosphere, hydrosphere, geosphere and atmosphere. These spheres are significantly impacted by human activity and require people to find solutions to ensure the balance on Earth is maintained. The external assessment for SACE EES is a long-term field study that teaches students conceptual thinking and skills required in climate action-related careers tackling the climate crisis.

3.06 Maximising Learning with AI prompts (Room: CW304)

Ange Travers, Xavier College

primary, middle, senior

Dive into the exciting world of Artificial Intelligence (AI) designed just for classrooms! In this fun and interactive session, we will explore how AI can make teaching easier, get students more engaged, and help cater to different learning needs. Make sure you're signed up to ChatGPT before joining this workshop.

We'll start by exploring how AI can create personalised resources for each student, making learning more tailored and effective. Then, we'll see how AI can assist with research tasks. We will learn how to design some AI-powered learning games that make studying feel like a breeze!

AI isn't just for fun and games. We'll also discover how it can supercharge exam preparation, providing practice questions and feedback in an instant with a personalised AI tutor.

By the end of our time together, you'll have practical tips and tricks to bring AI into your classroom, using tools like ChatGPT and Copilot to make teaching a whole lot easier and more exciting. Whether you are a tech pro or just starting out, this session is packed with easy-to-use strategies to level up your teaching game. Let's make AI your new favourite teaching tool!

******(Many tools for senior school however this workshop is suitable for teachers of all years).

3.07D Practical Decon and Design in the Junior Science Classroom (7-10) - Tips, Strategies and Hands on Experience (DOUBLE SESSION) (Room: SC301)

Jason Greenslade, Westminster School

middle, senior

In this workshop, we will examine the important role that practical design plays in the middle school science classroom. We will begin by looking at a practical task that could be given (and differentiated) and then talk through strategies to teach/brainstorm this in the classroom. A variety of ICT tools will be employed to get students to brainstorm to a group in real time. We will then discuss how students might show some basic evidence of this design before moving to the practical component. Attendees will have the opportunity to carry out a practical and then we will do some analysis of the data at the end and talk through errors in a way that might help middle school students 'get it'.

In short; the entire practical process will be modelled (in a shortened timeframe) to allow participants to see how it might work in their classroom and they will leave with a new task and some other new tools.

3.20 pm Workshop Session 4

4.01 Nature-Inspired Science Education (Room: CW301)

Thomas Man, Neuplex

primary, middle

How differently does teaching science using nature impact student learning, compared to classroom, laboratory or virtual experiences? This session explores three important aspects of nature-inspired science education: 1. Observing/measuring nature 2. Biomimicry 3. Student well-being through connections with nature

4.02 South Australian Aboriginal Contexts in Science (Room: CW302)

Caroline Dean, Department for Education

primary, middle

Come and explore what learning looks and feels like with curriculum resources that bring together First Nations Peoples of Australia Cultural knowledge with science concepts. We will look at primary and secondary teaching and learning resources showcasing Aboriginal contexts specific to South Australia highlighting the importance of Aboriginal People's deep connection to Country.

As well as engaging science learning we will also look at advice developed in consultation with Aboriginal Knowledge Holders, Nations and Communities with teacher tips and alerts that articulate language/ terminology and sensitivities appropriate when describing Aboriginal ways of knowing.

These resources developed by the Department for Education SA Aboriginal Contexts in Science Initiative promote ways for students and teachers to engage in reconciliation, respect, and recognition of the world's oldest continuous living cultures.

4.03 STEM approaches using Data Loggers (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

"STEM is science where you think with your hands". Are you looking for ways of embedding STEM activities into the Australian Curriculum? Are you looking for a way to revive and extend your existing science equipment? This workshop will use Vernier data loggers to explore different STEM experiments. Topics will include:

- A reimagining of the classic Egg Drop experiment to include data and tie it to the Curriculum;
- Using Vernier probes with Arduino and Scratch;
- A look at how to build the Microsoft robotic hand challenge;

4.04 Systems Thinking: Seeing South Australia as a whole (Room: CW303)

Deborah Devis, University of South Australia

middle, senior, tertiary

How is a wombat related to the moon? What does algae have to do with the bus I took to work this morning? It is all about systems.

To properly understand the environment, sustainability, and even the nature of science itself, we need to look at the big picture. Everything works together and affects each other, and when we take a step back we can see it as a thriving, ever-changing system.

However, thinking at the level of a system can be difficult, despite it being a necessary skill to protect the environment.

Using the South Australian ecosystem as an example, this session will provide a framework for systems thinking that can be used to understand any system at all, from complex molecular systems to advanced AI networks.

4.05 UniSA Planetarium - More Than Just The Night Sky (Room: CW304)

Mary Adams, Nathaneal Scherer and Anita Trenwith, University of South Australia

primary, middle, senior

Step into the cosmos and rediscover the wonders of the Planetarium! Join us for an informative session that unveils the experiences awaiting you and your students under the dome. Whether you last visited years ago or are a first-time explorer, there is plenty to learn, so come along and see what UniSA, Mawson Lakes campus can offer.

Find out what your class can experience, including spectacular night sky presentations, zooming in on some of the most interesting parts of our universe, and dome movies to engage your students in all things space related. From the biological impact on the human body in "The Astronaut" to unravelling the mysteries of particle theory in "The Phantom of the Universe," there's something for everyone, spanning from year 2 to Stage 2.

But wait, there's more! UniSA offers more than just cosmic encounters, with additional STEM activities that can be added to your visit. These can be linked to your Planetarium activity, or you can book into stand-alone full day or extended STEM programs. All of our programs are linked to the curriculum and designed to engage students in STEM. Come along and hear what we have to offer you.

4.06 Bin Blitz - your new bin system (Room: CW305)

Lee Harrison, Jo Hendrikx, KESAB environmental solutions

primary, middle, senior

Learn the What, Why, and How of the new Department for Education bin system rolled out to most Department sites over the last year. Explore ways to involve your students in creating effective resource management systems, and education for long term behaviour change.

4.20 pm Happy Hour (Chiverton Lawns)

Following on from your Day 1 program with Professional Networking with drinks and nibbles. And don't forget you have the chance to win prizes donated by our sponsors if you are present at Happy Hour!

Please register your attendance at this event when you register online.

8.50 am

Welcome & Awards Presentation (Chapel)

9.10 am

Keynote Presentation 2 (Chapel)

South Australia's Hydrogen Jobs Plan

Nicola McFarlane, Chief Operating Officer, Office of Hydrogen Power SA\

The world is working toward a net-zero emissions future. A global shift to decarbonise energy depends upon clean, flexible and storable green fuels. With some of the most abundant wind and solar resources in the world, South Australia has a competitive edge to become a global leader in renewable hydrogen production.

Keynote Presentation 3 (Chapel)

Igniting Learning: Embedding two-way learning and respect into your curriculum

Jayne Boase & Professor Delene Weber, University of South Australia

Join UniSA academics, Jayne Boase and Delene Weber to discuss how to effectively scaffold Aboriginal knowledges into your curriculum. Using the case study of a course "Fire and Culture", and the perspectives of an Aboriginal and non-Aboriginal teacher, they will unpack some important learnings about why students really want to know more about Aboriginal culture; how to develop respect for two-way learning; build Aboriginal content into curriculum in a holistic manner; and how to address challenging issues such as unconscious bias. Importantly, they will share practical tips on how to make this fun, exciting and meaningful for students and teachers.

Jayne Boase

Jayne works with Program Directors and Course Coordinators embedding Aboriginal content in undergraduate programs for UniSA STEM. Alongside of this Jayne,, together with Professor Delene Weber, developed and delivers the award winning Fire and Culture course. Jayne is of Ngarrindjeri and Bungandidj (Boandik) descent through my father and his Mother.

Professor Delene Weber

Delene is a social scientist who focuses on the human dimensions of environmental management. In addition to teaching both undergraduate and postgraduate students, Delene enjoys an active research role at UniSA.

Her research includes work on the benefits we derive from green space and how we can engage the wider community in more sustainable practices



10.10 am

SASTA Annual General Meeting (Chapel)

10.40 am

Morning Tea & Exhibition (Performing Arts Centre)

11.15 am Cutting Edge Session 1

1A Indigenous Artefacts (Tools for Living) (Room: CW301)

Trent Hill, South Australian Aboriginal Building, Civil and Construction Academy

Delivered by an Indigenous instructor, the session covers the traditional methods of making artefacts (tools) for living and their uses, fire and bush glue making, aerodynamics and seasonal movements.

Trent Hill is an Indigenous instructor and guide who has delivered cultural sessions and tours in kindergartens, schools and the Botanic Gardens for 20 years. He is a proud noongar Wiilman man living on Kurna country.

1B Understanding animal welfare (Room: CW302)

Dr Alexandra Whittaker, University of Adelaide

The concept of animal welfare has undergone a significant evolution, transitioning from a focus solely on mitigating negative experiences to encompassing a broader perspective that emphasises the promotion of positive well-being. This paradigm shift reflects an increasing recognition of animals as sentient beings deserving of not only freedom from suffering but also opportunities for positive experiences and fulfilment. A key to this evolving understanding is a promising frontier where data science, sensors, and artificial intelligence (AI) converge to revolutionise the way we assess animal welfare.

This conference presentation will delve into the changing definition of animal welfare and explore the history of its assessment, from basic measures of animal production to today's focus on animal mind based on principles derived from psychology. By examining the latest innovations in data science, sensor technology, and AI, I will illustrate how these tools are reshaping our ability to monitor, understand, and improve the well-being of animals across various domains, including agriculture, research, and conservation.

Central to this discussion is the recognition of the societal importance of animal welfare based on broader values related to environmental sustainability, and public health.

I will also explore the pivotal role of social license in shaping the trajectory of animal use industries. In an era marked by heightened public scrutiny and evolving consumer preferences, maintaining social license requires transparency, accountability, and a demonstrated commitment to animal welfare standards. Leveraging advancements in data science, sensors, and AI not only enhances our capacity to meet these expectations but also facilitates evidence-based decision-making and continuous improvement in animal welfare practices.

Alexandra Whittaker has a diverse background being trained in veterinary/animal welfare science, law, and evidence-based practice. She holds dual veterinary specialist qualifications from the UK certification authority in animal welfare science, ethics, law (AWSEL) and laboratory animal science.

Alex's research explores methods to assess animal welfare, with a focus on identifying positive animal welfare; emotions such as contentment or joy. She is actively involved in the development of cutting-edge welfare assessment methodologies that improve the practicality and reliability of welfare assessment in animals. Since 2012 she has published more than 70 scientific articles, and presented her work at a range of national and international conferences. Alex is the recipient of a number of prestigious fellowships, honours and awards, including an NHMRC Peter Doherty Fellowship, Fresh Science Award, and South Australian Young Tall Poppy.

1C STEM Problem Based Learning in partnership with industry (Room: CW303)

Christie Evans & Candice Martin, Heathfield Primary School

Teaching that motivates students to engage and learn needs to be meaningful, have an authentic context and provide a real world application for learning. Problem based learning (PBL) in partnership with industry offers that opportunity.

One of the significant advantages of STEM PBL is the increased engagement in the STEM disciplines as well as the student directed learning that takes place during the process. Students are driven to find answers as they go about solving a problem for an industry professional giving rise to an authentic application for their learning at school. With this self-efficacy and confidence students challenge themselves and each other for greater understanding and have the opportunity to show their knowledge.

The process begins with developing a relationship between the school and an industry partner. Learn how to develop these connections and build a relationship with industry. Working collaboratively with your industry professional, we will support you to select an appropriate and authentic problem that the company is having which complements the curricular requirements for your year level. Often teachers are initially overwhelmed by the problem as they do not know the answer nor some of the content the students will need. We will demonstrate how careful planning ensures teachers are prepared to explicitly teach content and then allow for a student driven approach to solving the problem.

Teachers learn alongside their students, modelling learning attributes, collaboration and struggle. The industry partner presents the problem to the students rather than the teacher, instantly raising the engagement and importance of the learning.

In order to solve this complex, multifaceted problem students are supported by a common Engineering Design Process (EDP). Explicitly taught in the younger years this becomes the scaffolding for all problem solving and has strong links to Numeracy skill development.

Join us as we take you through the steps and share our experiences.

SA Science Excellence and Innovation STEMM educator of the year for 2023, Christie Evans has partnered with industry for the last 7 years to deliver engaging problem based learning opportunities for her students. As CSIRO's educator on board Christie embarked on a field research trip aboard the RV Investigator to contribute to plankton collection and research connecting students to current scientific practise. Whilst currently the deputy principal and science teacher at Heathfield Primary School, she works across many schools connecting students with industry professionals from international construction companies to local council. She provides an engineering design process to scaffold problem solving and fosters the development of critical and creative thinking.

Candice has been a primary school teacher for 12 years. She has taught a range of year levels, however more predominately in upper primary. When Candice first started teaching, she did not feel confident teaching Maths or Science. Wanting to improve, when offered the opportunity, she volunteered to be a part the STEM 500 and Thinking Maths programs.

From here, approximately 5 years ago, Candice also began exploring STEM PBL and valued the benefits for both students and teachers. Since then, she has been a strong supporter of sharing her STEM experiences with other educators. She created and administered a STEM PBL course for teachers, outlining her experiences from a teacher's perspective, and in partnership with Fulton Hogan she was recruited as a STEM ambassador to introduce STEM PBL to several Brisbane schools.

1D Illuminating Possibilities: Precision optics research to improve healthcare (Room: CW306)

Dr Chris Perrella, University of Adelaide

Optical technologies underpin a large amount of our modern-day society. Lasers specifically have revolutionized the way we store and transmit data from CD's/DVDs/ Blu Ray disks to the operation of the internet using optical fibres to transmit light around the world. In this talk, I will discuss how laser technology is finding it's way into healthcare and how this could be another field that lasers revolutionise. I will present two different projects I'm working on in the healthcare space. The first is medical breath analysis in which we shine a laser through a person's breath to detect molecules known as biomarkers that are indicators of a person's health. The second project is focused on determining the health of mammal eggs prior to fertilisation so that the healthiest eggs can be chosen with the hope this will improve the success rates of IVF for people.

**12.20 pm
Cutting Edge Session 2**

2A The power of a connected community and reflective thinking in science education to improve work readiness (Room: CW301)

Jill Bauer and Beth Loveys, The University of Adelaide

Preparing graduates for future careers that may not have yet been imagined is a constant challenge for teachers in higher education. We can anticipate that graduates will need to master skills in critical and creative thinking, communication and finding sustainable solutions to complex, global problems. In addition, there is an expectation that they will have knowledge of the latest research innovations in their field of study. Managing these competing expectations and building job-ready students is a challenge for educators.

Metacognition improves learning, by encouraging students to identify their own strengths and weaknesses increasing their higher order thinking and ability to create, evaluate, and analyse. These problem solving skills are critical for career readiness of the students, sustaining the goals of the higher education sector to develop 21st Century, and life-long learners. In addition, such skills are central to the graduate attributes of many Universities.

We report the outcomes of a cross-discipline project exploring methods to encourage student connectedness and reflective thinking on their learning and assessment.

Associate Professor Beth Loveys' PhD research began in the area of plant ecophysiology and expanded into the effects of global climate change on plant growth during her post-doctoral positions. She has written extensively on how climate variability and change will impact plant physiology and growth, and the corresponding impact it will have on food production. Beth is now an Education Specialist and was a Science Awards Finalist in 2019 for STEM Educator of the Year in Tertiary Teaching and a recipient of an Award of Excellence from the Australian Awards for University Teaching (AAUT) in 2022. Beth is currently Deputy Head of School in the School of Agriculture Food and Wine and oversees all teaching at undergraduate and postgraduate coursework level.

Jill Bauer's career in wine began over 25 years ago in Napa, California and expanded into teaching and lecturing in wine production after completing her Masters in Oenology at the University of Adelaide. Her focus is building confident, job-ready graduates with a foundation in the sciences of winemaking, but who also have a strong connection to industry and understand the global social, environmental and governance issues of contemporary wine and viticulture. Her research in whole bunch applications, smoke taint amelioration and new no and low alcohol products and approaches aims to deliver employable outcomes for the winemakers. Jill was awarded 2023 STEMM Educator of the Year in Tertiary Teaching for her novel approaches to teaching and outreach. Jill is currently Senior Winemaker for the University of Adelaide and training the next generation of undergraduate and winemakers.

2B Harnessing technology and visuo-spatial teaching for active-learning of health and medical science (Room: CW303)

Dr Viythia Katharesan, The University of Adelaide

Engaging students is increasingly challenging as contemporary students have easy access to information at their fingertips, around the clock. While active-learning strategies can be “low-tech”, they predominantly rely on having face-to-face interactions. Similarly, tutorials for health-sciences students require them to be “hands-on” with cadaveric specimens. However, when a remote-teaching approach was imminent due to COVID-19 lockdown measures in 2020, I promptly created pathology eResources using organ specimens. I then curated the eResources into interactive eTutorial modules to replace face-to-face tutorial sessions. To optimise their experience, I worked in partnership with students by relying on their feedback for iterative changes. While face-to-face tutorial sessions have slowly returned to campus, the eTutorials have scaled up to a range of courses and are still being deployed in a blended-learning approach to encourage visuo-spatial learning. This presentation will include a summary of this journey and share some of the available active-learning technological platforms utilised to engage current health and medical science students.

Dr. Viythia Katharesan is a Senior Lecturer from the School of Biomedicine, Faculty of Health & Medical Sciences at the University of Adelaide and a keen member of the Adelaide Education Academy. Viythia has created her ideal nexus between her research in neuroscience and pedagogies and her passion for teaching anatomy and pathology. She has a strong commitment to share and develop best-practice active-learning approaches. Her teaching directly impacts the future healthcare sector by encouraging both Health Science students & Medical students to focus on real-world applications of their detailed lessons. Accordingly, she has been recognised with numerous teaching-excellence accolades including her recent recognition as a finalist in the South Australian STEMM Educator of the Year award category for tertiary institutions.

2C Mind-Bending Light (Room: CW304)

Ben Sparkes, Irene Bolognino, Thomas Chambers, Darryl Jones, Stephen Warren-Smith, Australian Institute of Physics

Light plays a significant role in our everyday lives, from bar-code scanning at the supermarket through to medical procedures and enabling future driverless cars. To explore the important role light plays in our lives, this workshop consists of a short introductory presentation focusing on applications of light for communications followed by two hands-on activities: “Jelly Waveguides” and “Laser Radios”, both of which are designed to be run in high schools.

The Australian Institute of Physics (AIP) is an organisation dedicated to promoting the role of physics in research, education, industry and the community by:

**Representing and promoting the physics community to government and other legislative or policy-making bodies;*

**Organising meetings and conferences on research and professional topics;*

**Promoting and supporting physics teaching and education in schools, colleges and universities;*

**Encouraging investment in government and industrial research;*

**Setting and supporting professional standards and qualifications in physics;*

**Identifying and supporting the needs of physicists in all sectors of employment;*

**Recognising distinguished contributions to physics.*

Since 2020 the South Australian branch of the AIP has been developing a series of outreach experiments to excite and inspire the next generation of STEM professionals in SA.

1.20 pm

Lunch & Exhibition (Performing Arts Centre)

2.10 pm Workshop Session 5

5.01 Using the Oliphant Science Awards to guide student inquiry (Room: CW301)

Sarah Finney, Stirling East PS

primary

After judging for the Oliphant Science Awards for many years, and on return from the BHP Billiton Awards, I stepped out of my comfort zone and into Science Inquiry, STEM. For the past eight years, I have guided year 3 and 4, then 5 and 6 children at Stirling East Primary School through their OWN scientific enquiry, driven by topics OF THEIR OWN choice. We have received much positive feedback from parents, students, teachers, scientists and science communicators, and this project was an instrumental contribution towards my Prime Minister's Prize for Excellence in Science Teaching award in 2019.

In this workshop I will take you through the process and allow you to access my resources, to assist you in scaffolding the inquiry method with children in your class. This has the power to transform learning and truly engage students in learning skills to equip them for the future. - and they might just be winners in a well-respected South Aussie Competition too!

5.02 Medicinal and Dietary uses for First Nation Botanicals (Room: SC301)

Leonne Hewson and Jenny Woodcock, DfE

primary, middle

In this workshop, Leonne (ACEO) and Jenny (Specialist Science Teacher) will share information about the plants in our First Nation garden. Both their medicinal and dietary uses. Attendees will enjoy a cup of tea made from native botanicals and try some medicinal products made from native ingredients. Participants will examine how the book 'The First Scientists' by Corey Tutt is a great reference to help prepare science lessons.

5.03 The Science of Us - Measuring humans using Vernier Data Loggers (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

Humans are not simple. We are a series of complex systems streamed through a conscious brain. This means that there is a lot that can be measured, from bioelectric impulses required to move muscles to an analysis of touch.

This workshop will use Vernier data logging equipment to explore topics such as:

- EKG and heart analysis
- Muscle analysis and strength
- Wavelengths of light that fool the eye
- How to tell if a room is well-ventilated
- Which feels warmer? tactile illusions
- How much dye is in foods?

5.04 Fieldwork with Year 7's? Yeah Right! (Room: CW302)

Karina Darling, St Mark's College, Port Pirie

middle, senior, lab officers

When St Mark's College decided to adopt version 9 of the Australian Curriculum right away (2023), that meant that we had to make immediate changes to the way we teach Science in the Middle Years. We need to include thinking, analysing and considering carefully for fieldwork locations (now part of the Planning & Conducting strand). But - what is the point of all this focus, if we aren't going to use the fieldwork locations? Well - I think there is no point. That meant taking a bunch of 12 and 13 year olds out to our local area to do some fieldwork in the locations they'd spent time "considering". How did that go? This workshop will show you how we managed those fieldwork trips, what we'll do differently in 2024 and some really handy tips for working out in the field with Year 7s.

5.05 Educating the future nuclear workforce of South Australia: Teaching real-world applications of radioactivity and fission (Room: CW303)

Bridget Murphy, ANSTO

senior, tertiary

The future build of submarines for the AUKUS Nuclear-powered Submarine Program will utilise South Australia's ship-building expertise at the Osbourne Naval Shipyard, just outside of Adelaide. Up to 4,000 workers will be involved in the design and upgrade of the construction yard, and another 4,000-5,500 jobs will be created to build these submarines at the peak of the program in the 2040s.

Some people will have questions or concerns about the use of fission to power future submarines. The Australian Nuclear Science and Technology Organisation (ANSTO) has 70 years of experience in nuclear science and operates Australia's only nuclear reactor in Lucas Heights in southern Sydney. ANSTO has an education team experienced in talking about nuclear to school students, teachers, government and business groups and has developed curriculum-linked education programs and resources for schools.

In this workshop, we will unpack some of the fundamental concepts of nuclear science, including radioactive decay, half-life, measuring radiation, radiation safety, fission and uranium enrichment. We will demonstrate two student activities that teach these concepts in the context of real-world applications; 1) Using authentic science data to determine the half-life of radioisotopes used in medicine; 2) Using models to understand the dynamics and requirements of a fission chain reaction. Teachers gain hands-on experience in how to bring nuclear science into their classroom using real-world examples to suit a variety of learners.

5.06 Filming Our Places (Room: CW306)

Michelle McLeod, The Royal Institution of Australia

primary, middle, senior

Interested in expanding student agency in your classrooms? Why not consider achieving this by incorporating films as a way for students to demonstrate their understanding? Today's students live in a media driven world, this session will support you to incorporate student media skills within your learning tasks. Learn how to access FREE online Australian Curriculum connected resources and how to use easily accessible programs to create short films. Inspire your students to share their interests, passions and understanding by becoming digital science communicators and storytellers.

5.07 Expanding Horizons: STEMfooty's Evolution from Year 7 to Years 9 and 11

Niamh Kelly and Tyrell Hocking, STEMfooty

middle, senior

STEMfooty has made a significant impact on Year 7 students by blending the excitement of Australian Rules Football with essential STEM principles, enhancing both engagement and understanding. Building on this success, we're poised to extend the innovative STEMfooty curriculum into Years 9 and 11 in 2024, focusing on specialised mathematics and science integration, aligned to the Australian Curriculum. This presentation will explore the development process, including collaborative work with educators and the Education Department and an insight into the development of the new Year 9 Statistics interactive platform. Join us to discover the pillars of STEMfooty and how your school register to implement it at Year 7, 9 and 11.

3.15 pm Workshop Session 6

6.01 The Earth as an Apple (Room: CW301)

Abby Macpherson and Rebecca Mumford, Seaview High School and Greenhill Living

primary, middle

Attendees will participate in activities crafted to explore the expansive, significant, and delicate soil ecosystem. This workshop targets the Year 7 Biological and Earth and Space strands of the Australian Curriculum Version 9, but can be tailored for both primary and senior high school levels. Activities will entail constructing a no-dig garden and developing a seasonal planting guide linked to lunar phases.

6.02 Rocking Geology: An innovative, integrated and immersive exploration of the universe with Adelaide University (Room: CW302)

Ross Riach, Gleeson College

middle

Do your students think geology is sedimentary?

Shake things up with a journey from the heart of Adelaide to the far reaches of space!

In this presentation you will be introduced to Extra-Terrestrial Terrains, an immersive and interdisciplinary unit of Geoscience and mathematics for year 8, exploring the universe, collaborating with Adelaide University, and building on General Capabilities.

Imagine your students demonstrating transfer skills through analysing an exoplanet, making inferences from geological features, designing an exploratory team and justifying mathematically and scientifically if their given exoplanet would be a suitable candidate for humanity. Picture students conducting a “test” with less angst than usual, seeing Martian rocks and attending engaging mini-lectures at Adelaide University.

Explore alternative possibilities for teaching this unit, be inspired to adapt other units currently taken for Granite and explore a new immersive and gamified approach to assessments that students will find far less igneous.

By attending this presentation, you’ll gain:

- Insight and ideas for an innovative teaching unit that integrates geoscience with mathematics through the engaging theme of extraterrestrial terrains.
- Strategies to inspire your students with the wonders of the universe, making “rocks” cool and mathematics fascinatingly practical.
- The full suite of resources to run or adapt this unit yourself
- An awareness of the local resources available and industry experts through Adelaide Universities geoscience department to support your teaching and connect your classroom to the forefront of scientific discovery.

This presentation is not just about teaching a unit; it’s about inspiring the next generation of scientists, mathematicians, and explorers and evolving traditional teaching methods into engaging thematic units.

Come along and let’s turn those ‘bored’ students into ‘boulder’ thinkers!

6.03 Key experiments: Inquiry approaches using Vernier Data Loggers in High School Science (Room: SC302)

Stuart Lewis, Scientrific Pty Ltd

middle, senior, lab officers

Are you looking for new ways of collecting data related to experiments in the Australian Curriculum?

Multiple workstations will be set up for participants to experiment with support from our presenter. The experiments may include:

- Boyle's Law and chemical reaction rates
- Spectroscopy and Beers Law
- Newtons laws of motion
- Electrical induction and electromagnetism
- Respiration

Ideas for further investigations will also be explored

6.04 Our sense of place: teaching with web maps for STEM in the classroom (Room: CW304)

Tessa Lane, Flinders University

primary, middle, senior, lab officers, tertiary

Maps are fundamental tools that help us to make sense of place. They are one of the oldest forms of communication and have roots in most ancient societies. Geographic data link place, time and attributes allowing us deeper insights into data to solve a range of local and global problems. Since the inception of Geospatial Information Systems (GIS) in the 1960s, maps and spatial data have moved from largely paper based, to computer-based systems. Recently, we have seen a shift to largely web-based technologies for the storage, delivery, and communication of geospatial information.

Developing geospatial intelligence is so important in STEM education as it allows students to contextualise concepts in Earth systems, climate change, and ecology (for example) while helping to improve spatial reasoning abilities more generally. In this workshop, we will explore ways to build on these critical STEM skills using web maps in the classroom. We will focus on new tools including National Geographic MapMaker that require no licence or sign-up and can be run directly from a browser. We will finish with some ways forward for those wanting to engage with ESRI online applications.

I will show a specific example that can be used in an upper primary mathematics lesson (geometry) and another that can be used in SACE Stage 1 Earth and Environmental Science. However, you will see that this tool has many applications. Please bring your questions, concerns, suggestions, and your laptop if you have one. I hope that you leave with some new ideas, inspiration, and some ready-made lesson plans.

6.05 Creating Our Places (Room: CW306)

Michelle McLeod, The Royal Institution of Australia

primary, middle, senior, lab officers

Join this session to further your understanding of how scientific knowledge helps sustain the places we inhabit and use every day. Enhance your teaching resources connected with Science as a Human Endeavour and Aboriginal and Torres Strait Islander Histories and Cultures topics, and explore how science in action is supporting the global drive to achieve the United Nation's Sustainable Development Goals. You will have the opportunity to explore FREE online Australian Curriculum connected resources and grow your collection of hands-on STEM activities. Shared resources can be adapted for use across various science subjects, integrated STEM projects, and year levels.

6.06 Building a sense of place through Design Thinking

Maria Vieira, University of South Australia

middle, senior

How can teachers empower students to explore their own 'sense of place' through scientific initiatives? Design Thinking presents a practical and intuitive framework for educators, facilitating the connection between scientific reasoning and human-centric needs across diverse educational contexts. In this workshop, teachers will participate in a rapid Design Thinking session designed to provide them with the knowledge and confidence necessary to effectively implement Design Thinking in their classrooms.

6.07 Teaching Science through the creation of interactive science inquiries (Room: CW305)

Paul Unsworth & Rosanna Cotino, edgedVR

middle, senior

Digital learning technologies now play a key role in schooling and education. However, exactly where Virtual and Augmented Reality (XR) technologies fit within this rapidly changing schooling and education landscape has yet to be determined. Whilst use of virtual and augmented reality technologies in education are broadly apparent, there is scant evidence of studies that investigate XR's educational merit from within a design, creation and inquiry context – studies that have tracked and determined how teachers and their students benefit from the use XR as learning technologies, especially in STEAM projects and or Science Inquiry studies where teachers and students critically have communicated and shared knowledge through the creation of interactive assets within XR products for storytelling and inquiry.

Over the last 3 years Paul and close colleagues have undertaken a series of STEAM based immersive projects that have explored and investigated how teachers and students can benefit from an applied use of immersive Virtual Reality (iVR) Authoring technologies. This practice-based research now concentrates its gaze on how iVR technologies when used in a science inquiry learning design: (a) supports and transforms teacher' professional practice, (b) engages students in processes of higher-order thinking, meaning-making and doing and (c) produces evidence of confident, capable and creative learners (teachers and students).

Along with Industry partner Rosanna Cotino (CEO EdgedVR) Paul, Rosanna and their teams are now progressing a hands-on VR in Schools program that is tailor made for Science and or STEM teachers situated both national and internationally. At the forefront of this activity are a series of interactive workshops that immerse teachers into the practice and pedagogy of teaching science through the creation of interactive VR projects.

4.15 pm Happy Hour (Middle School Lawns)

Stick around for your last chance to network with colleagues and new friends you may have met at the Conference. And don't forget you have the chance to win prizes donated by our sponsors if you are present at Happy Hour!

Please register your attendance at this event when you register online.

Thank you to our generous sponsors

Click on the logos below to visit the sponsor websites

Gold Sponsors



Trade Display

