**Science Teachers' Association of Victoria Inc.**
ABN 59 004 145 329
Patron: Associate Professor Misty Jenkins BSc (Hons), PhD, MAICD

Founded 1943

**Science Victoria**
ABN 94 108 759 762

# STAVCON 2020

# A Vision for the Future

## Asynchronous Sessions open 20th November 2020

## Synchronous Sessions live on 27th November 2020

All sessions will be recorded and available to view until 29th January 2021

## Welcome to STAVCON 2020 Online Conference

This year we have assembled a very exciting, diverse and engaging program with a mix of "live" and "pre-recorded" presentations and workshops.

As you can see from the attached Synchronous program, we will run seven (7) simultaneous virtual rooms which have been organised into specific focus areas to help with your selection.

These will all be accessible on the day via a dedicated Zoom link and we hope that you take advantage of the chat function and ask the presenters many questions to ensure it is interactive.

Highlights include three (3) keynote addresses, VCAA Updates, Q Project Update and the Spotlight Report on STEM Education to name just a few and don't forget to join us for our networking session after the Conference.

There are also over twenty (20) Asynchronous Sessions which you can view at your convenience either before, during or after the Conference and offer a great resource.

We would also like to acknowledge and thank our generous exhibitors and sponsors and we encourage you to click on their logos on the interactive wall and learn more about their products and services during the long breaks in the program. Many of them will also present a short 20min live session or pre-recorded presentation and be available on the day for answering your questions either via the chat function on Zoom or directly via phone or email.

Finally, thank you for being part of this "new way" of delivering a Conference and staying connected and we trust you will enjoy and find the sessions interesting and rewarding.

Alexandra Abela

President, Science Teachers' Association of Victoria Inc. (STAV)

Science Teachers' Association of Victoria Inc. acknowledges the support of the Department of Education and Training through the Strategic Partnerships Program.

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# Keynote Presenters

## Morning Keynote Address

### Professor Lisa Harvey-Smith

Prof Lisa Harvey-Smith is a British-Australian astrophysicist, Australia's first Women in STEM Ambassador and Professor of Practice in Science Communication, UNSW Professor Lisa Harvey-Smith is the Australian Government's Women in STEM Ambassador and a Professor of Practice in Science Communication at The University of New South Wales in Sydney, Australia.

In her role as the Women in STEM Ambassador, Lisa is responsible for increasing the participation of women and girls in STEM (science, technology, engineering and mathematics) studies and careers in Australia. She works across academia, education and training and industry to increase visibility and drive cultural and social change for gender equity in STEM. Lisa is an award-winning astronomer with research interests in the birth and death of stars and supermassive black holes and serves on the Australian Space Agency's Advisory Group. She previously worked on the mega-telescope project, the Square Kilometre Array – a continent-spanning next-generation radio telescope that will survey billions of years of cosmic history. Lisa is a TEDx speaker, has appeared on stage with Apollo astronauts including Buzz Aldrin and is author of the popular science book When Galaxies Collide.

## STAV Patron Address

### Associate Professor Misty Jenkins BSc (Hons), PhD, MAICD

Misty Jenkins is a NHMRC fellow and laboratory head in the Immunology Division at Walter and Eliza Hall Institute for Medical Research, where she researches cellular immunology and cancer immunotherapy. Misty studied her PhD in Immunology at The University of Melbourne, followed by postdoctoral positions at The Universities of Cambridge and Oxford, and The Peter MacCallum Cancer Centre in Melbourne. Misty has a long-standing interest in how a specialized group of white blood cells, CD8+ T cells, kill cancer. Her current research program currently researches the use of T cell immunotherapy for brain cancer. A/Prof Jenkins was awarded the L'Oreal for Women in Science Fellowship (2013), was Tall Poppy of the year (2015), was awarded the Westpac/Australian Financial Review Top100 Women of Influence award (2016) in recognition for her significant contribution to science and gender equity. A/Prof Jenkins has been a strong advocate for diversity and inclusion in academia over the past decade and her efforts in this area have been recognized nationally and internationally. In addition to her research career, A/Prof Jenkins is experienced in governance and is a Board Director for Monash Health, Co-Chair of the Indigenous Health Medical Research Future Fund. @DrMistyJenkins

## Closing Keynote Address

### Professor MaryLouise McLaws

MaryLouise McLaws is a Professor of Epidemiology, Hospital Infection and Infectious Diseases Control, UNSW.

MaryLouise is an epidemiologist with expertise in hospital infection and infectious diseases control. Her COVID-19 related activities include member of the World Health Organization (WHO) Health Emergencies Program Experts Advisory Panel for Infection Prevention and Control Preparedness, Readiness and Response to COVID-19 and member of the NSW Clinical Excellence Commission COVID Infection Prevention and Control taskforce.

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# Synchronous Sessions

## live on 27th November 2020

**8:45am - 8:50am** Welcome & Housekeeping by Alexandra Abela, STAV President

**8:50am - 9:40am** Introduction of Keynote and Keynote: Professor Lisa Harvey-Smith, Australia's WiSTEM Ambassador

**Short Break - STAV Grab 9:40am - 9:50am**

## Session A 9:50am - 10:35am

### A1 Russell Tytler & Peta White, Deakin University

**"Interdisciplinary Mathematics and Science Learning"**

This is an international, longitudinal project which aims to investigate the effectiveness of an innovative interdisciplinary learning approach in mathematics and science. Through collaborating primary schools in Victoria and the United States of America (USA), we have investigated how student's invention and transformation of representational systems can connect to support deeper reasoning and learning.

The pedagogy focused on student's construction of diagrammatic and textual representations, measurement and data displays, through the following sequence of processes

1. Material engagement / observation / measurement
2. Representation challenge / invention
3. Comparative review / sharing / evaluation
4. Review/ refinement / application to new settings

Teaching and learning sequences (grade 1- 6) are freely available online and use student work samples to exemplify lesson strategies.

**Focus: Primary Science**

### A2 Andrew McKenzie, Emmanuel College

**"Adversity brings opportunity to teach Forensic Files differently"**

Benjamin Franklin once said, Out of adversity comes opportunity. This has certainly been the case for teaching online for a substantial part of 2020. Teaching Forensic Files online, has certainly brought about new and exciting ways of teaching enthusiastic, young enquiring minds. It has been rewarding to watch students develop and grow in their knowledge and understanding of skills whilst they have had the freedom of expression and creativity at home. The home lab has become the new science lab In this online session, I will share some ideas and resources to teach a Forensic based course remotely. This will include the practicalities of how to set up and record practical demonstrations for various topics like fingerprinting, blood spatter, ballistics and chromatography. This workshop is relevant for the beginner, intermediate and the more experienced Forensic Science teacher.

**Focus: Secondary Science A**

### A3 Dale Carroll, Geelong College

**"Benefits of in-house prepared videos and how to make them."**

With the year being what it has been, we wanted the students to still be able to able to see results from practical they would have done. For this to happen I have been making videos of these practicals. Making the videos has meant looking at how to best show the information and read displays as required, or the background to avoid other distractions. I will quickly introduce some of the methods I have used to achieve this.

**Focus: Science Strategies and Skills**

### A4 Connie Cirkony and Mark Rickinson, Monash University

**"Understanding and improving evidence-informed practice in Australian schools"**

The Q Project is the first Australian study focused specifically on what it means to use research evidence well within schools. Through a systematic review of research in health, social care, policy and education, the Q Project has developed a framework to support Quality Use of Research Evidence (QURE) in education. Drawing on this framework, the participants attending this presentation will engage in discussions around the components and enablers of quality evidence use, and their potential implications for evidence-informed science educators.

**Focus: Educational Research**

### A5 Barbara McKinnon, Kew High School

**"Seeing the Light and Fun with Imaging"**

Light is an intrinsically engaging topic in science. This session presents effective teaching tools for exploring the formation of images by light in support of the VELS Level 7 and 8 Science Curriculum as well as suggestions for extension and inquiry projects.

**Focus: Secondary Science B**

# Session A commercial

## 9:50am - 10:10am

### A6.1 Libby Moore, Moore Educational

**"Meet NEW LEGO Education SPIKE Prime"**

For teachers of Grade 5- Year 8 Accelerate STEM learning in your classroom with SPIKE Prime Robotics for Middle Years. Explore the easy entry lessons and the design challenges that will engage your students to think critically, analyze data and solve simple to complex problems with real world relevance. A new Science Unit has just been added to the existing four Teaching Units. Explore how the LEGO building system, intelligent hardware, scratch based coding and Micro Python experience gives your students the opportunity to develop STEM skills today to be the innovators of tomorrow.

**Focus: Educational Science**

### A7.1 Richard Allan, Biozone Learning Media Australia

**"BIOZONE's NEW 2020 (Interim) Editions for VCE Biology"**

Hear about the 2 new digital versions of our eBOOKs (LITE and PLUS) as well as access to Online Model Answers. New editions for 2021 will also be discussed. Workshop attendees will each be sent FREE print copies and 30-day eBook trials of BIOZONE's NEW Interim (colour) editions of Biology for VCE Biology - Units 1-4.

**Focus: Exhibitors/Sponsors**

## 5 minute break

## 10:15am - 10:35am

### A6.2 Libby Moore, Moore Educational

**"Build Code Learn with WeDo 2.0"**

WeDo 2.0 is a robotic resource that provides endless opportunities to engage Early Years students in coding, problem solving and designing solutions. See how engaged your students will be to build a Robot and program it using a motor and sensor. Experience how to follow, describe and represent a series of steps and decisions needed to solve simple problems. Strongly linked to the Australian Technologies and Science curriculum, WeDo 2.0 develops coding and computational thinking in Early Years students.

**Focus: Educational Science**

### A7.2 Ms Hilary Bea, EducART Ambassador, AppeARition

**"Bringing Immersive Learning to life."**

Immersive Learning helps deliver better learning outcomes for educators and students by facilitating a greater sense of "learning by doing".

In the live session Hilary will show how a student can interact with a virtual 3D model of the human heart and then use the EducART Studio tool to create her own 3D interactive heart experience. Not only is this a more interesting and engaging activity for students it also helps to provide a deeper learning of complex concepts.

Attendees will see first-hand how easy it is to introduce Immersive Learning technology to their class and receive a complimentary license to EducART Pro to use for 12 months (value $300).

For further information visit the https://educart.appearition.com/.

**Focus: Exhibitors/Sponsors**

## Morning Tea Break 10:35am - 10:50am (Time to visit Exhibitors)

# Session B 10:50am - 11:35am

### B1 Meg Upton & Gen Blades & Bronwyn Sutton, & Peta White, Climate Change Education Network

**"A Commitment To Our World"**

On the eve of 2021, all beings of the living world? humans, plants, creatures, elements are gathered by the Council to make a commitment to the Earth. This workshop is adapted from the Council of All Beings. It explores nature-human interactions and related environmental issues from the perspective of the more-than human world. The pedagogy is an embodied exploration of these issues using a ritual process of working collaboratively where participants create and present an address to humanity. The arts and humanities are integral parts of this multidisciplinary workshop that incorporates literacies from the sciences that are innovative and work as catalysts for developing agency and citizenship in young people. The workshop draws on and acknowledges the work of Joanna Macy*.

*http //www.rainforestinfo.org.au/deep-eco/coab.htm

**Focus: Primary Science**

## B2 Seamus Delaney, Deakin University

**"Situating green chemistry and sustainable development in the science classroom with systems thinking"**

This interactive workshop will outline classroom activities that directly relate to critical challenges, such as those highlighted by the United Nations Global Goals for sustainable development (SDGs). These activities have been co-designed with contemporary science researchers who are actively addressing the global, holistic, complex nature of challenges such as sustainable development. Incorporating systems thinking skills into chemistry and materials science has been proposed as a means to connect students with contemporary science contexts addressing SDGs (biodegradable plastics, e-waste, novel battery technologies). Systems thinking and its relationship to critical thinking, design thinking, and the general capabilities of the Victorian Curriculum will also be explored.

**Focus: Secondary Science A**

## B3 Cristy Herron, Aitken College

**"OneNote for remote and face-to-face learning"**

In this session I will share my strategies and experiences with using Microsoft OneNote with my students for a variety of purposes, including content delivery, flipped learning, class activities, feedback, formative AND summative assessment, digital logbooks, collaboration and more. In this ever-changing climate, teachers need flexible learning tools that work effectively in remote and face-to-face settings. OneNote has been

one such tool for me. Bring your laptop and Microsoft login details.

Delegate Note: Internet connection for presenter and participants, collaboration tables each with monitor.

**Focus: Science Strategies and Skills**

## B4 Deb Corrigan, Professor of Science Education - Director of Education Futures - Monash University

**"Implementing an integrated STEM education in schools: five key questions answered"**

As a professor of science education, Education Futures director, Deborah Corrigan, is regularly asked about STEM education, its impact, and how we can do it better. For this Spotlight Report, she has examined over 200 research articles, books and reports on STEM education to collate the research evidence and offer answers to five key questions on STEM education:

What is STEM education?

Why is STEM education important?

How do we include STEM education in school education?

What impact is STEM education likely to have on students?

What will be the indicators of success of STEM education?

For the full report download from:
https://cog-live.s3-ap-southeast-2.amazonaws.com/n/1271/2020/Aug/11/FJpR1YB8c0JO4Y9mLLht.pdf

**Focus: Educational Research**

## B5 Emily Rochette, The University of Melbourne

**"Teaching Science through the Big Ideas... with Digital Technologies?"**

Abstract: Challenges brought on by the global pandemic have positioned teachers to change plans and swiftly curate lessons to be learned from home in the midst of other personal and professional duties. Digital technologies have been central to this response, however the extent to which students are offered meaningful science experiences depends on the pedagogical approaches employed. In this interactive presentation, we will reflect on teaching science through the big ideas. Educators at all stages of their teaching career are welcome as together we explore the big ideas in light of the challenges and opportunities that come with teaching science in the online space.

**Focus: Secondary Science**

# Session B commercial

## 10:50am - 11:10am

### B6.1 Brendan Jackson, Immersive Education

**"STEM: Aviation"**

Participants attending this professional development workshop will be presented with a stand-alone STEM course that they could implement in their school. The professional development session covers the theoretical and practical aspects involved with implementing a STEM Aviation course, which is a STEM-based course that has a contextual focus on Aviation. After participation in this day, teachers will have the necessary knowledge, skillset, and insight to implement this course in their school with their students. As multiple aspects of the Victorian Curriculum are embraced in the STEM Aviation course, schools could choose to run this course as either a co-curricular subject or an elective based subject.

Theoretical Components:

- Bernoulli's principle and its application to flight
- Aircraft design and design considerations when dealing with flight
- Electrical systems

Practical Components

- Create an aircraft using balsa wood, motor, propeller and landing gear
- Make modifications to their original aircraft and study the impact of these design changes on flight characteristics

**Focus: Educational Science**

### B7.1 Kelly Hollis, Education Perfect

**"Effective Online Assessment with Education Perfect"**

EP Science is a complete teaching, learning and assessment solution that provides unparalleled data and the opportunity for continuous feedback, buying back time for more hands-on, inquiry based experiences in the classroom. EP Assessment provides a range of assessment tools to allow teachers to perform secure assessments to enable them to power measurable learning growth. Throughout 2020, a large number of Victorian teachers used EP Assessments to deliver secure and effective assessment to their students remotely. Through EP Studio, teachers can build their own assessments and through the use of 'analysis tags' gain a deeper understanding of student outcomes and harness the power of the Targeted Remediation, where an individualised learning pathway can be generated for each student based on their results. In this session we will explore the power of EP Assessments and explore how you can harness these tools in your Science classroom.

**Focus: Exhibitors/Sponsors**

## 5 minute break

## 11:15am - 11:35am

### B6.2 Andrew McAlindon, Immersive Education

**"STEM Rocketry"**

Participants attending this professional development workshop will be presented with a stand-alone STEM course that they could implement in their school. The session covers the theoretical and practical aspects involved with implementing a STEM Rocketry course, which has a contextual focus on Rocketry and can be linked to multiple aspects of the Victorian Curriculum. Teachers will gain the necessary knowledge, skill-set, and insight to implement this course in their school with their students and schools could choose to run this course as either a co-curricular or an elective based subject. This course is designed to teach students creative and critical thinking through designing, building and testing rockets.

Theoretical Components

- Rocket propulsion systems and associated theory
- Atmospheric considerations for rocket launches
- CASA regulations for launching rockets

Practical Components

- Design, build and launch a rocket

**Focus: Educational Science**

### B7.2 Alanna Duffy, Jacaranda

**"Inspiring students to love and succeed in science using Jacaranda Science Quest"**

Science is a dynamic, engaging subject that empowers students to make sense of universal mysteries and make informed decisions about a changing world. The diversity of science gives students an incredible opportunity to inquire and to learn in a variety of ways.

In this session, you will learn about ways to inspire and encourage students of all abilities using the brand-new edition of *Jacaranda Science Quest VC*. Find out how you can cater for all of your students using the most comprehensive and innovative resource on the market, to enable all students to experience success and a passion for science. Discover how to customise content for learners through differentiated learning pathways and many additional resources.

**Focus: Exhibitors/Sponsors**

## Short Break - STAV Grab 11:35am - 11:45pm

## STAV Patron's Address 11:45am - 12:10pm

**11:45am - 12:10pm Associate Professor Misty Jenkins BSc (Hons), PhD, MAICD**
**introduced by Alexandra Abela, STAV President**

# Session C - VCAA Updates 12:10pm - 12:35pm

**VCAA - Maria James and Erin Wilson**

### C1 Maria James - Curriculum Manager, Science - Victorian Curriculum and Assessment Authority (VCAA)

How has COVID-19 affected delivery of science in secondary schools? What resources are available for primary school teachers to use with classes either at school or learning remotely? The Australian Curriculum Science is currently under review – what are the major issues? What about links between science, the capabilities and the cross-curriculum priorities? What is available for assessment? What is happening with VCE reviews? This session will outline the current issues, resources and opportunities available through the Victorian Curriculum, Science for Levels 7 to 10 and outline review processes and implementation workshops for the suite of VCE sciences.

### C2 Erin Wilson - Curriculum Manager, STEM, Curriculum Division - Victorian Curriculum and Assessment Authority (VCAA)

How has COVID-19 affected delivery of science in primary schools? What resources are available for primary school teachers to use with classes either at school or learning remotely? The Australian Curriculum Science is currently under review – what are the major issues? What about links between science, the capabilities and the cross-curriculum priorities? What is available for assessment? This session will outline the current issues, resources and opportunities available through the Victorian Curriculum, Science for Levels Foundation to 6.

# Lunch Break 12:35pm - 1:20pm (Time to visit Exhibitors)

# Session D 1:20pm - 2:05pm

### D1 Maria James, VCAA

**"Careers Education and Job Skilling Is Primary School Too Early to Start?"**

Conversations about preparing students for the future workforce generally focus on secondary years education. Skills including critical and creative thinking, problem solving, collaboration, resilience, leadership and communication are included in the primary years curriculum through the General Capabilities and referenced in the SHE sub-strand and SIS strand of the Science Curriculum. This workshop will highlight the new careers-focused resource materials on the VCAA website and will illustrate how these skills can be incorporated into primary level lessons and units of work. Assessment of these skills will be discussed, and assessment rubrics will be provided to participants.

**Focus: Primary Science**

## D2 Michael Foster, Thornbury High School

**"Basic theory of electricity and electric circuits for teachers with little or no background in basic electricity or physics"**

The workshop is divided into three areas
1. Basic theory of electricity
2. Electric circuits
3. Measuring instruments
Part 1.
Basic properties of atoms
- Electric charge
- Unit of electric charge
- Electrical current â?" Definition (qualitative / quantitative)
- Electrical resistance

Energy
- Force on charges (qualitative)
- Electrical potential energy
- Comparison of electrical potential energy to other forms e.g. gravitational potential energy etc
- Voltage (electrical potential)
- Voltage drop (electrical potential difference)

Circuits
- Series
- Parallel
- Current and potential difference in series and parallel circuits
- Power

Measuring instruments
- Use of a multimeter to measure current, voltage and resistance for series and parallel circuits.

**Focus: Secondary Science A**

## D3 Kieran Lim, Deakin University

**"But where is the hypothesis?"**

Investigations are at the heart of the testable and contestable nature of science, but if there is no obvious hypothesis? The Victorian Curriculum requires students to respond to, pose, identify, and/or formulate inquiry questions. Examples include students gathering information about the world around them, modelling sea-floor spreading, and exploring the use of sensors in robotics and control devices. This presentation will re-examine the "scientific method" in the light of Toulmin analysis, to include investigations without any obvious hypothesis.

Kieran Lim has taught chemistry for over 30 years and is the recipient of an Australian Commonwealth Government Award for Teaching Excellence.

**Focus: Science Strategies and Skills**

## D4 Victoria Millar, Senior Lecturer Melbourne Graduate School of Education & Linda Hobbs, Associate Professor of Education (Science Education), Deakin University

**"Girls' Future – Our Future Review of the outcomes of the 2020 Invergowrie Foundation STEM Report"**

Despite girls performing equally well as boys in STEM learning measures, a complex range of social and cultural influences discourage girls from pursuing STEM, operating from a very early age. These social and cultural factors operate to influence the construction of girls' gendered identity and, with that, social expectations of their place within STEM. The 2020 version of the Invergowrie STEM Report focuses on three topics that are important to girls in STEM: early childhood and primary education, mentoring and role modelling, and careers advice. For each of these issues, a review of recent initiatives and research internationally was undertaken to identify enablers and barriers. To complement the information in the literature and on websites, we used data from interviews with local stakeholders. This talk will provide a summary of the main findings on these three topics and possible ways forward.

Authors Coral Campbell, Linda Hobbs, Victoria Millar, Adam Ragab Masri, Chris Speldewinde, Russell Tytler, Jan van Driel

**Focus: Educational Research**

### D5 Peter Razos, Caulfield Grammar School

**"Remote learning-teaching the family not just the student."**

At the end of this abstract is an email from a parent and one that typifies the incredible response to our online Kitchen Chemistry unit in year 7. Please read as it clearly demonstrates that we can be effective even if we are remote. This unit demonstrated the capacity to meaningfully engage students in hands on activities such as making "Ooblek (yeah that's the name I didn't make this one up), rock candy, acid base indicators and Violet Crumble" just to name a few. Participants will have full access to the online resources that made this unit of work so successful and will be encouraged to actively cook with us online. Be ready for some wonderful engagement and a lot of fun. Nothing better than to experience the fun rather than to talk about it. Participants will need to have the following ingredients at the ready in order to use the most tastiest decomposition reaction in our kitchen to make violet crumble.

- 200 g of castor sugar
- 5 tablespoons of honey
- deep sauce pan
- A whisk to stir the mixture as its cooking
- a baking tray lined with grease proof paper
- 2 teaspoons of Bi-carb soda
- 60 mL of water

Here is the link to this activity

http://www.dynamicscience.com.au/tester/solutions1/chemistry/juniorsciencefoodchem/violetcrumble.htm

**Focus: Secondary Science B**

## Session D commercial

## 1:20pm - 1:40pm

### D6.1 Michael Kasmovic, UNSW

**Using mobile devices to provide students with hands-on experiences in scientific inquiry**

Much of what students learn in science is invisible, which means scientific concepts are often difficult to explain. We've simplified science teaching by creating a library of mobile applications that engage students and encourage them to interact. As they interact, the applications collect data about the topic students are learning about and visualize these data anonymously at the front of class. After playing for 10-15 minutes, students and teachers can then spend time discussing the data together. This allows teachers to focus on teaching scientific inquiry, hypothesis testing, and experimental design. I'll also be discussing a new research study we are performing - we'll be looking to enroll 60 schools into the Arludo program for free.

**Focus: Educational Science**

### D7.1 Andrew Nicholls, Stile Education

**"Australia's No. 1 science teaching resource"**

Join this workshop to learn more about Stile, Australia's No. 1 science teaching resource, and see why over 75% of Victorian Secondary schools use Stile to help them deliver world class STEM programs taught in the context of real world science news.

Our mission is to improve scientific literacy in the community and help prepare students for the increasing number of STEM-related jobs that await them.

This session is for those teachers who haven't seen Stile and want a quick introduction to some of the key benefits as well as an opportunity to ask questions.

**Focus: Exhibitors/Sponsors**

## 5 minute break

## 1:45pm - 2:05pm

### D6.2 Jackie Bondell, OzGrav

**"Gravitational Wave Science for the Secondary Classroom: Discoveries and Activities"**

2020 has seen a release of multiple exciting new results in gravitational wave science! In this session, we will review these latest discoveries that have opened new windows into understanding the universe. Then we will introduce teachers to multiple activities that can be used in the classroom, both remote and in-person, to introduce secondary science students to some of the major concepts related to understanding and detecting gravitational waves, including the new results! Teachers will have the opportunity to participate in these activities and will receive materials with curriculum links to incorporate these activities in their own classrooms.

### D7.2 Cor Nie Tan, Education Coordinator and Dietitian, Yakult Australia

**"Science Behind Yakult"**

Introducing "Science Behind Yakult" lesson program (scenario and activities) – investigating the cause of digestive disorders and the effect of intestinal microbiota in the human body. The program includes activity sheets and further engagement with Yakult for an opportunity to receive class pack/resources, certification of completion and prizes.

Interested to learn how Yakult is manufactured? Yakult is proud to present our "Guided Virtual Factory Tour", with an opportunity to book sessions with your school groups

## Short Break - STAV Grab 2:05pm - 2:15pm

# Session E 2:15pm - 3:00pm

### E1 Megan Griesser & Mandy Crofts, Camberwell High School

**"Teaching literacy through the language of science"**

We scientists have our own way of speaking, writing, reading and listening and for good reason. Science requires accuracy, precision and objectivity of communication to achieve its purpose. For our students to be interpreters, consumers and producers of scientific ideas, they need to know more than just facts, laws and theories; they need to master the language of science. Teaching strategies and classroom resources will be presented that focus on interpretation of what is (and what is not) said in scientific texts, distinction between observation and inference, and refinement of the expression of scientific concepts and arguments.

**Focus: Educational Science**

### E2 Spiro Liacos, Cheltenham Secondary College

**"Electricity: The Shocking Truth"**

How do engineers achieve the extraordinary feat of wiring up a car's electrical circuitry so that the same courtesy light turns on regardless of which door you open? This session will give you ideas (and the actual prac sheets) that will allow your students to learn to design and construct a variety of electrical circuits that satisfy a range of design briefs. Currently the best electricity pracs ever!! (Positively a bad pun, but I will conductor good session with ample opportunities for you to learn watts of stuff that can transform your class before you go ohm.)

**Focus: Secondary Science A**

### E3 Lisa Moloney, Reconciliation Victoria

**"Introduction to Aboriginal Perspectives in Science"**

This session will look at different ways that Aboriginal perspectives can be introduced into your Science curriculum. Aboriginal Science can be used as a context for teaching science content. Topics include seasons, ecosystems, astronomy, technology and Science as a human endeavour. Victorian based resources and activities will be shared.

**Focus: Science Strategies and Skills**

### E4 Jorja McKinnon and Peta White, Deakin University & Monica Green, Federation University

**"Climate change education in and outside the classroom"**

Despite its prominence as a key issue of our time, climate change is a complex and underrepresented topic in the wider curriculum, leaving many teachers uncertain about how best to teach and engage with it. This workshop is offered by the Climate Change Education Network (CCEN), a collective of educators who focus on climate change education research and scholarship. The workshop is designed to enhance teacher's climate change education practices through a combination of discussions and group work that explores climate-related ideas that can be applied across early childhood, primary and secondary curriculum. In particular, it focuses on the Sustainable Development Goals, children and young people's climate responses, curriculum (critical and creative thinking) and place-based pedagogies. Workshop participants will be shown an extensive range of free curriculum resources and ideas that have been collected and curated by the CCEN collective on their website

**Focus: Educational Research**

### E5 Famie Needham, Newcomb Secondary College

**"GROWing a Curriculum Fit for 21st Century Learners"**

Keep hitting roadblocks when trying to introduce innovative STEM practice to your school? In this interactive session you will learn how Newcomb Secondary College in Geelong has embraced the challenge of preparing learners for a changing world of work, one in which STEM capabilities are highly regarded. We will share with you our journey (so far – it's a work in progress!) in the creation of our year seven to 10 subject 'Getting Ready for the Outside World' (GROW). In this subject, STEM education, the Capabilities, career education, industry partners and tertiary education connections intersect to create a unique curriculum aimed at best preparing students for their future. We will explore the enablers and obstacles of introducing a new initiative and share strategies to overcome these.

**Focus: Secondary Science B**

## Session E 2:15pm - 2:35pm

### E6.1 Jade Bohni, John Monash Science School

**"Tips for Teaching in a Virtual Classroom"**

In this session you will be taken through some tips and tricks for delivering science content in a virtual classroom. From rigging up a 'second' camera to using activities to get students engaging in discussions and thinking critically about scientific concepts, this session will give you ideas that you can use in both virtual and face-to-face classes. We will also discuss different ways of approaching online pedagogy and monitoring student progress.

**Focus: Educational Science**

## 5 minute break

## 2:40pm - 3.00pm

### E6.2 Richard Allan, Biozone Learning Media Australia

**"Human Evolution - Trends, Anomalies & New Discoveries"**

Recent advances (2018-2020) in scientific thinking and modelling of human adaptive radiation. How do the most recent discoveries and scientific data gathering techniques affect how you teach this exciting but challenging topic? This presentation will explore recent advances in scientific thinking and modelling of human adaptive radiation. See how BIOZONE has developed annotated 3D models that allow students to explore early human anatomy on their own devices. Workshop attendees will each receive a copy of the PowerPoint.

# Session E 2:15pm - 3:00pm

### E7 IRL HUB (45 minute session)

Come and see what IRL Hub is all about with this sample workshop, targeted at Year 9/10 science students. Round off your conference with this unique highly interactive, entertaining exercise. A new virus is spreading like wildfire across the world! Retrovirus Capillus Tabasco turns its victims' hair bright pink overnight. No way? Rosè? Indeed. Thousands of hair and makeup influencers have been driven out of business, baseball cap manufacturers can hardly keep up with demand, and since Donald Trump became infected he looks even sillier than ever (if that's possible). This workshop is a choose your own epidemiological adventure: as a group you'll be asked to make a series of decisions guiding the investigation and mitigation of this bizarre epidemic. Track the impact of your choices as the disease's spread is tracked through a series of engaging animations and illustrations. If you can help shut the outbreak down before your hair starts to turn embarrassingly rouge, everyone can remain in the pink. Along the way, the workshop decision points will be used to demonstrate important curriculum ideas around genetics, epidemiology, immunology and the scientific method. Bring a pen and paper to make notes as we go!

**Focus: Exhibitors/Sponsors**

## Short Break - STAV Grab 3:00pm - 3:10pm

## Closing Keynote 3:10pm - 3:40pm

**Professor MaryLouise McLaws, Professor of Epidemiology, Hospital Infection and Infectious Diseases Control, UNSW.**

**"What we know, what we dont know, the epidemiology globally and second waves, and about the vaccine candidates"**

## Closing remarks 3:40pm - 3:55pm

**Closing remarks, thanks and Awards, Alexandra Abela, STAV President.**

**Stay online for Happy Hour and further networking.**

# Asynchronous Sessions

## available to view from 20th November 2020

### Richard Allan, Biozone Learning Media Australia

**"Human Evolution - Trends, Anomalies & New Discoveries"**

Recent advances (2018-2020) in scientific thinking and modelling of human adaptive radiation. How do the most recent discoveries and scientific data gathering techniques affect how you teach this exciting but challenging topic? This presentation will explore recent advances in scientific thinking and modelling of human adaptive radiation. See how BIOZONE has developed annotated 3D models that allow students to explore early human anatomy on their own devices. Workshop attendees will each receive a copy of the PowerPoint.

### Josh Cox, Director Reptile Encounters

**"Integrating sustainability teaching into science curricula using the SKILL framework"**

Reptile Encounters recently conducted an international study to assess the integration of sustainability teaching within the ethos, curriculum and subject teaching of primary and secondary schools. The study found that over 88% of schools were failing to meet the minimum requirements that demonstrate the effective teaching and modelling of the principles of sustainable living. On the back of years of experience working with students in the classroom and delivering unique, interactive wildlife experiences Reptile Encounters developed the five step SKILL framework. It contains the necessary ingredients to achieve our ultimate goal of creating Better Humans. The SKILL framework has been developed to assist teachers in delivering a program that is engaging for their students and connects them to nature, giving them the necessary skills required to tackle the big scary world. By following the framework students will gain perspective on the world and work towards leaving a positive mark on the planet. The efficacy of the SKILL framework is currently being studied by a doctoral student of the Western Sydney University. During the session, Reptile Encounters will walk teachers through the individual steps of the SKILL framework, giving explicit examples of how the framework can effectively increase sustainability teaching in the classroom by integrating it within the Science curriculum. The presentation will aim to give teachers the tools to easily and effortlessly implement sustainability and conservation practices in their daily teaching, while also utilising tools such as project based learning and peer teaching and assessment.

### Emma Craven and Aaron Elias , Hampton Park Secondary College

**"Working smarter, not harder in your science classroom"**

Let's be honest - even before remote learning, teachers in 2020 had more responsibility and less time than ever. Emma and Aaron strongly believe that every resource made for teachers needs to authentically save them time, support them better and add genuine value to their expertise and practice. We asked ourselves why textbooks are only aiming to be content for students – when we know they can be vehicles for smart pedagogy too. In this workshop Emma and Aaron will unpack the pedagogical features that make the Good Science series so unique. They will discuss the strategies underpinning these resources; such as formative assessment, questioning, critical and creative thinking skills, literacy, numeracy and core preparation for VCE. Leave this workshop with a toolbox of ideas and strategies, ready to make every lesson, a good lesson.

### Seamus Delaney, Deakin University

**"Embedding the material basis of society into the science classroom"**

Science educators have an important community engagement role in re-positioning the public image of chemistry and materials science. Incorporating both the general capabilities and cross-curriculum priorities of the Victorian Curriculum, this presentation will outline examples of practical hands-on, systems thinking oriented classroom activities that have been developed in consultation with contemporary science researchers focussed on sustainable and green chemistry. These are directly related to critical challenges, such as those highlighted by the United Nations Global Goals for sustainable development (SDGs). A logical place for teachers and students to start is to recognise the "material basis of society", acknowledging that understanding the properties of chemicals and their past, current and future uses is central to overcoming the 21st century challenges of sustainability.

## Jodie Donaghey, Holy Rosary School

### 'A touch of Class in the Science Talent Search'

How do you run a class project in the Science Talent Search (STS) and how could it be done in lockdown in the middle of a pandemic? After running science fairs and facilitating students to enter projects in the STS over the last 20 years I finally attempted a class research project in the STS with one of my classes. Up until then I had put it in the too hard basket. Why had I put it off for so long? The students were really engaged and it gave some students the opportunity to be involved that may never have entered a project on their own.

## Nicole Dobson, Mount Alexander College

### "Women in STEM: addressing the challenge for educators, families and the industry"

As part of a fellowship, Nicole Dobson (Science coordinator and teacher) travelled to Scotland in April 2019 to bring a successful program targeted at improving gender balance in Scotland back to our soil. Discover your own bias and practical ways to overcome this in the classroom. From this workshop you can expect generous sharing of resources, rich discussion and the latest research.

## Sean Elliott, Rough Science

### "How COVID moved incursions online"

When the COVID lockdowns were announced, Rough Science was faced with cancellations of school programs and holiday activities. The business pivoted to presenting sessions online, including a daily science show, and curriculum lessons over Zoom. In this session we will explore the lessons learned, and advice for teachers and science communicators.

## Chris Guest and Nik Alksnis, Australian Skeptics

### "History and Philosophy of Science in the YouTube Age"

When science teachers encounter new students they are frequently competing for their minds with the celebrity pseudoscientists of YouTube. They come primed with videos promoting Flat Earth theory, NASA lunar and climate conspiracies and even doubting the germ theory of disease. Adolescents are particularly susceptible to this kind of material if they have little grounding in the history and philosophy of science. To this end we are offering resources tailored to the Victorian Curriculum that promote a foundational knowledge of key topics including the discovery of the Earth's sphericity, the clash of the geocentric and heliocentric world views and the birth of epidemiology and the germ theory of disease.

## Richard Gunstone, Emeritus Professor of Science and Technology Education, Faculty of Education, Monash University

### "Science, STEM and Integrated Curriculum"

School Science in Victoria had a central place in past attempts to integrate aspects of curriculum (e.g. â?~Science Frameworksâ?T from the 1980s brought together Science-Technology-Society-Personal Development). Century 21 has seen a renewed interest in integrated and cross curriculum around the world â?" and in the Australian Curriculum with focus on themes such as critical thinking and creativity. At the same time there has been an explosion of emphasis on STEM. This offers genuine possibilities for integrating curriculum through, for example, critical thinking and creativity, including beyond what is usually associated with STEM. Science should play a central role in such integration.

## Bill Healy, Kilbaha Education

### "Interactive automatically marked VCAA VCE Exam Papers"

Give your students the experience of doing the VCAA VCE Biology, Chemistry, Physics, and Psychology Examinations online. See how the Section A questions on the VCAA Exam Papers have been transformed into interactive automatically marked multiple choice questions. Kilbaha has used the original PDFs of the examination papers with a unique overlay of Javascript programming to produce a really useful VCE revision tool for teachers and students. Use online on any computer with the free Adobe Acrobat Reader. Student work is automatically marked with a percentage score and a summary is provided of student correct and incorrect answers for analysis.

# Asynchronous Sessions

## Cristy Herron, Aitken College

### "Improving Self-efficacy Through Assessment Tasks"

Ever have students with the mindset 'I'm not good at science' or 'Science is too hard'? If so, you probably know how hard it is to change their mentality. Conducting highly scaffolded revision sessions in conjunction with assessment reference sheets has shown to be successful in building student confidence, no matter their skill level. I've seen an increase engagement levels and self-efficacy in my students. This strategy also proved effective during remote learning. In this session, revision and assessment strategies will be shared that boost student self-efficacy, ultimately leading to increased subject dedication, success and retention.

## Adele Hudson, Aitken College

### "Increasing participation in science with student-centred projects"

With a vision of making science accessible for all students, we redesigned Year 10 science with a focus on student-centred projects. Based on research from the Invergowrie report and the 7 principles of The GiST, the changes in curriculum have correlated with increased participation of girls in VCE Physics and higher student numbers in all VCE Sciences. In this session we will showcase a Biomechanics project where students' use chemistry and physics concepts to design a bioassistive aid for a client with specific mobility needs. The design ideas unpinning this project can be used in all year levels to highlight to students that science is a creative and practical endeavour that can make a difference in the world.

## Marta Ivkov, Head of Content from Stile Education

### "Teaching science skills – laying the foundations for success in senior science and beyond"

As science skills become more prominent in the VCE study design, it's important that we scaffold students learning experiences prior to reaching this stage to ensure they are primed for success. Join Marta, the Head of Content from Stile Education, Australia's number 1 science resource to explore how to support students in Year 9 and 10 to develop the essential skills they need as they move into senior science in Year 11 and 12. Marta will unpack lessons designed by Stile's expert team of teachers, scientists and engineers to reveal the evidence-based teaching and learning principles underpinning them and the real-world contexts used to drive student engagement. All participants will be given free access to the skills lessons used in the session.

## Radhika Iyer, Mulluana College

### "Tips and Tricks to enhance the quality of research and self-designed"

Nature has provided ways and means for survival for all the organisms. If a particular species is not able to adapt to its surroundings and use its survival mechanism well, it is hard for those species to survive and exist in land or water. Darwin's theory still holds good. Some species have specialized structures to survive in land or water while others develop specialized methods to disperse the seeds or spores to maximize survival.
Let's explore through this workshop, some thought provoking hints, demos and hands on techniques to compare the insect pollinated and wind pollinated flowers, seeds and many more, to understand how each is adapted for pollination and how species survive. This workshop is directly relevant to Unit 2, 4 Biology Study design, 2016-2021. The broad ideas could also be used in experiments for year levels 7-10.
DelegateNote: Please bring your own magnifying lens if you can and some wild flowering plants in your locality

## Man Lam, Mt Alexander College & Neil Champion, Retired Physics Teachers

### "Open day demonstration ideas"

We will show a series of experiments/demonstrations that can be done in school either in the class or Open Day. Examples include Tesla coil, visualization of electric field, converting a calculator into data logger, wireless energy transmission, Franklin Bell, primary colours of light, and ambiguous shapes.  Some of these were presented in the VCE physics teacher conference in the last two years.  Teachers expressed enormous interest in setting up these experiments in their schools but complained of a lack of technical support. In this session, we aim to show teachers and technicians how to set these up in their schools.

## Simon Maaser, Brighton Grammar School, Cambridge University Press

**"Unpacking the VCE Biology Curriculum"**

This session explores the interconnectedness between different topics within the upcoming Biology curriculum. It will provide strategies for how the curriculum can best be delivered, introducing new concepts in relation to those previously taught and the importance of retrieval practice in consolidating and building on student's prior knowledge. As part of this session, features of the new Cambridge resources will be unveiled showcasing how they have been specifically designed to guide students (and teachers) through the connected pathway that is VCE Biology, all with an eye on preparing and building the skills required for successful assessment performance.

## Emily Rochette, The University of Melbourne & Elke Barczak, Museums Victoria

**'Experiencing the Road to Zero Education Complex and Supporting Resources"**

In this presentation, we introduce the Road to Zero Education Complex and revised Physics Challenge Program offered at the Melbourne Museum and through the Regional In-School Program, both free of charge. We also explore resources designed in 2020 to scaffold students through hybrid on- and off-line learning experiences as they study motion at levels 9-10 of the Victorian Curriculum. As participants, teachers are offered these free resources to trial and reflect on how they might be adapted for different cohorts of learners in ways that may complement a Road to Zero excursion or incursion or that could be delivered without these.

## Jenny Sharwood, OAM MACE, FAIE, FRACI-CChem, RACI

**"How to set excellent multiple choice questions in junior and senior chemistry"**

There are many pitfalls in writing multiple choice questions! In this session I will draw on my experience as a lead writer of multiple choice questions for the RACI Australian National Chemistry Quiz, providing examples of a range of questions that need improvement, identifying their drawbacks and showing how they can be improved. Overall principles for good question writing will be outlined.

## Prince Kurumthodathu Surendran & Raji Kochandra, Swinburne Academy, Swinburne University of Technology

**"Create an Impact: Instructional Videos For Better Student Engagement and Learning."**

In the recent past, learning videos have grown as a prominent educational tool for many flipped, blended, and online classes. Now, in response to COVID 19, these instructional videos gain a profound value as almost every university has scrambled to move to teach online. To support students' learning, we have created two different types of videos, the Screencasts and Lightboard videos which are short physics problem-solving videos. Our study aims to investigate the effectiveness of these (screencasts versus lightboards) instructor generated physics video tutorials together with learner's experiences. The video tutorials are delivered for the purpose of improving student's conceptual understanding, critical thinking, and problem-solving skills. The data was collected through an end-of-semester questionnaire containing 5-point Likert-scale questions addressing students' learning, engagement, and satisfaction with delivered videos. Our preliminary results of the comparative analysis showed that students more engaged with lightboard videos than screencasts. Also, we found that students' perception of the impact of both types of videos on their learning gain was positive.

## Robert Ross, Engineering Department at La Trobe University

**"Inescapable Learning Presentation"**

Educational Escape Rooms are highly engaging, team-based learning experiences where students work together to solve problems within a time-critical narrative. Educational escape rooms are a new frontier within game-based learning and are widely applicable across age groups and discipline domains. Find out how you can integrate them into your classroom and re-engage your students.

## Maree Timms (eLearning Coordinator), Galen Catholic College, Wangaratta

**"Our Solar Siblings Program"**

Maree will take you on a journey to discover the beauty of teaching astronomy via the Our Solar Siblings Program. Our Solar siblings allows students to work with real astronomical data, learning how to process Raw Data images from robotic telescopes from across the world, looking at supernova data from the Messier101 supernova that exploded in 2011, using other supernova data to calculate Hubble's constant and the age of the universe. The beautiful thing about this course is that it has everything a teacher needs, the whole kit and kaboodle: teacher guides, worksheets, data, software, PowerPoints, video help guides, plus a network of teachers ready to help and assist

## Peta White, Deakin University

### "Climate Futures and Student Leadership"

Young people are actively exploring the need for action around sustainability and climate issues that are important and relevant to them. The complexity of sustainability and climate issues renders this a tricky space and there are no simple solutions. Young people should feel enabled to lead change and insist that their voice be heard by those in positions of power. This presentation will explore a new teaching and learning sequence designed to strengthen student's critical and creative thinking skills as an integral part of becoming socially and scientifically literate and active citizens who act with environmental consciousness for a sustainable future in this time of climate crisis. The focus is on developing student leadership capabilities in young people so that they can have a voice in their future. The fundamental beliefs that understanding and actioning are at the core of learning. Young people need to learn how to survive and thrive as they will benefit from learning how to create a world worth living in for all beings a environmentally, socially, culturally, and economically. Sustainability is central to education, not peripheral.

## Peta White & Maria Vamvakas, Deakin University

### "Contemporary Science Practice in Schools"

Explore curriculum materials that have been developed by Deakin University with you and your students in mind. We have connected with contemporary science researchers conducting current and local (Victorian) research and have developed lower secondary teaching and learning sequences. The sequences are presented in discrete sites and suggest activities appropriate for lower secondary students and linked to the Victorian Curriculum. They cover a range of science disciplines and many include videos of the scientists discussing their passion for science and the research (science as human endeavour). These resources are available online and are free to use and adapt to suit your specific needs. In this session we will give you and overview of the resources, focus in on some specifically and prepare you to be ready to use these resources on Monday.

## Peta White and Russell Tytler, Deakin University - School of Education

### STEME Team Support Schools

The Deakin University STEME Education Team https://deakinsteme.org/ offers a range of professional learning opportunities for teachers of science, mathematics, environmental education, technology education and interdisciplinary STEM. These opportunities include part of whole day workshops and more extended, negotiated support for teachers and schools in the STEM areas to develop innovative and evidence-based practices and activities. Details of these offerings can be found here https://deakinsteme.org/professional-learning/ This presentation will showcase the professional learning as well as highlighting two new and innovative Graduate Certificates in Science and in Mathematics Education. There are still funded places available for DET School staff in the Science Education Graduate Certificate for 2021.

## Angela White Hands on Science

### "Design Projects – Build a model playground"

This presentation will guide you through an authentic design and engineering project that is suitable for a primary (or secondary) classroom. We'll work through the design process, including elements of math and science, using problem solving skills and creative thinking.

## Alec Young, Automarque

### "How teachers can obtain new insights into the quality of their teaching"

The author collaborated with schools in three states to develop a 'world first' means for teachers to improve their students' outcomes through 'assessment for learning'.

When teachers use pre-test/post-test analysis in their every day teaching they learn how effective their 'impact' has been. This has enabled teachers to, "change their lives and that of their students", or as a speaker at the ACEL 2012 conference put it; "The students in her school, on average, learnt at twice the pace of the nation and at twice the usual depth of learning".

# Presenters

## Alexandra Abela

Alex is the President of the Science Teachers' Association of Victoria. She has been a continuous member of STAV since joining as a pre-service teacher in 1993. Since first joining STAV Council in 2001, Alex has held a number of Executive roles, and she is currently STAV's representative on the board of the Australian Science Teachers Association. Alex has held a variety of leadership positions in science education throughout her career. She is passionate about curriculum design, committed to innovation in teacher professional learning, and loves teaching students of Chemistry at Penleigh and Essendon Grammar School.

## Dr. Nik Alksnis

Nik is an expert in integrating education and technology. Having started his career as a programmer and project manager developing touch typing software, he managed the project to create one of the first fully online typing trainers for K12 students. After moving to the higher education sector with the completion of his PhD in Philosophy at La Trobe University, he spent several years lecturing in philosophy with a specialisation in critical thinking and developing general online resources for the faculty. At Monash University, he led the digital uplift team that converted all the university's paper exams to digital in less than a month in response to COVID-19. As an Educational Designer for the Faculty of Engineering at Monash University he works in a pivotal role up-skilling academics to rapidly deploy online learning in the face of the current pandemic restrictions. He also serves as a committee member with the Australian Skeptics Victorian Branch.

## Richard Allan

Richard Allan has an MSc in biology and is founder and CEO of BIOZONE International, an educational publishing house specialising in the publication of instructional materials for high school science programmes.

## Hilary Bea

Hilary went to school at MLC in Melbourne and loved Biology & Chemistry and is now studying first year science at Melbourne University.

In 2018 Hilary and her team won the TiE Young Entrepreneur of the Year award and went on to represent Australia at the global competition in Boston, USA in June 2019. Accepting the Best Teamwork prize Hilary commented, "We are grateful for having this opportunity to learn entrepreneurship and life skills that are not taught at our school". Hilary is very passionate about helping others learn new skills and is an Ambassador for EducART in her spare time.

# Presenters

## Jade Bohni

Jade has been teaching secondary science in virtual classrooms for the past 4 years and has developed a range of strategies for creating engaging lessons in interactive virtual classes. She is an enthusiastic educator and wants her students to develop a passion and interest in science.

Broadcasting from a purpose-built studio on the campus of John Monash Science School, Emerging Sciences Victoria (ESV) makes it possible for Year 9 and 10 students in Victoria to access specialised STEM subjects through a virtual classroom. Our state-of-the-art virtual classroom makes engaging, collaborative and inclusive learning available to all students – regardless of their geographic location or socio-economic situation.

## Gen Blades

Gen Blades (PhD) has been involved in outdoor and environmental education in schools and the tertiary sector. Her areas of interest, both research and teaching, include environmental values and ethics, environmental eco-pedagogies and sustainability education.

## Dale Carroll

Dale Carroll has been working as a Science Technician for more than 40 years at Geelong College. Along the way he has been on the science technician associations committee for many years. This led to being an instigator of the formation of SETA (science education technicians Australia), a national network connecting each State association together.

## Connie Cirkony

Connie Cirkony is a research fellow with the Q Project in the Faculty of Education at Monash University. Her background is in education, science and environmental education, and education policy.

## Deb Corrigan

Deb is passionate about fostering student enthusiasm for learning science and STEM. She strives to work closely with teachers, encouraging them to realise the potential of their learning environments. By considering their students' needs (intellectual, personal and behavioural) teachers can transform their classrooms into learning spaces that support people to question preconceived views, clarify ideas and ultimately, reach a position or consensus. In these ways teachers can develop creative learners who can engage with and critique ideas, appreciate differing viewpoints and provide compelling reasons why they think the way they do. As Director of Education Futures and a Monash professor, I dedicate my research to challenging accepted wisdom and practices – and traditional views of science education for more contemporary and authentic ones.

## Josh Cox

Founding Director of Reptile Encounters, which is a zoo based in Burwood, Melbourne, housing around 470 Australian native animals.
The business has been in operation for soon to be 15 years.
The focus of the business is delivering wild face to face and virtual experiences with Australian native animals.

## Emma Craven

Emma has been in education for over 15 years and writing textbooks for 12 of those. She has worked in a number of settings, primarily as a science teacher in Government schools but also in policy in the Department of Education, in community settings for vulnerable students and as the Head of Science in a high performing international school. Emma has taught Year 7 – 10 science as well as VCE Biology, Health and Human Development and Environmental Science and is a VCAA Exam Assessor. Her educational interests include working with disadvantaged students, engagement and high-growth learning.

## Mandy Crofts

Mandy is a senior VCE Chemistry teacher at Camberwell High. She has a diverse range of teaching specialisations, from junior maths and science to EAL and Chinese. Mandy has delivered PL workshops for her teaching colleagues to develop their awareness and appreciation of the challenging literacy demands of maths and science.

## Seamus Delaney

Dr Seamus Delaney (https://twitter.com/delaneysw) is a Science Education Lecturer and Researcher in the School of Education, Deakin University. He has worked as a classroom teacher, Head of Science, Head of eLearning, teacher educator and researcher in both Australia and Switzerland over his last 15 years. He is currently Secretary of the Chemistry Education Association (CEA), and he co-founded the Early Careers Chemistry Network (ECCN) which supports chemistry teachers early in their careers.

## Jodie Donaghey

Jodie is a specialist science teacher in an inner city catholic primary school. Over the last 20 years she has worked as both a classroom teacher and a specialist science teacher in state, independent and catholic schools. Jodie completed a Bachelor of Teaching and a Bachelor of Science with honours in chemistry before completing a masters in specific learning difficulties. She is passionate about engaging children of all ability levels in science education. Jodie aims to encourage children to open their eyes to their surroundings and see that science is fundamental to everything around them. Jodie attempts to make all her science classes as hands on and as engaging as possible. She has been responsible for starting up and organising science fairs in numerous schools and facilitated many primary school students to enter projects into the Science Talent Search.

# Presenters

## Aaron Elias

Aaron has been teaching for seven years at high performing schools both in Victoria and internationally. Aaron began his career in physics before becoming a teacher a little later in life. He has taught Year 7-10 science as well as VCE Physics and Chemistry. His educational interests include embedding literacy and numeracy into every lesson, formative assessment and extension for high performing students. Aaron's favourite part of teaching is sharing his enthusiasm and passion for science with his students.

## Sean Elliott

Sean M Elliott is a writer and educator who has been working in science communication since 2001. He has written and presented education sessions for schools and community groups, and has worked for groups such as Museum Victoria, CSIRO, and Edinburgh International Science Festival.

## Monica Green

Dr Monica Green is a Senior Lecturer and teacher educator in the School of Education at Federation University Australia. Her teaching and research interests are in place- and community-based pedagogies, education for sustainability, climate change and sustainable communities. She is current Chair of the Regional Centre of Expertise in Education for Sustainable Development (RCE Gippsland).

## Megan Griesser

Megan is a senior VCE Biology teacher at Camberwell High and holds a PhD in Neurobiology. She also teaches junior science, maths, and VCE Psychology. As a learning specialist, Megan works with teachers to plan and trial pedagogical strategies that develop students' mastery of the discipline-specific languages of maths and science.

## Chris Guest

Chris is a software developer and occasional bioinformatician who has been recently employed at the University of Melbourne and Melbourne Childrens Research Institute. He has been involved in developing health software systems and was a core developer at the University of Melbourne's SWARM project for promoting crowd-sourced forecasting and critical reasoning. He is currently co-authoring a book on Software Development and holds the position of President in the Australian Skeptics Victorian Branch.

## Richard Gunstone

Professor Richard Gunstone is Emeritus Professor of Science and Technology Education at Monash University, and is still actively researching and writing and publishing. For much of his former life as a high school physics, science and maths teacher (1962-73 inclusive) he was heavily involved with STAV. He was STAV's first executive officer.

## Bill Healy

Bill Healy is the CEO of Kilbaha Education delivering science digital resources to schools, teachers and students throughout Australia. Bill was a VCE Chemistry and Physics Teacher for many years. VCE Trial Examinations from Kilbaha for Biology, Chemistry, Physics and Psychology are well known and have been used by schools for decades.

## Cristy Herron

Cristy Herron is Head of Environmental Programs at Aitken College and has experience teaching General Science and Maths, as well as VCE Chemistry, Environmental Science and Psychology. She is particularly interested in curriculum innovations and implementation, in conjunction with student self-efficacy.

## Linda Hobbs

Associate Professor Linda Hobbs has designed, implemented and evaluated professional learning for school teachers for over ten years. She currently leads the evaluation of the Victorian Tech Schools Initiative, working closely with the Department of Education and Training (DET) and Tech Schools to develop a rigorous evaluation strategy involving a range of key stakeholders.

## Kelly Hollis

Kelly Hollis is the Global Head of Science for Education Perfect. With over 12 years experience in the classroom, she joined EP in 2017 as an experienced Science teacher and an ambassador for the effective implementation of technology in the classroom.

## Adele Hudson

Adele is Head of Science at Aitken College and currently teaches middle school science, and senior chemistry and physics. Coming from a background in research, Adele is passionate about providing students with opportunities to engage in open-ended investigations; finding that when students learn through exploration and discovery, this engenders in them a love of learning. As part of promoting the importance of science in student's futures, she facilitates numerous extracurricular STEM programs where students are drivers of the projects. One of these programs, EngGirls, is a program that aims to increase girl's awareness of STEM careers.

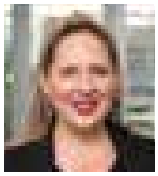
## Brendan Jackson

Brendan has over eight years experience as a secondary school Science, Mathematics and STEM Teacher, and has held various Positions of Leadership in curriculum. Brendan has completed a Bachelor of Science, Masters of Teaching (Secondary) and Masters of Education (Educational Management) at the University of Melbourne.

## Maria James

Maria is the Science Curriculum Manager at the Victorian Curriculum and Assessment Authority, having previously held school positions including Head of Science, Dean of Students and Head of Senior College. Maria holds a Masters degree in Education and has written junior science and senior chemistry textbooks.

# Presenters



## Misty Jenkins

Associate Professor Misty Jenkins BSc (Hons), PhD, MAICD

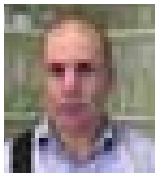
Misty Jenkins is a NHMRC fellow and laboratory head in the Immunology Division at Walter and Eliza Hall Institute for Medical Research, where she researches cellular immunology and cancer immunotherapy. Misty studied her PhD in Immunology at The University of Melbourne, followed by postdoctoral positions at The Universities of Cambridge and Oxford, and The Peter MacCallum Cancer Centre in Melbourne.

## Michael Kasumovic

Michael is an Associate Professor at UNSW Sydney. An award winning evolutionary biologist and science communicator, Michael explores the role the social environment has on how individuals develop and behave. These interests have resulted in him working on a number of different species throughout his career from birds, to spiders, to crickets, and now humans.

## Raji Kochandra

Raji is a passionate STEM educator at Swinburne University of Technology. She has a deep interest in effective pedagogies in science and mathematics education. Presently, she is engaged with multimedia integration of learning resources to support student's learning.



## Spiro Liacos

Spiro Liacos has been teaching Science, Physics, and PE since 1990. In 2011, he formed Liacos Educational Media with his wife Georgina and the two of them produce the famous Shedding Light series of educational programs.

## Kieran Lim

Dr Kieran F Lim (林百君) FRACI CChem MACE is an Associate Professor of Chemistry in the School of Life and Environmental Sciences at Deakin University, Geelong, Australia. Since 2004, he has been a regular presenter at STAV and ASTA conferences.

## Simon Maaser

Simon has had experience leading and developing Science curriculum within the government and independent school sectors. In addition, he was a member of the VCAA Review Panel for the new Biology Study Design and current Assistant Chief Assessor for the Biology examinations. As current Head of Science at Brighton Grammar School and lead author for the new Cambridge VCE Biology series, to be released in 2021, he has a passion for helping students and teachers to make important cross-content connections within the Biology curriculum.

## Andrew McAlindon

Andrew has over ten years experience as a secondary school Science, Mathematics and STEM Teacher, has held various Positions of Leadership in curriculum, and is currently a Deputy Principal. Andrew has completed a Bachelor of Science (Honours), Masters of Teaching (Secondary) and Post Graduate Certificate in Mathematics Leadership at both the University of Melbourne, and Monash University. Andrew has recently completed a Doctor of Education at the University of Melbourne, focusing on the flipped classroom.

## Andrew McKenzie

Andrew McKenzie, an enthusiastic Science Teacher, is known for helping, educating and instilling a passion for learning in his students and fellow science colleagues alike. He has gained his wealth of experience whilst teaching in three different countries.

## Barbara McKinnon

I teach Physics and Science at Kew High School and have a deep interest in effective pedagogies in Physics teaching. I have worked in a broad range of settings, from presenting hands on science to students in prep to lecturing on the physics of materials.

## Jorja McKinnon

Jorja McKinnon has taught in the field of Environmental Education for the past 17 years. currently she works with Environment Education Victoria and also has teaching and research roles with Deakin University

## Victoria Millar

Dr Victoria Millar is a Senior Lecturer in the Melbourne Graduate School of Education at the University of Melbourne. She lectures into the Masters of Teaching and undertakes research in science education. She has been involved in a range of successful national research projects investigating science participation and curriculum.

## Libby Moore

Libby Moore taught in Victorian schools for 15 years. It was during this time that her passion for LEGO Education and the educational benefits to teachers and children of 'hands on minds on learning' began. Moore Educational has been an official partner of LEGO Education for over 20 years.

## Famie Needham

Famie has over 20 years of experience in a variety of educational contexts, with significant experience in curriculum development and leadership. She is currently the STEM Learning Specialist at Newcomb Secondary College in Geelong where she leads the GROW program, an innovative cross-curricula subject aimed at the development of 21st century skills. For 10 years previous to this, she was a lecturer in education at Deakin University, working with the mathematics and science education teams.

# Presenters

## Peter Razos

Head of Middle School Science Caulfield Grammar (Caulfield campus)

## Mark Rickinson

Mark Rickinson is an Associate Professor in the Faculty of Education at Monash University. His work is focused on understanding and improving the use of research in education. In Australia, and before that in the UK, he has undertaken research, evaluation and consultancy projects around evidence-based policy, evidence-informed practice and user engagement. He is currently leading the Monash Q Project (https://www.monash.edu/education/research/projects/qproject), a five-year initiative with the Paul Ramsay Foundation to improve the use of research evidence in Australian schools

## Emily Rochette

Emily Rochette is a classroom science teacher and lecturer at The Melbourne Graduate School of Education. Her research interests are situated with understanding teachers' use of digital technologies in the science classroom as they teach both in- and out-of-field.

## Robert Ross

Robert Ross is a Senior Lecturer in the Engineering Department at La Trobe University. Robert was the Engineering Teaching and Learning Coordinator from 2017-2019, is the inventor of the escape room decoder box and recently co-authored a book titled "Inescapable Learning: Unlock the power of educational escape rooms". Robert along with his wife Sarah, are pioneers in development and research into educational escape rooms. Sarah Ross is the Director of Escape Room Education (escaperoomeducation.com) which was formed to provide educators with the skills and equipment they need to run their own educational escape rooms.

## Jenny Sharwood

Jenny taught Chemistry, Science and Mathematics in a range of schools for over 26 years, fulfilling several leadership roles over that time. Jenny was the lead author and series editor of a number of Chemistry and Science textbooks, teacher guides and many other resources as well as conducted many teacher workshops in these subjects. Jenny also was appointed as the writer for the STELR Project, a three-year STEM project on climate change, renewable energy and sustainability by the Australian Academy of Technological Sciences and Engineering (ATSE). Jenny is very active in the Royal Australian Chemical Institute (RACI). She is the Chair of the RACI Victorian Chemical Education Committee and has been the lead writer for the Year 11 and Year 12 papers for the RACI Australian National Chemistry Quiz (ANCQ). Earlier this year she presented a webinar on how to write excellent multiple choice questions to over a thousand teachers in 12 overseas countries that participate in ANCQ.

## Prince Kurumthodathu Surendran

Prince is an experienced STEM educator at Swinburne University of Technology. His research interest includes developing interactive learning resources to achieve better students' learning outcome. Currently, he is involved in supporting students' learning with engaging videos.

## Bronwyn Sutton

Bronwyn is a creative at heart who blends experience, curiosity and research to create purpose-driven programs which connect with communities on a deep level to inspire action on sustainability and climate change. She does this through her work as an engagement and communications consultant, and as a sessional tutor. Bronwyn is a PhD student at Deakin University exploring transformative learning, leadership and public pedagogies of environmental sustainability.

## Cor Nie Tan

How can we link classrooms to real-world experiences? Yakult Education is committed to improving and providing a link between education and the food industry, helping students to find the "why" behind learning with real-world case studies.

As a Dietitian and a Biology/Health educator, Cor Nie is in a unique position to offer some insights into the food industry from an educational lens.

## Maree Timms

Maree is a passionate Science Educator, who has taught in a range of learning environments for over 30 years; Melbourne, England, Turkey, Humpty Doo (near Darwin), Gunbalanya (Arnhemland) and now back home in Wangaratta. She has been teaching at Galen Catholic College, Wangaratta for the last 13yrs. She loves teaching science, especially her favourite topic of astronomy. She is also leading STEM education in the region. Founding DTAC Wangaratta - Digital Technologies Advisory Committee, a collaboration between local schools, Charles Sturt Uni, GOTAFE and local industry. Maree has also led a highly successful VEX Robotics program at her school, where her teams have been highly successful they have qualified for and represented Australia at three VEX Robotics World Championships, in the USA.

## Russell Tytler

Professor Russell Tytler is Alfred Deakin Professor and Chair in Science Education at Deakin University, Melbourne. He has researched and written extensively on student learning and reasoning in science. His interest in the role of representation in reasoning and learning in science extends to pedagogy and teacher and school change. He researches and writes on student engagement with science and mathematics, school-community partnerships, and STEM curriculum policy and practice. His current interest is in interdisciplinarity leading to critical and creative reasoning. He is widely published, and has been chief investigator on a range of Australian Research Council and other research projects.

# Presenters

## Meg Upton

Dr. Meg Upton is an arts educator, researcher and teaching artist. She has worked extensively in the arts industry as a consultant. Meg has worked in the Faculty of Arts and Education at Deakin since 2007 teaching drama, pedagogy and curriculum within the M.Teach. Her interests are in embodied and participatory pedagogies in learning. She has a particular interest in climate change education as is the author of the Drama Australia's Acting Green - Guidelines for sustainable drama practice and drama teaching. Meg is a board member of Drama Victoria, Rawcus Theatre Company, and University of Melbourne Student Theatre.

## Maria Vamvakas

Maria began her career teaching Science and Biology, having completed a Bachelor of Science and Graduate Diploma of Education at Monash University. Progressing to the position of Head of Science from 2007, her primary responsibilities included staff and curriculum leadership. Marias roles have enabled her to act as a facilitator in developing students' scientific literacy, critical thinking and passion for science.  From 2017 she has been working at Deakin University as a Teaching Associate and Research Assistant and completed a Graduate Certificate in Education Research at Deakin University in 2018, culminating in a Research Paper investigating "Contemporary Science practice in the Classroom". Currently Maria is enrolled as a PhD candidate in the Degree program, Doctor of Philosophy - Education investigating how scientists' practices can be best represented in the classroom.

## Angela White

I am a passionate educator with over 30 years experience. I have taught at both primary and secondary level in Victoria and the Northern Territory as well as in three states in the USA. I have been a classroom teacher, field naturalist and instructor at Outdoor Science School. I have designed and implemented new science programs in Primary schools in Victoria and the USA as well as presenting PD workshops for teachers.

## Peta White

Dr Peta White is a science and environmental education senior lecturer at Deakin University. Peta has worked in classrooms, as a curriculum consultant and manager, and as a teacher educator in several jurisdictions across Canada and Australia. Peta gained her PhD in Saskatchewan, Canada where she focussed on learning to live sustainably which became a platform from which to educate future teachers. Her passion for initial teacher educator, environmental education/academic activist work, and action-orientated methodologies drives her current teaching/research scholarship. Peta's current research interests follows three directions including science and biology education, sustainability, climate change, and environmental education, and collaborative/activist research.

## Erin Wilson

Erin Wilson is the Curriculum Manager, STEM for the VCAA. With responsibilities for VCE Biology, VCE Psychology and the Victorian Curriculum F-10 Science, she has a keen interest in engaging students in science and education and developing quality science and STEM curriculum  for all learners.

## Alec Young

Alexander (Alec) Young, RFD, FACEL, MACE, MIAEA, has many years experience in leadership positions in secondary education and professional teacher associations. His work is underpinned by believing teachers need time saving resources and powerful diagnostic tools if they are to improve the outcomes of all students. To this end, he built a resource to assist teachers to better understand the quality of their pedagogy. When teachers know what has or has not worked they are more effective at improving their students outcomes. His collaborative research work was supported by Commonwealth Government research and development grants.