Science Teachers' Association of Victoria Inc.
ABN 59 004 145 329
Patron: Dr Barry Jones, AO, FAA, FAHA, FTSE, FASSA, FRSA, FRSN, FRSV, FACE
Founded 1943

Science Victoria
ABN 94 108 759 762

STEM Conference 2017

"STEM skills for the 21st Century"

Friday 25 August 2017

Quantum Victoria, 235 Kingsbury Drive, Macleod West

8:00am – 9:00am **Registration**

9:00am – 9:05am **Welcome and Housekeeping by Soula Bennett**

9:05am – 9:55am **Keynote**

Australian Defence Science in the 21st Century

Dr Claire Davis, Defence, Science & Technology

The increasing pace of geopolitical, economic and technological change in the 21st century means it is critical for Defence to ensure it has continued access to the best skills and innovation Australia has to offer. These new skills, backed by science, technology, engineering and mathematics, will help Defence to take advantage of emerging technology areas that have the potential to provide a capability edge for Australia's relatively small force and ensure that Defence remains resilient to new and emerging threats.

Defence Science and Technology (DST) will play a key role in Australia's new approach to Defence innovation. In particular, DST is leading the $730 million Next Generation Technologies Fund, working with Defence stakeholders, industry, academia and our allies in the development of the game-changing capabilities of the future.

This presentation will provide an overview of some of the technology areas which have been identified as having the potential to deliver these game-changing capabilities for Defence and the skills and attributes which will be required in the future to support this delivery in a rapidly changing environment.

Dr Claire Davis is a Senior Research Scientist at the Australian Defence Science and Technology (DST) group. She works on the development of new sensors and materials to improve the performance and safety of ships, submarines and aircraft. She has also served as a Specialist Science Advisor in the Science Strategy and Program Division with a particular interest in the development of effective external partnering strategies to enhance the delivery of Defence outcomes.

10:00am – 10:20am **Morning Tea & Displays**

10:25am – 11:25am Session A

A1 STEM School Tours, Kennedy Space Center an Educating Adventure

James Whiteley, Educating Adventures

At Educating Adventures we understand the challenges of organising overseas tours for students, and our team of professionals can guide you throughout the process. This presentation will focus on how to run a successful tour to Kennedy Space Center that will excite your students and open their eyes to the endless possibilities in STEM. Our STEM Tours provide students amazing opportunities to discover through experiential learning.

Discover our range of programs focussing on different STEM subjects, and how Educating Adventures can help make your journey as smooth as possible, from the planning stage all the way through to your time on tour.

Suitability: Years 7 - 10
Curriculum: Earth & Space Sciences/Physics/General

A2 Do cyborgs really exist? Integrating cybernetics studies into the Science Curriculum

Jacqui Lupton, Penleigh & Essendon Grammar School

Building on STEM knowledge and skills developed in earlier years, Year 10 Science students at PEGS are examining a broad range of principles relevant to the fields of robotics and cybernetics. In this session, the presenters will share their experiences of the classroom, as their students seek to answer the essential questions What will humans of the future look like, and what will be the impact of cybernetics on biodiversity? To what extent is it possible to incorporate robotic and computer technologies into our bodies? Can we 3D print prosthetic limbs? What is AI? Is direct brain to brain communication possible? And do cyborgs really exist?

Suitability: Years 7 - 10
Curriculum: General

A3 Science by Doing: Engaging students with science

Denis Goodrum, Australian Academy of Science & Jess Sartori, Brunswick Secondary College

How can we excite and intellectually engage high school science students? The Australian Academy of Science has developed a high school program called Science by Doing. Much research and testing has gone into its development.

Science by Doing is a comprehensive online science program for Years 7 to 10 available free to all Australian students and teachers and supported by award winning professional learning modules and a research based professional learning approach. At present, 60% of all Australian high school teachers have registered to use the program.

We will provide an overview of the program while Jess will outline how the program has been implemented in her school.

Suitability: Years 7 - 10
Curriculum: Physics/Earth & Space Sciences/Learning Technologies/General

A4 STEM in the Primary Years

Emma Castelow, VCAA

In this session, participants will explore the place of STEM in the Victorian Curriculum. The presenter will showcase some examples of successful lesson plans that integrate three curriculum areas of Science, Technology and Mathematics. Participants will understand how these units are structured and will have the opportunity to beginning planning some STEM learning sequences.

Suitability: Years P - 6
Curriculum: General
Repeated in D4

A5 STEM at Parkdale Secondary College

Tim Thompson & Janelle Scott, Parkdale Secondary College

A journey through the roadblocks, setbacks, successes and failures of implementing a co-curricular STEM program. A program that has matured over 4 years with 300 enrolments, generated huge interest with students & parents, brought recognition to our school and won the 2016 Graeme Clark Award for Innovation in Science. Discussion will centre on our STEM units - Forensics, Advanced 3D, Robotics, F1 in Schools, Super Chef, Super Chef Restaurant, Anatomy by Dissection and STEM Year 7.

Suitability: ALL
Curriculum: Learning Technologies
Repeated in D1

A6 STEM Project Based Learning with Quantum Victoria

Cressida Byrne & Latha Shivasubramanian, Quantum Victoria

In this interactive, hands-on workshop, participants will be introduced to a STEM Project Based Learning framework that allows for authentic incorporation into the school curriculum. Delegates will be presented with a problem to solve that will require them to draw on their creativity, design and Higher Order Thinking skills.

Quantum Victoria is a state-wide provider of STEM education programs. Join our presenters and learn how you can bring STEM Project based learning to your classroom.
In this interactive, hands-on workshop, participants will be introduced to a STEM Project Based Learning framework that allows for authentic incorporation into the school curriculum. Delegates will be presented with a problem to solve that will require them to draw on their creativity, design and Higher Order Thinking skills.

Delegates Note: This is a DOUBLE SESSION A6 & B6

Suitability: Years 5 - 10
Curriculum: General

11:30am – 12:30pm Session B

B1 Why do schools love Stile Science

Andrew Nicholls & Katrina DonPaul, Stile Education

Stile is an Australian STEM education company. 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.

To do this, Stile has partnered with Cosmos Magazine and the CSIRO to create a library of online interactive science lessons for Years 5-10 that collectively cover the Australian Science Curriculum (all three strands). The lessons are used in over 300 Australian schools and contain a mixture of content delivery, formative assessment, summative assessment, experiments, projects, classroom activities, and STEM career profiles.

Delegates Note: Please bring you own laptop to the session

Suitability: Years 5 - 10
Curriculum: General

B2 Using STEM as a framework for building cross curricular links

Jessica Sartori & Rohan McCarthy, Brunswick Secondary College

At Brunswick Secondary College we have decided to use STEM as a framework to develop cross curricular assessment in Year 7. The objective of the unit was to focus on developing students' skills not just content knowledge in the different learning areas. The result was a 6-week course integrating Science, English, Maths and the General Capabilities. Students worked collaboratively or individually to solve a problem using design cycle theory. These products or ideas were then celebrated and recognised at an Innovation Fair.

The objectives of this session are to:

-Provide an outline of the context.

-Provide the learning intentions and time frames we used.

-Methods of communication between teams.

-Examples of rubrics used in Science.

-Opportunities for integrating General Capabilities

Suitability: Years 7 - 10
Curriculum: General
Repeated in D6

B3 STEM and Simple Circuits in the Victorian Curriculum

Britt Gow, Hawkesdale P12 College – VCAA STEM Specialist teacher

A learning sequence is presented for students to gain a better understanding of the wired-up world they live in. From squishy circuits with play dough to paper circuits and soft circuits to student-constructed torches, this is a hands-on session for integrating science, technology and mathematics into your classes.

Suitability: Middle Years 5 - 8
Curriculum: Physics/General
Repeated in D3

B4 Communications Engineering - digital communication with Innovator interface hub

Brian Lannen, Wodonga Institute of TAFE

An understanding of the building blocks necessary for the engineering of our communications industry calls upon all four components of STEM education. This workshop shares ready-to-use worksheets that coach students through the process of designing and controlling a flashing LED communicator that can be engineered to carry binary coded information. Better still, we can also use a similar unit with light sensor to read the flashing LED signal and decode it to information using the standard TI-Nspire calculators that students use for their maths classes.

Suitability: Years 7 - 10
Curriculum: Physics/Learning Technologies/General

B5 The importance of failure and creativity in STEM

Michael Rosenbrock, Regional STEM Centre

Being creative and experiencing failure are core components of high-level STEM programs. This session will explore why this is so important and how to develop programs to support students to access their creativity and embrace failure.

Suitability: ALL
Curriculum: General
Repeated in D5

B6 STEM Project Based Learning with Quantum Victoria

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Delegates Note: This is a DOUBLE SESSION B6 & A6

Suitability: Years 5 - 10
Curriculum: General

12:35pm – 1:20pm Lunch

1:25pm – 2:25pm Session C

C1 Engaging Girls in STEM beyond Year 10

Eroia Barone-Nugent, University of Melbourne.

The Growing Tall Poppies Science STEM Partnership Program (GTP) has produced a curriculum based pedagogy to link students in Year 10 with scientists to help them identify the value of staying with sciences to year 12. This has resulted in increased enrolments and engagement levels. The curriculum gets students and scientists to work on real science together in labs. It addresses four factors that inhibit girls taking science; negative stereotypes about physicists, the difficulty of science and lack of identity, the relatability and importance of science to individuals and society, and the lack of transparency of science pathways and frontiers generated from physics skills. The GTP pedagogy is underpinned by mindset theory to develop aspects of science engagement.

STEM subjects are enabling for the progress of technology and medical advancement and the GTP program creates tangible experiences for students. This presentation will provide you with the structures, curriculum materials and the methods to source scientists and implement this pedagogy to help you make sciences to year 12 a real choice for students and especially girls at your school.

Suitability: ALL
Curriculum: Biology/Chemistry/Physics/Environmental Science/ Psychology/General

C2 We can build that! Incorporating design and engineering principles into a Science classroom

Jacqui Lupton, Penleigh & Essendon Grammar School

The Victorian Curriculum includes understandings based on chemical reactions, electric circuits, magnets, energy flow and forces in the Levels 9 and 10 Content Descriptions. How to address a range of these while keeping students actively engage, entertained, developing design and problem solving skills? Have them build a Rube Goldberg machine! In this session, the integration of these understandings will be examined, some tools explored that encourage development of the design process and outcomes discussed. Want to make it more challenging? Introduce some 3D printing into the mix as well!

Suitability: Years 7 - 10
Curriculum: General
Repeated in D2

C3 Science Simulations for BYOD and other IT configurations

Michael O'Brien, Newbyte Educational Software.

Bring your own device (BYOD), Interactive Whiteboards and student laptops are trends in education, however, finding good science simulations and using them effectively in your classroom is a problem.

This, hands on workshop, will give you some great practical ideas for using this new technology in your classroom. During the workshop we will examine several Newbyte packages covering ecology, genetics and chemistry.

Receive free trial software and someone will win a copy of one of these packages.

Suitability: Years 9 - 12
Curriculum: Biology

C4 A clever action packed STEM activity for the middle school

Carl Ahlers, Prof Bunsen Science

Teachers now are challenged to deliver creative STEM activities that are engaging and within their budget. OneCar is such a fun resource for middle school classrooms. A multi-powered car that involves students in basic make & create technology, while drawing them into learning areas such as electricity, motion, forces, energy transformation, sustainability and chemistry.

Come along and experience OneCar, it is clever, affordable & fun!

Suitability: Years 5 - 10
Curriculum: Physics/General

C5 Coding with Quantum Victoria

Joel Willis & David Smith, Quantum Victoria

In this hands-on workshop, participants will discover ways to incorporate coding authentically into the school curriculum. Participants will be taken through a step-by-step process introducing them to basic coding, with the capacity to build on the knowledge gained. No previous coding experience is required to attend this workshop. New coding technology has enabled coding to be easily included into the STEM classroom, with the only requirements being a connection to the internet and a browser!

Quantum Victoria is a state-wide provider of STEM education programs. Join our presenters and learn how you can bring coding to your classroom.

Suitability: Years 5 - 10
Curriculum: General

C6 The Giant STEM Investigation

Carlie Alexander & Yuvadee Patchon, Quantum Victoria

This hands-on STEM focused session will provide delegates with an overview of the scientific inquiry that students undertake during a scientific research project via this Quantum Victoria Student Program. Students investigate an Endangered Victorian invertebrate (the Giant Gippsland Earthworm) and collaborate through the extended investigation. The testing includes groundwater salinity, soil pH, soil copper content, soil potassium content and soil moisture. Delegates will also learn techniques that are applicable both to the classroom and preparation room.

Quantum Victoria is a state-wide provider of STEM education programs. Join our presenters and discover how this exciting program can enhance your junior STEM classroom.

Suitability: Years 7 - 10
Curriculum: Biology/Chemistry/General

2:30pm – 3:30pm Session D

D1 STEM at Parkdale Secondary College

Tim Thompson & Janelle Scott, Parkdale Secondary College

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Suitability: ALL
Curriculum: Learning Technologies Repeat of A5

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Suitability: Years 7 - 10
Curriculum: General
Repeat of C2

D3 STEM and Simple Circuits in the Victorian Curriculum

Britt Gow, Hawkesdale P12 College – VCAA STEM Specialist teacher

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Suitability: Middle Years 5 - 8
Curriculum: Physics/General
Repeat of B3

D4 STEM in the Primary Years

Emma Castelow, VCAA.

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Suitability: Years P - 6
Curriculum: General
Repeat of A4

D5 The importance of failure and creativity in STEM

Michael Rosenbrock, Regional STEM Centre

Being creative and experiencing failure are core components of high-level STEM programs. This session will explore why this is so important and how to develop programs to support students to access their creativity and embrace failure.

Suitability: ALL
Curriculum: General
Repeat of B5

D6 Using STEM as a framework for building cross curricular links

Jessica Sartori & Rohan McCarthy, Brunswick Secondary College

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-Examples of rubrics used in Science.

-Opportunities for integrating General Capabilities

Suitability: Years 7 - 10
Curriculum: General
Repeat of B2

3:35pm – 4:00pm Meet'n Greet

For further information

Contact the STAV Business Centre, PO Box 109 COBURG VIC 3058
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OFFICE USE ONLY
Registration Number

STAV/Quantum Victoria STEM Conference 2017 — Registration

Friday 25 August 2017 at Quantum Victoria, 235 Kingsbury Drive, Macleod West.

Personal Details - Please complete **all** the fields below.

School Purchase Order No. _____ ☐ STAV Individual Member Membership No. _____

Title First name Surname Male/Female

Email (all correspondence is by email)

School/Organisation

Address

Suburb State Postcode

Telephone Fax Mobile

School Type: ☐ Government ☐ Independent ☐ Catholic ☐ Other

Region: ☐ Western Metro ☐ Northern Metro ☐ Eastern Metro ☐ Southern Metro
☐ Loddon Mallee ☐ Barwon Sth Western ☐ Gippsland ☐ Grampians ☐ Hume

School Level ☐ Early Years (P-4) ☐ Middle Years (5-9) ☐ Later Years (10-12) ☐ VCE

Special dietary requirements call STAV 03 9385 3904

☐ **Privacy statement:** As part of this event STAV compiles a list of participants' contact details for communication of upcoming events. If you **do not** wish to be included on this list please tick this box.

Workshops: Session Selection

Sessions will be allocated on a 'first come, first served' basis. **Please register as early as possible to ensure your choice of sessions.** ONLY use the codes given in the conference program. These codes appear at the beginning of each session, eg. **A1.**

Preferences	1st	2nd	3rd	Preferences	1st	2nd	3rd
Session A				**Session C**			
Session B				**Session D**			

Meet'n Greet ☐ **Yes** ☐ **No** (for catering purposes)

Refund Policy: **No** refund will be given for cancellations made within 2 weeks or less of the conference.
A 50% cancellation fee applies for cancellations made prior to 2 weeks of the conference and **must** be in writing and emailed to stav@stav.vic.edu.au. A Tax Invoice will be issued.

Conference Fee (All catering is included in the Conference Registration Fee)

☐ **$150.00 STAV INDIVIDUAL MEMBERS ONLY** Per Person. GST Incl.

☐ **$202.00 STAV School Subscribers/Non-members** Per Person. GST Incl. **TOTAL COST $**_____

Payment details ABN 94 108 759 762 — TAX INVOICE

☐ Cheque – made payable to: **SCIENCE VICTORIA** ☐ Invoice School/Purchase order supplied

☐ Credit Card *(Please tick applicable)* ☐ VISA ☐ Master Card

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ Expiry Date ☐☐/☐☐ CCV No. ☐☐☐

Name of Cardholder (please print) Signature

Registrations close Monday 21 August 2017
EMAIL this form to STAV - stav@stav.vic.edu.au or FAX - 9386 6722