



# STAV STEM Conference 2018

'Cultivating Future Ready Students'



## Program

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**8:00am – 9:00am Registration**

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**9:00am – 9:10am Welcome and Housekeeping by Soula Bennett**

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**9:10am – 10:00am Keynote**

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**Professor Bronwyn Fox**

**Director, Manufacturing Futures Research Institute**

**Swinburne University of Technology**

*Bronwyn Fox is the founding Director of Swinburne University's Manufacturing Futures Research Institute where her*

*mission is to support transition of Australia's industries into Industry 4.0 - the fourth industrial revolution.*

*She has demonstrated a sustained commitment to support the growth of the carbon fibre and composite industry in Australia through targeted research and was previously a co-founder of the Carbon Nexus facility at Deakin University, a core part of a \$100 million dollar precinct in Geelong. Leveraging her specific knowledge of materials engineering, Bronwyn builds multidisciplinary teams who work with the manufacturing sector to ensure they are digitally equipped and linked into global supply chains.*

*Bronwyn is an internationally recognised expert on carbon fibre and composite materials and has worked extensively with the automotive and aerospace industries globally. She has published more than 170 papers during her career. Bronwyn is a Fellow of the Academy of Technological Sciences and Engineering and a Fellow of the Royal Australian Chemical Institute.*

**Friday 31 August 2018**

**Register by  
Thursday 23 August 2018**

**Conference will be held at  
Quantum Victoria,  
235 Kingsbury Drive,  
Macleod West**

**Session details  
next pages**

**Registration costs  
and booking form  
last page**

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**10:00am – 10:25am Morning Tea & Displays**

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**10:30am – 11:30am Session A**

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### **A1 STEM at Parkdale Secondary College**

Tim Thompson & Janelle Scott, Parkdale Secondary College

STEM at Parkdale Secondary College. A journey through the roadblocks, setbacks, successes and failures of implementing a co-curricular / extra-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 Year7.

*Suitability: Years 7 - 10*

*Curriculum: General*

### **A2 Coding with Quantum Victoria**

Latha Shivasubramanian & Nathan Moore, 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: Primary and Secondary*

*Curriculum: Learning Technologies, General*

*Repeated in B2*

### **A3 Challenging Stereotypes in STEM: Empowering our girls for the future**

Jacqueline Lupton & Sarah Chuck, Penleigh and Essendon Grammar School

An effective Science Curriculum is one that is inclusive of all students, thus improving all students' engagement in STEM, especially that of girls. When planning for and delivering a Science curriculum, it is important to be mindful of improving student outcomes and participation. The presenters will share their experiences when it comes to engaging and developing STEM-related design and problem solving skills of girls at PEGS.

Examples to be used include studies in Flight and Aerodynamics, Robotics and Artificial Intelligence, and Rube Goldberg Machines.

*Suitability: Primary and Secondary*

*Curriculum: Learning Technologies, General*

### **A4 Addressing Authentic Problems through STEM**

Lucas Johnson, Monash University

The purpose of this workshop is to build an understanding of the nature of effective pedagogical practices in STEM Education, including conceptual understandings, transdisciplinary integration and the application of STEM skills. Participants will be challenged to consider what STEM Education is and how it can be regularly included in the classroom, through recognising opportunities to involve students in STEM based problems within their own communities. The workshop will utilise the Design Process as a tool for the beginning stages of planning and assessing, within an integrated approach to STEM Education.

*Suitability: General*

*Curriculum: Primary and Secondary Years F - 8*

### **A5 What happens when you stop "Teaching" students and start "Challenging" them? - Achieving the impossible with nothing!**

Ray Harvey & Jamie Astill, Cider House Ict & Sirius College

The school has never done anything like this before - you've never done this before, you have almost zero resources... and you're not even a teacher - you're a school laboratory technician!

What would you do? This really happened - and the results have been beyond anyone's wildest expectations...consistently beyond everyone's expectations.

We've developed a "process of excellence" that we're going to share with you...the strategies, tools, and techniques we use, so that you too can go beyond the ordinary!

In this workshop, you'll hear from two people with unique perspectives on this journey; Mr Ray Harvey - Mentor, inspirer, conspirator and evil mastermind and Mr Jamie Astill - Lab technician - Sirius College.

This workshop will show you how dedicated educators, inspirational mentors and CSIRO CREST professionals engaged students at Sirius College Eastmeadows Girls Campus.

We used STEM projects as an elective subject, utilised the CREST program, entered into local science competitions, and travelled overseas to participate in science fairs around the world. You will receive practical tools today that you can take away and employ at your school.

Even the experienced STEM educators will find something of value.

*Suitability: Years 7 - 10, VCE Units 1 & 2*

*Curriculum: General*

### **A6 Problem solving and rich learning: STEM in the Victorian Curriculum**

James Bayard & Scott Alldis, Northern Bay P-12 College

Flexible problem-solving and collaborative skills will continue to become increasingly important for students, for both success in school and their future workplace. STEM provides an authentic and engaging way for students to develop these skills and the framework of the Victorian Curriculum can be

used as a powerful tool to support the design of rich, rigorous STEM learning opportunities. This workshop will explore integrated STEM activities that build problem solving and collaboration, while also developing knowledge and skills from the Victorian Curriculum. Participants will engage in hands on STEM activities throughout this session as exemplars of the principles discussed.

*Suitability: Years 4 - 10*

*Curriculum: General*

## 11:35am – 12:35pm Session B

### **B1 Growing general capabilities through student driven STEM projects**

Adele Hudson, Aitken College

There has been a growing consensus that schools need to provide opportunities for students to develop general capabilities such as critical thinking, social skills and problem solving. It is easy to see that student driven STEM projects are a great way to facilitate this type of learning, however, it harder to see how this can be achieved within the constraints of the curriculum. In this session I will share about how our Science faculty has integrated over 600 student design projects and 1000 research projects into our classroom curriculum. I will also show a model that we use to grow students' project management skills in extracurricular STEM activities.

*Suitability: Applicable to primary, but most examples are secondary*

*Curriculum: All Areas*

### **B2 Coding with Quantum Victoria**

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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: Primary and Secondary*

*Curriculum: Learning Technologies, General*

*Repeat of A2*

### **B3 Modular Robotics & The Australian Digital Technologies Curriculum: EZ-Robot**

Sam Kingsley, The Brainary

The Brainary will look at the benefits of using a modular robotics platform to engage with and meet the requirements of the Australian Digital Technologies Curriculum. Participants will work with the 3D printable EZ-Robot robotics platform, where they will build, program and control EZ-Robots in groups. The emphasis will be on the practicalities of utilising the Australian Digital Technologies Curriculum in the classroom. Participants will be given access to the EZ-Robot programming software and no prior programming or coding experience is required. Please bring your laptop and or tablet fully charged for the session.

**Delegates Note:** Please bring your own device

*Suitability: Years 7-9 and teachers/lab technicians*

*Curriculum: Robotics and Digital Curriculum*

### **B4 Make Science Come Alive with WeDo Robotics for Early Years**

Libby Moore, Moore Educational

Real world science projects, including engineering, technology and coding in LEGO Education WeDo 2.0 makes this a relevant learning solution for early years classrooms. Ignite curiosity in science and build student confidence to design while promoting scientific investigation and experimentation. This hands on workshop will provide you the opportunity to freely download and explore the digitally relevant science projects fully supported with teacher guide and links to the ANCA.

*Suitability: Early Years P - 3*

*Curriculum: Physics, Earth & Space Sciences, Learning Technologies*

### **B5 Interactive Genetics Simulations for years 9-12**

Michael O'Brien, Newbyte Educational Software

Finding good interactive science simulations for secondary students and using them effectively in your classroom is difficult. This, hands on workshop, will give you some great practical ideas for using this computer technology in your classroom. During the workshop we will examine the new Drosophila,

Pea Plant Genetics and DNA Labs developed in Australia for the new Victorian syllabi, which include self-marking interactive worksheets.

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

**Delegates Note:** Please bring your own laptop - fully charged. Laptop NOT essential, however, it would make the workshop more interactive for you. Windows and Mac preferred.

*Suitability: Years 7 - 10*

*Curriculum: Biology*

## **B6 Towards Fluency in the Language of Science Aligning Concepts and Curriculum in Mathematics and Science**

Diana Beggs & Gay Vasirani, Somerville Secondary College

Science enjoys a symbiotic relationship with mathematics both professionally and in the classroom. Indeed, these two comprise the bookmarks and 50% of STEM, a major headline grab for current learning, funding and projected future employment. Examiners' reports from year 12 assessments in Victoria and elsewhere highlight a number of deficiencies in mathematical literacy for senior science students. The Head of Science and the Curriculum Coordinator at Somerville Secondary College demonstrate an innovative approach to scheduling and cross-referencing the curriculum for mathematics and science in years 7 - 10. This is designed to improve learning outcomes for both subjects, leading to senior science students being fluent in the language of mathematics. Examples of lesson plans aligned with the curriculum overview are included and a summary CD is given to all participants. A laptop is recommended for this session which includes workshop elements.

**Delegates Note:** please bring a laptop

*Suitability: Years 7 - 10, VCE Units 1, 2, 3 & 4*

*Curriculum: Biology, Chemistry, Physics, Earth & Space Sciences*

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**12:35pm - 1:25pm Lunch**

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**1:30pm - 2:30pm**

**Session C**

### **C1 A new approach to STEM through Tech Schools**

Marc Blanks, Melbourne Polytechnic

The Banyule Nillumbik and Whittlesea Tech Schools are tech enabled innovation hubs to promote the development of key STEM and enterprise skills for young people in the North of Melbourne. Join us as we share the integrated model that unites, curriculum, innovation, industry and learning environments to present STEM experiences in new and authentic ways. In this the Tech Schools have explored STEM in a range of contexts, including AI, Koorie culture, music synthesis, Maker Faires and more! This presentation will share some of the key strategies and engagements in the development of the model, illustrated by case studies and other artefacts.

*Suitability: Primary and Secondary*

*Curriculum: STEM, General*

*Repeated in D1*

### **C2 Teaching STEM through Lego Robotics**

Carlie Alexander & Mahaelia Thavarajah, Quantum Victoria

This hands-on workshop demonstrates the STEM teaching strategies implemented by Quantum Victoria to engage students in higher order thinking.

Participants will complete challenges using the Lego EV3 Robots, and will have an opportunity to discuss the STEM pedagogy adopted throughout the challenges.

*Suitability: Years 4 - 10*

*Curriculum: Learning Technologies, General*

*Repeated in D2*

### **C3 Augment Your Science Reality**

John Pearce, Deakin University

If you've clicked on a QR Code or if you joined in the Pokemon Go craze then you've involved yourself with another 'reality', one virtual, the other augmented. Whilst higher end applications of both may be beyond most schools there are some very cost effective entry options available too. In this session we will explore some virtual and augmented reality options that can be used in your science classroom both for consumption of content as well as ones that can be used for sharing learning and understandings.

*Suitability: Years 5 - 10*

*Curriculum: Learning Technologies, General*

#### **C4 Day of STEM ~ Exciting Challenges for the STEM Generation**

Renee Hoareau, LifeJourney International

Cyber fluencies are essential to everyone living, working and playing in today's global world. Cybersafety and security awareness are important life skills for consumers of technology and innovators alike; everyone today, needs a foundation in Cyber to participate in today's digital society.

Participants will walk away with a framework to start their professional development journey in Cyber and will be able to build confidence and capacity in students to succeed in future STEM careers. Cyber knowledge and skills are relevant to our national STEM strategies and Digital Technologies priority goals. This workshop includes an interactive, hands-on session.

**Delegates Note:** BYO Laptop and/or tablet fully charged

*Suitability:* ALL

*Curriculum:* General

#### **C5 Are we leaving our science students out in the cold?**

Cress Byrne, Mount Ridley P-12 College

Whether it is through conscious or unconscious biases or through delivery of Industrial revolution teaching methods in the 21st Century, students are flocking away from STEM based disciplines in droves. How then do we engage this Netflix generation? This interactive, hands on workshop provides student centred learning at its best with a 21st Century flavour. Delegates will leave with a gamut of strategies and resources that will inspire any leadership team and make the science classroom the place to be.

*Suitability:* Primary and Secondary

#### **C6 Connecting the Dots - Leading STEM**

Roxanne Summer and Fiona Gordon, Bialik College

How are you breaking down the silos to create multidisciplinary and cross-curricular collaborations? What needs to be in place to support students' desire to explore? Bialik College K - 12 has been developing whole school STEM and entrepreneurial strategies that have seen the growth of immersive experiences, new middle school elective subjects, Makerspace, STEM Days, Parent Education and encouragement of girls to study in STEM fields. This session will explore a range of STEM success stories and snapshots for Primary and Middle School teachers and encourage entrepreneurial leadership.

*Suitability:* Years P - 10

*Curriculum:* Biology, Chemistry, Physics, Earth & Space Sciences, Learning Technologies, General

**2:35pm - 3:35pm**

**Session D**

#### **D1 A new approach to STEM through Tech Schools**

Marc Blanks, Melbourne Polytechnic

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*Suitability:* Primary and Secondary

*Curriculum:* STEM, General

*Repeat of C1*

#### **D2 Teaching STEM through Lego Robotics**

Carlie Alexander & Mahaelia Thavarajah, Quantum Victoria

This hands-on workshop demonstrates the STEM teaching strategies implemented by Quantum Victoria to engage students in higher order thinking.

Participants will complete challenges using the Lego EV3 Robots, and will have an opportunity to discuss the STEM pedagogy adopted throughout the challenges.

*Suitability:* Years 4 - 10

*Curriculum:* Learning Technologies, General

*Repeat of C2*

#### **D3 Droning On About Science**

John Pearce, Deakin University

Everywhere you turn these days there are stories about drones and how they are going to change the way we live. The big question is how can schools leverage this interest? Programmable and other entry level drones are now priced very keenly. Even higher level machines are being used productively in education settings. From developing understandings of the physics of flight through maths and engineering activities and more, drones have a lot to offer students from middle school and beyond. This session will explore some school based drone options and how they might be utilised.

*Suitability:* Years 5 - 10

*Curriculum:* Learning Technologies, General

#### **D4 First Public Release of Green Galaxies from Solar Schools, the richest most influential, real-time data visualisation ever created for teaching and learning!**

Stephen Harris, Jamie Astill and Ray Harvey, Solar Schools/Green Galaxies, Sirius College and Cider House

Green Galaxies and Solar Schools have produced a world first...An Australia wide big data visualisation and complete resource/teaching toolkit for energy education and STEM. This is the largest set of real-time raw data ever offered in a STEM package.

Beginning in 2010, the Solar Schools program has been monitoring schools with solar panels installed on their roofs. These schools have grown to 1400 in number, providing the feedback, experience and co-creative efforts that have resulted in Green Galaxies (a teacher-led, interactive game designed for classroom delivery for grades 1-12). These resources engage higher-order thinking skills and curiosity regarding the environment and humanity.

Today you'll see the launch of: The Green Galaxies Live Data Portal; Green Galaxies learning application; Australian Curriculum Approved Teachers Toolkit (unit/lesson plans, student activities, off-the shelf resources; the world's most comprehensive Knowledge Bank (8 years of data and 3 years of visualisation development)

There is literally nothing like this in the world. Join us and see how you can benefit from this amazing new initiative in STEM.

*Suitability: Middle school – late senior*  
*Curriculum: All*

#### **D5 Learning with your students in a vertical curriculum**

Nicole Dobson, Mount Alexander College and Randi Klassen, Mount Alexander College

At Mount Alexander College, we have abolished year 7-10 general science classes and exchanged it for more authentic learning opportunities. In science, student-led electives focus on inquiry, collaboration, and student choice extended investigations. The real value of this structure comes from the elimination of grades and the saturation of interest based, student empowered learning. Take from us what we have learned about structure, planning, assessment, reporting and bring this into your traditional model, your electives or a unit within a traditional year level science class.

*Suitability: Years 7 - 10*  
*Curriculum: Biology, Chemistry, Physics, Earth & Space Sciences & General*

#### **D6 Using Data Science to change the world (and teach science)**

Linda McIver, Australian Data Science Education Institute

Science these days is as much a matter of data and computation as it is petri dishes and test tubes. The internet is awash in open data, and we can use real datasets to explore and change our world, learning science as we go. This presentation will show examples of students using real world datasets to learn about politics, history, geography, and science, and make real change in their own communities.

I will show you how to use data to excite kids with the potential of integrated STEM.

*Suitability: Years 3 - 10, ALL*

*Curriculum: Biology, Chemistry, Physics, Earth & Space Sciences, Learning Technologies, General*

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**3:35pm – 4:15pm**

**Meet'n Greet**

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#### **For further information**

Contact the STAV Business Centre,  
PO Box 109 COBURG VIC 3058  
Ph: (03) 9385 3999 • Fax: (03) 9386 6722  
• Email: [stav@stav.vic.edu.au](mailto:stav@stav.vic.edu.au)  
• Website: [www.sciencevictoria.com.au](http://www.sciencevictoria.com.au)



STAV/Quantum Victoria STEM Conference 2018

Registration

Friday 31 August 2018 at Quantum Victoria, 235 Kingsbury Drive, Macleod West.

Personal Details - Please complete all the fields below.

School Purchase Order No. STAV Individual Membership No.

Title: First name: Surname:

School/Organisation:

Email Address (all correspondence by email)

Address:

Suburb: State: Postcode:

Telephone: Mobile:

School Type: Government Independent Catholic Other

Region: North-Eastern North-Western South-Eastern South-Western Victoria

School Level: Early Years (F-4) Middle Years (5-8) Later Years (9 - 10) VCE

Gender: Male/Female Dietary requirements call STAV directly on 03 9385 3999

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.

Session A, Session B preference selection table with 1st, 2nd, 3rd columns

Session C, Session D preference selection table with 1st, 2nd, 3rd columns

Meet'n Greet Yes No (for catering purposes)

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

\$155.00 STAV INDIVIDUAL MEMBERS ONLY Per Person. GST Incl.

\$207.00 STAV School Subscribers/Non-members Per Person. GST Incl.

\$60.00 Full time Student Concession Per Person. GST Incl.

TOTAL COST \$

Payment details ABN 94 108 759 762

TAX INVOICE

Cheque - make 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

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.

Registrations close Thursday 23 August 2018
EMAIL this form to STAV - stav@stav.vic.edu.au or FAX - 9386 6722