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

Science Victoria
ABN 94 108 759 762

STEM Regional, Metro and Labtech Conference Program

Advancing STEM Education for All

STAV are excited to announce that the previously postponed STEM Regional, STEM Metro and LabTech conferences will all run in a new online conference format. These conferences will launch on Friday August 28th, 2020 and close six weeks later on Friday October 9th, 2020. This conference offers both asynchronous and synchronous experiences for delegates. We hope that this window supports more of you, our teachers and Laboratory Technicians, to access these conferences at a time convenient to you.

By registering for this conference you will have access to:

⇨ asynchronous video presentations from our presenters across the STEM and LabTech fields, with access to this content from Friday August 28th until Friday October 9th 2020.

⇨ the option of joining our two synchronous (live) days to:

- watch our three keynotes,
- participate in the STEM regional forum and
- contribute to a Q &A webinars with some of our presenters (after viewing their asynchronous presentations).
- These synchronous sessions will be recorded, so if you can't make it you can catch up later.
- Selection of sessions for these synchronous days will be accessible for delegates closer to the day.

Further information will be sent to delegates after the conference launch day.

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

DTAC is proud to sponsor and support this event

PRESENTERS

KEYNOTES

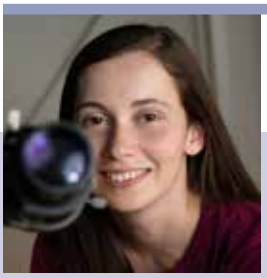
Dr Amanda Caples. BSc Hons. PhD GAICD

Friday 11 September 2020
Title: STEM Opens Many Doors
Time: 9:15 am - 9:40 am

Dr Amanda Caples BSc Hons PhD GAICD is Victoria's Lead Scientist, a 'catalyst' responsible for working across the Victorian Government to identify opportunities for economic outcomes by building relationships between business, the research sector and government. Amanda brings to the role broad experience in technology commercialisation, public policy development and governance of public and private entities. Amanda joined the Victorian public service in 2002 as the inaugural Director of Biotechnology and subsequently was appointed as the Executive Director Science and Technology and Deputy Secretary Sector Development and Programs to drive the state's science agenda. In these roles, Amanda has led the development of industry sector strategy plans, delivered research-led health initiatives, regulatory and legislative scientific reforms and established international business development and research alliances. Amanda has worked with Commonwealth agencies on national science and innovation policies and programs, including the Australian Synchrotron and the National Collaborative Research Infrastructure Scheme

Krystal De Napoli

Friday 11 September 2020
Title: Wangaratta To The Edge Of The Universe
Time: 9:45 am - 10:25 am



Krystal De Napoli is a proud Kamilaroi woman and aspiring astrophysicist studying at Monash University, researching the ways in which her love for her culture and her passion for science intersect. Krystal uses her platform as a scientific communicator to deliver a series of public lectures on the field of Indigenous science, presenting the intricate and complex understanding our First Nations people have of the night sky and its objects. Krystal has worked as a summer intern within the CSIRO's Data61, and has completed research into detecting exoplanets from light curve data and understanding the astrophysical significance of the Pleiades in Indigenous astronomical traditions. In 2018 Krystal became the first non-genomicist to be awarded the Illumina Women in Genomics Bracelet, which acts as a visible token of appreciation to a woman for making a noteworthy contribution to a scientific field, with distinguished leadership and a devotion to teaching

PRESENTERS

KEYNOTES

Felicity Furey

Friday 9 October 2020
Title: STEM For All: Making it Happen
Time: 11:00 am - 12:15 pm

An award-winning engineer, business entrepreneur and an advocate for change, Felicity Furey's tenacious spirit, infectious energy and relentless drive to create a better world inspires students, emerging leaders and their communities to re-engineer what's possible in the future of education and STEM. From standing as one of just 12 women in her graduating class of 120 to being named BOSS Magazine's Young Executive of The Year and 'Innovative Engineer of The Year', Felicity has always made it her mission to make the 'impossible' possible. From the classroom to the boardroom, Felicity takes a no holds barred approach to driving change in her industry and creating a world that works for everybody. Her passion for engineering and her lifelong desire to improve diversity and equity across industries led her to found Machinam in 2013 and Power of Engineering in 2012 - two groundbreaking organisations encouraging the next generation to consider careers in STEM through real-world applications and opportunities.
Felicity's accolades range from Engineer Australia's 'Innovative Engineer of The Year' award to the Vice Chancellor's Award for Excellence. In 2019 she was named as an Engineers Australia Centenary Hero and selected as a Superstar of STEM. Felicity regularly shares her insights on Young Entrepreneurship, The Future of Work, Millennial Leadership, Diversity in STEM and the importance of reframing 'failures' as moments of growth and resilience with over 120,000 people across Australia, Asia and the United States. In 2020, Felicity is on a mission to reach her goal of 1 million hours of volunteering for STEM schools, with a focus on coaching and training 10,000 emerging leaders to 'do the impossible' for themselves, their schools and for their broader communities.

PROGRAMS

2020 STAV STEM Conferences and LabTech Conference Online

THEME: Advancing STEM Education for All

FRIDAY 28 AUGUST 2020

ASYNCHRONOUS

Sessions

Jamie Astill, Sirius College

"CREST, Resources and Competitions for research projects!"

STEM skills are highly sought after traits for our future workforce!

Sirius College has been using CSIRO's CREST (Creativity in Research, Engineering, Science and Technology) program as a framework for students to undertake innovative and challenging research projects. See how a couple of laboratory technicians run CREST as an elective from Years 7-10. Grab your lab tech (because their experts at hands-on science!) and we'll show you CREST, resources you can use to teach students inquiry based learning, report writing, and competitions as motivation to get the student engaged in research science.

Doug Bail, Cider House

"Coding to Learn: Learning to Code"

The integration of Blockly into PASCO's SPARKvue and Capstone gives students unparalleled control over their experiments and the opportunity not only to learn to code, but code for deeper learning of key scientific ideas. For example, a student could use an understanding of the pH of different liquids to code automatic identification of each liquid. Start with the science of the difference in pH and better understand the implications by coding to create a sorting machine. The potential examples are endless, the value to the science classroom in adding immediate applications to student measurements and an understanding of coding bringing another element of learning and STEM directly to the science classroom.

Elke Barczak, TAC

"Along for the ride: Engaging students in studies of motion using immersive technologies"

How do you engage students in meaningful exploration of the physics of motion in a way that is equally appealing to the student who 'doesn't really get science' and the student who reads Cosmos in their spare time? Join Elke to see how this has been achieved at Road to Zero, TAC's world first Road Safety Education Complex at Melbourne Museum. Elke will take you on a virtual tour of the science program, designed for Year 9 and 10 students, and outline how it can be incorporated into your planning for teaching and learning. Both the Melbourne Museum and Regional In-School Program (a pop-up version of the Museum experience that sets up in regional schools) will be showcased.

ASYNCHRONOUS

Dale Carroll (Laboratory Manager & STAV Councillor), The Geelong College

"Getting results from STEM-type practicals"

Doing practical science should be enjoyed by the students. The introduction of STEM thinking has added a new dimension to some of the practical activities. Students can modify/design their own practicals. This brings in other considerations in a classroom, safety being most important, along with feasibility, logistics and time. Getting useful data from an experiment is important, we don't want students to come away saying "science doesn't work". This session will look at how some practicals have been worked through to give reasonable results that students gain data that can be worked with.

Jill Forward, Aitken College "

Streamlining Student Design Investigations"

This presentation will describe how to streamline lab tech processes to facilitate student design investigations. With over 1000 student design investigations at Aitken College each year it is essential that resources such as time and materials are used efficiently. The presentation will show how systems were developed over the last five years, beginning with one year level to now encompassing Years 7-12.

Jacqueline Lupton (Science Coordinator Middle Schools) Rodney Clarke (Year 10 Coordinator), Penleigh & Essendon Grammar School, Keilor East

"Take a Risk! Problem solving using STEM"

How do we encourage students to take risks in a Science classroom, or in STEM subjects? What can we do to encourage our students to accept 'failure' as an integral part of the learning process for it to be expected and celebrated? This session will showcase curriculum initiatives used in a middle school setting that encourages students to practise 'risk taking' as part of their education. This will include discussion around Year 10 Elective subjects that include practical initiatives such as boomerang making and testing, 3D printing, coding robots and building a Rube Goldberg machines.

Daniela Migliorati, Science Supply Australia

"Littlebits Workshop"

Engage, empower and inspire students with this hands-on session of "Littlebits" an innovative product that allows you to create inventions large and small with a platform of easy to use electronic magnetic building blocks that snap together!

Peter Pentland, ATSE STELR

"Using the relevant context of Sustainable Housing to teach STEM"

Sustainable Housing is a multidisciplinary STEM module designed to be taught at year 9 level. It maps into the Physical Sciences strand of the Science Curriculum and has embedded maths and technology activities. It features a purpose-built equipment kit. Sustainable Housing aims to show the relevance of STEM subjects to student's lives, now and in the future. Participants in this workshop will gain hands-on experience of the equipment pack and data logger gather and analyse data evaluate support materials trial activities investigate the effectiveness of building materials and high-tech treatments.

Martin Richards, ESA

"An insight into turtle populations using real data"

What data do marine scientists collect, and how is it used to help them monitor populations of marine fauna such as turtles? This presentation explores three different data sets collected by CSIRO scientists. Firstly we look at modelling data related to the number of eggs a female turtle lays in her lifetime, and relate this to the health of the population. We use spreadsheeting software to model changes by changing inputs such as age of the turtle and numbers of eggs laid and analyse the effect on offspring numbers. Next we use a dataset that includes geospatial data for several different turtles which is used to track their movement over time. We show how to use online mapping software to visualise the latitude and longitude data. Finally we use a dataset to explore ways to analyse and display the data in order to examine the impact of rising global temperatures on Flatback Turtle Populations. Use the links to the free lesson plans to highlight the work of Australian scientists and devlop data science skills of interpretation, analysis and visualisation.

Jaclyn Rooney & Meghan Fennessy, Stile Education

"SOS! Help!"

Your expedition to explore the deep, dark depths of the ocean has gone horribly wrong! On your mission to find the world's largest colossal squid in Antarctic waters…your deep sea explorer's main battery has failed! You'll need to help the crew find the codes to switch to the spare battery so they can return safely to the surface…or else you'll be in deep trouble!

Join us for a workshop where you will experience Stile's 'Deep Blue' Escape Room lesson, and learn how to run these engaging and interactive experiences in your own classroom.

Then (only if you escape, of course!) you'll also have the opportunity to explore how to create an escape room experience of your own. Escape rooms are a great way to engage students in a topic, provide exciting and interactive revision opportunities, and allow students to apply their scientific knowledge and critical and creative thinking skills.

Victor Sam, Maribyrnong College

"Managing Remote Learning"

The sudden transition into remote learning due to COVID-19 has put teachers in a challenging situation. Managing remote learning requires a combination of good organisational practices and leveraging of available computer technology and software. In this workshop, I will share some of the solutions that I found useful for student management, curriculum management, lesson delivery, and collaboration with colleagues in a remote learning setting. Some of these ideas and practices can also be applied when we transition back into classrooms to improve your work efficiency. As a teacher working in the public sector, I will specifically talk about the application of O365 (Microsoft Teams, OneNote, & Forms), Google Drive, Compass and STILE, as well as other useful software I've found to help me manage remote learning for Science and Physics. This session will NOT focus on developing technical skills, but will instead focus on showing what's possible with the available software, best practice pedagogical approaches using the software and other hint & tips. There will be also opportunities for you to bring YOUR ideas and share with others in the session. Highly recommend that you bring your laptop/ devices and perhaps a portable storage to copy/share resources if you wish.

Angela White, Hands on Science

"STEM Design Projects - a practical guide"

We will guide you through Arcade Games and STEM design project. Working as an individual and as part of a team, participants will experience some simple investigations to explore the science behind simple machines found in various arcade games. We'll work through the design process and show how the project can be differentiated for levels within your class.

FRIDAY 11 SEPTEMBER

SYNCHRONOUS SESSIONS - LIVE AND RECORDED

9:00am **Welcome by Alexandra Abela, STAV President**

9:15am - 9:40am **Keynote 1: Dr Amanda Caples BSc Hons PhD GAICD**

Title: STEM Opens Many Doors

9:45am - 10:25am **Keynote 2: Krystal De Napoli, Monash University**

Title: Wangaratta To The Edge Of The Universe

10:45 am - 11:30am Session 1

Adele Hudson, Aitken College.

"Student led STEM initiative"

Are you interested in starting a student led STEM initiative that promotes the importance of STEM in students' futures? Then this is the workshop for you. As the co-developer of STEM pop up lunch time programs such as Dream-IT, STEM ambassadors and EngGirls I will share strategies that you can use to reach out to large numbers of students with limited time and resources. Whilst each program is designed for different groups of students, the focus remains on developing student leadership and entrepreneur skills. Five years on these programs are well integrated into the school community with involvement of greater than 500 participants each year.

Libby Moore, Moore Educational

"Get Hands On with NEW LEGO Education Spike Prime"

Accelerate STEM learning in your classroom with SPIKE Prime. Explore the easy entry lessons to the limitless creativity design challenges that will engage your students to think critically, analyze data and solve complex problems with real world relevance. The intuitive LEGO building system, intelligent hardware, scratch based coding and Micro Python experience will give your students the ability to develop STEM skills today to be the innovators of tomorrow.

Leanne Robertson & Emma Durbridge Connecting Girls and STEM Careers – The Girls in STEM Toolkit

"Overview of the GiST, findings and 7 principles to a gender inclusive classroom"

Why are girls self-selecting out of science, technology, engineering and mathematics (STEM) at school, and what can we do about it? This presentation will explore research undertaken to inform the development of a new online resource, The Girls in STEM Toolkit, which will be made available free through funding from the Australian Government Department of Industry, Innovation and Science. The presentation will also provide a practical framework for teachers and STEM professionals to actively support girls' engagement in the classroom and beyond.

Aimee Snowden, Charles Sturt University

“Digging into Agriculture”

Aimee will introduce her character, the LEGO® Farmer, share how he came about, and the ways in which Little BRICK Pastoral is being used to showcase the diverse array of careers within the wider agricultural industry. Join Aimee in a hand- on classroom activity looking at soil properties, types and textures to identify and ascertain the best crop to grow. Aimee will also share industry resources you can access, as well as workshops, school visits, and excursions.

11:45 am -12:30pm Session 2

Adele Hudson, Aitken College

"Flexible learning with OneNote"

Using Microsoft OneNote has revolutionised the way that students and teachers collaborate on STEM projects. In this workshop I will show delegates tips and tricks to increase student accountability, support content delivery and provide individual student feedback. Moving to an online platform for curriculum delivery has also provided a seamless transition between home learning and face to face teaching. I will also show how OneNote is a one stop shop where all subjects and teaching planning can be managed from within the one app.

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

"Branching out from STEM to the capabilities"

Problem-based learning provides a framework by which students can explore what they know, what they need to know, and how they can develop and apply knowledge and skills across relevant STEM elements to solve authentic socio-scientific problems. The capabilities in the F-10 Victorian Curriculum support students in being able to develop and evaluate alternative options, before proposing a preferred solution. This interactive workshop will look at how each of the four capabilities can be 'unpacked' in relation to selected STEM challenges. Rubrics will be provided to support both formative and summative assessment.

Jacqueline Lupton (Science Coordinator Middle Schools)

Rodney Clarke (Year 10 Coordinator)

Penleigh & Essendon Grammar School, Keilor East

"Take a Risk! Problem solving using STEM" How do we encourage students to take risks in a Science classroom, or in STEM subjects? What can we do to encourage our students to accept 'failure' as an integral part of the learning process for it to be expected and celebrated? This session will showcase curriculum initiatives used in a middle school setting that encourages students to practise 'risk taking' as part of their education. This will include discussion around Year 10 Elective subjects that include practical initiatives such as boomerang making and testing, 3D printing, coding robots and building a Rube Goldberg machines.

Dr Robert Ross, La Trobe University Primary & Secondary

"Education Escape Rooms for Inescapable Learning"

Dr Robert Ross is an international pioneer of educational escape rooms. Robert has published 4 escape room papers, developed the world's first open source electronic escape room decoder and recently published a book for teachers to help them develop escape rooms for their classrooms. In this workshop you will get the chance to experience firsthand some educational escape rooms, understand the research behind them and most importantly how you can develop them further for yourselves.

1:45pm -2:30pm Session 3

Dale Carroll, Geelong College

"Beginning Lab Managers"

This session will cover some basics or running your school science laboratories. Ideas on how to make your role manageable, prac requisitions, safety and some hints to make your life easier.

Nicole Fetchet, Educator Programs Leader, Questacon

Prue Fabian, Educator Program, Questacon

"Putting the Engineering back into STEM" - part 3
more information on page 12

Dr Victoria Millar, Senior Lecturer Melbourne Graduate School of Education

Dr 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

Brett Webber, Galen Catholic College, Wangaratta

"Developing the skills of tomorrow through VEX Robotics"

Brett and the Galen VEX students will introduce you to the world of VEX Robotics, and how students explore real world problems to build and program autonomous robots. Join us for a hands lesson where you will learn how to program your own robot and experience the world of VEX IQ, VEXcode IQ Blocks, and the newly released VEX VR virtual programming environment.

2:45pm - 3:30pm Session 4

Dale Carroll (Laboratory Manager & STAV Councillor), The Geelong College

"You and your Science Technician"

The roles of science teacher and science technician are quite different, but the goal to work as a team and combine the skills of the individuals to create a sound learning environment is paramount. This session will look at some aspects of OH&S, risk assessments and the different roles and responsibilities. A brief introduction to the "Professional Standards for Australian School Science Technicians" to provide a guide to what could be expected of your technician at what classification level. We will look at "Science ASSIST", a resource that could be utilised by both teachers and technicians, along with other suggestions for gathering information or assistance.

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

"STEM as an integrated approach to curriculum planning and implementation"

This workshop explores STEM as an integrated approach to whole school curriculum planning, as well as the delivery of specialist STEM curriculum programs. Examples of different approaches to whole school STEM curriculum planning and curriculum programs will be shared. Participants will also have the opportunity to discuss factors that need to consider when implementing STEM as an integrated approach, the importance of curriculum mapping and planning as well as resources to support STEM education.

2:45pm - 3.30pm Regional Forum

Where to now?

Advancing STEM education in regional areas

Moderators: **Alyce Holland and Maree Timms**

Panellists: **Aimee Snowden - The LEGO Farmer, Little Brick Pastoral**

Alexandra Abela - STAV President

Dr Amanda Caples - Lead Scientist of Victoria

Dr Helen Haines - Member for Indi

Ilena Young - Charles Sturt University

Krystal De Napoli - winner of the Monash University 2020 Faculty of Science - Science Communication Award

Questacon Live Sessions

A 3-PART WORKSHOP, WITH RECORDED CATCH-UP AVAILABLE

Session 1: Friday 11th September 1:45pm – 3:30pm

Session 2: Wednesday 16th September – 3:30pm – 5:00pm

Session 3: Friday 9th October – 1:00pm – 2:30pm

Nicole Fetchet, Educator Programs Leader, Questacon

Prue Fabian, Educator Program, Questacon

"Putting the Engineering back into STEM"

Engineering is Elementary is an exciting and immersive program that will help you to:

- Build your confidence to teach and assess STEM in K-6 classrooms,
- Develop your teaching strategies to meet the specific learning needs of all students,
- Connect to a national network of teachers, providing ongoing collaboration and support.

Join us for this interactive online professional development workshop, to be delivered in three parts via video conference.

The workshop will focus on a unit of work called A Work in Process: Improving the Play Dough Process. This unit has a range of engaging hands-on activities that immerse your students in engineering education. It will explore not only key science, technology, engineering and maths concepts, but strategies for capturing your students' thinking.

You will need to source some simple materials to participate in the workshop activities. At the completion of the course you will be sent the both the curriculum resources and a class kit of resources for immediate implementation.

FRIDAY 9 OCTOBER

SYNCHRONOUS SESSIONS - LIVE AND RECORDED

8:45am **Welcome by Alexandra Abela, STAV President**

9:00am - 9:45am Session 1

John Cripps Clark, Deakin University

"Modelling Motion - Developing science & mathematics concepts through STEM activities"

The purpose of the Modelling Motion unit is to engage students in STEM activities in order to advance their understandings of science and mathematical concepts in an engaging and integrated way. The unit consists of practical, inquiry-based lessons in which teachers challenge students to use simple equipment to predict, observe and represent motion. Students create a series of graphs to directly represent motion, time falling balls, and construct instruments to measure forces in one and then two dimensions. They then interpret these representations to develop concepts of force and motion**.**

Peter Pentland, ATSE STELR

"Using the relevant context of Sustainable Housing to teach STEM"

Sustainable Housing is a multidisciplinary STEM module designed to be taught at year 9 level. It maps into the Physical Sciences strand of the Science Curriculum and has embedded maths and technology activities. It features a purpose-built equipment kit. Sustainable Housing aims to show the relevance of STEM subjects to student's lives, now and in the future. Participants in this workshop will gain hands-on experience of the equipment pack and data logger gather and analyse data evaluate support materials trial activities investigate the effectiveness of building materials and high-tech treatments.

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.

10:00am - 10:45am Session 2

Jamie Astill, Sirius College

"CREST, Resources and Competitions for research projects!"

STEM skills are highly sought after traits for our future workforce!

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Q and A Session

11:00am - 12:15pm Keynote 3

Title: STEM For All: Making it Happen

Felicity Furey, Award-winning Business Leader. Aviator. Engineer. Entrepreneur.

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In 2020, Felicity is on a mission to reach her goal of 1 million hours of volunteering for STEM schools, with a focus on coaching and training 10,000 emerging leaders to 'do the impossible' for themselves, their schools and for their broader communities.

1:00pm -1:45pm Session 3

Nicole Fetchet, Educator Programs Leader, Questacon

Prue Fabian, Educator Program, Questacon

"Putting the Engineering back into STEM" - part 3
This session will run from 1:00 – 2:30pm

more information on page 12

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John Pearce, Deakin University

"Droning On About Science"

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 utilized.

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

"Creating STEM Opportunities for Regional Students"

Maree will highlight her STEM journey, from humble beginnings, a few ideas, a few discussions with a couple of key people, to creating a STEM Careers EXPO, DTAC Wangaratta (Digital Technologies Advisory Committee, a successful VEX Robotics Program, plus other Student STEM opportunities - In2science, Melb Uni: Girl Power in STEMM, Girls in CyberSecurity, Questacon Invention Convention, Conoco Science Experience, NYSF, Girl Powered Events, Our Solar Siblings, Vic STEM Alliance. Maree will highlight the power of collaboration and networking and what opportunities they can bring to your students.

2.00pm - 2.45pm Session 4

John Pearce, Deakin University

"Augment Your Science Reality"

If you've clicked on a QR Code or if you joined in the Pokemon Go craze then you have 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.

Saeed Salimpour

"Cosmos in the Classroom: Astronomy Research and Conceptual Cosmology for Grades 9 – 12"

The Universe offers students awe-inspiring and curiosity piquing mysteries, the likes of which are unparalleled in any other scientific endeavour. Topics in astronomy and cosmology, commonly identified as strong interest areas in students (aside from dinosaurs), have gained much media attention in recent years, driven by ground-breaking and mind-bending discoveries. Research has shown that curricula around the world are gradually taking note and incorporating such topics into curriculum documents. The question is how do teachers take advantage of the potential and richness offered by topics related to the Universe, in a tangible pragmatic way that gives students authentic insights into "Science as Practice", and strengthens their conceptual understanding of topics rather than mere memorisation of the "facts of science". This presentation has two parts. First, we will highlight the initial findings from a research study which is developing evidence-based teaching resources and pedagogical frameworks for teaching Cosmology in school using Representation Construction. Second, we will highlight a continuing Astronomy education project, which provides free access to remote telescopes, free curriculum material, professional development and research experiences for teachers & students.

Dr. Peta White and Prof. Russell Tytler

"A quiz for young people that explores skills and dispositions for future work"

Thinking about what our future might look like piques imaginations, often along sci-fi themes involving machine domination. Recent research into the future of work reveals that many of our concerns about losing some jobs to mechanised systems might be accurate. However, with an aging population and the likelihood for environmental change there will be jobs created that provide interesting opportunities. Our young people should be thinking about this as their futures of work will look very different to ours. The 100 Jobs of the Future is an industry funded research project that not only explored work futures but also designed and described 100 jobs that are likely to exist in the future. In many cases similar jobs exist now but have technological aspects and additional skill requirements. Once we designed the 100 jobs we needed to ensure that young people could (and would) engage in the ideas offered by them. So, we designed a jobs explorer tool. This online quiz asks four questions where you reflect on your work preferences and skills before revealing a selection of the 100 jobs for further exploration. In this presentation we will take the quiz, exploring your job futures. Then we will investigate jobs and associated skills relevant to urban environments focussing on sustainability and community development (leadership). Many of these jobs require interpersonal skills and critical and creative thinking, such as the Nostalgist and the Urban Cricket Farmer.

3.00pm - 4.30pm

Conference Closing Activities
Networking and Trivia

PRESENTERS

BIOGRAPHIES

R STEM REGIONAL M STEM METRO L LABTECH

Alexandra Abela

R M L

Alex has been a teacher of science for over 25 years and a STAV member since her pre-service teacher days. She is chartered Chemist and currently teaches VCE Chemistry at Penleigh and Essendon Grammar School in Melbourne. Alex assumed the role of STAV President in 2019. Since first joining Council in 2001, she has served on Executive as Honorary Secretary, Vice President and President Elect. She has held a variety of leadership positions in Science education throughout her teaching career. She has expertise in curriculum design and has presented and advised on such matters at a local, national and international level. Alex is STAV's representative on the Board of the Australian Science Teachers Association, and she is active as a member of advisory panels and working groups.

Jamie Astill

L

I have a Bachelor of Science (Biological) Hons, worked in industry and education as a scientist and laboratory technician for more than 20 years. Currently working as a laboratory technician at Sirius College and teaching research science using the CSIRO CREST program.

DOUG BAIL

M L

Doug Bail worked for many years in schools as a Maths/Physics/Science teacher - in other words " STEM". He was a Head of Science, Director of Technology and involved in innovative curriculum development. He now runs his own company specialising in quality science equipment. He is also on the Pearson Physics team for the National Curriculum.

Elke Barczak

R M L

Elke Barczak is a science communicator and educator with over 15 years' experience in secondary schools, with scientific research organisations, and Museums Victoria. Currently, she works at Road to Zero, TAC's world first road safety education complex at Melbourne Museum.

Dale Carroll

L

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. One of SETA's highlights was working with ASTA in establishing Science ASSIST, an information service for science teachers and technicians., of which he was one of the inaugural "expert" panel answering questions and providing information. Dale has presented mainly hands-on sessions for technicians across Australia for a number of years. Dale is still passionate about his role and keen to see science education continue to flourish in Australia.

Rodney Clarke

R M

Rodney has been teaching for over 20 years and has held various student welfare roles, including his current position as Year 10 Coordinator (Boys) at Penleigh & Essendon Grammar School. As a Science teacher, he has been involved in the design and implementation of science elective subjects including Robotics and Flight Principles. His attitude toward his welfare work mirrors his approach in the science classroom; encourage students to take risks, give them responsibility, understanding that mistakes will be made but use those mistakes to create the learning experience. Watching and supporting students work through struggles to reach a solution gives him deep satisfaction.

John Cripps Clark

M

John has taught physics, science and mathematics in primary, secondary schools and universities in Victoria and NSW and has researched primary science and physics education in rural and urban schools in Victoria, NSW and the ACT, focusing on exemplary teachers of science and their use of practical activities. He teaches science and technology pedagogy to pre-service primary and physics teachers in school-based education units in primary schools across Melbourne & Geelong and science communication to undergraduate science students. John has provided professional development for teachers in Victoria in the 'Switched on Secondary Science Professional Learning program' (2010-2011); the 'Primary Science Specialists' (2012-2015); 'Successful Students STEM (Skilling the Bay) (2015-2017); and STEM Catalysts (2017-2018).

SS STEM involved working with year 7 & 8 teachers in eleven Geelong schools to:

• Improve educator capability and innovation in the teaching of STEM-related subjects in schools;

• Improve student attainment levels in STEM-related subjects in partner schools;

• Develop consistency of pedagogy in the teaching of STEM-related subjects; and

• Improve students' awareness of and aspirations for STEM-related education, training and employment pathways.

John has developed the 'Modelling motion' inquiry-based unit, integrating Mathematics and Physics for the reSolve: Maths by Inquiry national program

https://www.resolve.edu.au/modelling-motion which will be the focus of this presentation.

Emma Durbridge

R M

Emma is a Project Manager at Education Services Australia, within the Digital Teaching and Learning business area. In her role she has managed the development, build on-going promotion of The Girls In STEM Toolkit (The GiST), along with other national projects within Civics and Citizenship Education and the humanities. Previously Emma spent several years working within Change Communications for large multi-national businesses, before moving into Project Management whilst living in London. Emma has UX and digital agency experience, and brings clear understanding and communication of technical requirements to projects and clients.

Prue Fabian

R

Questacon's Educator team are a dynamic team of primary, high school and informal educators with extensive experience working with students, teachers and school leadership. Prue Fabian, a science and maths teacher, is passionate about equitable access to quality education for all learnings and highlighting the environmental diversity on offer in Australia.

Nicole Fetchet

R

Questacon's Educator team are a dynamic team of primary, high school and informal educators with extensive experience working with students, teachers and school leadership. Nicole Fetchet has a background as an industrial chemist before moving into science communication. She enjoys working with teachers nationwide where she can connect likeminded individuals and facilitating in depth discussions

Jill Forward

L

Previously employed as a scientist in the medical sector, Jill has a background in Biology, Chemistry and Physics and brings this wide knowledge to the education setting, supporting teachers to bring a range of learning to the students. Jillian is eager for laboratory processes to be as efficient as possible for both Laboratory technicians and teachers to maximise the time better spent facilitating learning in the students. Streamlining the delivery of materials for student designed investigations promotes this more efficient use of time.

Dr Helen Haines

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Helen Haines is the Independent Federal Member for Indi. She was elected in May 2019 – the first Independent to succeed another in the same electorate in Commonwealth Parliamentary history. In her earlier professional career she was a nurse, midwife, health administrator and rural health researcher in Victoria's North East for more than 32 years. Helen has long been active as a member of community organisation boards and is a graduate of the Australian Institute of Company Directors and the Alpine Valleys Community Leadership Program. Helen lives with her husband, Phil, on a small beef farm by Wangaratta's King River, where they raised three children. Before contesting this year's federal election she worked as a Senior Research Fellow with the University of Melbourne Department of Rural Health and as Director of Education and Research Unit at NHW.

Linda Hobbs

R M

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. She has also led a number of projects, including an Australian Research Council (ARC) project, investigating the learning experiences of out-of-field teachers of science and mathematics. Her research into out-of-field teaching, and teacher and school change materials developed as part of her STEM professional learning program have been applied to a range of contexts, including a state-wide DET teacher professional development program called STEM Catalyst program, and other programs for primary and secondary school teachers.

Alyce Holland

R

Alyce is the STAV Honorary Secretary and represents regional and rural members on council. As a grade 5 teacher at Yarrawonga College P-12, she is working to build confidence and engagement in Science across the 5/6 cohort. Alyce is looking forward to engaging with the regional panel about advancing STEM education in regional areas.

Adele Hudson

R M

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.

Maria James

R M

The Science Curriculum Manager with 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. She is passionate about motivating and engaging students with science. A particular interest for Maria is encouraging students to apply their knowledge and skills in science and in other areas to take action in local and global contexts

Michael Kasumovic

M

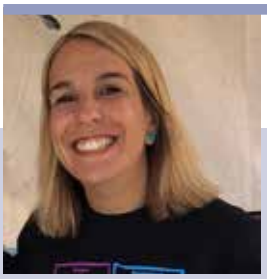
Michael is an ARC DECRA Senior Research Fellow at Edith Cowan University. He combines a long background in both astronomy and education research at both high school and undergraduate university level. His research focus is on the provision of learning experiences that are authentic in nature, plausible in implementation and efficient in communication and which deliver the educational outcomes for students and teachers. He is the lead investigator of a high-school level astronomy education program ("Our Solar Siblings") providing training, materials and support to teachers and students accessing robotic telescopes. Michael is also lead investigator on a range of national and international Astronomy Education projects.

Jacqueline Lupton

R M

Jacqui currently holds the role of Middle Science Coordinator at Penleigh and Essendon Grammar. She loves to find new ways in which to engage the students of MS across the Science curriculum, from having them devise their own experiments, create crazy Rube Goldberg machines or develop complex programming for a selfdesigned robot - with a focus on practical elements of Science. Open ended tasks with purpose foster engagement, with a low threshold and high ceiling to allow access to all. Jacqui works closely with staff to develop their pedagogies and ability to create tasks and assessments for students to develop and demonstrate their strengths. She has regularly presented at various STAV conferences over the last 6 years.

Daniela Migliorati



L

My name is Daniela Migliorati and I have more than 15 years experience in the Education and Industrial sector, in particular offering teaching solutions to secondary, primary and early learning teachers. I have been working at Science Supply Australia, an Australian owned and managed family business which has been operating for over 34 years. We specialise in supplying STEAM, scientific and laboratory products to education platforms and universities. I am passionate about learning through fun and offering innovative and diverse products to assist with 21st century learning. I enjoy delivering STEAM integration in the classroom and product development workshops

Victoria Millar

R M

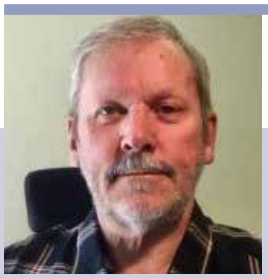
Victoria is a Senior Lecturer in the Melbourne Graduate School of Education at the University of Melbourne. She lectures into the Masters of Teaching and undertakes research in science education. She has been involved in a range of successful national research projects investigating science participation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

Libby Moore

L

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. Libby is also the director of LEGO Education Innovation Studios in Melbourne and Brisbane where a unique learning environment engages children and teachers in STEM, innovation and the development of skills for 21st Century learning.

John Pearce



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Having spent more than thirty years teaching in primary schools John Pearce now tutors at Deakin University. John's ongoing interest in science education and also the use of ICT across the curriculum has seen him present at local, national and international conferences. Lately, he has become interested in the digital curriculum including robotics, coding, Makerspaces and drones with a particular emphasis on the classroom implications around these themes. He is also involved in a number of local citizen science projects including the Victorian Coastal Monitoring Program.

Peter Pentland

M L

Peter Pentland is the Executive Manager Schools Program for the Australian Academy of Technology and Engineering. He has extensive experience in classroom teaching and in writing for education audiences including senior physics textbooks and primary school library books aimed at inspiring students to consider careers in STEM. He has run successful STEM teacher training programs in Australia, New Zealand and Indonesia.

Martin Richards

R M

Martin Richards is a Content Manager at Education Services Australia (ESA) and heads the team that develops the Digital Technologies Hub. Martin has lead the development of resources to support teachers to implement Digital Technologies. Martin has particular interest and background in integrating Science and Digital Technologies drawing on his science teaching and curriculum writing experience. Martin has collaborated with key science organisations to develop comprehensive, engaging STEM resources that demonstrate the work of scientists and aim to inspire young people to take on a STEM career.

Leanne Robertson

R M L

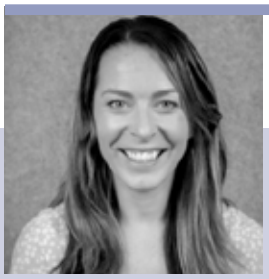
Leanne is a Program Director with Education Services Australia. Leanne has managed a range of projects for Education Services including Maths Learning Objects, the Girls in STEM Toolkit, and the Digital Technologies Hub. In a former role Leanne was involved in the initial development and implementation of the NZ Information Technology Roadshow and delivered ICT professional learning sessions. Leanne is an experienced primary school teacher, has a Master's in ICT in Education and is currently studying at University of Sydney to undertake postgraduate research in computational thinking in primary schools.

Dr Robert Ross

M L

Dr Robert Ross is the head of electronics and robotics engineering at La Trobe University. Robert has a keen interest in robotics and active learning and has been in international pioneer of the escape room based learning pedagogy. Robert has recently launched an educational escape room book (Inescapable Learning: Unlock the Power of Educational Escape Rooms) and has launched his reconfigurable electronic decoder box to empower educators everywhere.

Jaclyn Rooney



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Jaclyn Rooney is the Head of Teaching & Learning at Stile Education – Australia's number 1 science resource. Having worked across many facets of the education sector including public, private and in alternative educational organisations such as Melbourne Zoo; Jaclyn has a wealth of experience in science education, and is incredibly passionate about engaging students in science, and supporting teachers to deliver a world class science education to their students.

Saeed Salimpour

M

Saeed is PhD student at Deakin University, with a background in Astronomy/Astrophysics (focussing on Cosmology), Education and Design. His research focuses on Cosmology Education, Representation, Big Data Visualisation, VR/AR, Curriculum Development, Learning Progressions, Concept Inventories, Student Research in Astronomy and the interaction between Science and Art. His goal is to bring the science and beauty of Cosmos to everyone, whilst working at the interface of Science, Art and Education. He has experience teaching Physics and Astronomy in school, providing teacher training in Astronomy, and being a mentor in student research projects. Saeed has worked in various national and international Astronomy Education projects.

Maree Timms

R

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

M

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.

Brett Webber

R

Brett Webber is an ICT and VEX Robotics Teacher with experience teaching in the Catholic and Government sectors. Through VEX Robotics he has developed a passion for student led learning and has seen first-hand the success that students can achieve when given the right opportunities. This desire for student success has led to him now teaching a VEX Robotics "Integrated Studies" unit where all Year 7 students at Galen Catholic College are helped to develop the skills necessary to succeed in the workplace of tomorrow.

Angela White

M

Angela is a passionate educator with over 20 years experience. She has taught at both primary and secondary level in Victoria and the Northern Territory as well as in three states in the USA. Angela has been a classroom teacher, field naturalist and instructor at Outdoor Science School. Angela advocates for lifelong learning and has recently completed her Master of Education at Latrobe University.

Dr Peta White

M

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

R M

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.