2022 Quantum Victoria STEM Conference

Challenges of the 21st Century -

Climate Change, Sustainability, Energy, Technology & Cyber Security

A Conference for Primary and Secondary Science, Maths and STEM/STEAM Teachers, Lab Techs and Pre-Service Teachers

Friday 18th November 2022 Quantum Victoria, 235 Kingsbury Drive, Macleod West







Challenges of the 21st Century – Climate Change, Living Sustainably, Energy, Technology & Cyber Security

Climate change is the biggest threat to human wellbeing and the health of the planet, according to the Intergovernmental Panel on Climate Change (IPPC). The IPCC <u>report</u> published on February 28, states that human-induced climate change is causing dangerous and widespread disruption in nature and affecting the lives of billions of people around the world. Hoesung Lee, Chair of the IPCC states, 'This report is a dire warning about the consequences of inaction'.

Prof. David Karoly's keynote, 'Climate change and sustainability - what you really need to know!', will address the issues and the science of climate change and its impact on humanity.

This conference brings together primary and secondary teachers and lab techs from across Victoria, sharing best practice in the teaching and learning of STEM/STEAM.

I invite you to join us as we explore ideas and strategies on some of the most pressing topics facing humanity.

Soula Bennett

Conference Convenor and Director, Quantum Victoria



KEYNOTE SPEAKER

'Climate change and sustainability - what you really need to know!'



Professor David Karoly

Melbourne Climate Futures, University of Melbourne

David Karoly is an internationally recognised expert on climate change and climate variability and a Fellow of the Australian Academy of Science. He is an honorary Professor at the University of Melbourne, having recently retired from the CSIRO Climate Science Centre.

He was Leader of the Earth Systems and Climate Change Hub in the Australian Government's National Environmental Science Program, based in CSIRO, during 2018-21.

Professor Karoly was a member of the National Climate Science Advisory Committee during 2018-19. From 2012 to 2017, he was a member of the Climate Change Authority, which provides advice to the Australian government on responding to climate change, including targets for reducing greenhouse gas emissions. He has been involved in the Assessment Reports of the Intergovernmental Panel on Climate Change in 2001, 2007, 2014 and 2021 in several different roles. He was awarded the 2015 Royal Society of Victoria Medal for Scientific Excellence in Earth Sciences.



SPONSORS

Platinum



Education and Training

The Victorian Department of Education and Training leads the delivery of education and development services to children, young people and adults both directly through government schools and indirectly through the regulation and funding of early childhood services, non-government schools and training programs.

The Tech School and Digital Learning Branch supports students to develop contemporary skills, knowledge, and capabilities through innovative digital and STEM education provision. Through a network that includes 10 Tech Schools, six science and mathematics specialist centres and two STEM centres of excellence, we design and implement a unique model of schooling to deliver applied STEM learning students need to succeed in the 21st century world. Through digital learning services, we enable schools and teachers to support students' development of contemporary skills including digital literacies, creativity, collaboration and communication.

Gold



GENIUS ARMOURY - https://geniusarmoury.com

A platform to attract and identify a cybersecurity talent pool within the autistic community and provide them with some fundamental training in cybersecurity. This project is supported by a consortium including BHP, DXC, Quantum Victoria, Untapped Holdings, Cyberstronomy, La Trobe University, Curtin University, Splunk and AustCyber.

The materials provide an introductory cyber security syllabus that is accessible and understandable by autistic individuals with minimal or no prior knowledge of cybersecurity. It is geared towards people who may be interested in further learning or commencing a career in cybersecurity and ethical hacking.

The course provides a foundation syllabus in an inspirational and understandable manner that is intended to spark interest and the pursuit of further learning.

The platform is being extended to target veterans and those returning to work from career breaks.

Materials are also being developed for high school students in years 7-10.

Genius Armoury is looking to partner with educational institutions (to create pathways to their cybersecurity courses) and with employers (to assist in developing their cybersecurity talent acquisition strategies).

Silver



EDUCATION PERFECT - https://www.educationperfect.com/

Curriculum aligned teaching & learning. For Secondary & Primary and all subjects.

CONFERENCE PROGRAM



8.00 am - 8.50 am 8.50 am - 8.55 am 8.55 am - 9.00 am 9.00 am - 9.05 am 9.10 am - 9.55 am 9.55 am - 10.30 am	Registration & Exhibitors - Gallery Welcome – Soula Bennett, Director, Quantum Victoria Welcome – Victorian STEM Education Ambassador, Dr Tien Kieu Dr Brendan Rigby, Director, Tech Schools and Digital Learning, Department of Education & Training Keynote – Professor David Karoly, Melbourne Climate Futures, University of Melbourne Morning Tea & Exhibitors – PD Suite, Gallery & QV STEM Garden
10.35am - 11.35 am Session 1 Workshops (1A – 1F)	 1A Sustainability in the digital classroom John Davison, Education Perfect - QV Theatre 1B How does the primary school curriculum support students to think and live sustainably? Maria James, VCAA - SLS Lab 1C Renewable Energy Futures Ember Chittenden, Cameron Shand, Kim Shore, Bendigo Tech School - QV Boardroom 1D Mini Workshops using Technology Carla Maxwell, Carlton North Primary/ ACU - Game Break Out Space 1E Driving the Future-Giving students the skills to ask the right questions in an uncertain world, Dr Peter Morgan, Beaumaris Secondary College - Game Development Suite 1F Minecraft - Minecraft - Incorporating an Indigenous Perspective to STEM & Sustainability, Mahaelia Thavarajah & Jakin Stasce, Quantum Victoria - Wet Lab
11.40 am - 12.40 pm Session 2 Workshops (2A – 2F)	2A Demonstrating Climate Change through the lens of a Laser Cutter, Domenic Di Giorgio, Darkly Labs & Anthony Simcox, Quantum Victoria - QV Theatre 2B Cyber Security - Why it matters! Soula Bennett, Quantum Victoria & Andrew Eddy, Raza Nowrozy, Untapped Holdings - QV Boardroom 2C The Science of Bees Fitzroy Primary School, Robyn Cairns & Vicki Henty, Fitzroy Primary School - SLS Lab 2D Year 8 STEAM: Sustainable Construction during Climate Change, Phillipa Maher & Steve Blackwell, Yarra Hills Secondary - Game Development Suite 2E 3D Printing Applications in Science and Maths, Scott Mclean & Campbell Wiggins, Quantum Victoria - Wet Lab
12.40 pm – 1.25 pm	Lunch & Exhibitors – PD Suite, Gallery & STEM Garden
1.35 pm - 2.30 pm Session 3 Workshops (3A – 3F)	3A Integrate Technology to Manage Waste [Secondary] Dhivyaa Ambikavathi & Leanne Ciara, Knox Innovation Opportunity and Sustainability Centre – QV Theatre 3B STEM to STEAM: When Art and Science Unite! Mara Rosenkratz, Leonie Magnuson & Emma Fitzgerald, Thomastown Secondary College - SLS Lab 3C Creative Science for a Sustainable future, Craig Bradley & Paul Taylor, Rolling Hills Primary School - Game Development Suite 3D Systems Design through Recycling, Mahaelia Thavarajah, Jakin Stasce & Julia Cherubin, Quantum Victoria – Wet Lab
2.35 pm - 3.30 pm Session 4 Workshops (4A – 4F)	 4A Climate Science for All! Tejinder Kaur & Anastasia Popovska, University of Western Australia – QV Theatre 4B Innovate Science, Tooba Awais, Zach Parr, Mooroolbark College – SLS Lab 4C Sustainability PBL in the Primary Classroom, Binh Hoang Charles LaTrobe College & Campbell Wiggins Quantum Victoria – QV Boardroom 4D Learning to Code, Coding to Learn, Megan Simkin, Customer Support, Cider House Tech – Break Out Space 4E The Dream Time connecting STEAM and sustainability in the Kitchen Garden, John Caroll Thomas Chirnside Primary – Game Development Suite 4F Crack the Code! Cyber Educational Escape Room, Robert Ross, La Trobe University, Scott Mclean & Anthony Simcox, Quantum Victoria – Wet Lab
3.40 pm - 4.30 pm	Meet and Mingle - PD Suite & QV STEM Garden



EXHIBITORS





Education

and Training





GENIUS ARMOURY

CYBER SECURITY GUARDIANS

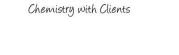


Darkly Labs









Science Supply Australia







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oore





PRESENTERS

Dhivyaa Ambikavathi, Knox Innovation Opportunity and Sustainability Centre Tooba Awais, STEAM Learning Specialist, Mooroolbark College Soula Bennett, Director, Quantum Victoria Steve Blackwell, Teacher, Yarra Hills Secondary College Craig Bradley, Principal, Rolling Hills Primary School Leanne Caira, Knox Innovation Opportunity & Sustainability Centre Robyn Cairns, Teacher, Fitzroy Primary School John Carroll, Teacher, Thomas Chirnside Primary School Julia Cherubin, Education Officer, Quantum Victoria Emma Chittenden, Head of Programs, Bendigo Tech School John Davison, Science Specialist Teacher, Education Perfect Domenic Di Giorgio, Darkly Labs Emma Fitzpatrick, Arts and Technology Faculty Leader, Thomastown Secondary College Belinda Granger, Teacher, Rolling Hills Primary School Vicki Henty, Teacher, Fitzroy Primary School Binh Hoang, Leading Teacher - Primary, Charles La Trobe P-12 College Maria James, Science Curriculum Manager, VCAA Tejinder Kaur, Postdoctoral Research Fellow – Physics University of Western Australia Phillipa Maher, Teacher, Yarra Hills Secondary College Zach Parr, Curriculum Leading Teacher, Mooroolbark College Carla Maxwell, Teacher, Carlton North Primary School Leonie Magnuson, Laboratory Technician, Thomastown Secondary College Scott Mclean, Learning Specialist, Quantum Victoria Peter Morgan, Learning Specialist, Beaumaris Secondary College Raza Nowrozy, Untapped Holdings Anastasia Popkova, PhD Student, Physics, University of Western Australia Mara Rosenkrantz, STEAM Coordinator, Thomastown Secondary College Robert Ross, Senior Lecturer, Engineering La Trobe University Cameron Shand, STEAM Learning Designer, Bendigo Tech School Kim Shore, STEAM Learning Designer, Bendigo Tech School Anthony Simcox, Virtual Learning Manager, Quantum Victoria Megan Simkin, Customer Support, Cider House Tech Katie Smith, Teacher, Rolling Hills Primary School Jakin Stasce, Teacher, Quantum Victoria Paul Taylor, Teacher, Rolling Hills Primary School Mahaelia Thavarajah, Teacher, Quantum Victoria Campbell Wiggins, Teacher, Quantum Victoria

Session 1 Workshops





QV THEATRE

Sustainability in the digital classroom - the importance of customisation and localisation in making learning relevant and authentic (Commercial, Secondary) John Davison, Education Perfect

Environmental pressures and sustainability are global issues but effective and engaging, authentic learning in the classroom needs to be linked to local issues relevant to students lives. As educators look for ways to engage and challenge students, digital learning platforms such as Education Perfect have a huge role to play in sustainability education, delivering content, creating community and capturing the student voice but need to be able to make the link from global to local and allow students choice and agency in delivering their response to an issue.

SLS LAB

How does the primary school curriculum support students to think and live sustainably? (Primary)

Maria James, Science Manager, VCAA

Sustainability is a cross-curriculum priority in the F-10 Victorian Curriculum but it is sometimes forgotten when planning for teaching, learning and assessment. Participants in this workshop will be involved in exploring different hands-on activities that span the primary school Foundation to Year 6 levels that showcase how you can use the science curriculum, supported by the sustainability priority, to scaffold and develop engaging pure science, STEM and/or STEAM programs that explore the ideas of climate change and sustainability. Literacy and numeracy links will be highlighted, and participants will receive a package of ready-to-use classroom materials and curriculum mapping.

10

QV BOARDROOM

Renewable Energy Futures [Secondary]

Ember Chittenden, Cameron Shand, Kim Shore, Bendigo Tech School

Renewable Energy Futures is a term-long program for schools and students in rural communities. Supported remotely by the Bendigo Tech School, students explore innovation, new energy technologies and climate change to design a future powered by renewable energy. This workshop will unpack the 'how' and 'why' of creating impactful industry and education partnerships to develop and deliver an interdisciplinary, design driven educational opportunity for young people. In this workshop, we aim to use a mix of techniques to prompt discussion, and engage the audience in 'learning by doing.'



GAME BREAK OUT SPACE

Mini Workshops using Technology [Primary & Secondary]

Carla Maxwell, Carlton North Primary/ ACU Science and Technology Tutor

Use a variety of Technology activities for use in Primary and Secondary classrooms. Delegates attending this workshop will get an introduction to my practice making Projects Via CNC projects and how I have incorporated this into the STEAM Program At Carlton North Primary and introducing project-based learning through 'Build A catapult/ or treehouse out of recycled industry wood off-cuts' and 'Program a Lego robot via scratch'.



GAME DEVELOPMENT SUITE

Driving the Future-Giving students the skills to ask the right questions in an uncertain world [Secondary]

Dr Peter Morgan, Beaumaris Secondary College

A look under the bonnet of a semester long Year 9/10 science elective that peers into the near future. Students explore scientific models and the science behind climate change and its denial. They explore how and why electric cars will need to displace fossil fuel engines and the challenges of the of the driver being displaced by artificial intelligence. The Problem Based learning (PBL) approach embedded in all courses at Beaumaris allows the explicit teaching of key curriculum concepts, as well as the embedding of general capabilities and student designed inquiry. A PBL approach is ideally suited to develop students who are optimistic and creative who can be part of the solutions needed to solve the wicked problems we face. Want to develop scientifically literate and engaged citizens and/or scientists of the future, come find out how this framework may fit your future classroom.



WET LAB

Minecraft - Incorporating an Indigenous Perspective to STEM & Sustainability [Primary]

Mahaelia Thavarajah & Jakin Stasce, Quantum Victoria

In this session we will explain our journey towards authentically and respectfully Incorporating Indigenous perspectives into the curriculum, using a game-based program- Minecraft. Delegates will have an opportunity to participate in a select group of activities based on the program theme of sustainability, that highlight the resource types used and the STEM knowledge of our First Nations People.

Session 2 Workshops





QV THEATRE

Demonstrating Climate Change through the lens of a Laser Cutter [Primary & Secondary] **Domenic Di Giorgio,** Darkly Labs & Anthony Simcox, Quantum Victoria

Delegates attending this workshop will acquire a basic introduction to laser cutting and will discuss uses for a laser cutter in the classroom as both a teaching tool and design/creation tool.

Laser cut props will be utilised to explore the effects of climate change on continents and islands around the world.

2B

QV BOARDROOM

Cyber Security - Why it matters! [Secondary]

Soula Bennett, Quantum Victoria, Andrew Eddy & Raza Nowrozy, Untapped Holdings

Delegates will explore cyber security concepts including cybercrime landscapes, threat actors, cryptography, vulnerabilities and cyber security pathways, through 3 custom-built Cyber Security Online Modules during this hands-on workshop; Module 1 - Introduction to Cyber Security, Module 2 - The Cybercrime Landscape & Module 3 - Diving a Little Deeper. These modules have been developed in partnership with Quantum Victoria and Genius Armoury, to equip students with strategies to mitigate risks and to raise an awareness of the diverse job opportunities. They are free, are designed to be self-paced and cater for Year 7-10 students.

20

SLS LAB

The Science of Bees [Primary]

Robyn Cairns & Vicki Henty, Fitzroy Primary School

The focus of our workshop is sharing how we have created opportunities for our students to learn the importance of the role bees for global food security and strategies we have used to educate our primary students on attracting bees and other pollinators to their gardens including the science of honey. We will be sharing our 'Honey' Kitchen Garden Science/Food Tech unit tech unit, highlighting the Sustainability and Science links to the Vic Curriculum and how this unit crosses over into many Curriculum Domains through teaching Science through Food tech, the Arts, Maths and Literacy.



GAME DEVELOPMENT SUITE

Year 8 STEAM: Sustainable Construction during Climate Change [Secondary] Phillipa Maher & Steve Blackwell, Yarra Hills Secondary

This workshop presents the running of a year 8 STEAM Subject, what resources we use, what tasks we explore and how the students have worked through the course. In this STEAM subject, students explore a 'Sustainable House' project, where they investigate the impact of climate change and extreme weather conditions on homes and what insulation materials work best to stabilize internal temperature. During this project students work through research and data collection tasks as well as physical experiments. Students also focus on designing a house for an extreme climate of choice (e.g. the Moon, Mars, underwater, desert etc) and work through a design process to research, design, digitally model, and create a 3D printed product prototype to support their end of course presentation.



WET LAB

3D Printing Applications in Science and Maths [Primary & Secondary]

Scott Mclean & Campbell Wiggins, Quantum Victoria

In this hands-on workshop, delegates will have an opportunity to participate as students and will gain a deeper understanding of real-world applications of 3D printing and modelling and how these can be incorporated into the teaching of science and mathematics in Primary and Secondary classrooms. No prior 3D modelling/printing experience is required for this session.

Session 3 Workshops





QV THEATRE

Integrate Technology to Manage Waste [Secondary]

Dhivyaa Ambikavathi & Leanne Ciara, Knox Innovation Opportunity and Sustainability Centre



SLS LAB

STEM to STEAM: When Art and Science Unite! [Secondary]

Mara Rosenkratz, Leonie Magnuson & Emma Fitzgerald, Thomastown Secondary College

This project enabled student agency, metacognition, design thinking, technology, science communication and Innovation through cross curricular arts and science learning. Year 11 Chemistry and VCD students were inspired by Quantum Victoria's Hexagon Installation, 'An Elemental Journey through the Periodic Table', and worked together to understand and represent the periodic table for a permanent display in the Science Foyer. In this workshop, we present one example of how teachers can collaborate across the ARTS and Science Faculties to create major science communication projects. Incorporating student agency and dynamic teaching practices, this project enabled students to build skills in design thinking, cross curricular learning, interpersonal relationships and invaluable future work "soft skills" within an extended, consultative process integrating design and communication technologies.



GAME DEVELOPMENT SUITE

Creative Science for a Sustainable future [Primary]

Craig Bradley & Paul Taylor, Rolling Hills Primary School

Living in a sustainable world means teaching and learning in a sustainable way. At Rolling Hills Primary School all staff engage in scientific concepts with our Prep to 6 students with creativity and upcycling as the DNA of all that we do. We model our sustainable approach to learning utilising recycled items in our teaching. Join us as we show you how to explore all the areas of the science curriculum using everyday items and materials. Whether you're working towards an integrated curriculum, or running science as an individual unit, our pedagogy is both simple and productive.



WET LAB

Systems Design through Recycling [Primary]

Mahaelia Thavarajah, Jakin Stasce & Julia Cherubin, Quantum Victoria

In this session delegates will alter their thinking to see waste as a valuable resource. Delegates will explore different material separation techniques and learn how student misconceptions associated with recycling techniques are addressed through activities including. the use of electromagnetism, Lego, and an augmented reality experience.

Session 4 Workshops





QV THEATRE

Climate Science for All! [Primary & Secondary]

Tejinder Kaur & Anastasia Popovska, University of Western Australia

Einstein-First project, is a part of an Australian and international collaboration focusing on introducing modern science concepts such as curved space, warped time, photons, and phonons into Years 3 to 10. A feature of the Einstein-First initiative is that an integrated Climate Science and Sustainable Energy program will be taught in Year 6. The lessons build on concepts of atoms and molecules, heat, forces and light as photons introduced in the Year 3, 4 and 5 chemical and physical sciences topics. Our modern understanding of these concepts is generally not introduced into primary school even though these concepts are essential to understanding climate science and alternative energy production. These ideas will be further developed in Years 8, 9 and 10. In this workshop, teachers will be introduced to fully developed lesson plans and hands-on activities to teach climate science to primary and secondary students.



SLS LAB

Innovate Science [Secondary]

Tooba Awais & Zach Parr, Mooroolbark College

Mooroolbark College runs a Year 9 Elective called Innovate Science engaging students in STEM experiences to develop skills & knowledge including; having an awareness of contemporary science issues, applying critical thinking skills to evaluate claims, applying reasoning, developing metacognition, discussing the ethics of complex socio-scientific issues and enabling students to investigate areas of interest. Students also explore questioning and predicting by formulating hypotheses, planning and conducting experiments, collecting and recording data and analysing patterns and trends in the data, identifying specific ways to improve the quality of scientific data and communicating scientific ideas for a particular purpose using scientific language and digital technologies. We will be showcasing various experiences including topics like Climate Change and Sustainability.



QV BOARDROOM Sustainability PBL in the Primary Classroom [Primary]

Binh Hoang Charles La Trobe College & Campbell Wiggins, Quantum Victoria

Increasing student engagement as well as authenticity in learning, have been the priority of many schools. Project Based Learning (PBL) is a teaching approach which enables students to learn by actively engaging in real-world and authentic projects. Many studies have proved that PBL is an engaging method because it allows students to understand the content deeply and develop different skills through participating in real work projects. My project is called "Water wise". The year two students worked in groups of four over four days to learn about water conservation and design a water tank for our school. Students were engaged throughout their project and lots of discussions had been taken placed. Students learned a variety of tier 3 vocabulary about water through songs and hands-on experiments. Our school has applied for funding to have a water tank installed in the near future



GAME BREAK OUT SPACE

Learning to Code, Coding to Learn [Commercial, Secondary]

Megan Simkin, Customer Support, Cider House Tech

An initial introduction on how PASCO Wireless Sensors can be easily utilised to quickly and accurately collect data in your science prac classes when investigating climate and environmental topics involving temperature, light, weather, pH, CO2, O2, soil moisture, GPS mapping etc. Followed by a workshop and demonstration using Blockly, the coding component within PASCO's SPARKvue and Capstone software, that will not only increase your knowledge of a scientific concept but also enable you to control aspects of your experiment such as regulating the light and temperature levels within a greenhouse to create the ideal environment for optimal plant growth.

Bring your own device (smartphone, tablet or chromebook) to the session with SPARKvue already installed free from Apple App Store or Playstore so we can show you how easy it is to get started. **Delegates attending this** workshop are to byo device (phone, tablet or chromebook) with PASCO SPARKvue software already installed. It is a free app.

Session 4 Workshops cont'd





GAME DEVELOPMENT SUITE

The Dream Time connecting STEAM and sustainability in the Kitchen Garden [Primary]

John Caroll Thomas Chirnside Primary

At TCPS students engage in activities that are theoretical, practical and designed to be informative, fun and connected to developing an appreciation for the natural world. Our STEAM classroom is known as the 'Engine Room' where our students develop their theoretical and academic interest and knowledge towards being committed practitioners in the art, craft and science of sustainable living. Our Stephanie Alexander Kitchen Garden and native gardens provide a field of research and hands on practice. This work shop will present the connections we make between STEAM, gardening and sustainability. Included will be samples of resources, demonstration activities with various magnifying glasses, microscopes and collected specimens and examples of our planted germination experiments. There will be discussion on why we believe, in our context, the 'A' is important in STEAM, based on developing the student's observational skills through botanical and entomological drawings, garden design and Indigenous Art.



WET LAB

Crack the Code! Cyber Educational Escape Room [Secondary]

Robert Ross, La Trobe University, Scott Mclean & Anthony Simcox, Quantum Victoria

Educational Escape Rooms are on the cutting edge of engaging, team-oriented, game-based learning. In this workshop, delegates will work against the clock to solve a series of cyber security challenges and gain an understanding of how educational escape rooms can be used in the classroom.

3.40 pm - 4.30 pm Meet and Mingle - PD Suite & QV STEM Garden





Conference Venue

Quantum Victoria

235 Kingsbury Drive, Macleod West Victoria, Australia, 3085 <u>Google Maps</u>

Contact Details

Phone: 03 9223 1460 Email: <u>admin@quantumvictoria.vic.edu.au</u> ABN 65 029 766 137

Parking

Free Parking onsite, entry to Quantum Victoria can only be accessed via Kingsbury Drive eastbound. There will be a left turning lane into the car park which has a sign: **CHARLES LATROBE COLLEGE & QUANTUM VICTORIA** car park.

Please park in non designated parking bays.

Registration

Register \underline{here} or scan the QR Code

Conference Cost

Primary/Secondary Teachers	\$195.00 (Inc.GST)
Lab Technicians	\$135.00 (Inc.GST)
Pre-Service Teachers	\$95.00 (Inc.GST)

Morning tea, Lunch and Meet and Mingle are included in the cost of registration.

Refund and Attendance

Notice of cancellation is required Prior to Friday, 4th November 2022 for a full refund. Cancellation after this date will incur the full attendance cost. To Secure your place please follow the link to register or scan the QR Code. Attendance at the QV STEM Conference without a confirmed place will result in you being turned away.





