

2023 Quantum Victoria STEM Conference

Effective Pedagogies in STEM/STEAM Education

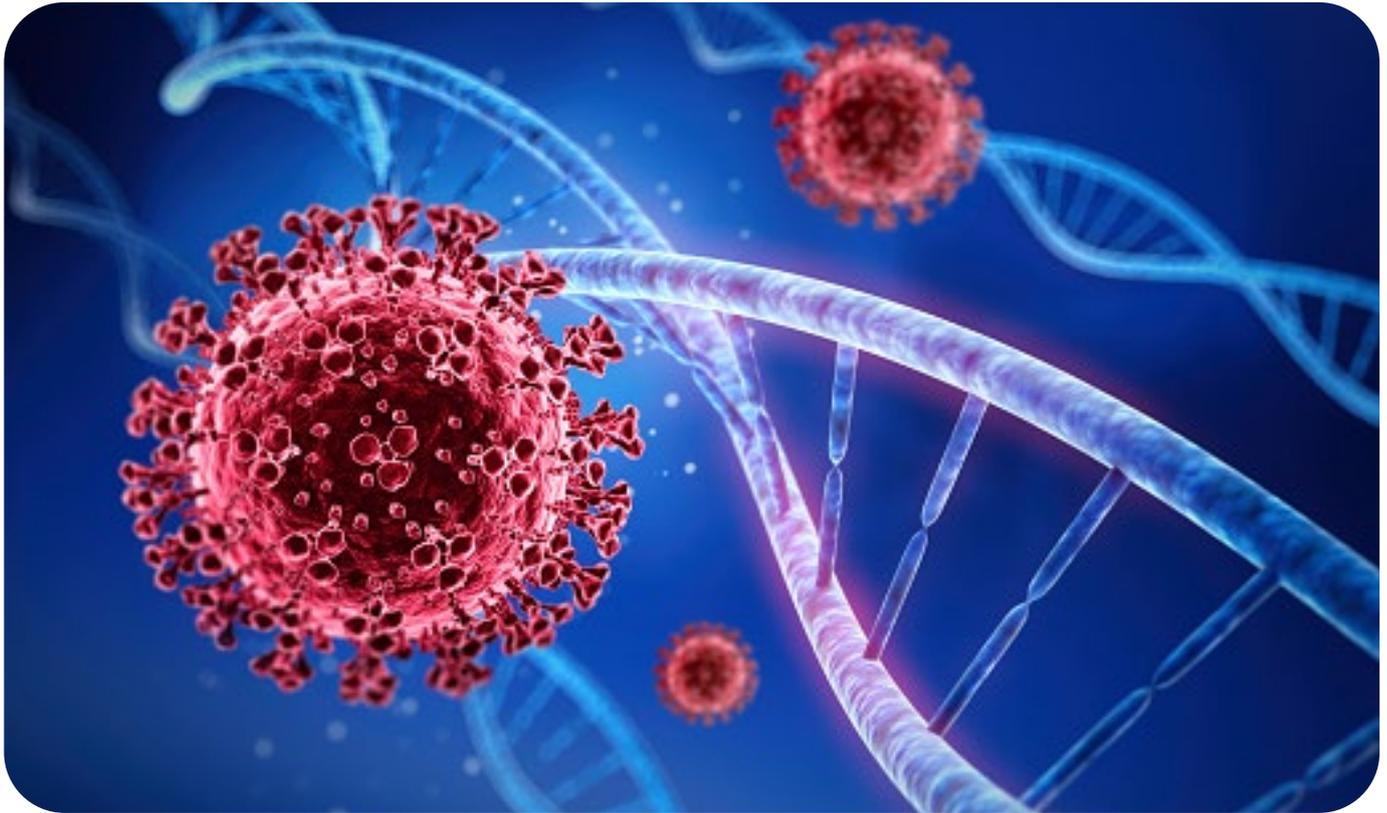
A Conference for Primary and Secondary Science, Maths and STEM/STEAM Teachers,
Lab Techs and Pre-Service Teachers

Friday 24th November 2023

Quantum Victoria, 235 Kingsbury Drive, Macleod West

PBL, Game-based Learning, Design Thinking, Coding and Programming, Scientific Inquiry, Mathematical Reasoning, Resilience through Productive Failure, Immersive Technologies, AI & Machine Learning, Culturally Responsive Teaching and Scenario-Based Challenges.

 **Quantum**
VICTORIA



Effective Pedagogies in STEM/STEAM Education

The use of effective pedagogies in STEM/STEAM education is crucial in preparing our students for the future by equipping them with the necessary knowledge, skills, and mindset to thrive in a rapidly evolving world.

Effective pedagogies in STEM/STEAM (Science, Technology, Engineering, Arts, and Mathematics) education:

- Foster critical thinking and problem-solving skills by enable students to apply scientific principles, mathematical concepts, and technological tools to real-world challenges.
- Enhance student engagement and motivation by incorporating hands-on experiments, project-based learning, and interdisciplinary approaches, making learning more enjoyable and meaningful.
- Promote innovation and creativity by nurturing students' creativity and encouraging them to explore, experiment, and think outside the box.
- Develop future-ready skills in an increasingly technology-driven world, equipping students with a range of transferable skills such as critical thinking, communication, collaboration, adaptability, and digital literacy, preparing them for the demands of the 21st-century workforce.
- Reduce the gender and diversity gap by promoting and creating a supportive and inclusive learning environment, encouraging girls and underrepresented cohorts to pursue STEM-related careers.
- Encourage lifelong learning by developing a growth mindset and cultivating curiosity, perseverance, and the ability to embrace challenges.
- Address global challenges, such as climate change, energy, and healthcare, by developing a generation of problem solvers who can tackle these complex challenges and make informed decisions based on scientific evidence.

We invite primary and secondary teachers, lab techs and pre-service teachers to join us as we share ideas, knowledge and best practice in the teaching and learning of STEM/STEAM.

Soula Bennett

Conference Convenor and Director, Quantum Victoria

KEYNOTE SPEAKER



Associate Professor Vasileios Stavropoulos

Clinical Psychologist, RMIT University

Vasileios is an academic and professional psychologist activated in the area of disordered gaming. He has worked as the leading clinician in the outpatient program for problematic internet use of the Psychiatric Hospital of Attica in Greece between 2009 and 2012. His scholarly work in the field of disordered gaming focuses on the exploration of risk and protective factors, measurement issues and factors that make gaming applications engaging. As an acknowledgment of his research work, he received the Australian Research Council Discovery Early Career Researcher Award, 2021 and the Victorian Tall Poppy Award. Vasileios is currently working as an Associate Professor of Clinical Psychology in RMIT University.



SPONSORS

Platinum



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DEPARTMENT OF EDUCATION

The Victorian Department of Education leads the delivery of education and development services to Victorians both directly through government schools and indirectly through the regulation and funding of early childhood services and non-government schools.

The Tech School Branch supports students to develop contemporary skills, knowledge, and capabilities through innovative STEM education provision. Through a network that currently includes 10 Tech Schools, 6 science and mathematics specialist centres and 2 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. Another 6 Tech Schools will soon be opening across Victoria.

Gold



NEURODIVERSITYHUB

GENIUS ARMOURY - <https://geniusarmoury.com>

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

The materials provide an introductory cyber security syllabus that is accessible and understandable by autists 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.

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).



3DPRINTERGEAR - <https://www.3dprinter gear.com.au/>

Founded in 2012, 3D Printer Gear is an all-encompassing 3D printing solution provider based in Australia. More than just a supplier; we are dedicated partners to all industries incorporating 3D printing and additive manufacturing. As the operators of Australia's highest-rated 3D printing service, we offer advice, 3D printing equipment and training based on our extensive experience with over 90,000 completed orders and 1,000,000 machine hours. With a deep understanding of the industry, we are here to support you every step of the way. From the initial decision-making process of 3D printer types and models, materials and the 3D printing procedure, we ensure that you make informed choices. We only offer 3D printers renowned for their reliability, consistency, and user-friendly design, carefully selected and extensively tested in our own print farm and combined with the highest quality consumables available on the market today. We are committed by supporting you with comprehensive training and maintenance services to ensure you have all the necessary tools and knowledge to succeed. Our dedicated team is always ready to address any questions or concerns you may have, ensuring a seamless experience. 3D Printer Gear is the only solution for any institution looking to integrate 3D printing into their curriculum and inspire the innovators of today.

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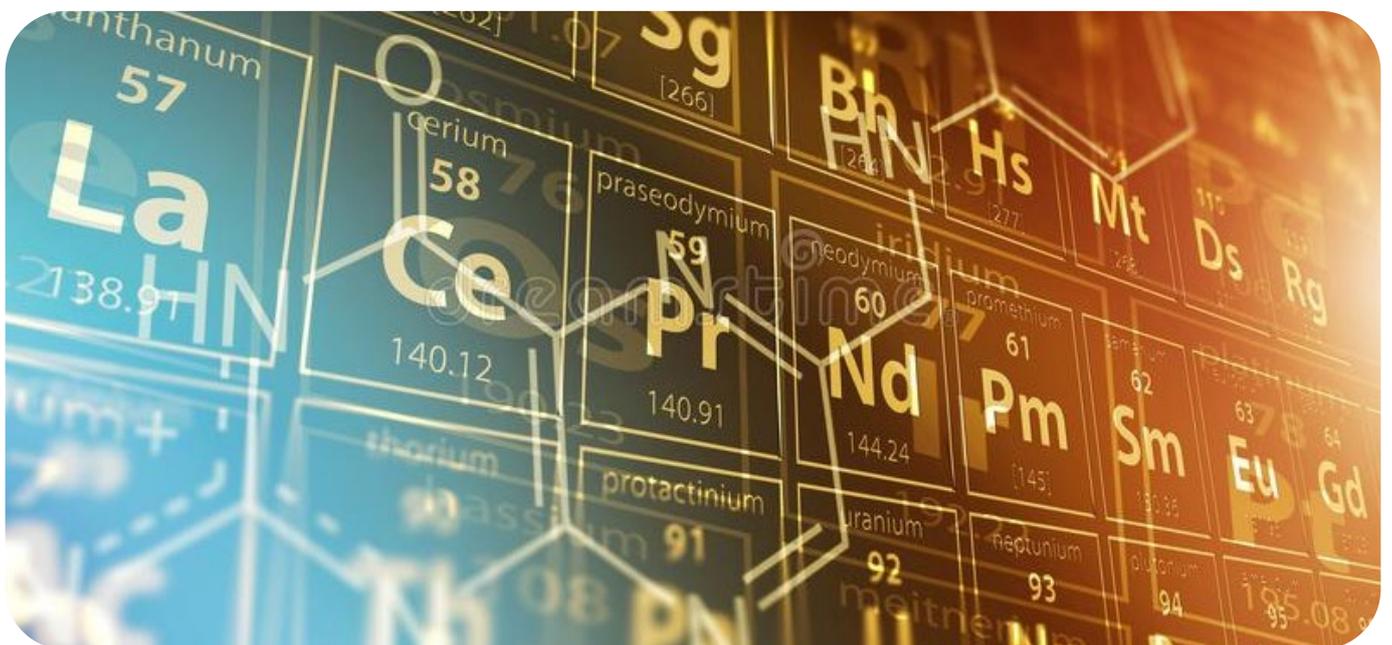
EE Group Australia

<https://www.eegroup.com.au/>



Australian Institute of Policy and Science (AIPS)

<https://aips.net.au/>



CONFERENCE PROGRAM

| | |
|---------------------|--|
| 8.00 am - 8.45 am | Registration & Exhibitors - Gallery |
| 8.45 am - 8.55 am | Welcome to Country |
| 8.55 am - 9.05 am | Welcome – Soula Bennett, Quantum Victoria Director, and Brendan Rigby, Director, Tech School Division |
| 9.05 am - 9.55 am | Keynote – Associate Prof Vasileios Stavropoulos, Clinical Psychologist, RMIT University |
| 9.55 am - 10.30 am | Morning Tea & Exhibitors – PD Suite, Gallery & QV STEM Garden |
| 10.35am - 11.35 am | <p>Session 1 Workshops (1A – 1G)</p> <p>1A Pairing the Design Thinking Process with collegial collaboration to improve the efficacy of STEM inquiry Melissa Blacklock, Angie Atal Carreon & James Cutting, Southern Cross Grammar - SLS Lab 2</p> <p>1B Catapults and Jackson Pollock: A STEAM activity for differentiated learning Maria James, VCAA – Wet Lab</p> <p>1C Implementing a STEM Education from P-6 to improve Tier 3 Language Quyen Ngoc Thai, Christ the King Catholic Primary School – Game Breakout Space</p> <p>1D Empowering Educators: A Master Class in High School Cybersecurity Education for Educators Raza Nowrozy & Andrew Eddy, Untapped Holdings & Soula Bennett, Quantum Victoria – Room TBD</p> <p>1E Let's STEMIty!! Tooba Awais & Amy Godfrey, Mooroolbark College – Room TBD</p> <p>1F Probably, approximately correct - meaningful failure as a response to 'problems' Colin Chapman, Victorian Academy of Teaching and Leadership – SLS Lab 1</p> <p>1G Engaging Students in STEM Learning using the BBC Micro. Bit Greg Hellard & Ai Lin Ho, Huntingtower School – Game Development Suite</p> |
| 11.40 am - 12.40 pm | <p>Session 2 Workshops (2A – 2G)</p> <p>2A PBL Toolbox for Primary Educators: Equipping Students with Critical Thinking and Design Skills Kate Sommerfeld, Emily O'Donnell, Casey Fields Primary School – SLS Lab 1</p> <p>2B STEM Arcade Game Jam Anthony Gasson, Banyule Nillumbik Tech School, Melbourne Polytechnic – Game Development Suite</p> <p>2C Rethinking STEM Libby Moore, Moore Education Learning – Game Breakout Space</p> <p>2D Speculative Pedagogy (a workshop for the future) Henry Hartley, Strathmore North Primary School – Room TBD</p> <p>2E Design thinking for beginners in the mathematics classroom Jennifer Palisse, Monash Tech School – Wet Lab</p> <p>2F Connecting industry to the curriculum to improve STEM education Shane Giese, St. Raphael's Primary School – SLS Lab 2</p> <p>2G Mission Control! Jesse Chambers, Matt Coffey & Narelle Wood, Science Gattery Melbourne – Room TBD</p> |
| 12.40 pm - 1.25 pm | Lunch & Exhibitors – PD Suite, Gallery & STEM Garden |
| 1.30 pm - 2.30 pm | <p>Session 3 Workshops (3A – 3G)</p> <p>3A Integrating coding, algorithmic thinking, problem solving & higher order thinking using drones! David Feillafe & Anthony Simcox, Quantum Victoria & Pathik Shah, EE Group Australia – QV Theatre/Gym</p> <p>3B Industry and community connections to enhance STEM programs through design thinking, science inquiry and PBL Vicki Henty, Fitzroy Primary School & Robyn Cairns, Karwan Primary School - Game Development Suite</p> <p>3C Illuminating Futures Ember Chittenden & Danie McKee, Bendigo Tech School – Room TBD</p> <p>3D Reimagining the Year 7-9 Science Curriculum with STEM Emma Love, Marta Ivkov & Rebecca Hellweg, Blackburn High School – Game Breakout Space</p> <p>3E Applications of Generative Artificial Intelligence in the Classroom Anam Javed, Victorian Academy of Teaching and Leadership – SLS Lab 2</p> <p>3F 3D Printing Applications in Science and Maths Scott Mclean & Mahaelia Thavarajah, Quantum Victoria – Wet Lab</p> <p>3G Effective pedagogy to develop interest in electronics through fun projects Gita Pendharker, RMIT University – Room TBD</p> |
| 2.35 pm - 3.35 pm | <p>Session 4 Workshops (4A – 4G)</p> <p>4A The Power of Failure! Steven Scammell & Danh Nguyen, Sunshine College – SLS Lab 1</p> <p>4B Activating student agency in STEM inquiry Duncan Goddard, Richard Bader & Stacey Jamieson, GTAC – Wet Lab</p> <p>4C Educational Escape Rooms to captivate your learners Robert Ross, La Trobe University Educational – Game Development Suite</p> <p>4D Sparking Ideas: Building connections in STEM Education Erin Wilson, VCAA – Game Breakout Space</p> <p>4E Team Rocket Blasting off Again – Primary Inquiry starring science and explosions on a budget! Paul Taylor & Craig Bradley, Rolling Hills Primary School – SLS Lab 2</p> <p>4F Choices: The Path to Net Zero – How to Make the Energy Transition Glen Nash & Rod Boucher, TESEP – Room TBD</p> <p>4G Pivoting a Hard Fork in an Innovative STEM Curriculum Lachlan Zubovich, Serpell Primary School – Room TBD</p> |
| 3.35 pm - 4.30 pm | Meet & Mingle - PD Suite & QV STEM Garden |

EXHIBITORS



Department
of Education



PRESENTERS

Tooba Awais, Mooroolbark College
Richard Bader, GTAC
Soula Bennett, Quantum Victoria
Melissa Blacklock, Southern Cross Grammar
Rob Boucher, TESEP
Craig Bradley, Rolling Hills Primary School
Robyn Cairns, Karwan Primary School
Angie Atal Carreon, Southern Cross Grammar
Jesse Chambers, Science Gallery Melbourne
Colin Chapman, Victorian Academy of Teaching and Leadership
Ember Chittenden, Bendigo Tech School
Matt Coffey, Science Gallery Melbourne
James Cutting, Southern Cross Grammar
Andrew Eddy, Untapped Holdings
David Feillafe, Quantum Victoria
Anthony Gasson, Banyule Nillumbik Tech School
Shane Giese, St Raphael Primary School
Duncan Goddard, GTAC
Amy Godfrey, Mooroolbark College
Henry Hartley, Strathmore North Primary School
Greg Hellard, Huntingtower School
Rebecca Hellweg, Blackburn High School
Vicki Henty, Fitzroy Primary School
Ai Lin Ho, Huntingtower School
Marta Ivkov, Blackburn High School
Maria James, VCAA
Stacey Jamieson, GTAC
Anam Javed, Victorian Academy of Teaching and Leadership
Emma Love, Blackburn High School
Danie McKee, Bendigo Tech School
Scott Mclean, Quantum Victoria
Libby Moore, Moore Education
Glen Nash, TESEP
Danh Nguyen, Sunshine College
Raza Nowrozy, Untapped Holdings
Emily O'Donnell, Casey Fields Primary School
Jennifer Palisse, Monash Tech School
Gita Pendharkar, RMIT University
Robert Ross, Engineering La Trobe University
Steven Scammell, Sunshine College
Pathik Shah, EE Group Australia
Anthony Simcox, Quantum Victoria
Kate Sommerfield, Casey Fields Primary School
Paul Taylor, Rolling Hills Primary School
Quyen Ngoc Thai, Christ the King Catholic Primary School
Mahaelia Thavarajah, Quantum Victoria
Erin Wilson, VCAA
Narelle Wood, Science Gallery Melbourne
Lachlan Zubevich, Serpell Primary School

Session 1 Workshops

1A

SLS LAB 2

Pairing the Design Thinking Process with collegial collaboration to improve the efficacy of STEM inquiry

Melissa Blacklock, Angie Atal Carreon & James Cutting, Southern Cross Grammar (Secondary 7-10)

STEM education and the Design Thinking Process (DTP) form a dynamic partnership, fostering the development of critical thinking, problem-solving, and innovation skills. At Southern Cross Grammar, where STEM is offered as a middle-school elective subject, a multidisciplinary and collegial approach is prioritised to help students tackle real-world challenges. By incorporating the iterative framework of the DTP, students are equipped to tackle complex problems with creativity and resilience. By integrating this methodology, we hope to inspire a new generation of STEM enthusiasts who are equipped to address the evolving needs of our rapidly changing world.

This workshop aims to highlight the strengths of using the DTP in the STEM classroom, and will explore the pivotal role of auxiliary staff members in ensuring the efficacy of our pedagogical practice. Attendees will have the opportunity to consider how the DTP could be used to explicitly structure learning within their current STEM units.

1B

WET LAB

Catapults and Jackson Pollock: A STEAM activity for differentiated learning

Maria James, VCAA (Primary & Secondary F-10)

Simply adding paint, tape and glue to a STEM lesson, such as creating a shadow-box about the planets in a science lesson or painting a solar-powered car that was constructed in an engineering unit, doesn't make it a STEAM lesson. Curriculum mapping can assist in ensuring that discipline integrity is maintained. In this session, participants will construct a paint-throwing catapult as they consider how this activity can be differentiated across year levels. STEM/STEAM activities lend themselves well to teaching and assessing communication, both within a Learning Area and/or as a General Capability. Sample rubrics will be provided to demonstrate how this activity can be assessed.

1C

GAME BREAKOUT SPACE

Implementing a STEM Education from P-6 to improve Tier 3 Language

Quyen Ngoc Thai, Christ the King Catholic Primary School (Primary F-6)

This workshop will showcase the integration of STEM with Literacy, Numeracy, Inquiry, and Music specialist. Delegates attending the workshop will gain an understanding of how this initiative has been implemented using the Design Thinking cycle within classrooms to improve the Tier 3 language acquirement of our students at our school. In addition, I have been awarded the Victorian Teaching Innovation Fellowship grant and I am investigating how to use research-based education change practices to ensure that this practice is eventually embedded at our school.

1D

ROOM TBD

~~**Empowering Educators: A Master Class in High School Cybersecurity Education for Educators-**~~

~~**Raza Nowrozy & Andrew Eddy**, Untapped Holdings & **Soula Bennett**, Quantum Victoria (Secondary 7-10)~~

In today's digital world, the risk of cyber threats is growing. This makes it important for high school students to be safe and savvy online users. This masterclass is designed to help teachers make students aware of cybersecurity concepts and to safely navigate their way through online environments. The presentation covers key online dangers including: phishing (deceptive emails), malware (harmful software), and cyberbullying. It provides teaching strategies to weave cybersecurity topics into regular lessons. The masterclass uses real-case scenarios and examples to assist teachers understand online risks and ways to handle them, aiming to build a culture of cybersecurity knowledge and online safety among students. The presentation also identifies useful resources for teachers (online safety resources) to keep abreast of the fast-changing cybersecurity trends. This masterclass provides a step-by-step guide to enhance online engagement and raise awareness of cybersecurity threats.

1E

ROOM TBD

~~**Let's STEMify!!-**~~

~~**Tooba Awais & Amy Godfrey**, Mooroolbark College (Primary & Secondary 5-10)~~

Delegates attending this workshop are asked to bring a STEM activity that is either planned or implemented, which presenters will then STEMify using the STEM PBL Model adopted by Mooroolbark College. Delegates will also have access to completed examples of activities and can design their own STEM task utilising the STEM PBL Model presented.

1F

SLS LAB 1

Probably, approximately correct - meaningful failure as a response to 'problems'

Colin Chapman, Victorian Academy of Teaching and Leadership

In this practical workshop we will build key circuits for the measurement of data, develop calibrations for scratch-built sensors and realise an implementation that may be used to measure a range of quantities.

This workshop chooses an intentional approach that is sensitive to narrative trajectories of learning. We will look at the opportunities that modelling, simulation and computation offer intentional approaches to the design of learning opportunities to allow explicit approaches and inquiry processes to work together in education, in a context of discipline informed, practitioner-oriented engagement. We will explore how the experience with the design, building and implementation of instrumentation may provoke learners to rethink and reimagine instrumentation, experimental protocols, data wrangling and conclusion crafting. We will explore apparent boundaries between theoretical/applied learning and the between the disciplines themselves by playing with an assembly approach to learning opportunities.

1G

GAME DEVELOPMENT SUITE

Engaging Students in STEM Learning using the BBC Micro.Bit

Greg Hellard & Ai Lin Ho, Huntingtower School (Primary & Secondary 5-9)

Creating engaging STEM experiences using the BBC micro.bit processor board. This workshop aims to introduce the BBC micro.bit to STEM educators in both primary and secondary classes.

Session 2 Workshops

2A

SLS LAB 1

PBL Toolbox for Primary Educators: Equipping Students with Critical Thinking and Design Skills

Kate Sommerfeld, Emily O'Donnell, Casey Fields Primary School (Primary F-6)

In this interactive workshop, educators will have the opportunity to explore the PBL Toolbox, a comprehensive set of thinking strategies necessary for empowering primary school students in problem-based learning (PBL) settings. The session aims to provide practical techniques for explicitly teaching students how to approach and solve problems effectively.

Participants will learn research-based instructional strategies, such as "The 5 Why's" and "Picture This" to develop students' ability to generate, apply, and evaluate effective designed solutions. The workshop will also demonstrate how these strategies facilitate meaningful feedback and assessment in a PBL classroom. Through hands-on learning, interactive ICT collaboration, modelled examples and take-home resources, attendees will gain a deeper understanding of how to integrate the PBL Toolbox into their STEM classrooms.

By explicitly teaching these strategies, educators can enhance students' independence in solving STEM problems and foster a culture of continuous improvement.

2B

GAME DEVELOPMENT SUITE

STEM Arcade Game Jam

Anthony Gasson, Banyule Nillumbik Tech School, Melbourne Polytechnic

Attendees will take on the role of a game designer to create an 8-bit arcade-style videogame. You will learn about game mechanics and game structure, and come up with topic ideas for your own game and code it on a fun and easy-to-use coding platform called MakeCode Arcade. At the end of the program, you will have an opportunity to showcase your game and share it with other like-minded participants.

Never coded? No problem. The coding platform – MakeCode Arcade – uses a system of tool drawers and drag and drop blocks so users can quickly and easily learn game design in a free browser-based environment which is colourful and welcoming.

2C

GAME BREAKOUT SPACE

Rethinking STEM

Libby Moore, Moore Education Learning (Commercial and Primary & Secondary F-8)

The integration of Science, Technology, Engineering, the Arts and Maths - STEAM, gives students the opportunity to connect ideas, knowledge, and techniques, combining them in new and engaging ways. STEAM education encourages integrated teaching, helping students to think in a future-orientated, 'what-if' mindset, through innovation and problem-solving. The ability to critically and creatively think as well as solve problems is necessary to prepare our students for a rapidly evolving future. When a student can relate a concept to their own lives, they are more likely to be motivated to learn about it, and more likely to retain the knowledge. When teachers create classroom learning environments in which all students are engaged, challenged, and feel safe to take risks, learning is optimised. This hands-on workshop introduces delegates to the next generation LEGO robotics through the LEGO Education SPIKE portfolio and assists teachers of early to middle years students in progressive STEAM learning.

2D

~~ROOM TBD~~

~~**Speculative Pedagogy (a workshop for the future)**~~

~~**Henry Hartley**, Strathmore North Primary School (Primary & Secondary 3-9)~~

~~By 2028 every student will have an AI powered personal tutor working alongside them in the classroom. These virtual tutors will provide personalized teaching and learning in a way never before possible. This workshop invites you to imagine the challenges and possibilities that such technology can bring, and collectively develop a speculative pedagogy for this classroom of the future.~~

2E

WET LAB

Design thinking for beginners in the mathematics classroom

Jennifer Palisse, Monash Tech School (Primary & Secondary 3-10)

Design thinking is a human-centred problem-solving framework that emphasises collaboration and creativity to come up with solutions for messy problems. When used in the classroom, it offers a framework for facilitating collaborative pedagogies as well as a way to develop interpersonal and metacognitive skills.

In this session, we will explore some example design thinking tasks that could be used in the mathematics classroom, suitable at both primary and secondary. We will focus on the empathy and define stages of design thinking, as these can be the most challenging to achieve in the mathematics classroom. This workshop is intended for teachers who have no prior knowledge of design thinking and a brief introduction.

2F

SLS LAB 2

Connecting industry to the curriculum to improve STEM education

Shane Giese, St. Raphael's Primary School (Primary & Secondary F-12)

This workshop will explain why the curriculum (Victorian / Australian Curriculum) needs to be at the forefront in all industry partnerships and experiences, and how this resonates with educators of today. It will also outline what schools can do to get the best out of their curriculum, and get the support they need from industry partners to make their learning and teaching 'deeper' and in context. The session will outline how to connect the curriculum using a variety of models and ways of thinking, and use real life examples of how industry partners have improved education through PBL and STEM in a primary school in the northern suburbs of Melbourne.

2G

~~ROOM TBD~~

~~**Mission Control!**~~

~~**Jesse Chambers, Matt Coffey & Narelle Wood**, Science Gallery Melbourne (Secondary 7-12)~~

~~During this workshop, educators will gain insights into how Mission Control engages students in envisioning preferred futures. Through experiential activities, participants will explore how the workshop supports students' understanding of our parliamentary system and enables them to make critical choices regarding the skills and qualities required for a successful mission. Teachers will acquire practical tools and strategies to encourage students' creative problem-solving, collaboration, and strategic thinking. Part exhibition, part experiment – Science Gallery Melbourne (SGM) is a place for young people to explore interdisciplinary perspectives on the things that matter to them. Learning Experiences at SGM have partnered with Parliament of Victoria to deliver a scenario-based workshop, Mission Control, challenging students to imagine the future of the space industry and speculate on how we might set up planetary operations on distant worlds. In planning for their mission, students will mirror the parliamentary process to better understand how our democratic system works.~~

Session 3 Workshops

3A

QV THEATRE/GYM

Integrating coding, algorithmic thinking, problem solving & higher order thinking using drones!

David Feillafe & Anthony Simcox, Quantum Victoria & **Pathik Shah**, EE Group Australia (Primary & Secondary 4-10)

Discover how the integration of coding, algorithmic thinking, problem-solving, and higher-order thinking with drones provides a compelling and engaging hands-on learning experience for students. Drones offer a practical and interactive platform to explore various concepts in a real-world context.

This workshop provides you with an overview of how drones can enhance learning through: coding using Scratch or Python to perform tasks such as pre-defined flight paths; problem solving to identify and analyse problems related to drone flight, payload delivery or data collection; tackling complex tasks that require higher order thinking skills; the integration of interdisciplinary learning in science (collection of environmental data), mathematics (algorithmic thinking), and art/media (capture of aerial images and creation of videos).

By integrating coding, algorithmic thinking, problem-solving, and higher-order thinking with drones, you can create an immersive and dynamic learning experience that prepares students for the challenges of the future while nurturing their creativity and critical thinking abilities.

3B

GAME DEVELOPMENT SUITE

Industry and community connections to enhance STEM programs through design thinking, science inquiry and PBL

Vicki Henty, Fitzroy Primary School & **Robyn Cairns**, Karwan Primary School (Primary F-6)

Vicki Henty has successfully driven a collaborative project with her STEM classes working together with engineers from Fulton Hogan Utilities division (water works) to solve a real-life engineering problem. Students were proposed the problem of installing a third water tank at the Redfern catchment project to supply the water supply to Romsey township. Vicki will be sharing the successes of the Fulton Hogan Partnership and how design thinking and science inquiry were applied. Fitzroy Primary were successful in obtaining a Yarra City Council grant for an Urban Microbat Project to create microbat boxes for the school grounds. Both Vicki and Robyn will share STEM pedagogical approaches, curriculum links and the success of community partnerships to enhance STEM ED. Robyn Cairns will share some strategies for engaging community in science inquiry schoolwide at Karwan Primary school in its founding year and offer ways to network for opportunities in STEM ED.

3C

ROOM-TBD

Illuminating Futures

Ember Chittenden & Danie McKee, Bendigo Tech School (Primary & Secondary 5-10)

This hands-on workshop will provide thought-provoking discussion and opportunity to learn and impact the lives of children affected by energy poverty. This social STEAM Program will explore the intersection of sustainable energy and equitable access to resources, and emphasizes the critical role played by Solar Buddy - an organization committed to empowering disadvantaged communities through solar lighting solutions. Solar Buddy's innovative solar-powered lighting devices are not only environmentally friendly but also serve as a catalyst for social change. By providing access to clean and affordable energy, Solar Buddy enables marginalized communities to break free from the cycle of energy poverty and gain opportunities for education, safety, and economic development.

The benefits of social STEAM programs shine a light on the issue of energy poverty and inspire students to create a brighter future for those who lack safe and sustainable sources of energy.

3D

GAME BREAKOUT SPACE

Reimagining the Year 7-9 Science Curriculum with STEM

Emma Love, Marta Ivkov & Rebecca Hellweg, Blackburn High School (Secondary 7-9)

Designed specifically for science teachers working with students in Years 7 to 9, this workshop offers a comprehensive exploration of the seamless integration of STEM principles into the Science curriculum. We will delve into the journey staff at Blackburn High School undertook to make changes to their curriculum and give you practical strategies of how you could do this yourself. Through a combination of collaborative discussions and hands-on activities, you will gain strategies and resources that will empower you to rethink your own science curriculum.

3E

SLS LAB 2

Applications of Generative Artificial Intelligence in the Classroom

Anam Javed, Victorian Academy of Teaching and Leadership (Primary & Secondary 4-11)

Chat-GPT has taken the world by storm, and many say that despite being launched only 6 months ago, it is already outdated. In government schools, Chat-GPT was only rolled out for use in May 2023. What does the advent of generative artificial intelligence mean for teachers, students and the wider community? What are its potential uses, strengths and pitfalls? Join in as we navigate a range of AI tools and how best to leverage them to improve student engagement in the interdisciplinary classroom.

3F

WET LAB

3D Printing Applications in Science and Maths

Scott Mclean & Mahaelia Thavarajah, Quantum Victoria (Primary & Secondary 5-10)

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 workshop.

3G

ROOM-TBD

Effective pedagogy to develop interest in electronics through fun projects

Gita Pendharkar, RMIT University (Secondary 7-12)

Electronics is a vital part of our daily lives. Electronics deals with very low current and voltages and hence is becoming popular as the gadgets/systems are very low power devices and there is no risk of electrocution. This hands-on workshop focuses on the importance of electronic circuits which are widely used in a different areas TV, Computers, Microwave, Fan control, Smart Watches, Mobile Phones, etc. Delegates will learn to read and interpret a technical/electrical/electronic drawing and construct circuits using various electronic components such as resistors, capacitors, op-amplifiers, timers, LED's, etc. on a board, similar to those used in industry. Basic concepts on series and parallel circuits normally used for electrical lighting will be demonstrated through projects. Delegates can build interesting electronic projects using sound and light sensors using readily available boards and components in this workshop.

Session 4 Workshops

4A

SLS LAB 1

The Power of Failure!

Steven Scammell & Danh Nguyen, Sunshine College (Secondary 7-10)

An interactive session that takes participants through a scenario based challenge using the EDP (Engineering Design Process). This non-prescriptive approach to learning provides participants with a safe space to explore their ideas through trial and error. Prepare for setbacks and failures, as you collaborate with your teammates in order to meet the needs of the client within the time limit. Testing time allows participants the opportunity to reflect upon their efforts, as well as learn from the efforts of other groups, but know that failure does not conclude the challenge. Participants are then given the opportunity to improve upon their builds through the addition of resources, time or even constraints in some cases. Come celebrate the failures of all participants as all efforts are reflective of each participant's learning journey and the things they have learned from failing.

4B

WET LAB

Activating student agency in STEM inquiry

Duncan Goddard, Richard Bader & Stacy Jameison, GTAC (Primary & Secondary 4-8)

What will you discover as you use different microscopes to view everyday objects?

Zoom in on nature to investigate the structure and function of plants and insects to explore their adaptations for survival and reproduction. Zoom in on non-living objects to consider how biomimicry has led to the design of useful products in materials technology.

In this hands-on workshop, explore how the GTAC interactive STEM cycle of inquiry is designed to generate student curiosity and activate student agency by guiding students to carry out research in an area of personal interest. Our cycle of inquiry showcases pedagogies and thinking tools that can be used in your classroom by you and your students to generate questions, make predictions, plan and carry out research, and analyse and reflect on results. Explore variations of the gallery walk strategy to consider how your students can share their results and foster curiosity in their peers.

4C

GAME DEVELOPMENT SUITE

Educational Escape Rooms to captivate your learners

Robert Ross, La Trobe University (Primary & Secondary 4-11)

Educational Escape Rooms are highly engaging, team-based learning experiences where students work together to solve problems within a time-critical narrative. Educational escape rooms are a new frontier within game-based learning and are widely applicable across age groups and discipline domains. In this seminar we will map out what educational escape rooms are, how they can be used and a series of STEM based example puzzles for participants to stretch their minds on. We will also cover best practice for puzzle design, how to use the electronic decoder box, tips for making escape rooms run smoothly and the new frontiers we are looking towards for further research in educational escape rooms. Find out how you can integrate the next generation of educational escape rooms into your classroom and re-engage your students.

4D

GAME BREAKOUT SPACE

Sparking Ideas: Building connections in STEM Education

Erin Wilson, VCAA (Primary & Secondary F-12)

The F-10 Victorian Curriculum is being revised for implementation from 2024. What is the relationship between the Australian Curriculum V9 and the Victorian Curriculum 2.0? What are the curriculum issues that need to be resolved in providing a smooth transition for students as they navigate their own educational pathways? Where does STEM fit in at F-10? How can we make better connections between primary years and secondary years, and between F-10 and VCE? What resources are available for schools? This session will provide an overview of the current Victorian education landscape, with a specific focus on STEM.

4E

SLS LAB 2

Team Rocket Blasting off Again - Primary Inquiry starring science and explosions on a budget!

Paul Taylor & Craig Bradley, Rolling Hills Primary School (Primary 3-6)

Participants will learn about the inquiry approach at RHPS to leverage student creativity through the exploration of science and technology. Students are supported to develop a can-do attitude through hands-on learning, engaging in prototyping, sometimes explosive failure, and resilience. No matter the direction of student interest, there's always a path for learning filled with questioning, intrigue, and successes. You'll learn how to safely build and use an air-powered launcher, where the sky is the limit.

4F

ROOM TBD

Choices: The Path to Net Zero - How to Make the Energy Transition

Glen Nash & Rod Boucher, TESEP (Commercial & Secondary 9-12)

Energy has a transformational impact on the quality of human life. It impacts every facet of what we do and how we live, making energy one of the most important issues of our time. We require nothing short of a complete transformation of how we produce, transport and consume energy. However, energy, the environment and the economy are intimately linked and the four pillars of energy security (i.e., affordability, availability, reliability and sustainability) must be maintained.

This topic challenges how we plan the way forward, how each country may view the Energy Transformation differently or at a different timescale - Choices are discussed and related to secondary teaching syllabi.

4G

ROOM TBD

Pivoting a Hard Fork in an Innovative STEM Curriculum

Lachlan Zubevich, Serpell Primary School (Primary F-6)

After years of lockdown, our school sought to refresh its STEM offerings and develop a clear, consistent scope and sequence that provided all of our students with the opportunity to flourish by working across year levels, and reaching out to the community, discover how we pivoted from the pre-covid world to thrive in the age of global uncertainty.

Conference Venue

Quantum Victoria
235 Kingsbury Drive, Macleod West
Victoria, Australia, 3085
[Google Maps](#)

Contact Details
Phone: 03 9223 1460
Email: admin@quantumvictoria.vic.edu.au
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 CHARLES LA TROBE COLLEGE & QUANTUM VICTORIA car park. Please park in non designated parking bays.

Registration

Register [here](#) or scan the QR Code



Conference Cost

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|----------------------------|--|
| Primary/Secondary Teachers | \$260.00 (Inc.GST) for the first teacher |
| Additional Teacher | \$135.00 (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 by Friday, 10th November 2023 for a full refund. Cancellation after this date will incur the full attendance cost. Registrations accepted up until Friday, 17th November 2023.

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.

