It Takes a Spark!

grok academy STEM Conference

Friday, 17 November 2023 | VIC

Theme: Multiverse of STEM

The 2023 conference is to highlight the multidisciplinary nature of STEM, that everybody is capable of being a STEM learner, and the wide range of possibilities and entry points available for everyone. STEM includes the parallel and intersecting worlds of sustainability, inclusion, creativity, design, science, arts, health, equity, nature, the environment, technology, entrepreneurship, and much more.

Teacher PD workshops from leading STEM experts, teachers and students on topics as diverse as

>> First Steps to designing a well-planned STEM program
>> Evaluating Possible, Probable and Preferable Futures Using Science Fiction
>> Inspiring STEAM through problem solving challenges
>> Using AI tools - the good, the bad and the ugly
>> Using Design Thinking to create or enhance your school's STEM program
>> Developing climate change problem solvers
>> Teacher Networking and STEM Pathways session

Hands-on sessions for students and teachers, examples...

>> Railway Signalling with Puffing Billy
>> High Powered Paper Rockets
>> Gears in motion!
>> Detecting the Unseen: Dark Matter
>> Designing for Disability
>> STEM to STEAM: When art and science unite!
>> LEGO Algorithmics
>> IS the beach really as clean as it looks?
>> Man or Machine: How does Artificial Intelligence work?
>> Create a Chase Game using Scratch
>> A Bug's Life!
>> STEM EXPO activities
  >> How can visual art communicate data?
  >> Invent Your World
  >> Grok Academy @ the STEM Expo
  >> AUS STEM Video Game Challenge
  >> Volcanic Vista - Drone Mission

Problem Solver sessions: design challenges taking students and teachers through the design process including...

>> Creativity in Indigenous STEM
>> What Does Learning Sound Like? Optimising acoustics for educational environments
>> Space Design: Humans on the Moon
>> Strange Devices
>> Rover rangers: Let's Explore Our Moon!
>> Sustainably powered vehicles
>> Future of Food

...read on for full programme

Outstanding Keynote Speakers

DR ELAHE ABDI

Department of Mechanical, Aerospace and Mechatronics Engineering Monash University
Superstar of STEM

Dr Elahe Abdi is a Senior Lecturer at the Department of Mechanical and Aerospace Engineering, Monash University. She is the Director of Robotics in Medicine and Interaction Laboratory and the Robotics Education Liaison Representative at the Australian Robotics and Automation Association.
Dr Abdi received her PhD in Robotics in 2017, from EPFL, Switzerland. She then moved to Australia to establish her research team active in human-robot interaction, shared autonomy and haptic, with application in medicine, construction and service robotics. Elahe has received numerous recognitions for her leadership and efforts for encouraging diversity in Engineering, including being selected as a Finalist for the Women's Agenda Award "Emerging Leader in STEM" in 2021, and Women Leading Tech Award Education/Research in 2023. Most recently, she was named as one of Science and Technology Australia's Superstars of STEM 2023.

PAULA WASIAK

Senior Research Officer
Phillip Island Nature Parks
Superstar of STEM

They may be the clowns of the animal kingdom but Little penguins are so much more. Fierce apex predators, long distance endurance swimmers, and a key indicator of ocean health. Paula's mission is to make you fall in love with them – and inspire you to protect our coastal environments in the process.
Paula began her journey researching penguins in 2007 and has been found covered in penguin poop and elbow deep in burrows ever since. She coordinates and conducts Little penguin field research for the Phillip Island Nature Parks, supporting projects aimed at future-proofing Little penguins and unlocking the mysteries of the oceans.
Paula loves sharing her knowledge and has a passion for sharing nature stories with broader audiences, mixing in the serious science with funny anecdotes. You may have seen her doing just that on the ABC documentary Meet the Penguins, or you can hear her regularly on ABC Radio National.

PROGRAMME: spark-educonferences.com.au/victoria-2023/

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Host School

JOHN PAUL COLLEGE
with Him is the fullness of life

Conference Coordinator

Intuyu Consulting | Empowering 21st Century Learning

Teacher Mini Masterclass: Practical Professional Development

First Steps to designing a well-planned STEM program

Dr Adrian Bertolini - Intuyu Consulting / Spark STEM Conferences

Schools often begin enacting STEM by introducing STEM clubs or activities at lunchtime or after school, having STEM specialist subjects and maker spaces, or even participating in STEM competitions. These approaches are all great ways to begin laying the groundwork for a sustainable STEM program. The challenge for many schools will be moving STEM from these groundwork laying activities to an authentic STEM program that delivers the desired outcomes. In this session Adrian will outline the thinking and planning that primary and secondary schools will need to do if they are going to design a whole school STEM program that delivers. This includes discussing creating a design brief for a STEM program, mindset and capabilities planning, learning ladders, and curriculum mapping approaches. Templates for planning will be provided.

Suitable for Primary Teachers

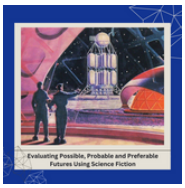
Using AI tools - the good, the bad and the ugly

Grok Academy

AI tools are increasingly making themselves known in education. Grammarly, Co-pilot, GPT3 are now being used by students. How can teachers use it to make learning more meaningful and support their students to navigate this space? How can teachers be equipped to navigate this fast changing landscape? Join us as we demonstrate how AI tools can be used effectively in teaching and learning and discuss the potential pitfalls and how to avoid them.

Suitable for Primary & Secondary Teachers - BYO Laptop

Evaluating Possible, Probable and Preferable Futures Using Science Fiction



Jordan Michael, Richmond High School

Science fiction films present several socially relevant (and sometimes controversial) real-world problems that are based in science (e.g. AI, genetic engineering, climate change). This teacher mini-masterclass will present a learning sequence that scaffolds students in identifying important science-related social issues from films. They then identify key trends and analyse key drivers in the modern world that relate to their chosen issue. Students then use this information to judge whether the sci-fi future is possible and/or probable. Through exploring ethical frameworks, students must then consider whether this future is preferable and, if not, what might be. This is a great session that shows how teachers can blend science, English and the general capabilities.

Suitable for Secondary Teachers

Inspiring STEAM through problem solving challenges

Wendy Keen, Melbourne Girls' College

There are so many fantastic problem solving challenges and events available to primary and secondary students. They range from app making, to robotics to biomechanics and cybersecurity. Through challenges and events students have the opportunity to apply key STEM skills to real life problems and build their confidence, team working and communication skills.

In this teacher masterclass, MGC will present some accessible problem solving challenges that they have been involved in, how they have addressed student learning and growth, and the difference they have made for the students. Attending teachers will also have the opportunity to share about their own experiences and the lessons they have learned.

Suitable for Secondary Teachers

Using Design Thinking to create or enhance your school's STEM program

Stephanie Pollard, Malvern Valley Primary School

When students learn and internalise design thinking at the start of a STEM program it makes a huge difference to their ability to problem solve, think critically and deliver extraordinary outcomes.

In this hands-on teacher workshop you will experience working through the Design Thinking model (empathise, define, ideate, prototype and test) to design a toy or gadget for someone who is moving to Mars. The workshop will demonstrate how you can plan an engaging, authentic STEM program that will foster your student's natural curiosity whilst building their critical and creative thinking skills.

Suitable for Primary and Lower Secondary Teachers

Developing climate change problem solvers

Pathik Shah, Pakronics

Climate scientists have shown that humans are responsible for virtually all global heating over the last 200 years. While there are global frameworks such as the United Nations (UN) Sustainable Development goals, students and teachers need to be able to engage authentically with them so they experience being empowered so that they can make a difference.

In this teacher session, you will experience how teachers can use the Micro:bit to support students to gain practical skills, problem solve, develop innovative solutions while actively contributing to solving sustainability goals. This approach empowers students to become environmentally conscious individuals who can make a positive impact on our planet's future

Suitable for Primary & Lower Secondary Teachers

DigiDesign Mini-workshops - Teacher and/or Student

STEM to STEAM: When art and science unite!

Thomastown Secondary College

In 2022, TSC Year 11 Chemistry students and Visual Communication and Design students teamed up to create a new periodic table display for the science building. Working together taught us the importance of art and design principles in creating effective science communication that inspires curiosity and drives further learning. We have distilled our key takeaways into a workshop full of tools to help teachers and students create similar multidisciplinary projects in their own schools. In this workshop you will work in collaborative groups on a demonstration project, creating collage posters that illustrate the classes of animals. Your group will leave with a handmade poster and a handout of resources to show how beautifully design can give us new perspectives on science!

Suitable for Year 7 to 10 students and/or teacher

LEGO Algorithmics

Grok Academy

An algorithm is a procedure or a list of step by step instructions that can be used to solve a problem or deliver a particular outcome. When creating STEM solutions it is vital that you are able to accurately communicate your ideas and the actions you want to be taken by others. In this workshop you will be introduced to the ideas of problem decomposition and accurate documentation. You will have the opportunity to build a small LEGO 'thing' and then attempt to document how another person would build the same 'thing'.

Suitable for Year 4 to 6 students and/or teacher

Railway Signalling with Puffing Billy

Peta Howard, Puffing Billy Railway

Safety is critical at Puffing Billy and one of the most important pieces of equipment to keep our passengers safe is our signalling system that allows the train to move along different parts of the line and stop people and trains moving along the track when it isn't safe.
In this workshop you will be faced with a real world STEAM challenge at Puffing Billy Railway. As designers you are going to use design thinking to come up with innovative ideas and create a prototype to help solve this problem. You will need to rely on teamwork and communication to complete this task and create a design as a team.
Suitable for Year 4 to 6 students and/or teacher

High Powered Paper Rockets

Monash High Powered Rocketry

The use of rockets dates back to at least 13th century China but significant scientific, interplanetary and industrial use did not occur until the 20th century with the advent of the Space age. We are again entering an exciting period of rocketry with space missions and rocket launches planned by many countries. In this exciting workshop the student team from Monash High Powered Rocketry will not only share with you what they are working on but give you the opportunity to construct paper rockets to launch outside using their air cannon. You will learn the strategic design choices that need to be made when building a rocket plus how important creative decoration is to make it look good! Are you ready to be a high powered rocketeer?
Suitable for Year 4 to 6 students and/or teacher

Man or Machine: How does Artificial Intelligence work?

Grok Academy

Is ChatGPT actually sentient? How can Scribble Diffusion turn your sketch into a realistic photo?
Join us as we lift the lid on how Artificial Intelligence works and decide for yourself what opportunities there are for how we use it in the future and where there is still room for growth.

Suitable for Year 5 to 8 students and/or teacher

Detecting the Unseen: Dark Matter

ARC Centre of Excellence for Dark Matter Particle Physics

Dark Matter is the mysterious material that scientists think makes up over 80% of our Universe but has not yet been directly detected. Australia is at the forefront of Dark Matter research. The Southern Hemisphere's first Dark Matter direct detection lab was built in regional Victoria and began operating in 2021! The science of dark matter involves everything from the largest structures in the Universe to the smallest known particles that make up the atom.
In this session, students and teachers will be guided through activities to understand how scientists learn about the 'invisible' with clues from the cosmos and to understand how scientific discoveries are building our understanding of matter in the universe. Teachers will receive lesson plans to bring these activities back to their classrooms.
Suitable for Year 7 to 10 students and/or teacher

Designing For Disability

Adam Oldmeadow, Akorn Education

Disability directly affects more than 4.4 million people in Australia, and indirectly affects us all!
Did you know that you can use your STEM skills to generate ideas and develop assistive/enabling technologies that overcome environmental and societal barriers to living a healthy and happy life?
In this workshop you will discover how!

Suitable for Year 5 to 10 students and/or teacher

LEGO Algorithmics

Grok Academy

An algorithm is a procedure or a list of step by step instructions that can be used to solve a problem or deliver a particular outcome. When creating STEM solutions it is vital that you are able to accurately communicate your ideas and the actions you want to be taken by others. In this workshop you will be introduced to the ideas of problem decomposition and accurate documentation. You will have the opportunity to build a small LEGO 'thing' and then attempt to document how another person would build the same 'thing'.

Suitable for Year 4 to 6 students and/or teacher

Is the beach really as clean as it looks – Primary?

Dolphin Research Institute

Ever wondered how we reduce the litter in our environment? One way is to do a litter audit at the beach and try and identify the source of that litter. It's not always obvious so we will show you, with our sandbox activity, how litter is everywhere and hard to identify but once we do, we can start to work out how to reduce litter from the source!

Suitable for Year 4 to 6 students and/or teacher

Is the beach really as clean as it looks – Secondary?

Dolphin Research Institute

Ever wondered how we reduce the litter in our environment? One way is to do a litter audit at the beach and try and identify the source of that litter. It's not always obvious so we will show you, with our sandbox activity, how litter is everywhere and hard to identify but once we do, we can start to work out how to reduce litter from the source!

Suitable for Year 7 to 10 students and/or teacher

Create a Chase Game using Scratch!

Students from Malvern Valley Primary School

Playing video games is so much fun! But, did you know that coding your own game is easy too?
In this workshop you will learn to create your very own Chase Game using block code. You will learn to use motion blocks to program your sprite (characters) to move, add variables and controls to create a scoring system. Experiment with using sound and look blocks to engage other players whilst working through the design thinking cycle. Teachers – come and find out how we learnt how to do this ourselves!
Suitable for Year 4 to 6 students and/or teacher

A Bug's Life!

Rowellyn Park Primary

Did you know we need bugs? Without bugs to help break down and dispose of wastes, dead animals and plants would accumulate in our environment and it would be messy indeed. Bugs are the sole food source for many amphibians, reptiles, birds, and mammals.
In this workshop you will learn to use TinkerCAD to design a 3D bug house. Encourage the bugs you want to your garden, or perhaps you want to direct them away from where you DON'T want them. Research the bug of your choice to discover their needs and wants. What will you include in your bug house to attract them? Use the Design Thinking Process to ask, plan, create, test and improve a bug house.
Suitable for Year 5 to 7 students and/or teacher

Gears in motion!

Nash Naidoo, STEMed Kits

One of the ways we first learn how to problem solve and critically think is by building stuff. Whether it is wooden blocks, Lego, Meccano or our STEM education kits, we all go through some design thinking process in order to build the desired product.
In this workshop you will learn about forces, motion and gears from first principles as you build a Trike. Teachers will discover how simple kits such as these can support the delivery of STEM and the Australian curriculum in classes.

Suitable for Year 5 to 7 students and/or teacher

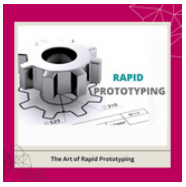
Good Design / Bad Design

Sid Verma, BrainSTEM

Design Thinking is an approach to creative problem-solving that aims to bring together what is desirable from a human point of view, with what is technologically feasible and economically viable.
In this session you will tackle a design challenge through the lenses of good design and bad design. This is a fabulous way to understand how to design well!

Suitable for Year 7 to 10 students and/or teacher

The Art of Rapid Prototyping



Kristen Hebden, Swinburne University of Technology

Prototyping doesn't have to take a lot of time or expensive materials. Rapid prototyping is a great way to learn if your ideas will work, how to improve them, and if it is worth putting more time in. During this workshop attendees will use simple materials to create moving contraptions. Materials include:

- Straws to reduce friction
- Bendable wire to make cranks
- Wooden skewers to make axles
- Cardboard for housing and other parts
- Pipe cleaners and googly eyes (because everything is better with googly eyes)

Suitable for Year 4 to 10 students and/or teacher

Future of Fashion

Academy for Enterprising Girls

Globally, the fashion industry is worth over $1 trillion. It's an exciting industry creating products that allow people to express themselves, help stay warm (or cool) and stay safe at work or doing the things they love! It also provides countless jobs across the world. However, it's also an industry that creates a lot of waste and is under the spotlight for exploiting workers.
In this workshop you will participate in a design thinking challenge that empowers you to explore the fashion industry using lenses such as sustainability, role of technology and making fashion inclusive for all. You will identify problems, brainstorm possible solutions and make a 2 min pitch about your solution!
Suitable for Year 7 to 10 students and/or teacher

STEM Expo: hands-on activity area - Student and / or Teacher (selected as one workshop, activities may not run in both rotations)

The STEAM Journey at Puffing Billy

Peta Howard, Puffing Billy Railway

The early railway systems are clear demonstrations of how the things you learn in school are used in real world applications. Come and learn about how concepts such as energy, force and motion, past and present, design and technology and biodiversity are part of the Puffing Billy Railway multiverse and even have a go to build a signal tower using Lego and Meccano!
Suitable for Year 4 to 6

How can visual art communicate data?

Birgit Verhagen, The Knox School

Whilst there has never been a greater weight of information and statistics searchable to the general public, there has also never been more disinformation, distortion or distraction. How can the real facts cut through the noise?
In this expo you will see how Knox school students have explored how data visualisation can be used to convey important, complex information in a creative way. They have used strategies from art and design disciplines to translate statistics into engaging works that represent the information gathered. Students will present their findings through a brief presentation with some examples of their exploratory works. **Suitable for Year 7 to 10**

Follow the Water

Frankston Primary School

Water, and specifically liquid water, is so important to planetary life that few scientists entertain the possibility of life existing on our world or other worlds without it. The search for extra-terrestrial life by organisations like NASA often boils down to one simple strategy: "follow the water".
In this Expo activity the students from Frankston Primary will showcase the water cycle in action. There will be two activities that will allow you to observe evaporation, condensation and precipitation whilst developing a better understanding of the process that underpins this cycle. **Suitable for Year 4 to 6**

Volcanic Vista - Drone Mission

Pakronics

Drones are used for a wide range of activities including; search and rescue, surveillance, traffic monitoring, firefighting, photography and videography, organisations such as energy companies, agriculture and mines and scientists such as volcanologists.
In this STEAM Expo activity you will have an opportunity to record the highest CO2 data spike over an active 'volcano'. What variables do you think will impact the data reading? Height above the volcano? Hover control? Elapsed time from the activation? Good luck pilots and data scientists!
Suitable for Year 4 to 10

Grok Academy @ the STEM Expo

Grok Academy

How do we secure information on the internet?
What information is safe to share online?
How do computer programs work?
Discover the answers to these questions and more by participating in a range of short unplugged activities running across the day:

- Cybersecurity Cards: sort through cards about various personal information and determine if it is safe to share online or not
- Cryptography: use different cyphers to encrypt and decrypt messages to understand the importance of encryption
- Decision Trees: classify animals using a decision tree
- Algorithmic Treasure Hunt: complete the activities to find the prize!

Suitable for Year 4 to 10

Indigenous Creativity

Dr Tim Patston, Creative Actions

For at least 60,000 years our First Nations People have been using social, medical, ecological and STEM creativity to solve problems. It was their creativity and adaptability that enabled them to flourish throughout the Australian continent for millennia.
In this Expo you will explore 5 open-ended Indigenous STEM examples which will spark you to consider how and why Indigenous Australians solved STEM problems in a certain way. **Suitable for Year 5 to 10**

Australian STEM Video Game Challenge

Australian Council for Educational Research

The Australian STEM Video Game Challenge (STEM VGC) is a free national video game development competition for students in Years 4 to 12. It is a fun challenge that aims to engage more students in STEM and enable them to develop real world skills required to succeed in work and life.
This workshop will showcase the 2022 winning entries and demonstrate how schools can participate in the Challenge in 2024. **Suitable for Year 4 to 10**

Stick Insects

Harrisfield Primary School

Successful agriculture depends on growers knowing not only a plant's life cycle, but the life cycle of insect pests common to their crop. Knowing the life cycle of insects allows growers to control it at the most vulnerable point in the cycle, or possibly avoid it altogether. In this Expo activity, you will have an opportunity to hold a stick insect and see all the stages of the life cycle from egg, nymph to adult. Stick insects are very large for an insect and this allows you to see their delicate features and understand how they adapt to their environment. Even better – they make great pets for the classroom!
Suitable for Year 4 to 6

STEM Expo: hands-on activity area - Student and / or Teacher (selected as one workshop, activities may not run in both rotations)

Invent Your World
MakerDojo
STEAM is much more than the disciplines captured in the acronym. It is about developing depth of thinking and applying understanding to real world challenges so that learners become flexible and agile problem solvers.
Discover how to engage learners with hands-on STEAM activities ranging from cardboard arcade games and floor pianos to 3D holographs and fidget toys. These activities will demonstrate and explore how to excite, engage, and extend the creativity and knowledge of all learners whilst developing transferable skills.
Suitable for Year 4 to 6

Get STEMed!
Nash Naidoo, STEMed Kits
What happens when Engineers, Designers and Teachers come together? You get a family who has collaborated, rethought, planned and delivered STEM products that better prepare our 21st century problem-solvers and entrepreneurs from a young age! Come along and find out about how our curriculum aligned kits and lesson plans can support young people to move fluidly between the disciplines of Science, Technology, Engineering, Art and Mathematics while maintaining their natural inquisitiveness! **Suitable for Year 5 to 8**

Edunet Learning Showcase
Edunet is a leading provider of ICT consultancy within public, catholic and private schools to enhance classroom outcomes through the right technology solutions. Visit our interactive stand to discover how Promethean interactive boards and displays can be used in the classroom, find out the options we can provide around Chromebooks and other BYOD devices, and have a play with a range of VR activities!
Suitable for Year 4 to 10

Seed Paper
CERES
The first seed bearing plants started appearing around 400 million years ago! A seed, though not active, is a tiny living thing. It contains the embryo of the future plant, which is dormant.
In this engaging hands-on expo activity run by CERES you will explore science and nature, learning about plant life cycles, biodiversity, and the importance of pollinators. Take home some seed paper you can plant in your garden or at the school! **Suitable for Year 4 to 10**

Structural blocks - open ended STEM Play explorations
Green Hat Workshop
Curiosity and play is the cornerstone of developing flexible, adaptable and lifelong learners. Using 1,000s of rectangular prism wooden blocks, Green Hat Workshop will support and encourage a playful & creative environment, rife with opportunities, not just for iterative and collaborative engineering, design problem solving and physics experimentation but also for social and interpersonal skills, resilience, negotiation and compromise. **Suitable for Year 4 to 10**

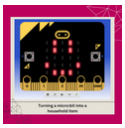
Blast off. Look out below!
ARC Centre of Excellence for Future Low-Energy Electronics Technologies (FLEET), Monash University
Energy exists in many different forms such as light energy, heat energy, mechanical energy, gravitational energy, electrical energy, sound energy, chemical energy, nuclear or atomic energy and so on. Although there are many specific types of energy, the two major forms are kinetic energy and potential energy.
In this high energy and deep-thinking Expo you will explore the conversion of potential energy to kinetic energy, as well as forces and motion, by building and modifying catapults and then testing them out. Can you make the most powerful catapult? **Suitable for Year 4 to 6**

Augmented Reality Live
Worley
Augmented Reality (AR) software allows 3D visualization, collaboration, and field to office communication across all stages of construction, such as design review, facility management, and more. Utilizing augmented live technology, engineers are now able to visit the site and experience their design in the field virtually.
Communication and collaboration in virtual environments have the power to significantly reduce emissions within all facets of business operation. Now, more than ever, it is vital that businesses choose to actively work towards improving their environmental footprint and for Worley specifically to strive to deliver a more sustainable world. **Suitable for Year 4 to 10**

Remida resources and STEM exploration
Reverse Art Truck
A Remida repurposes unwanted materials into education settings, enabling access to an abundance and variety of inexpensive materials. Many exciting, open-ended STEM explorations begin with a prompt and are supported by a wide range of cheap materials that lend themselves to creative experimentation and iterative problem solving.
Come along to the Reverse Art Truck 'making table', learn about Remida and create products using the prompts of 'vehicles that go', 'rolling ramp play', wacky instruments, or simply enjoy STEM inspired open ended making! **Suitable for Year 4 to 7**

Pat's Robots
Patrick McMahon
Pat is a certified legend in the educational Technology space. After 50 years of teaching in the Victorian Dept of Education he retired but continues to design, build and create educational materials for schools using Arduinos, Picaxe and homemade devices.
In this Expo you will have the opportunity to view and play with various STEAM activities controlled with Arduino Microcontrollers. These include Marble Runs, Scrolling LED Message Board, Light Towers and various 4WD Robots controlled with Infrared Remotes and Bluetooth Apps on a mobile phone. Discover how you can create your own solutions for the challenges you face. **Suitable for Year 4 to 10**

Data Analysis & AI Technology
Elastik
Elastik is a revolutionary new platform that empowers teachers to pinpoint and address unidentified gaps in their students' learning in Maths, English and Science. It saves time by reducing the administrative burden, freeing teachers to do what they do best: stretch children to help them thrive.
In this Expo activity we will demonstrate Elastik's ability to analyse multiple curriculum linked data sets to instantly pinpoint gaps in learning to inform planning & teaching. We will also demonstrate how Elastik is leading the way in AI technology through its writing assessment tool, Writemark. **Suitable for Year 4 to 10**



Turning a micro:bit into a household item
John Paul College
Have you ever wanted a multi-purpose instrument that can help you in the kitchen, garden, as home security and much more? The BBC micro:bit is a cheap pocket-sized computer that is jam packed with input and output possibilities; these engaging devices can be used to create lots of household devices that will make your life easier!
Come along and play with working micro:bits and explore the code that powers them. The micro:bits on display will all showcase practical STEM solutions. Great for all skill levels, from beginners to code up to serious game developers and electrical engineers.
Suitable for Year 4 to 10

Problem Solvers Design Challenge - Student and Teacher

Each session has a different real life design or STEAM challenge to solve aimed at Year 4 to 10 students. You will be posed with a real life design challenge and lead through the design process to ideate and present possible solutions.

Creativity in Indigenous STEM
Dr Tim Patston, Creative Actions
For at least 65,000 years First Nations peoples have been creative problem solvers, particularly in STEM. From Indigenous astronomy to chemistry, maths, medicine and physics, First Nations peoples were the world's first scientists.
This workshop offers teachers and students the opportunity to explore Indigenous creativity in STEM through a range of practical activities. You will be given background information regarding an element of Indigenous STEM and have the opportunity to
·develop your own lesson plan if you are a teacher
·create an Indigenous product if you are a student
Come and learn about the amazing world of Indigenous science and creativity
Suitable for Year 5 to 10 students and teachers

Crash Course in Micro:Bit
Grok Academy
Micro:bits are a great introduction to physical computing. This problem solver session introduces you to the BBC micro:bit and how to program it. You will learn about inputs and outputs and use basic programming skills to solve a variety of different challenges such as making a dice game!

Suitable for Year 4 to 6 students and teachers

Earthquake Proof Structure
Jacqui Ross, John Paul College
Have you ever felt an earth tremor and wondered if you are safe inside a building? Structural Engineers design buildings to withstand the pressures and stresses of their environment such as gravity loads, storms and earthquakes.
In this fun STEM challenge, you will need to build a structure that can withstand earthquakes. You will learn about making things sturdy, choosing strong materials, and designing to keep buildings safe during quakes. You will need to design a three-storey structure that can withstand a 30 second earthquake.
Suitable for Year 4 to 6 students and teachers

Space Design: Humans on the Moon
Emilie Nachtigall, Scienceworks/Museums Victoria
Space travel is difficult. There are many challenges to overcome as humans venture further in space. One of these includes moon habitation. In this Design Sprint you will encounter the physical environment of the moonscape, the resource limitations, and the psychological and sensory difficulties humans will face. You will be challenged to draw on space knowledge to overcome the challenges of intergalactic space travel.
Suitable for Year 4 to 8 students and teachers

Future of Food

Cat Kitney, Young Change Agents

According to the UN, over 800 million people suffer from hunger worldwide, and food systems are responsible for 21-37% of global greenhouse gas emissions. To address this situation responsibly it is essential that you, as a young person, be part of creating innovative and sustainable solutions for the future.

In this problem solver session run you will explore themes such as

- How might we encourage and provide more healthy food options for young people to thrive?
- How might we ensure stable access to sufficient nutritious food for our future?
- How might we improve post-consumption practices to be more thoughtful and sustainable?
- How might we integrate culture and traditional practices into our food systems to develop more spiritually connected consumption?
- How might we increase food innovation in regional and rural Australia to engage and support local communities?
- How might we utilise agritech to improve the quality and safety of our food while ensuring physical, social and economic access?

Be part of the solution!

Suitable for Year 7 to 10 students and teachers

What Does Learning Sound Like? Optimising acoustics for educational environments

Matthew Ottley - Marshall Day Acoustics and Fiona Young - Hayball Architects

When we walk into a classroom it is rare that we think about how the acoustics affect our ability to learn - unless of course the acoustics are awful! Yet the design of the physical spaces and their acoustics can make a profound difference to creating a more collaborative and creative learning environment.

In this problem solver session, you will view your learning environments through sound. Working together with an architect and an acoustic consultant, you will consider the impact of acoustics on the types of learning and settings that create an engaging learning environment. This hands-on session will merge maths and design in the exploration of reverberation and sound absorption as you work together to improve your learning environments.

Suitable for Year 7 to 10 students and teachers

Become a disease detective- solve an outbreak!

Rladies-Melbourne

A mysterious disease is causing people to fall ill at your school. What are the common characteristics of the people that are ill (e.g. did they all eat the same thing)? What are the common symptoms of infected people? How can we stop the epidemic before it spreads throughout the whole school and beyond?

In this session you will learn about epidemiology and how medical teams use data to pinpoint the causes of a disease and come up with solutions to stop outbreaks. You will cover key concepts such as 'what is an outbreak' and 'what do epidemiologists do', as well as exploring concepts such as data visualisation and the importance of clear science communication.

Suitable for Year 7 to 10 students and teachers

Strange Devices

Casey Tech School

In the vast spectrum of human innovation, there exists a delightful niche of inventions that straddle the line between absurdity and genius: Chindogu. However, unlike conventional inventions that solve problems in an efficient manner, Chindogu offers solutions that often create more problems or inconveniences than they purport to resolve.

In this workshop you will be guided through the process of creating and evaluating your own Strange Devices that are (almost) completely useless.

Suitable for Year 6 to 10 students and teachers

Sustainably powered vehicles

John Paul College

As humanity works towards minimizing fossil fuel energy usage it is critically important that we, the designers, scientists and engineers of the future, come to understand the factors at play in creating sustainably powered vehicles.

In this workshop you will have the opportunity to work in small groups to create and test model cars with different power sources such as wind, solar and propeller. The structure, weight distribution and aerodynamics of the car are vitally important to the success and distance the car will be able to travel. You will have the opportunity to evaluate your designs and, using the design process, improve them!

Suitable for Year 6 to 9 students and teachers

Rover rangers: Let's Explore Our Moon!

Swinburne Youth Space Innovation Challenge

Australia has committed to working with NASA to provide a rover for the lunar surface. The lunar rover has jobs such as collecting moon surface samples, drilling into the Moon's Crust, taking images inside craters, and delivering materials to astronauts out in the field. The challenge of making a lunar rover is the moon's surface temperature can span from 123 degrees Celsius to -233 degrees Celsius.

In this problem solver session you will be introduced to the challenges of making something for a moon mission and then work in teams of 4 to design a lunar rover.

Suitable for Year 4 to 10 students and teachers

The Ideas Challenge

Sid Verma, BrainSTEM

"A good idea doesn't care who it belongs to", Plynn Williams

To solve the challenges that we face now and into the future we need to be great idea creators and action takers. In this design thinking workshop you will team up with attendees from across a range of schools to tackle community challenges in health, safety, and infrastructure using LEGO as your design tool. Learn problem-solving and critical thinking from experts and make a real impact!"

Suitable for Year 6 to 10 students and teachers

Building a socially responsible digital future

ARC Centre of Excellence for Future Low-Energy Electronics Technologies (FLEET), Monash University

The demand for computation is increasing 70% each year. Digital technologies (tech with a computer chip) use 10% of the world's energy, a figure that is doubling every decade. If this continues we will run out of energy – we will not be able to generate enough to meet the demands from digital technologies – no matter how many wind turbines, solar panels or nuclear/coal-fired power plants we build.

You will participate in a role-playing activity to work through the problem and identify and debate different pathways to achieve a socially responsible digital future.

Suitable for Year 6 to 10 students and teachers

A Porpoiseful Problem

Dr Sue Mason, Cetacean Science Connections

Cetaceans (whales, dolphins, and porpoises) are what marine scientists describe as cryptic. Being cryptic, they are hard to find, which of course makes them even harder to study.

In this problem solver session, you will be introduced to some of the challenges of working with and studying wild dolphins. Importantly, this STEM session poses a real-life question often asked by wildlife managers and marine scientists … exactly how do we work out how many dolphins reside in our local bay, Port Phillip?

Suitable for Year 4 to 10 students and teachers

Friday, 17 November 2023

Begins: 8.45am

Concludes: 2.45pm

(Doors open for sign-in 8.15am)

Venue: John Paul College

161 McMahons Rd

Frankston VIC 3199

includes Morning tea and Lunch

Flow of the day....

*Listed program is subject to change

8.15am	Sign-in, coffee and networking
8.45am	Master of Ceremonies - Welcome, set up for the day and housekeeping
9.00am	**KEYNOTE SPEAKER: DR ELAHE ABDI** Department of Mechanical, Aerospace and Mechatronics Engineering Monash University and Superstar of STEM
9.40am	**ROTATION ONE - 40 min parallel sessions** >> Teacher Mini-Master Classes >> Student and/or Teacher DigiDesign Mini-workshops and STEM Expo
10.25am	**MORNING TEA -** An opportunity to network with other teachers and students, and explore EXPO
11.00am	**PROBLEM SOLVERS DESIGN CHALLENGE** >> 80 min session - parallel sessions aimed at Year 4 to 10 students and teachers. This session is an opportunity for universities, industry, schools or community organizations' to pose real life design challenges and lead students through the design process to ideate and present possible solutions. **TEACHER ALTERNATE SESSIONS**
11.00am	>> 40 min Teacher Networking STEM Pathways session: Opportunity to connect with other teachers and presenters to share ideas, possibilities and practices
11.40am	>> 40 min STEM Pathways session: Opportunity to meet with the sponsors in the STEM EXPO area to discuss (without students) how they can support you in delivering and inspiring STEM in your school.
12.25pm	**LUNCH -** An opportunity to network with other teachers and students, and explore EXPO
1.00pm	**KEYNOTE SPEAKER: PAULA WASIAK** Senior Research Officer @ Phillip Island Nature Parks and Superstar of STEM
1.40pm	**ROTATION TWO - 40 min parallel sessions** >> Teacher Mini-Master Classes >> Student and/or Teacher DigiDesign Mini-workshops and STEM Expo
2.30pm	**FEEDBACK AND CONFERENCE COMPLETION** >> Awarding of prizes to attendees >> Completion of feedback form
2.45pm	**CLOSE OF THE CONFERENCE**

Registration: spark-educonferences.com.au/victoria-2023/

Contact

Rachel Manneke-Jones
Registrations & Bookings
Spark STEM Conferences
P I 0411 270 277
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Host School

JOHN PAUL COLLEGE
with Him is the fullness of life

Conference Coordinator

Intuyu Consulting | Empowering 21st Century Learning

What does my registration include? Every student registration for the Conference includes attending keynotes given by leading STEM practitioners and access to a wide range of hands-on STEM activities /events / workshops and materials.

All teachers, in addition to the above, will have access to teacher mini-masterclasses, presentation handouts and notes, access to STEM experts and presenters, as well as opportunities to network with other teachers and STEM industry and university providers. All teachers will receive a Professional Development Certificate for the hours of the conference which can be counted for their yearly teacher professional hours.
Teachers are welcome to attend without students.

The workshop selection process will occur 3 to 4 weeks prior to the conference. Workshops run parallel within Rotation #1, Problem Solvers, and Rotation #2. The preference selection will be emailed to you with a due date, correspondence is usually by email but we may need to call and appreciate your partnership with the process.

Registration also covers morning tea (half and full day conference) and lunch (full day conference only)

Is my registration transferable? Yes, your registration can be transferred to a colleague or student. We ask that you provide all transfer details to us by contacting rachel@spark-educonferences.com.au

What is the refund policy? 75% refund is available from 11 to 30 days prior to the event. After this date or for non-attendance refunds are not available and payment must be made in full. However, we will be pleased for you to transfer your registration to another attendee (see above). Sponsored and supported schools may differ. Please contact rachel@spark-educonferences.com.au to process this transfer or call Rachel on 0411 270 277.

Cancellation of an event by us: In the event of insufficient applications, or mitigating circumstances (e.g. pandemic, floods, etc), which lead us to cancel the conference, registration monies will be fully refunded. In the event of the conference being cancelled, registration monies only will be refunded as we will not accept liability for the payment of any other associated costs.
While we seek to ensure that all workshops listed in the conference programme do occur on the day this is sometimes not possible due to presenter illness or other circumstances. In this case we will endeavour to ensure that the attendees who have chosen that workshop are placed in another workshop of similar quality or design.

Payment of registration: By submitting the registration form you are confirming that you have been given financial approval by the school/organisation to attend or will confirm if places are on hold. All registration payments must be made prior to the date of the conference. Notes: Early Bird rate must be paid by the invoice due date otherwise we reserve the right to re-invoice at the standard rate. Presenter fee (teacher/sponsor/guest) – students must still pay even if presenting.

Student attendees: You agree as your school representative teacher to take full responsibility and duty of care for the students attending with you. We aim to ensure all presenters/facilitators have their WWCC (or state equivalent) and the event meets Occupational Health and Safety and any other government requirements.

Privacy Policy: We promise to keep your information private at all times. We will not sell, pass on or by any other method share your information with a third party. We will store your information for the purpose of communication regarding the event. You will be added to our newsletter list to enable us to correspond with you leading up to the conference and to enable us to invite you to future events. You are welcome to unsubscribe at any time.
NOTE: We will send emails prior to the conference requiring you to take actions. This may include; understanding your current ability and needs, providing you with technical requirements for your workshop choices, seeking dietary requirements and traffic management information, and sending information to prepare you for the conference. We aim to keep the emails to a minimum. Excursion documentation will be available upon request.

Accessibility: We are committed to making our events as inclusive as possible. If you have additional accessibility requests, please contact us at rachel@spark-educonferences.com.au

Media on Premises: Our aim is to represent the conference in a positive light and support the advancement of STEM activities.
A media consent form is sent with your registration confirmation email. We ask you complete and return to us prior to your attendance.

Contact

Rachel Manneke-Jones
Registrations & Bookings
P I 0411 270 277

Conference Coordinator

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