

WESTERN AUSTRALIA

Wednesday, 18 September 2024

It Takes a Spark! STEM Conference

STEM – Making and Shaping the Future

The theme of the conference is to highlight how STEM develops the transferable skills and mindset that will empower young people to shape not only their future but the future of the world. The workshops and activities focus on how STEM provides the skills and thinking for people to solve challenges, overcome barriers, and create a better and thriving world for everyone.

The It Takes a Spark! STEM Conference inspires and engages forward thinking Year 4 to 10 students, teachers and leaders in STEM.

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

- >> Hydrogen Grand Prix – Engaging Students with Hydrogen Fuel Cell Technology
- >> Esports in Education
- >> Engaging ways of teaching coding and thinking
- >> Upcycling textile waste
- >> Design for Change
- >> After-school STEM Clubs – Traps, pitfalls and opportunities
- >> Dive into the world of Micromelon Robotics and Mechatronics!
- >> Good Design - from Creativity to Reality
- >> Teacher Networking and STEM Pathways session

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

- >> Engineering Rules!
- >> Rocket Science Explorers: STEM Adventures in Space Launches
- >> Growing food in the future
- >> Meteor Mapper: Collaborating Across Continents in Meteor Detection
- >> AI Pets
- >> Eco-Engineers: Innovating for Our Oceans
- >> Digital Fabrication
- >> Virtual pet
- >> Cyber Live
- >> Minecraft – Problem solving with STEM
- >> Virtual and Augmented Reality
- >> STEM EXPO activities...examples
 - >> VR Stellar Safari: Journey to the Cosmic Frontier
 - >> Unleashing Creativity and Innovation: A Hands-On Exploration of 3D Scanning and Printing
 - >> Travelling Back in Time with WA Organic and Isotope Geochemistry Centre
 - >> Grok Academy @ the STEM Expo
 - >> Inspiring STEM learning and engagement through Robotics Competition and community

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

- >> Appropriate Houses by Adaptive Design
- >> Building Buzz Design Challenge
- >> Refashioning the Future
- >> Prosthetic Leg
- >> Are we ready for the cyborg revolution?
- >> Air operated crane design
- >> Li-ion battery recycling - material science problem solving in action!

And more....

WA Outstanding Keynote Speakers

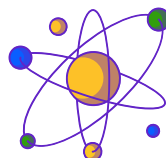


ASSOCIATE PROFESSOR PARWINDER KAUR

Associate Professor and Director, DNA Zoo Australia, The University of Western Australia

Dr Parwinder Kaur leads cross-disciplinary biotechnology research investigating Earth's biodiversity and natural environments to ensure sustainable futures. Through her diverse research teams, such as DNA Zoo Australia, she harnesses STEM to achieve maximised impact. In doing so, she believes this will help us tackle the bigger issues we as society are facing, bringing about solutions through fresh thinking rather than following usual norms.

Her noteworthy achievements include receiving the prestigious 'Science and Innovation Award' from the Australian Academy of Sciences in 2013, winning Microsoft's AI for Earth award in 2019, being recognised as a finalist for WA Innovator of the Year in 2022, and earning the esteemed Australian Sikh Woman of the Year for Excellence in 2023. She has also been inducted into the WA Women Hall of Fame in 2023, is a Superstar of STEM, a winner of Women in Technology WA Tech+ Star in 2022, the recipient of the AmCham Alliance Award in Biotechnology in 2023, a finalist for Trend Setter of the Year, and an ambassador for GirlsXTech internationally.



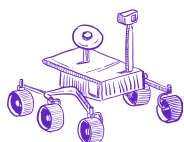
DR KATHRYN ROSS

Astrophysicist
Curtin Institute of Radio Astronomy

Dr Kat Ross is an astrophysics post-doctoral researcher using the novel technique of spectral variability to study active galactic nuclei and galaxy evolution. She has a PhD working with telescopes around Australia, in particular, using the Murchison Widefield Array, a radio telescope based in the remote outback of Western Australia.

She has worked extensively as a science communicator and activist for women in STEM including leading a national campaign, #IncludeHer, to correct high school courses to include a more diverse representation of scientists. Kat has also appeared as a host in the documentary "A Hidden Universe," which aired on Channel 7 in 2022.

Kat is a proud bisexual and agender person and was diagnosed as an adult with ADHD. She is looking to help create safe spaces and welcoming environments for other LGBTQIA+ and neurodiverse individuals in STEM.



Contact

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Registrations & Bookings

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Host School



PETER CARNLEY
ANGLICAN COMMUNITY SCHOOL

Conference Coordinator



Empowering
21st Century
Learning

Register: spark-educonferences.com.au/western-australia-2024/

Hydrogen Grand Prix – Engaging Students with Hydrogen Fuel Cell Technology



Australian Earth Science Education

2024 is the inaugural year for the Horizon Education Hydrogen Grand Prix, energised by Chevron in WA. This event has been a feature of STEM education internationally for a number of years, providing students the opportunity to learn more about energy and the energy transition. Building up to modifying their very own hydrogen fuel cell powered RC car for the state finals endurance race. The winning team for the state finals represents WA in the World Finals. Join us to find out more about the program and to see how fast you are on the test track.

Suitable for Secondary Teachers

Design for Change



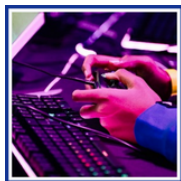
Frederick Irwin Anglican School

Frederick Irwin Anglican School and the City of Mandurah are using Design for Change (DfC) to empower students to be change-agents with an 'I CAN' mindset.

In this teacher workshop Jon will share the DfC approach and how they support students to take a deep dive into passion and compassion, content and character, and doing well and doing good. Students are supported to identify real world challenges they are experiencing, use thinking routines to unpack and own the challenges, and then create viable and sustainable real-world solutions. From shared examples, you will leave this session with a framework that is easy to adapt with immediate impact routines and an understanding of how you can implement DfC at your school.

Suitable for Primary & Secondary Teachers

Esports in Education



SPACEJUMP

Esports (or electronic sports) is rapidly growing in K–12 education as a path for building STEAM and social-emotional skills while increasing student engagement and opportunities for student inclusion. It teaches students teamwork, communication, creative thinking, and digital literacy. Esports can also inspire students to pursue higher education or careers in STEAM, such as game design, computer science, data analysis, broadcasting, music production, or graphic design.

In this teacher mini-masterclass you will discover how to integrate esports into your lessons and align it with the Australian curriculum. Explore innovative and engaging strategies for student involvement through gaming. Elevate your teaching approach with esports education!

Suitable for Secondary Teachers

Upcycling textile waste



Peter Carnley Anglican Community School

Over 800,000 tonnes of textile waste are generated each year in Australia. Most of it ends in landfill which represents an enormous waste of the water and energy required to produce it.

In this teacher mini-masterclass, you will design and create an exclusive fabric by repurposing recycled fabrics, ribbons, and threads. You will learn how to use a water-soluble stabilizer and free motion embroidery techniques to craft a new fabric. This is a hands-on example of how teachers can create an engaging real-world STEM project for students that makes a difference to our environment. You will receive a handout which will support you in running this back at your school.

Suitable for Primary & Secondary Teachers

After-school STEM Clubs – Traps, pitfalls and opportunities



Beaconsfield Primary School

Have you always wanted to do more for budding scientists and entrepreneurs but don't know where to fit it in? An after-school club could be the answer, but it sounds daunting. Hear about one school's journey to become an award-winning promoter of STEM. Leave with practical advice about what (not!) to do.

Suitable for Primary Teachers

Engaging ways of teaching coding and thinking



Grok Academy

Grok Academy's mission is to educate all learners in transformative computing skills, knowledge, and dispositions, empowering them to meet the challenges and seize the opportunities of the future.

In this teacher session you will explore coding pedagogy to enhance classroom teaching. Both Primary and Secondary educators will discover how to boost student engagement and deepen learning in Digital Technologies. Gain confidence in integrating computational thinking strategies into your STEM curriculum with practical examples and hands-on activities for structured teaching and learning.

Suitable for Primary & Secondary Teachers (80 minute Teacher Mini-Masterclass)

Dive into the world of Micromelon Robotics and Mechatronics!



Micromelon Robotics

In this hands-on workshop, using the Micromelon Code Editor and Micromelon Rover, we will guide you through a series of engaging and real-world activities and challenges that you can immediately incorporate into your robotics lessons or after school club, some without even using robots. You'll be able to code along without a robot using the Micromelon Robot Simulator, Blockly and/or Python to program a robot of your own.

Suitable for Primary & Secondary Teachers (BYO laptop)

Good Design - from Creativity to Reality



National Committee of Engineering Design of Engineers Australia

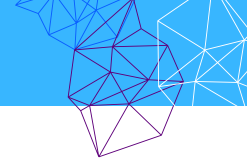
What is "good design"?

Does it meet the users needs? Is it easy to manufacture? What materials would be involved? Will it be something people want to buy? There are lots of ideas and nuances to what has people judge a design as "good" or not.

In this 80 min workshop, Cliff Green, who was recognized by Engineers Australia in 2016 as one of Australia's 50 Most Innovative Engineers, will lead you through a range of exercises and examples that will upskill you in creating designs that are "good" and manufacturable.

You will not only takeaway a deep appreciation of design for manufacture – but have the examples and exercises to support students to understand design, to understand what might define 'good' and to how to go about applying their knowledge now and in the future into real world solutions. This is a masterclass led by a master Consulting Design Engineer.

Suitable for Primary & Secondary Teachers (80 minute Teacher Mini-Masterclass)



Virtual pet



Grok Academy

Virtual pets sparked a craze among young people with the arrival of Tamagotchi, Digimon and Neopets in the mid to late 1990's. Nowadays there are hundreds of virtual pet raising simulations on a wide range of computing devices. In this workshop you will be guided by Grok Academy's educators to create and interact with your own virtual pets. Available in Blockly or Python, this activity suits both Primary and Secondary students, regardless of their coding experience.
Suitable for Year 5 to 8 students and/or teacher

Meteor Mapper: Collaborating Across Continents in Meteor Detection



Perth Observatory

Join Perth Observatory and the Global Meteor Network to track shooting stars! You will learn how astronomers record meteors using advanced technology and can contribute by observing, reporting sightings, and aiding in global research. Become a star-studded detective of the night sky!
Suitable for Year 4 to 10 students and/or teacher

Digital Fabrication



Peter Carnley Anglican Community School

Digital fabrication is a design and manufacturing approach where digital data directly drives manufacturing equipment to form various components. This data most often comes from CAD (computer-aided design), which is then transferred to CAM (computer-aided manufacturing) software. In this workshop you will be learning how to design prototypes for an object using CAD and then gain hands-on experience using laser cutters and 3D printers to make that prototype.
Suitable for Year 7 to 10 students and/or teacher

How to develop a marketing campaign using AI



WA Data Science and Innovation Hub

The use of Artificial Intelligence (AI) is expanding at an enormous rate as the models improve and people find new uses. It is already being used to personalise shopping, in chatbots, fraud creation and prevention, personalising messages to people, voice assistants, facial recognition, creating images, writing essays, and much more. In STEM and entrepreneurship fields the ability to market and promote the products you create is critical to your success. In this session, you will have the opportunity to use different AI tools and your creative expression to develop an engaging campaign for something you are interested in.
Suitable for Year 7 to 10 students and/or teacher

Growing food in the future



Northlands Senior High School

The global issue of hunger and food insecurity has shown an alarming increase since 2015, a trend exacerbated by a combination of factors including the pandemic, conflict, climate change, and deepening inequalities. The United Nations Sustainability Goals include three related to food that focus on creating a better and thriving world. They are: Zero Hunger, Good Health and Wellbeing, and Responsible Consumption and Production. In this workshop, the team from Northam Senior High School will explore a possible solution to these goals – hydroponics. There will be a short presentation on what hydroponics is all about, followed by you creating a simple hydroponic system that you can take home with you!
Suitable for Year 7 to 10 students and/or teacher

Engineering Rules!



Grovelands Primary School

Failing at something is often taken as a problem and something to be avoided. Because of this we can experience a range of uncomfortable emotions when we fail. Yet failure is the key to getting useful feedback and learning! The engineering design process emphasizes open-ended problem solving and encourages you to learn from failure. This process nurtures your ability to create innovative solutions to challenges in any subject. In this workshop you will be participating in some fun engineering activities and learning how failure is just a stepping stone to coming up with great solutions!
Suitable for Year 4 to 6 students and/or teacher

Drones: Supporting the UN Sustainable Development Goals



Al-Ameen College

The United Nations (UN) Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet, and ensure that all people enjoy peace and prosperity by 2030. The 17 SDGs address a wide range of social, economic, and environmental challenges. Drones, play a significant role in advancing the SDGs by providing innovative solutions to these various global challenges. In this workshop, led by the students of Al-Ameen College, you will have the opportunity to play with and experience some of the ways that drones can be used to support 5 of the SDG goals - Good Health and Well-being, Sustainable Cities and Communities, Climate Action, Life below Water, Life on Land.
Suitable for Year 4 to 10 students and/or teacher

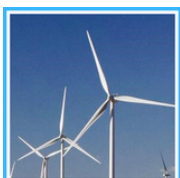
Rocket Science Explorers: STEM Adventures in Space Launches



Australian Christian College-Darling Downs

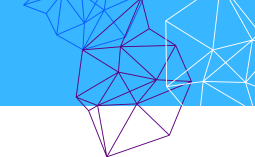
Rockets deliver satellites to space where they can begin to do their important work. Without rockets, we wouldn't be able to use our cell phones, watch a lot of our favorite television shows, find out the weather forecast, navigate with Global Positioning System (GPS), or explore our solar system—just to name a few. Embark on an engaging student-led workshop delving into the world of rocket design. You will be a member of a rocket science team who will be crafting personalised rockets. The culmination? An outdoor launch experience using our specially designed launcher. This hands-on adventure fosters creativity and ignites a passion for STEM exploration.
Suitable for Year 4 to 6 students and/or teacher

Wind Turbine Challenge



Scitech

A wind turbine turns wind energy into electricity using the aerodynamic force from the rotor blades, which work like an airplane wing or helicopter rotor blade. When wind flows across the blade, the air pressure on one side of the blade decreases. The difference in air pressure across the two sides of the blade creates both lift and drag. The force of the lift is stronger than the drag and this causes the rotor to spin. The rotor connects to the generator and creates electricity. In the Wind Turbine Challenge, you will follow an innovation process to design, create, and test your own prototype wind turbines. How much power can one Wind Turbine generate with enough investigation and iteration?
Suitable for Year 7 to 10 students and/or teacher



Minecraft – Problem solving with STEM



Peter Carnley Anglican Community School

Minecraft is a game-based learning platform that prepares you for a digital future while promoting creativity, collaboration and problem-solving in an immersive digital environment.

In this workshop you will participate in mathematical challenges including problem solving and ciphers related to real-world scenarios. For a posed problem you will have a short time to create a Minecraft solution. Teachers will receive a handout which will support you in running this back at your school.

Suitable for Year 5 to 8 students and/or teacher

Cyber Live



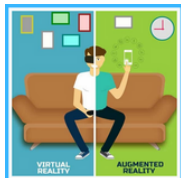
Grok Academy

A Navy captain is held captive inside his ship. A major landmark has gone dark. And weapons are pointed at Sydney's busiest sites... It's all connected, and it's up to you to free the captain, track down the culprit, and stop them.

You will need to trace clues, solve puzzles, and figure out how to stop a large-scale simulated cyber-attack before it's too late.

Suitable for Year 7 to 9 students and/or teacher

Virtual and Augmented Reality



Dale Christian College

Virtual and Augmented reality (VR / AR) is increasingly being used in construction, agriculture, mining, tourism, and even learning. With VR we can do site visits to historical places and hard to reach areas, see designs in 3D before they are built, support surgery, and much more. AR is used to improve manufacturing, guide and inform tourists, assist in healthcare, and much more.

In this workshop you will have a quick tour of Virtual and Augmented Reality through CoSpaces. Placing, orienting, and animating 3D assets to create interactive, immersive virtual environments for a multitude of purposes.

Suitable for Year 4 to 8 students and/or teacher

Solving daily challenges as an Engineer



Institute of Public Works Engineering Australasia – WA

Community assets and infrastructure, also referred to as the built environment, are a complex system of facilities, structures, and the environment of a neighborhood that contribute to the quality of life and overall safety and health of a community. Public works engineers manage them and every day solve problems to make sure you have water, can get to school or work, and are safe.

In this fascinating workshop IPWEA WA & Young IPWEA will present a mock situation using real life issues. You will work collaboratively in teams to come up with solutions to resolve various problems. Learn how Engineers make decisions, manage evolving situations, deal with ethical conundrums, and respond to situations as they unfold.

Suitable for Year 7 to 10 students and/or teacher

AI Pets



Cultivating Curiosity

"Robot pets" employing sophisticated artificial intelligence and animatronic technologies are being marketed as toys and companions by a number of large consumer electronics corporations. However, should we have some concerns about this given the unfettered nature of artificial intelligence development? As future STEM leaders we need to consider the ethical dilemmas that such technological progress will create. In this workshop you will use Philoso-Brick® to explore the philosophical and ethical implications of AI pets. What are the positives and negatives of robot pets? What are the unknowns with robot pets? What could we do with robot pets? What should we do with robot pets?

Suitable for Year 4 to 6 students and/or teacher

Eco-Engineers: Innovating for Our Oceans



Harrisdale Primary School

The Great Pacific Garbage Patch, also known as the Pacific trash vortex, spans waters from the West Coast of North America to Japan. The Great Pacific Garbage Patch is filled with so much litter because much of it is not biodegradable. Many plastics, for instance, do not wear down; they simply break into tinier and tinier pieces. In this hands-on workshop, you will dive into the environmental challenge of the Great Pacific Garbage Patch, focusing on the 14th Sustainable Development Goal - Life Below Water. Through collaborative problem-solving, you will design and build innovative solutions using Lego Spike Essential, targeting specific types of marine debris. By the end you will be empowered to think critically and act creatively for our oceans.

Suitable for Year 4 to 6 students and/or teacher

Fish for the Future



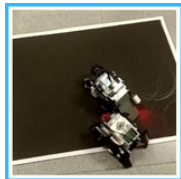
South Metro PEAC

When too many fish are taken out of the ocean it creates an imbalance that can erode the food web and lead to a loss of other important marine life, including vulnerable species like sea turtles and corals. It also endangers the billions of people who rely on seafood as a key source of protein. Without sustainable management, the world will face an unprecedented crisis.

In this workshop you will embark on a simulated fishing adventure where decision-making and risk-taking could see you earn big bucks or hit rock bottom. Based on the traditional Crayfishing game, this interactive version features new permutations incorporating sustainability. Competing against others and playing the odds but remember, how you fish could shape the future!

Suitable for Year 4 to 8 students and/or teacher

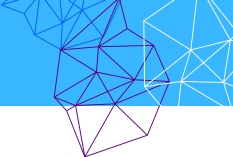
Sumo Smackdown Robotics



Robogals Perth

Robogals is a student run organisation that aims to inspire and empower young women to consider studying engineering and related fields. In this workshop, you will learn to program the actions of EV3 robots, gradually increasing in difficulty and complexity. The movements will range from simple traversal, to a more complex use of sensors, "if" statements and loops. The session will end with you using the light sensors on the EV3 robots to compete in a sumo wrestling competition!

Suitable for Year 4 to 8 students and teachers



STEM Expo: hands-on activity area - Student and/or Teacher

(selected as one workshop, activities may not run in both rotations)



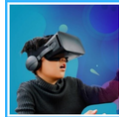
STEM Activities for High School Students

Gilmore College

At Gilmore College students apply knowledge, skills and resources in the development of practical solutions to problems. Through this process they learn to be innovative, adaptable and reflective as they select and use appropriate materials, information and systems to achieve worthwhile results.

In this expo activity you will discover a range of the practical STEM activities that are run at the College. These include Python programming of Lego and Drones, building an Eski Radio, bottle rockets and examples for First Lego League. Come and try your hand at programming!

Suitable for Year 7 to 10 students and teachers



VR Stellar Safari: Journey to the Cosmic Frontier

Perth Observatory

Embark on a thrilling VR journey through space! You will don your headset to soar among planets, witness stunning cosmic phenomena, and discover distant exoplanets. It's an immersive adventure that brings the wonders of the solar system and beyond right to your fingertips!

Suitable for Year 4 to 10 students and teachers



Drone Experience

Pakronics - run by Peter Carnley Anglican Community School students

Drones are used for a wide range of activities including search and rescue, surveillance, traffic monitoring, firefighting, photography and videography as well being used increasingly by organisations such as energy companies, agriculture and mines to inspect their assets. Drones are also great in STEAM education in learning about programming, design, robotics, and more.

In this STEAM Expo activity, you will have an opportunity to learn how to fly safely and show your drone maneuver to your class!

Suitable for Year 4 to 10 students and teachers



STEM Outreach Program

AusEarthEd - Australian Earth Science Education

Explore the world of Earth Sciences and resources with the STEM Outreach program. Code PIGs (pipeline inspection gauges), plan for geosequestration (and see if you were successful) and challenge yourself in a virtual training environment.

Suitable for Year 7 to 10 students and teachers



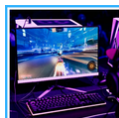
Australian STEM Video Game Challenge

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 3 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 2023 winning entries and demonstrate how schools can enter and what it takes to make a winning entry!

Suitable for Year 4 to 10 students and teachers



SPACEJUMP Esports Experience

SPACEJUMP

Esports is not just about gaming. It teaches you teamwork, communication, creative thinking, and digital literacy and is a real-world application of STEAM in areas such as game design, computer science, data analysis, broadcasting, music production, or graphic design.

In this expo you will have the opportunity to dive into the world of esports via Rocket League or Mario Kart and discover how esports can make a difference to your learning and career.

Suitable for Year 7 to 10 students and teachers



Engineering in Action!

Engineering Institute of Technology

The Engineering Institute of Technology specializes in delivering industry focused engineering courses to students from over 140 countries. Programs are delivered via industry-based expert lecturers and state-of-the-art online technologies such as hands-on remote and virtual labs, simulation software and live stream web and video conferencing.

Come along and find out about EIT and have a go at programming the robotic arm to pick up and move wooden blocks. This will give you a sense of the thinking and skills you will need to design robots!

Suitable for Year 7 to 10 students and teachers



Discover your future in construction

Construction Training Fund

The building and construction industry is involved in the construction, renovating, repairing and more of virtually everything you see in the built environment around you. In many ways they are at the heart of Western Australia's economic success and STEAM is at the heart of the development of a skilled and sustainable workforce.

Drive a crane on Perth's skyline, use the construction occupation oracle to help decide on a career pathway, and discover construction sites through the safety of AR.

Suitable for Year 8 to 10 students and teachers



Inspiring STEM learning and engagement through Robotics Competition and community

Gosnells Robotics Clubs

Robotics clubs and competitions are a great way to attract and engage students in learning, let alone STEM learning. They combine STEM learning with teamwork, problem-solving, and real-world application. They inspire students, foster important life skills, and contribute to preparing young people for the future.

In this STEAM Expo you will learn about the schools involved in the Gosnells Robotics Clubs and FIRST Robotics program and their impacts on students and communities. Students will demonstrate FIRST Robotics Challenge and FIRST Lego League in action and answer any of your questions. You will also be able to operate and code robots to complete challenges. Information and resources will be available for you to take away and seek further information about programs and Perth based networks and expertise.

Suitable for Year 4 to 10 students and teachers



The Martian Garden

ARC Centre of Excellence for Plants for Space

On entering the Mars habitat, you will become the scientists needed to sustain life off-earth, plant biologists, engineers, psychologists and food chemists. You will program vertical farms and harvesting robots, measure plant growth conditions, use DNA and imaging technologies, process plants and 3D print them into new Space-food products.

Suitable for Year 4 to 10 students and teachers



Energy Efficiency – it's not all black and white

Tronox

Energy efficiency is critical to solving the climate crisis. In most cases, efficiency measures have proven to be the most cost-effective way to address climate change while reducing energy waste, saving money, and affordably expanding the use of renewable energy resources. However it is not all black and white.

In this expo activity you will discover how improving the reflective nature of rooms and buildings can make a huge difference to energy efficiency. Even better, you will discover how leading edge technology using Titanium Dioxide can have benefits to the climate beyond reducing energy needs.

Suitable for Year 7 to 10 students and teachers



Travelling Back in Time with WA Organic and Isotope Geochemistry Centre

Curtin University

The WA Organic and Isotope Geochemistry Centre at Curtin University is a world research leader in the study of long extinct animals, prehistoric ecosystems, microbial life, the effect of microplastics on the environment and much more!

Visit the WA-OIGC expo booth where you can learn all about ancient life and paleoenvironments. With fossil samples that are hundreds of millions of years old and samples from the crater of the dinosaur killing asteroid, there are plenty of things to have a look at. Get your craft on and also have a go at making your very own glass marble fossil that you can take home.

Suitable for Year 4 to 10 students and teachers



Unleashing Creativity and Innovation: A Hands-On Exploration of 3D Scanning and Printing

MARS Engineers

This expo activity aims to inspire the next generation of engineers by introducing you to the fascinating world of 3D scanning and printing. Through interactive demonstrations you will discover how these technologies work together to create objects from digital designs.

Beyond the technical aspects, you will discover the importance of creativity, problem-solving, and teamwork in engineering. You will be encouraged to think critically, collaborate with others, and bring your ideas to life using 3D scanning and printing.

Suitable for Year 4 to 10 students and teachers



Grok Academy @ the STEM Expo

Grok Academy

At Grok Academy, our mission is to educate all learners in transformative computing skills, knowledge and dispositions, empowering them to meet the challenges and seize the opportunities of the future.

In this exciting expo you will participate in a range of short hands-on activities that will provoke your skills in problem solving, critical thinking and technology. Do you have what it takes to solve Australia's biggest problems through technology? Teachers can find out about the wide range of ways that Grok Academy can support them in teaching STEM – all for free!

Suitable for Year 4 to 10 students and teachers



CME Digital Technologies Program

The Chamber of Minerals & Energy of WA

The Chamber of Minerals and Energy Digital Technologies Program helps schools deliver fun and engaging educational activities aligned with the Australian and WA Digital Technologies curriculum.

In this expo session attendees will experience a sample of the program including the use of BeeBots and a demonstration of the Micro:Car Challenge for students to block code instructions and move across a map. Come along, have a go, and talk about how the program can support your school!

Suitable for Year 4 to 10 students and teachers



Hands on Robotics with Micromelon

Micromelon Robotics

Robots are widely used in manufacturing, mining, earth and space exploration, surgery, and much more!

You will be challenged to program your own robot using simple coding tools to move around a maze without running into any walls. Come along and test out your skills, no prior experience necessary.

Suitable for Year 7 to 10 students and teachers



Be Digitally Future Ready!

South Metropolitan TAFE

With continuous technological advancements, the IT world is constantly expanding and evolving. South Metropolitan TAFE offers a wide range of Information Technology training pathways from entry level courses through to diplomas and advanced diplomas that can prepare you for university study.

In this Expo we will show you a range of creative and technical activities taught in the TAFE IT courses including;

- Live cyber-attacks happening around the world in real time.
- Examples of games created by students.
- How AI is used in our courses

Come along a have a chat!

Suitable for Year 8 to 10 students and teachers



STEM in Mining – how science, technology and engineering is useful in the real world

Roy Hill

Ever wondered how the STEM subjects you study in the classroom are useful in the real world? Join our Roy Hill environment team to find out how different science disciplines (rehabilitation ecology, biological sciences, functional ecology, chemistry) come together and are used to help care for plants, animals and the physical environment in mining operations; then meet our engineering team to learn how simple mechanical engineering concepts like levers, joints and linkages are used in mining applications. Take part in activities like water testing, seed scarification and mechanical design/construction and see how the STEM knowledge you already have is used every day by engineers and environmental scientists in their mining jobs.

Suitable for Year 7 to 10 students and teachers



Emerging Energies

Webuild

Webuild is a leading global player in the construction of large, complex projects for sustainable mobility, hydropower, water, and green buildings. With over 87,000 diverse team members across the globe, they are building a new world, bringing the present closer to the future, to improve people's lives today and tomorrow.

Webuild believes STEAM subjects open the door to exciting careers. Come and have a chat with the team and take part in a fun emerging energies activity!

Suitable for Year 4 to 10 students and teachers

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 and teachers. You will be posed with a real life design challenge and lead through the design process to ideate and present possible solutions.



Building Buzz Design Challenge

Bloom Centre for Youth Innovation

WA's Southwest has been named a Global Biodiversity Hotspot with native bees playing a critical role in maintaining this ecosystem for both scientific and recreational purposes, but bee populations are declining.

In this design thinking workshop you will work collaboratively in teams to create innovative solutions to bee population decline. This will involve a range of hands-on design activities including building a prototype of your design using provided materials. A great real world design challenge!

Suitable for Year 7 to 10 students and teachers



Refashioning the Future

Fibre Economy

There is currently enough clothing on Earth to dress the whole world for the next 100 years...And yet, we are consuming over 400% more than we did 20 years ago. The worst part is that roughly 40% of these clothes don't even get worn!

In this problem solver workshop you will work in teams to explore the drivers and problems associated with clothing waste and how you can apply Circular Economy principles to reduce your wardrobe's impact on the planet. Teams will brainstorm possible solutions to problems, and present their ideas in a 2-minute pitch.

Suitable for Year 4 to 10 students and teachers



Appropriate Houses by Adaptive Design

Curtin Engineers Without Borders

The availability of safe, secure and affordable housing is an immense challenge facing current and future generations all around the world. For example, how do people live in a place that is buried under meters of water each year? By building a house that floats, of course! In this workshop, you will explore the challenges of people in Cambodia and around the world who live on flood plains, and the banks of major lakes, by building your own floating houses to stay safe and dry! By using household materials, you will use your engineering skills to try to make the most stable floating platform while also learning all about engineering, sustainability and critical thinking!

Suitable for Year 4 to 10 students and teachers



Prosthetic Leg

UWA Engineering Without Borders

Engineering is the practice of using science, mathematics, and the engineering design process to solve problems. Engineering is often portrayed as something done to make buildings, roads, bridges, cars, and other industrial uses. However, engineering has a clear place in solving real world humanitarian problems – such as people living with physical disabilities.

In this workshop you will collaboratively work in teams to design, build and test a prototype prosthetic leg. You will get to test how well your creation is in terms of stability and design. Come and learn how engineers make and shape the future for everyone.

Suitable for Year 4 to 10 students and teachers

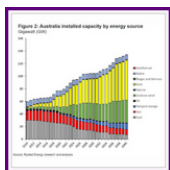


Are we ready for the cyborg revolution?

Cultivating Curiosity

Brain-computer interface technology has been at the core of science fiction for decades as well as movies such as Ready Player One, The Matrix and Avatar. Did you know that Australian scientists are a world leader in neural implants and are already helping paralysed people communicate, to study dreams and to control robots? As future STEM leaders we need to consider the ethical dilemmas that such technological progress will create. In this workshop you will use Philoso-Brick® to explore the philosophical and ethical implications of the integration of humans with technology. What makes a human human? What makes a cyborg a cyborg? When does a human become a cyborg? When does a cyborg become a human?

Suitable for Year 8 to 10 students and teachers



The STEM Energy Game

Woodside Energy Ltd

Climate change is one of the largest challenges countries and all of us face as we progress through this century. Different states and countries use a variety of energy sources (coal, gas, solar, wind, hydro, nuclear, tidal, etc) to make up their energy mix. As we move into the future and want to avoid irreversible climate change these energy mixes need to change to lower greenhouse gas emissions, but at the same time supply the ever-increasing demand for power.

In this problem solver session, you will participate in a game that shows how an energy mix can vary from 2025 to 2050, based on choices your team makes, events which happen and a bit of luck. Teams will play as different states or countries and discover how the complexities of building new energy, removing others, and transitioning in-between changes over time as technology evolves and ending contracts gets cheaper.

To win the game you have to follow the rules, spend your money wisely and focus on three areas:

1. Reduce the carbon intensity of your electricity grid
2. Grow the electricity grid in line with the goal your team receives in 2025
3. Ensure your energy mix meets minimum requirements your team receives in 2050

Suitable for Year 7 to 10 students and teachers



Save the Egg Challenge

Engineering Institute of Technology

When NASA scientists were building a lander for the Mars Exploration Rover, it had to withstand both the heat of entry into the Martian atmosphere and the impact of landing. They also had to figure out a way that the rover could right itself no matter how it landed. This was a wicked problem that they had to think creatively about.

In this workshop you will use your creativity and problem-solving skills to design and build a container using everyday materials to protect a boiled egg from breaking when dropped from a specific height.

Suitable for Year 7 to 10 students and teachers



Li-ion battery recycling - material science problem solving in action!

South Metropolitan TAFE Engineering

Lithium-ion batteries are enabling the efficient storage and delivery of emissions-free energy like never before. From home storage to grid scale developments, but what happens with the batteries at their end of life? How will we re-purpose them? And how will we recycle them? Your job is to work in a design team to devise a scheme for repurposing and recycling Li-ion batteries. You will use your knowledge of chemistry, physics, and a bit of engineering know-how to devise a solution!

Suitable for Year 7 to 10 students and teachers (must have long pants and closed shoes to participate)

Problem Solvers Design Challenge - Student and Teacher

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SUSTAINABLE DEVELOPMENT GOALS

Problem Solving Wicked Global Sustainability Development Goals

North Harrisdale PS and Lumos Learning

The Sustainable Development Goals (SDGs) were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. But what can we do about it? We aren't a rich, multinational organisation or government who can change the world! Well maybe not - but you do have the capacity to be a changemaker. In this session you will tackle a real-world wicked problem and use a questioning and prototype building process to brainstorm potential solutions. Along the way you'll discover how you can incorporate the SDGs into your life every day, and how you and your school can incite real and meaningful change in your community. Teachers, come and learn how you can create learning that is cross-curricular and empowering at the same time!

Suitable for Year 4 to 7 students and teachers



Using Lego to Prototype & Test the New Swan River Bridge

E2 Young Engineers Australia

Designing a bridge is not for the faint-hearted – it has life & death implications. The WA government is building a new \$100 million pedestrian & cyclist bridge alongside the existing causeway, separating path users from traffic. This will make it safer for all road users but it will have environmental and other implications.

You are part of the design team investigating and evaluating various design ideas. You have your teammates, a tray of Lego and your brilliant self to prototype and test the various design ideas.

Suitable for Year 4 to 8 students and teachers



Air operated crane design

Engineering Institute of Technology

Cranes are an essential piece of equipment in the field of construction, used to lift and move heavy materials and equipment on construction sites. They are used to move objects vertically or horizontally to various heights and distances, making them a versatile tool in the industry. In this design challenge you will work in teams to design and construct an air-powered crane to lift and lower a load. This is a challenge where you learn how engineers use maths, science and design thinking to figure out how to solve real-world problems.

Suitable for Year 6 to 9 students and teachers



Mars Mission Possible- remote operations in space!

AROSE, Engineers Australia & Bloom

Imagine ... Your team gets an encrypted message and it is NASA with a mission for you to accept. **You only have one shot to get a sample from the surface of Mars!**

How is this amazing feat of engineering going to happen? How will you get to Mars? How could you get the sample? How will you control your automated rover? How will you communicate with Earth? What do you need to stay alive? How will you stay safe?

Use your engineering ingenuity to answer these questions!

In this workshop, you will explore the different systems needed for this mission and how they will interact and connect with each other to bring this mission to life. Using a system engineering approach, we will uncover your engineering talents through your curiosity and creativity. Prepare to journey into the unknown...

Suitable for Year 6 to 10 students and teachers



Shaping how we extract minerals for the future

Peter Carnley Anglican Community School

Globally, countries are racing to secure the finite mineral supplies needed for the transition to low-carbon economies. Fears of running out of critical minerals drive further exploration and expansion and the impact is often felt on Indigenous Peoples' land and have significant environmental and social impacts. We need to consider how to make better use of what we mine, refine, discard, let alone reduce, reuse, and recycle. In this problem solver session, you will see some simple metal extraction techniques (electrolysis/thermite/ion exchange) followed by discussing the energy costs associated with each approach. This will set you up to play a challenge game to design a countrywide policy / energy requirements for sustainable metal extraction for future needs. Deepen your thinking about what we need to do as a country!

Suitable for Year 8 to 10 students and teachers

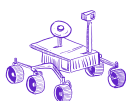


Building Bridges

Clough Webuild Group

Bridges are fascinating feats of engineering. Throughout history, humans have creatively designed everything from rope and plank bridges to the Sydney Harbour Bridge. Today, primarily civil and structural engineers are responsible for the design of bridges. Since bridges must be safe under all anticipated load and weather conditions, in designing today's modern bridges, engineers take into consideration tension and compression forces. They also creatively strive to meet people's needs within budget and material constraints. In this problem solver workshop, you will be challenged to build the strongest bridge, which meets the client's requirements. You will designate roles in your team (newly created company), plan, design, shop, build, test, and evaluate! Learn what it is to be a real-world construction engineer!

Suitable for Year 7 to 10 students and teachers



WEDNESDAY 18 SEPTEMBER 2024
PETER CARNLEY ANGLICAN COMMUNITY SCHOOL

386 WELLARD RD, WELLARD WA 6170

Register: spark-educonferences.com.au/western-australia-2024/

Who the conference is for...

- **Year 4 to 10 students** - those who are already (or aspire to be) STEM Leaders in your school OR students' schools wish to spark an interest in, and engagement in STEM
- **Teachers** - those who have little experience and those who have a lot, looking to be inspired, participate in hands-on professional learning and network with peers
- **Heads of Learning Areas / Curriculum** - who wish to connect and elevate their STEM discipline
- **Principals and Deputy Principals** - to witness what is possible by embedding STEM authentically in your school
- ...and the event is a 6 hour Professional Learning day for teachers - **certificate provided**

Further information

- In 2024 the It Takes a Spark STEM Conferences are being held in Melbourne, Perth, Tasmania and Queensland.
- Registration and FAQ's can be found on the website, along with Media and News appearances for reference.

Registration

- Begins at 8.45am / completes at 2.45pm
- Includes **Morning tea and Lunch**
- Early bird registration is recommended, ends 16/08/2024
- Register: spark-educonferences.com.au/wa2024-registration/
- Teachers can attend without students.
- Students must attend with their teachers.
- Approximately **480 places available** - you can hold places whilst you gain approval. Register and select 'hold place'.

Flow of the day....

- 8.15am Sign-in, coffee and networking
- 8.45am Master of Ceremonies - Welcome, set up for the day and housekeeping
- 9.00am **KEYNOTE SPEAKER - ASSOCIATE PROFESSOR PARWINDER KAUR**
Associate Professor and Director, DNA Zoo Australia, The University of Western Australia
Dr Parwinder Kaur leads cross-disciplinary biotechnology research investigating Earth's biodiversity and natural environments to ensure sustainable futures.
- 9.40am **ROTATION ONE - 40 min parallel sessions**
>> Teacher only Mini-Masterclasses
>> Student and/or Teacher DigiDesign hands-on workshops & 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 parallel sessions**
>> Design challenge sessions for Year 4 to 10 students and teachers
- 11.00am **TEACHER ALTERNATE SESSIONS**
>> 80 min Teacher only Mini-Masterclass
 - Engaging ways of teaching coding and thinking, Grok Academy
 - Good Design - from Creativity to Reality, National Committee of Engineering Design of Engineers AUS>> 80 min Teacher Networking and STEM Pathways session
 - Opportunity to connect with other teachers and presenters to share ideas, possibilities and practices. 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 - DR KATHRYN ROSS**
Astrophysicist, Curtin Institute of Radio Astronomy
Dr Kat has worked extensively as a science communicator and activist for women in STEM including leading a national campaign, #IncludeHer, to correct high school courses to include a more diverse representation of scientists.
- 1.40pm **ROTATION TWO - 40 min parallel sessions**
>> Teacher only Mini-Masterclasses
>> Student and/or Teacher DigiDesign hands-on workshops & STEM Expo
- 2.30pm **FEEDBACK AND CONFERENCE COMPLETION**
>> Awarding of prizes to attendees
>> Completion of feedback form
- 2.45pm **CLOSE OF THE CONFERENCE**
- *Listed program is subject to change

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BOOK NOW or HOLD PLACES:

spark-educonferences.com.au/western-australia-2024/



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