

Friday, 30 August 2024

STEAM – Empowering Leaders for a Changing World

The theme of the conference is to highlight how STEAM 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 STEAM.

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

- >> Object-Based Learning in the Classroom
- >> Extending your skill range using generative AI
- >> AI Launchpad: Igniting Entrepreneurial Minds
- >> How to attract more girls into Technology
- >> Deeper knowledge with coding pedagogies
- >> Arduino in AgTech
- >> Dive into the world of Micromelon Robotics with the Rover and Python!
- >> Practice, Failure and Learning - what I wish I was taught

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

- >> Tracing Disease
- >> From the arena to the clinic: how does movement impact our lives?
- >> Does stuff float on Oobleck?
- >> App Prototyping Inclusive Mental Health Solutions
- >> Virtual pet
- >> Cyber Live
- >> LEGO Robotics Engineering Challenge
- >> Digital Frontier: Design Thinking for Innovative Solutions
- >> Corals are Cool and Crucial
- >> Mission to Mars
- >> First Steps with Artificial Intelligence
- >> STEAM EXPO activities
 - >> Australian STEM Video Game Challenge
 - >> Insect Pest Management for Australian Cotton
 - >> Flying Scientists showcase
 - >> Grok Academy @ the STEAM Expo
 - >> Explore Electronics!
 - >> The Future of Transport Signalling
 - >> Paper Plane Launcher

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

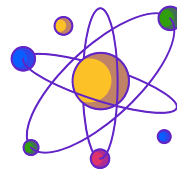
- >> Game on! Using card games to plan and design video games
- >> Creating a sustainable environment for all lives
- >> Reducing your carbon footprint by design
- >> What's involved in making Windfarms happen?
- >> DesignDash: Helmets – Necessary or a Nuisance?
- >> Innovating for a changing world
- >> Sustainable Space Exploration
- >> Matchbox Rockets
- >> Classroom Noise Reduction Design Challenge

QLD Outstanding Keynote Speakers



DR KARSTEN SCHULZ
CEO, Digital Technologies Institute

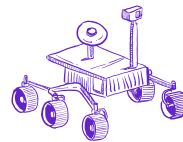
Karsten holds a PhD in Computer Science and a Bachelor in Electrical Engineering with a focus on Software Engineering. In 2010, Karsten created the Young ICT Explorers Competition and, in 2014, whilst working for NICTA (now part of CSIRO), he founded the Bebras Australia Computational Thinking Challenge, which is part of the International Bebras Challenge with over 2.9 million participants annually. Karsten is a former track and field athlete, who competed at German national youth level in long jump. Karsten has been working in the Australian ICT and Digital Technologies space since 1999 in an international R&D leadership position. He has designed a computer processor, builds artificial neural networks, has 18 patents in his name and has a passion for data, process flow and artificial intelligence.



DR ALEXANDRA CAMPBELL
Marine Scientist
University of the Sunshine Coast
Superstar of STEM

Can we save the world with seaweeds? Dr Alexandra Campbell is working hard to find out.

As a key member and co-founder of the USC Seaweed Research Group, Alex leads projects that are investigating how seaweeds can restore damaged ecosystems, improve food production and enhance human health. She was a founder of 'Operation Crayweed', which restores underwater seaweed forests along Sydney's coastline, won a 'Green Globe' award and was a Eureka Prize finalist (2017). Alex is a Churchill Fellow (2014), a Young Tall Poppy (2012), a busy mother of twins (always) and a passionate advocate for Women in STEM (forever).



Contact

Rachel Manneke-Jones
Registrations & Bookings
P | 0411 270 277
E | rachel@spark-educonferences.com.au
W | spark-educonferences.com.au

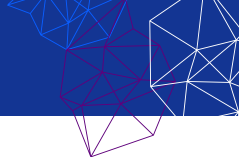
Host School



Conference Coordinator



Register: spark-educonferences.com.au/queensland-2024/



Object-Based Learning in the Classroom



Rebecca Lush, Integrated Pathology Learning Centre

Object-based learning (OBL) is a pedagogy that encourages participants to explore problems, concepts, events and ideas of the past, present and future by engaging with objects. OBL is the core of a museum's education program but it can just as easily be applied in the classroom.

In this hands-on presentation, teachers will be guided through its benefits and how to apply it in their teaching. This will include human specimens from the museum's collection.

Suitable for Secondary Teachers

Extending your skill range using generative AI



Derek Long, University of Southern QLD

Generative AI can adapt educational content to suit individual learning interests, pace, abilities, and styles, providing immediate feedback and support. It has the potential to make education more accessible and inclusive for learners with diverse needs and offers great gain in productivity and teaching quality to those who can become effective users of it.

In this workshop, you will learn how generative AI can be used to rapidly self-learn something that would normally be out of your skillset, and create a lesson plan and deliver it. Derek will also talk about the risks involved with generative AI.

Suitable for Primary & Secondary Teachers

Deeper knowledge with coding pedagogies



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

How to attract more girls into Technology



Cynthia Gusman-Nolan, Australian Computer Society

Building on her Masters research into "How to attract and retain girls in technology subjects?" Cynthia provides practical, tried and tested techniques that help balance the gender distribution in technology lessons. As the previous head of Technology at Somerville House, she reimagined the delivery of the curriculum and as a result had students changing electives to join her class.

Most recently Cynthia has been researching how gaming can be used to help girls understand their innate skills in technology that can transfer into the thriving technology industry that is crying out for more people and needs a much more balanced gender representation.

Cynthia will provide teachers with ideas that can be implemented immediately, including the best environments, lesson activities, and assessment for and of learning that will have girls queuing up to join in.

Suitable for Secondary Teachers

AI Launchpad: Igniting Entrepreneurial Minds



Digital Literacy Licence

Are you interested in inspiring the next generation of innovators and entrepreneurs?

This session will explore how AI tools (for example in Canva) can help students develop a mindset of innovation. Through practical activities including AI concept mapping, rapid prototyping, and pitch practice, teachers will learn how to guide students in identifying opportunities for AI applications in entrepreneurial projects. This session equips teachers with the necessary skills to lead AI-driven initiatives and empowers students to become forward-thinking leaders in a rapidly changing world.

Suitable for Secondary Teachers

Practice, Failure and Learning - what I wish I was taught



Cran Middlecoat, That Pilot Guy!

As an airline pilot I've seen some really good and some really bad training and assessment techniques. Practice most certainly does NOT make perfect; in fact, such a notion can be extremely detrimental to your students. Failure is NOT the opposite of success. Failure continues to be stigmatized as bad, something to be avoided. How on earth is a student meant to embrace failure? Should I be encouraging failure?

In this teacher workshop you will explore the inherent meanings and concepts of practice, failure and learning and redefine them and their usage so classes can become thriving and empowering learning environments. Cran will share his experiences as a pilot and educator and show you how you can implement the skills from his cockpit into your classroom.

Suitable for Primary & Secondary Teachers

Arduino in AgTech



IntegratedSTEM

AgTech development and adoption is key to the profitability and responsiveness of Queensland's agriculture supply chain. To keep pace in the changing climate, social, and economic environment, transformational approaches are needed for the agriculture sector to continue to meet the world's needs.

This workshop will showcase how students can use Arduino to automate or gather data from systems to inform decisions that lead to better farming practices that enhance yield and reduce production costs. These projects will demonstrate how AgTech can be effectively incorporated into the Grade 4 – 12 classrooms by teachers of any level of technology skills. Teachers will be shown how to engage students in real-world problems by sharing practical strategies and resources that IntegratedSTEM has developed teaching AgTech-focused education to thousands of students across Australia.

Suitable for Primary & Secondary Teachers

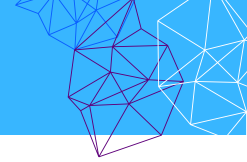
Dive into the world of Micromelon Robotics with the Rover and Python!



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 Secondary Teachers



Tracing Disease



Integrated Pathology Learning Centre

Pathologists provide diagnostic information to patients and medical practitioners. They impact nearly all aspects of patient care, from diagnosing cancer to managing chronic diseases through accurate laboratory testing. In this workshop you will be presented with an opportunity to view real human specimens as we trace the spread of melanoma throughout the body, starting with the skin. You will work together in teams to trace the disease and think about its impact on the body.

Suitable for Year 7 to 10 students and/or teacher

From the arena to the clinic: how does movement impact our lives?



CSIRO

Biomechanics is the science of the movement of a living body, including how muscles, bones, tendons, and ligaments work together. Biomechanics is increasingly used in sport to improve performance and in the medical field to support improved mobility. In this workshop, selected volunteers will have their movement tracked. You will then be introduced to how biomechanics data is collected, how kinematics (joint angles) can be visualized, and how this information can be used in the context of improving sporting performance and providing health care. This is STEM in action!

Suitable for Year 7 to 10 students and/or teacher

LEGO Robotics Engineering Challenge



Grace Lutheran College

Embark on an innovative journey with our LEGO robotics workshop! Dive into the world of engineering marvels as you explore locomotion without wheels. From caterpillar tracks to propeller-powered flight, creativity knows no bounds! Under expert guidance, you will learn to design, build, and program robots that defy convention. Join us for an exhilarating experience where imagination meets technology, and you hone critical skills in problem-solving and teamwork. Let's revolutionize robotics together, one LEGO brick at a time!

Suitable for Year 4 to 6 students and/or teacher

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

Digital Frontier: Design Thinking for Innovative Solutions



Grace Lutheran College

We live in a brave new world with current and emerging technologies predicted to enable us to meet problems big and small. For example, Red Cross Drones for Blood in Uganda or robots supporting individuals with disabilities to work.

In this exciting workshop you will use the design thinking process to explore how these current and emerging technologies could be used to tackle a problem of your choosing. You'll also consider the ethical considerations and impacts on individual people and societies. We don't want to accidentally create the next problem!

Suitable for Year 7 to 10 students and/or teacher

Does stuff float on Oobleck?



Students from Islamic College of Brisbane

Oobleck is a non-Newtonian fluid; it has properties of both liquids and solids. You can slowly dip your hand into it like a liquid, but if you squeeze the Oobleck or punch it, it will feel solid.

In this workshop, you will be testing the floatability of an object in a Oobleck fluid (solid?) that seemingly defies the Newtonian physics we learn in school. The workshop will allow you to test your trial and error and data recording skills in a real-world experiment.

Suitable for Year 4 to 6 students and/or teacher

App Prototyping Inclusive Mental Health Solutions



Sandy Gardner, Insight Technology Education

Mental health includes our emotional, psychological, and social well-being. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make healthy choices. Mental health is important at every stage of life, from childhood and adolescence through adulthood. In recent years there has been an increase of people experiencing mental health issues such as depression and anxiety. What can we do about this?

In this transformative workshop you will harness the power of STEAM skills and thinking to prototype an inclusive mental health app using Keynote. Through collaborative design activities, you will create mock-ups of a mental health app that empowers individuals to seek help, build resilience, and foster connection. Let us come together to innovate, advocate for mental health awareness, and pave the way for a more inclusive and thriving world for all.

Suitable for Year 4 to 6 one session. Year 7 to 10 alternate session - students and/or teacher

Corals are Cool and Crucial

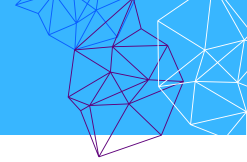


CoralWatch, The University of Queensland

Coral reefs are under relentless stress from myriad global and local issues, including climate change, declining water quality, overfishing, pollution and unsustainable coastal development.

In this session you will discover the importance of The Great Barrier Reef and local reefs, the lifecycle of corals and gain understanding how living things in the ocean depend on each other to survive. You'll learn how you can become a citizen scientist, collect data on coral bleaching and will have the opportunity to practice coral monitoring, collecting, and analysing virtual data using virtual tools. You will also learn about sustainable actions achievable in everyday life and how community action is required to protect reefs for the future.

Suitable for Year 4 to 6 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

Mission to Mars



Stephen Broderick, St Ursula's College Toowoomba

The idea of sending humans to Mars has been the subject of aerospace engineering and scientific studies since the late 1940s as part of the broader exploration of Mars. Much like the Apollo missions were the spark for a generation of scientists, mathematicians and engineers in the 1960's, the Mars missions will ignite a new generation of STEM thinkers and doers.

This hands-on workshop will have you working in groups to design a paper rocket, rotocopter and a logo for your mission. It will have you engage in the type of STEM thinking mission designers go through when planning missions. Groups achieve points for accuracy with their rocket, greatest height and distance reached by their rocket, slowest descent time for their rotocopter and points for their logo design.

The group with the highest cumulative score from the three activities will win. Teachers will receive a handout to support them in running a similar mission in their own classes.

Suitable for Year 7 to 10 students and/or teacher

The Tower Triumph Challenge



Students from Islamic College of Brisbane

Engineering is the application of science, maths, and design in the creation of real world structures. Engineers not only have to understand the underlying theories but to collaboratively work with others to problem solve possible solutions to challenges that may arise. In this workshop you will be challenged to work in teams to build the tallest and strongest tower, using the provided common materials, within the time frame of 25 minutes. The towers will be tested with as many 50-gram weights it can withstand. Extra points will be given depending on the durability and height of the tower. Will you triumph?

Suitable for Year 4 to 7 students and/or teacher

First Steps with Artificial Intelligence



Digital Technologies Institute

Artificial Intelligence is already playing a significant role in a range of industries including healthcare, transportation, finance and agriculture. It is essential that you understand what AI is, how it works, how it is different from machine learning, and how you can make the most of both in safe and ethical ways.

In this workshop you will experience a hands-on focus on artificial intelligence and machine learning. You will create your own AI models and explore AI's capabilities and limitations in a practical way. This will help you become a more informed user of AI technologies.

Teachers will gain an introductory level understanding of AI and will learn how they can recreate the activities back at their school.

Suitable for Year 5 to 8 students and/or teacher

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

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



This IS Rocket Science!!!!

Cran Middlecoat, That Pilot Guy!

Who invented the Rocket? It was the ancient Chinese...

Using fair testing principles, attendees will explore rocket design and learn how the centre of mass plays a pivotal role in why rockets fly straight. We achieve this with the use of small wind tunnel test rockets followed by launching the refined design to really get the STEM excitement going.

Suitable for Year 4 to 10 students and teachers



Explore Electronics!

IntegratedSTEM

Get a glimpse of the world of electronics engineering. In this Expo activity you will explore various types of electronic components and build your own simple circuits using a breadboard, with the assistance of experienced facilitators and circuit-building aides. You will learn about the principles of circuit design, including resistance, voltage, and current, and how these components can be combined to create a functioning circuit. This activity will challenge you to think on your feet, work quickly and collaboratively in small teams, and develop your problem-solving skills.

Suitable for Year 4 to 10 students and teachers



Insect Pest Management for Australian Cotton

Bayer Crop Science

Australian cotton is in high demand around the world because of its high-quality, sustainability, and traceability. To achieve this, cotton crops need to be protected from pest moths which can cause extensive damage. Bayer Crop Science breed, raise and monitor the different life stages of colonies of Heliothis moths to learn best how to protect crops like cotton.

In this expo activity you will have a hands-on opportunity to touch and play with cotton, moth pupae and larvae, as well as determine the sex of the pupae using a scientific microscope. You can also race against each other with scientific pipettes to see who can dispense all of a solution the quickest!

Suitable for Year 4 to 10 students and teachers



Drone Experience

Pakronics - run by Grace Lutheran College 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



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 STEM 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



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 find out and what it takes to make a winning entry!

Suitable for Year 4 to 10 students and teachers



Grok Academy @ the STEAM 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



Paper Plane Launcher

BotBuilders

Paper planes are a great way to learn about Science and Engineering while having a lot of fun. To build a great plane you will need to understand concepts such as aerodynamics, centre of gravity, wing design, good construction techniques, as well as how the process of testing and refining your design.

In this Expo activity you will use the handheld 3D printed launcher made for a First Tech Challenge Centrestage challenge to launch your own paper plane. Can you build an effective paper plane? You will have the opportunity to test your launch against a couple of the FTC robots as well!

Suitable for Year 4 to 10 students and teachers



Flying Scientists showcase

Wonder of Science

Wonder of Science is an educational program hosted by the University of Queensland (UQ) where year 5-9 students undertake exciting research and investigative projects at their schools.

This Expo activity will feature 2 - 3 early career researchers in a variety of STEM fields and Young Science Ambassadors (PhD students from multiple universities) who will showcase their research with hands-on investigations. You will get the chance to engage with and learn more about the exciting and cutting-edge research happening all over Queensland. You will also engage in the Wonder of Science STEM quiz!

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

STEAM Expo: hands-on activity area - Student and/or Teacher cont'd...

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

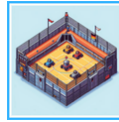


The Future of Transport Signalling

Cross River Rail Delivery Authority

The Cross River Rail is a new 10.2km rail line that includes 5.9km of twin tunnels running under the Brisbane River and CBD; with four new underground stations, a new above-ground station at Exhibition, a rebuild for seven stations between Dutton Park and Salisbury; three new stations on the Gold Coast; construction of two new train stabling facilities and installation of a new world-class signalling system. Come along to the Cross River Rail expo stand and discover the future of transport signalling using Ozobots! Look out for the cutest mini robots and see how they move according to signals detected by their sensors. Find out what this has to do with the new Cross River Rail signalling system and test out your skills by creating signals for the Ozobots.

Suitable for Year 4 to 6 students and teachers



Robot Drive Challenge

BotBuilders

In the 2024 Australian Lego Masters TV show the contestants had to build a robot out of Lego and then have a competition between their robots to see which could win in their driving "battle". Here is your chance to be part of a robot driving challenge yourself!

In this expo activity you will use a controller to drive your robot around inside an enclosed area on a table where there is a trapdoor in one corner. The challenge starts with 5 robots and 5 drivers. Do you have the reflexes and problem-solving skills to be the last one standing?

Suitable for Year 4 to 10 students and teachers



Melting Metal Mementos

Mark Baker, Assumption College Warwick

When we think of something being a metal we often think of copper, gold, silver, iron and steel. These metals are known to be quite strong, have high melting points and are used in a variety of construction, technology and jewellery. However not all metals have high melting points and can be quite beautiful in a crystalline form.

In this STEAM expo, you will discover how Science and Art can merge to create exotic jewellery. Come along and see non-toxic bismuth metal melt and then make your own bismuth rainbow crystals to grow on an earring.

Suitable for Year 8 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.



Creating a sustainable environment for all lives

Veronica Farina and Shelley DeRuyter, William Ross State High School Townsville

The United Nations Sustainable Development Goals (SDGs) are a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.

In this problem solver session you will be challenged to come up with possible solutions to protect biodiversity and natural habitats. During the workshop you will use Double Diamond design thinking to sprint through the challenge; exploring the broad problem, define your response, create a low fidelity prototype using supplied materials, and deliver a brief presentation of their solution.

Suitable for Year 7 to 10 students and teachers



Game on! Using card games to plan and design video games

Australian Council for Educational Research

Game developers turn game concepts into a playable reality. This is done by programming features, coding visual components, and testing models until the game is market ready.

In this problem solver session you will learn about gameplay concepts and how card games can be used to plan and design video games from these concepts. You will then have the opportunity to develop your very own card game related to the 2024 STEM VGC theme that you can take home and play with family and friends. You can even use this as a resource to develop a video game to enter the STEM VGC! This session will be supported by a two-time winning team - Conglomerate Squad!

Suitable for Year 4 to 10 students and teachers



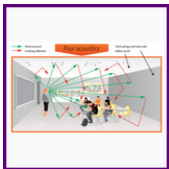
Reducing your carbon footprint by design

St Andrew's Anglican College

Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere over the last 150 years. The largest source of greenhouse gas emissions from human activities is from burning fossil fuels for electricity, heat, and transportation.

In this hands-on workshop you will learn how to tackle environmental challenges using the design thinking process. Focused on reducing the carbon footprint within a school community, you will engage in problem-solving activities aimed at implementing eco-friendly practices. Through collaborative discussions and hands-on exercises, you will explore innovative solutions to promote sustainability. Real-world examples and group activities facilitate practical application of the design thinking methodology. By the end, you will emerge equipped with a strong understanding of the design process and how it helps to solve problems in the real world.

Suitable for Year 4 to 10 students and teachers



Classroom Noise Reduction Design Challenge

Beenleigh State High School

Numerous studies have shown that exposure to high noise levels can lead to decreased cognitive performance and increased student stress levels. Excessive noise creates a chaotic atmosphere that inhibits learning and creates unnecessary distractions.

In this hands-on problem solver session, you will collaboratively design and build innovative noise reduction solutions for classrooms using sustainable materials. You will apply engineering principles, creative design, and scientific testing to create effective, eco-friendly prototypes that enhance the learning environment by reducing disruptive noise levels.

Suitable for Year 7 to 9 students and teachers



Sustainable Space Exploration

Cran Middlecoat, That Pilot Guy!

Until relatively recently space exploration has been extraordinarily environmentally harmful. From the vast usage of fossil fuels producing greenhouse gases to space junk left in space and single use expendable rockets and other components.

In this engineering, sustainability and recycling challenge, attendees will discover the methods of space transport from the past and present, explore the environmental impact of space junk and why sustainable space exploration using renewable energy will be essential for shaping the future communities and habitats.

Can you come up with some great ways to make space exploration sustainable?

Suitable for Year 4 to 10 students and teachers

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.



What's involved in making Windfarms happen?

Department of Transport and Main Roads

Queensland is in the midst of a shift to renewables for our green energy future. This requires establishment of windfarms up and down the state in areas which provide prime wind conditions. The problem is that these long, tall and heavy components (blades, tower sections, generators) need to be moved from manufacturing locations or from ports to site. This is a huge challenge for the Department of Transport and Main Roads. In this problem solver workshop you will not only 'peek behind the scenes' of how we make this happen, but will collectively work in groups to solve how to move 3 different types of components from port to site. Will you need to strengthen bridges? How will you manage traffic along the route? Will you need to build a temporary road? Will the component actually fit through that tunnel? Come and experience the real world STEM challenges involved in creating a sustainable future!

Suitable for Year 6 to 10 students and teachers



DesignDash: Helmets – Necessary or a Nuisance?

Brisbane South State Secondary College

The debate around mandatory bicycle helmets can quickly become emotive, complex and ambiguous due to the perceptions of helmets and conflicting research. A major meta-analysis study showed helmets prevented serious injury or fatality by 60%. However, some studies show that wearing a bicycle helmet means cars overtake with less distance than without helmets as they deem the cyclist to be more protected. In this problem solver workshop you will engage in a hands-on activity that explores the question, 'Helmets – Necessary or a Nuisance?'. Using a brain impact simulator, you will collect data and collaborate in groups to create a prototype of a helmet. These helmets will be tested to evaluate their efficacy.

Suitable for Year 7 to 9 students and teachers



Innovating for a changing world

Grace Lutheran College

When we think of innovation, people like Thomas Edison, Henry Ford, and Steve Jobs tend to come to mind. The lone hero in solitude has a hold on our imagination, but the truth is that innovation is rarely the result of an inspired genius toiling away in a garage. Groundbreaking innovation takes lots of people. Consider that more than 1,000 engineers worked on the first iPhone. More than 7,000 people worked on Curiosity (the rover on Mars). The takeaway? Innovation is a team sport.

In this hands-on problem solver session, you will be introduced to the concept of innovation and work together in a team to create an innovative product. You will begin by exploring the needs of a target audience/stakeholder, generate ideas for products that could benefit them and then use creativity to develop plans and a model of your proposed innovation, using recycled materials. The session will end by showcasing your plans and product to the group in a final pitch.

Suitable for Year 5 to 7 students and teachers



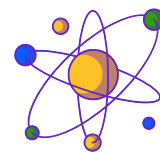
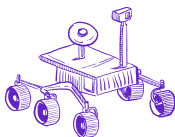
Matchbox Rockets

Wonder of Science

Throughout history people have looked up at the stars and wondered and imagined what was out there and how they could travel to space. What does it really take to build a rocket and go into space?

In this hands-on problem solver session, you will investigate some of the different variables (e.g. weight, shape, launch angle) that influence how high and far a rocket can travel. You will design and conduct an investigation to examine how your chosen variable affects the distance travelled then make a matchbox rocket to test your thinking. This is a great way to learn about the concepts of fair testing, hypothesis testing and selecting variables.

Suitable for Year 4 to 7 students and teachers



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
- Early bird registration is recommended **closing 30/07/2024**
- Book Now or Hold places: you can hold places whilst you gain approval. Register and select 'hold place'.
- **Teachers** can attend without students.
- **Students** must attend with their teachers.
- Excursion pack available
- Register: spark-educonferences.com.au/qld2024-registration/

Flow of the day....

- 8.15am Sign-in, coffee and networking *Listed program is subject to change
- 8.45am Master of Ceremonies - Welcome, set up for the day and housekeeping
- 9.00am **KEYNOTE SPEAKER - DR KARSTEN SCHULZ**
CEO, DIGITAL TECHNOLOGIES INSTITUTE
Dr Karsten Schultz has designed a computer processor, builds artificial neural networks, has 18 patents in his name and has a passion for data, process flow and artificial intelligence. Find out how he has been a world leader in everything ICT and Digital Technologies and his take on Artificial Intelligence in Education.
- 9.40am **ROTATION ONE - 40 min parallel sessions**
>> Teacher only Mini-Masterclasses
>> Student and/or Teacher DigiDesign hands-on workshops & STEAM 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
 - Deeper knowledge with coding pedagogies, Grok Academy
 - AI Launchpad: Igniting Entrepreneurial Minds, Digital Literacy Licence
- 12.25pm **LUNCH** - An opportunity to network with other teachers and students, and explore EXPO
- 1.00pm **KEYNOTE SPEAKER - DR ALEXANDRA CAMPBELL**
MARINE SCIENTIST, UNIVERSITY OF THE SUNSHINE COAST AND SUPERSTAR OF STEM
Can we save the world with seaweeds? Dr Alexandra Campbell is certainly trying to find out! She leads projects that are investigating how seaweeds can restore damaged ecosystems, improve food production and enhance human health.
- 1.40pm **ROTATION TWO - 40 min parallel sessions**
>> Teacher only Mini-Masterclasses
>> Student and/or Teacher DigiDesign hands-on workshops & STEAM Expo
- 2.30pm **FEEDBACK AND CONFERENCE COMPLETION**
>> Awarding of prizes to attendees
>> Completion of feedback form
- 2.45pm **CLOSE OF THE CONFERENCE**

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BOOK NOW or HOLD PLACES:

spark-educonferences.com.au/queensland-2024/



FRIDAY 30 AUGUST 2024
GRACE LUTHERAN COLLEGE, QUEENSLAND
ANZAC AVE &, MEWES RD, ROTHWELL QLD 4022

Contact

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

E | rachel@spark-educonferences.com.au

Dr Adrian Bertolini
Conference Coordinator
P | 0413 036 382

E | adrian@spark-educonferences.com.au