STEM 2024 - University of Newcastle

Professional Learning Agenda

Friday 6 December 2024

Contents

STEM 2024 Agenda - Friday 6th December

8:00am – 9:00am	**Registration, Coffee, Expo**

Plenary Session

9:00am – 9:15am	**Acknowledgement of Country and Address** **Nathan Towney** – Pro Vice-Chancellor Indigenous, Strategy and Leadership, University of Newcastle
9:15am – 9:35am	**Keynote 1:** *My Journey through Education with Adaptive Technology* **Professor Robert Greenberg** - Pro Vice-Chancellor for the College of Human and Social Futures, University of Newcastle
9:35am – 9:55am	**Keynote 2:** *How mathematics and STEM drive one another* **Eddie Woo –** Leader, Mathematics Growth and Mathematics Teacher
9:55am – 10:15am	**Keynote 3:** *Quality Teaching in STEM Education* **Professor Jenny Gore –** University of Newcastle
10:15am – 10:35am	**Keynote 4:** *Thoughts on the future of education beyond GenAI* **Associate Professor Erica Southgate –** University of Newcastle
10:35 – 11:55am	**Keynote Presentation 5:** *Unlocking the Secret History of Ed-Tech* **Brett Salakas** - HP Education Ambassador

11:55am – 11:20am	**Morning Tea, Networking and Expo (25-minutes)**

Deep-Dive Session (3-hours + lunch)

11:20am – 12:20pm	Deep Dive session (List below)
12:20pm – 1:20pm	**Lunch, Networking and Expo Break (1-hour)**
1:20pm – 2:20pm	Deep Dive session continued
2:20pm 2:30pm	**Comfort Break (10-minutes)**
2:30pm – 3:30pm	Deep Dive session

STEM 2024 Keynote Synopsis

Keynote 1: *My Journey through Education with Adaptive Technology*

Professor Robert Greenberg – Pro Vice-Chancellor of the College of Human and Social Futures, University of Newcastle

Having gone blind gradually over time, Professor Robert Greenberg describes his journey to break the glass ceiling of the academy through his embrace of screen readers, talking smart phones, and a belief that blindness is just another trait rather than a defining characteristic. While technology has gone a long way in leveling the playing field, attitudinal barriers stubbornly remain and preclude employability opportunities. Professor Greenberg describes how to navigate this complex space with the hope to inspire teachers in STEM fields to embrace the technology and believe in their students with disabilities.

Keynote 2: *How mathematics and STEM drive one another*

Professor Eddie Woo – Leader STEM Growth Team and Mathematics Teacher

Since schools are structured in faculties and we as teachers are grouped by our subjects, it's easy to think of the STEM disciplines in isolation from each other. Mathematics in particular, can often feel like it is the odd one out. In this keynote we will broaden our understanding of what mathematics really is and show how mathematical thinking is vital to every STEM project.

Keynote 3: *Quality Teaching in STEM Education*

Professor Jenny Gore – UoN School of Education

Behind every great scientist is a great education – which is why the quality of teaching matters in STEM, as it does in every field. In this presentation, Professor Gore provides an overview of research conducted over the past ten years on (1) student aspirations for STEM futures and (2) ways to improve the quality of teaching. The aspirations research highlights gender as a key factor and signals the importance of nurturing students in STEM classes. The quality teaching research found significant improvements in the quality of teaching, how teachers feel about their work, and

student achievement. Importantly, after professional development focused on Quality Teaching, student achievement growth (in mathematics and reading) was 25% greater than it was for students in matched control groups. The results were also slightly greater in disadvantaged contexts. Using her team's current projects on teacher induction and thriving schools, Jenny draws on interviews with science teachers to illuminate the potential of this work for ensuring a great science education for all.

Keynote 4: *Thoughts on the future of education beyond GenAI*

Associate Professor Erica Southgate – UoN School of Education

Erica Southgate is Associate Professor of Emerging Technologies for Education (University of Newcastle, Australia). She is a technology ethicist, maker of award-winning computer games for literacy and lead author on the Australian Government commissioned report, 'Artificial Intelligence and Emerging Technologies in Schools.' Erica is founder and lead researcher on the VR School Study, the first and longest running research on embedding VR into school classrooms. She is author of 'Virtual Reality in Curriculum and Pedagogy: Evidence from Secondary Classrooms' (Routledge). Currently Erica is Lead Investigator on the Australian Research Council funded project, Equipping Australian teachers today to face AI tomorrow. This presentation will canvas and reflect on key trends in automated education, asking pedagogical, curriculum and ethical questions of AI technology.

Keynote 5: *Unlocking the secret history of Ed-Tech*

Brett Salakas – HP Education Ambassador

What if the everyday technology in your classroom held secrets from the past — secrets powerful enough to break down barriers to student success? Join Brett Salakas, HP Education Ambassador for Australia and New Zealand, on a journey through time, revealing the surprising origins of the tools we use every day. Discover how innovations born from Cold War intrigue have evolved into the essential tech driving modern education. In this thought-provoking session, you'll gain a deeper understanding of the untapped potential in your hands and learn how to wield it to "tear down the walls" that keep your students from reaching their fullest potential. Get ready to see technology — and teaching — in a whole new light.

STEM 2024 Deep-Dive Synopsis

Deep-Dive 1: *Learning through Collaborative Problem-Solving*

Daniel Proctor - Deputy Principal Instructional Leader, Gloucester High School
Jocelyn Wray-Davis - Science teacher, Gloucester High School

During this session participants will engage with collaborative problem-solving activities in Science and Mathematics. Based on the principles of Peter Liljedahl's Building Thinking Classrooms, participants will work in different roles with different participants. No death by PowerPoint here. Participants can expect to be out their seats and thinking hard. Participants will walk away with easy-to-use ideas for lesson activities and a greater understanding of deep connected learning.

Audience: K-12

Deep-Dive 2: *From dry to awesome - make STEM concepts come alive with random materials*

Ben Newsome CF - Fizzics Education.

Science journal articles are filled with amazing discoveries... but they also can be rather dry to a student. Challenge yourself in this session as we look at science articles and flip them into teachable lessons using random materials and your creativity. Prepare to fail forwards as we trial lessons on the fly... and have some fun in the process.

Audience: K-12

Deep-Dive 3: *Mars Rover Missions: Integrating the Giant Aldrin Maps and Lego Spike Prime Robotics*

Shane Dryden - STEM Project Officer, Hunter Academy of STEM Excellence
Ben Moore - STEM Project Officer, Newcastle Academy of STEM Excellence

Be guided through an immersive session on utilizing the Giant Aldrin Mars Map to get students excited about coding, apply their knowledge to a set of engaging challenges, and grow their STEM aspirations through Mars exploration. Providing a hands-on tour of resources to support students in learning about and interacting with, Mars' topography while integrating Lego Spike Prime robotics into STEM learning. Guided through the step-by-step process of constructing, coding, and remotely piloting a Lego Spike Mars rover, advancing student skills from beginner to experienced coder

through remote piloting and automated rover missions. Students can utilise a mix of block and text-based coding, enabling learners to progressively build their coding proficiency. Get ready to launch your classroom on an educational mission to Mars!

Audience: Stage 2-5 teachers

Deep-Dive 4: *Leading Effective Curriculum Implementation (LECI) in STEM*

Belinda Norrie - Curriculum Reform Adviser, Curriculum Secondary Learners
Sandra Moore - STEM Enrichment Adviser, Curriculum Secondary Learners
This three-hour workshop will provide STEM leaders with a 'deep dive' on the six LECI eLearning modules. The workshop will focus on how to build whole school collective efficacy using evidence-based NSW Department of Education curriculum resources, advice and support. Participants will be supported to strengthen their leadership approach to change and plan for curriculum implementation as part of the teaching and learning cycle. Participants will be supported to plan for STEM centred high impact professional learning (HIPL) and identify ways to evaluate the impact for ongoing sustainability. Together, we will consider how effective curriculum implementation can be harnessed as an opportunity to strengthen leadership practice in STEM and foster a culture where every learner receives a high-quality education that enables them to excel.

Audience: K-12. Written for secondary but suitable for primary teachers, SLSOs and school leaders.

Deep-Dive 5: *FREE is my Second Favourite 'F' Word*

Brett Salakas – HP Education Ambassador
Channelling the no-nonsense energy of Roy Kent from Ted Lasso, this workshop is all about empowering teachers with AI tools that are not only powerful but also completely FREE. This session will showcase a range of cutting-edge tools that you can start using in your classroom right away. The stars of the session will be a suite of Adobe products, including the new Podcasting tools, AI Enhanced Speech, and Voice Animate, perfect for bringing creativity and innovation to your lessons. Alongside these, you'll be introduced to a variety of other free resources (like Snorkl and more) all designed to enhance your teaching practice without breaking the bank.

Join this lively and interactive workshop to walk away with a toolkit of free AI resources that will make a real difference in your classroom.
Audience: K-12

Deep-Dive 6: *Building STEM-Rich Classrooms - Integrating Robotics and the Scientific Method in K-6*

Olivia Clarkson - Team Leader, SMART Program
Megan Walker - Tour Leader, SMART Program

This deep dive will explore at elements of the SMART Program, including STEM workshops, robotics and science shows catered to a primary school audience. Specifically, the SMART Team will explore how to build a STEM workshop with strong syllabus links, how to use experiments to explore scientific inquiry and the scientific method, and exploring various forms of robotics and how they can be used to meet outcomes in the 'Design and Digital Solutions' content in the new syllabus.

Audience: K-6 teachers

Deep-Dive 7: *The Science and Engineering Challenge experience*

Mick Cassey - Events manager, UoN Science and Engineering Challenge
Lisa Campbell - Team Leader, UoN Science and Engineering Challenge
Anna Popowicz - Team Leader, UoN Science and Engineering Challenge
Pete Newman - Team Leader, UoN Science and Engineering Challenge

This three-hour workshop will give you an insight into how the United Nations award winning Science and Engineering Challenge operates nationally and conducts activity development for their workshop style activities. The Challenge has a long history of collaboration with community, industry and universities to deliver their program and develop activities for stages 3,4 and 5. You will also have the opportunity to work in a small group to build a bridge then test it on the bridge apparatus just like students do on event days. You will also work through the programs highly successfully Fish Traps activity. Fish Trap is a First Nations themed STEM activity that was developed in conjunction with Deadly Science and has been run nationwide this year.

Audience: Stage 3- 5

Deep-Dive 8: *Canva for Education: Unlocking Creative Potential in the Classroom*

Kylie Burrett - Canva Teacher Canvassador

In this immersive professional development session, educators will take a deep dive into Canva for Education, exploring tools and features that can transform teaching and learning experiences.

Participants will learn how to create visually engaging resources, interactive presentations, and collaborative projects tailored to their students' needs. This session will cover strategies for designing worksheets, assessments, and classroom materials that foster creativity and engagement. By the end, educators will feel confident using Canva to enhance their digital literacy and improve student outcomes in both traditional and virtual classrooms.

Audience: Stage 2-5 teachers

Deep-Dive 9: *Autonomous robotics for primary and high schools in the context of RoboCup Junior*

Dr Aaron Wong – AI Engineering Manager at 4AI Systems and Technical Chair RoboCup Junior Hunter Region.

RoboCup Junior is a project-oriented educational initiative that sponsors local, regional, and international robotic events for young students. It is designed to introduce RoboCup to primary and secondary school children. Created in a true cooperative spirit, RoboCup Junior encompasses not only vital STEM skills, but extends right across a school curriculum. In this workshop, Stage 3-5 teachers will use the Lego Mindstorm EV3 platform. You will learn how to use the EV3 onboard sensors, as well as design and implement the code to complete the main tasks required to participate in the Rescue League of RoboCup Junior. Join this highly interactive and hands-on session and be a champion for autonomous robotics.

Audience: Stage 3- 5

Deep-Dive 10: *The Mini EV Festival - Solar Boats and Cars*

Peter Melling - Lambton High School Teacher and Hunter Innovation and Science Hub member

Join us for a comprehensive professional learning session centred around the Mini EV Festival, where educators will immerse themselves in the innovative world of electric vehicles (EVs) through a hands-on, design-thinking approach.

Participants will explore the history and growth of EV festivals and their impact on STEM education, utilizing current car resources to inspire creative teaching methods. The session will emphasize the importance of connecting to the community, engaging educators in collaborative design thinking with solar boat resources to develop projects that foster local partnerships.

The experience culminates in teamwork and experimentation, where participants will construct and test solar-powered models, applying their design concepts to tackle real-world challenges. This

immersive session aims to equip educators with the skills and knowledge to inspire their students in STEM and sustainable technology while promoting teamwork and community engagement.

Audience: Stage 2 – Stage 5

Deep-Dive 11: '*Thinking Critically' about STEM*

Dr Ian Dunlop – Mathematics and physics teacher, Hunter School of Performing Arts
Cassandra Portelli and **Simone Richardson** – Secondary Mathematics Support Officer, Mathematics retraining program, University of Newcastle Affiliate

As a general capability, critical and creative thinking enhances students' understanding of content and skills across multiple disciplines. Join this workshop to explore *Critical Thinking*, the Department-approved elective course featuring core topics like *Solving problems of today and tomorrow*, *Recreating the human mind: The future of artificial intelligence (AI)*, and *Conspiracy theories: Where are the facts?*
In this Deep Dive, you'll meet a teacher currently implementing the *Critical Thinking* course, learn from his experiences, tackle thought-provoking challenges, engage in dynamic debate, and workshop ways to introduce the course with a STEM focus. The session concludes with collaboratively designing a scope and sequence that meets outcomes and inspires students.

Audience: Primary and Secondary Teachers

Deep-Dive 12: *STEM in Action: Empowering Educators to Shape Tomorrow's Innovative Engineers*

Engineering Australia

This dynamic 3-hour workshop is designed to equip STEM educators with insights and tools to inspire the next generation of engineers. Through three engaging sessions including engineering awareness, engineering in the classroom and engineering in the industry, where participants will explore the critical role engineering plays in society, classroom strategies, and industry trends.

Audience: Primary and Secondary Teacher