



Science, Technology and Education News from Australia, November 2018

Table of Contents

1. Science and Technology Developments	1
<i>UNSW quantum team delivers again</i>	1
<i>\$3.5M for mine drone startup</i>	1
<i>Lithium Australia to apply technology in Europe</i>	2
<i>Tech giants warn Australia against law to break encryption</i>	2
2. Education and Science Policy	2
<i>Shorten offers big lift in science</i>	2
<i>U-turn on research funding as Coalition pushes 'national interest test'</i>	3
<i>Hydrogen partnership to benefit R&D, jobs, exports</i>	3
<i>The Woman Putting Australia Into Space</i>	3
<i>CSIRO invests \$35M in future of space and AI for Australia</i>	3
<i>Digital strategy by end of the year</i>	3

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1. Science and Technology Developments

UNSW quantum team delivers again

A research team led by “Australian of the Year” Professor Michelle Simmons has published breakthrough research in the journey toward silicon-based quantum computing technology. The research demonstrates a new compact sensor technology for reading information stored in the electrons of individual atoms. Such a sensor is critical to achieving scale and, ultimately, commercial potential for quantum computing initiatives. Simmons believes this research leads to the point where sensitivity is good enough to perform any error correction needed to achieve a scalable quantum computer. Simmons’ team works at the Australian Centre of Excellence for Quantum Computation and Communication Technology (CQC2T) at the University of New South Wales (UNSW), which feeds its intellectual property into Silicon Quantum Computing Pty Ltd (SQC), Australia’s first quantum computing company. SQC is an alliance of government, corporate investment and university research, and has a current objective to build a silicon-based 10-qubit demonstration system by 2022.

Click [here](#) to read the article.

\$3.5M for mine drone startup

Emesent, a drone autonomy spin-off from CSIRO, has raised \$3.5 million in venture capital to commercialise its first product, Hovermap. Developed by former researchers from CSIRO’s Data61, Hovermap automates the collection of data in underground areas too dangerous or difficult for people to survey or navigate, such as stopes or ore passes in mines. Drones installed with Hovermap can be deployed in GPS-denied environments without a human controller



to create 3D maps, and record gas readings, videos and images. Last year, Hovermap enabled the world's first fully autonomous beyond line-of-sight drone flight in an underground mine, 600 metres below the surface of Western Australia. Emesent is partnered with CSIRO's Data61 to compete in the US Defense Advanced Projects Agency's (DARPA) new Subterranean Challenge, which aims to develop innovative technologies to rapidly map, navigate and search underground environments. The real world applications of this technology extends beyond mining and can be integrated into industries such as underground rail and road transport, telecommunications, and disaster response.

Click [here](#) to read the article.

Lithium Australia to apply technology in Europe

With its recent breakthrough production of lithium-ion battery cathode powders from waste mica minerals sourced from Kalgoorlie, the ASX listed Lithium Australia is now eyeing similar micas in Europe. The company's technology manages to leapfrog a number of expensive, traditional stages along the lithium processing route. Not only does it dispense with the need for expensive, energy hungry roasting of the ore to extract the lithium, but it also skips the challenging and very costly stage of producing lithium carbonate or lithium hydroxide – and can now potentially do this using largely unwanted waste material. Earlier this month, Lithium Australia produced a product containing between 90% and 95% lithium phosphate at its second generation pilot plant trial at ANSTO Minerals' facility in New South Wales.

Click [here](#) to read the article.

Tech giants warn Australia against law to break encryption

Digital giants led by Google, Facebook and Amazon have warned Australia against passing a “fundamentally flawed” law allowing security services to spy on encrypted communications among suspected criminals and terrorists. In a submission sent to parliament and made available to AFP, the Digital Industry Group Inc (DIGI) said the legislation proposed by Australia's government would undermine rather than enhance the nation's security. The bill, currently under consideration by a parliamentary committee, would give security agencies wide powers to force telecommunications and technology companies to give them access to encrypted devices and messaging apps. The group suggested a series of amendments, including the need for all security agency demands to be approved by an independent judge; that they do not require providers to build weaknesses into their systems or products; or impose “new data retention and interception capabilities”.

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2. Education and Science Policy

Shorten offers big lift in science

Opposition leader Bill Shorten would return science to the centre of government decision-making if elected at the next Federal elections and drive central efforts to lift the nation's spending on research and development by billions of dollars annually to 3 per cent of the GDP by 2030. In a landmark speech to the Australian Academy of Sciences in Canberra, Shorten also outlined a plan to resurrect the Hawke-Keating era model for a Prime Minister's Council for Science and Innovation that would develop big national research goals, with a National Scientific Expert Panel to provide advice on the day-to-day policy issues across the economy. A future Shorten government would also undertake “once in a generation, root and branch” review of research in Australia, with six of the nation's top scientists – including former Australian Government Chief Scientist Professor Ian Chubb – already named to the review panel, six months out from the election. Shorten railed against the “anti-science attitude in the current political discourse”. Meanwhile, just hours before the Opposition leader outlined plans for a Council on Science and Innovation, the Prime Minister Scott Morrison announced plans to restructure the Commonwealth Science Council into a National Science and Technology Council. The new council would identify Research Challenge projects and oversee horizon-scanning reports into long-term science and technology priorities, providing expert advice on issues such as health, emerging technologies and education.

Click [here](#) to read the article.

On the same topic, [Academy welcomes Labor's commitment to science](#)



U-turn on research funding as Coalition pushes 'national interest test'

The federal education minister has restored funding to three vetoed Australian Research Council grants and unveiled details of the new “national interest test” to apply in future rounds. In a statement Dan Tehan claimed the funding had been restored because the projects were “now markedly different”, but Labor argued they had simply been renamed. Tehan also revealed details of the national interest test to be applied to future grant rounds, “Applicants will be asked to explain the extent to which the research contributes to Australia’s national interest through its potential to have economic, commercial, environmental, social or cultural benefits to the Australian community,”. Where previously applicants were asked to state the “benefit and impact” of their research, they will now be required to provide a short 100- to 150-word statement in “plain English” against those criteria, he said.

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Hydrogen partnership to benefit R&D, jobs, exports

CSIRO, Australia's national science agency, will partner with Fortescue Metals Group (Fortescue) on hydrogen technologies to support the development of new industries, create jobs and pave the way for low emissions export opportunities. The centrepiece of the \$20m partnership is an investment in CSIRO's metal membrane technology, which enables ammonia to be used as a carrier material for hydrogen storage and transport. The agreement includes commercialisation arrangements for the membrane technology, with a subsequent five-year investment in hydrogen R&D. CSIRO's National Hydrogen Roadmap, released earlier this year, provided a coordinated blueprint for growing Australia's hydrogen industry and found that an economically-sustainable hydrogen industry could soon be a reality.

Click [here](#) to read the article.

The Woman Putting Australia Into Space

Australia is late to the space party. The leader of its new space agency, Megan Clark, said so herself. This continent, at the perfect location in the southern hemisphere to peer into the galaxy, has been one of the last developed countries to get a space agency, and she could not figure out why. So, last year, Clark led an expert review board to determine Australia's space capabilities, and what they found surprised them. The size of the existing industry was much larger than previous estimates. The Australian Space Agency officially got its start a few months later with Clark named as its first chief executive. She now oversees a plan to triple the value of the Australian space industry to between \$7 billion and \$9 billion a year by 2030. The agency has signed memorandums of understanding with space agencies in France, the United Kingdom and Canada, been commended in a resolution in the United States House of Representatives that promised further cooperation and signed a statement of intent with Airbus.

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CSIRO invests \$35M in future of space and AI for Australia

Australia's national science agency, CSIRO, is investing \$35M in frontier research in Space Technology and Artificial Intelligence. Space Technology will receive \$16M to identify and develop the science to leapfrog traditional technologies and find new areas for Australian industry to work in. Artificial Intelligence and Machine Learning will receive \$19M to target AI-driven solutions for areas including food security and quality, health and wellbeing, sustainable energy and resources, resilient and valuable environments, and Australian and regional security. The investment is part of CSIRO's Future Science Platforms (FSP) portfolio, aimed at dedicating research to new and emerging opportunities for Australia. Space Technology and Artificial Intelligence join eight other areas of future science, including in the fields of health and energy. By 2022, the CSIRO Future Science Platforms program will have invested \$205M since it was launched in 2016.

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Digital strategy by end of the year

Industry Minister Karen Andrews has confirmed that the federal government's Digital Economy Strategy is on track for release before the end of the year. The publication of the strategy document will come more than a year after it was commissioned in September 2017 by then industry minister Arthur Sinodinos. The strategy was then handed to Michaelia Cash when she took the industry portfolio, before being passed to Ms Andrews, who was promoted to Minister for Industry, Science and Technology as part of Scott Morrison's Cabinet reshuffle in August. When released, the strategy will provide case studies of how the digital economy can benefit different industries, such as agriculture,



education and health. The Opposition has previously taken government to task for the prolonged release of the initiative saying it was evidence that the government has failed to deliver on its signature innovation agenda.

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