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# Science, Technology and Education News from Australia, January 2019

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## 1. Science and Technology Developments

**TPG ceases mobile rollout following the Australian government's decision to ban companies from using Huawei equipment to build 5G networks**

TPG Telecom has called it quits on rolling out its mobile network in Australia, following the Australian government's decision to ban companies from using Huawei equipment to build 5G networks. It has spent to-date approximately $100 million in using Huawei equipment to build out what was meant to be Australia's fourth largest mobile network. It was expected to compete head to head with the likes of Telstra and Optus. Prior to August 2018, TPG purchased equipment for 1,500 sites and has fully or partially completed the implementation of just over 900 small cell sites. However, due to the government's decision to ban the use of Huawei equipment in late August 2018, TPG's path to upgrading its network to 5G is now blocked. With Huawei now out of the picture, Australia's telco companies now only have the option to choose from two equipment providers – Nokia and Ericsson. Telstra had confirmed in October that it was partnering with Ericsson for its 5G mobile rollout, while there are speculations that Nokia is the frontrunner provider for Optus.

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### New analytics platform to help future-proof farms

Australia's national science agency, CSIRO and rural technology start-up Digital Agriculture Services (DAS) launched an innovative new platform that combines artificial intelligence, machine learning and cloud-based geospatial technology to deliver reliable, independent and robust farm data and analytics. The Rural Intelligence Platform is the first ever software to comprehensively assess and monitor rural land anywhere in Australia, drawing on information from trusted data sources on productivity, water access, yield, land use, crop type, rainfall, drought impact and more. DAS estimates that annually around $125 billion in agricultural economic decisions in Australia are based on unreliable or incomplete data. The market for digital agriculture in the Asia Pacific region is estimated to be worth $10-25 billion by 2028, fueled by pressure to meet challenges from population growth and climate change.

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### Space technology predicts droughts several months in advance

Scientists from the Australian National University (ANU) have used new space technology to predict droughts and increased bushfire risk up to five months in advance. They used data from multiple satellites to measure water below the Earth's surface with unprecedented precision, and were able to relate this to drought impacts on the vegetation several months later. This new approach - by looking down from space and underground - opens up possibilities to prepare for drought with greater certainty. It will increase the amount of time available to manage the dire impacts of drought, such as bushfires and livestock losses. The drought forecasts will be combined with the latest satellite maps of vegetation flammability from the Australian Flammability Monitoring System at ANU to predict how the risk of uncontrollable bushfires will change over the coming months. The team used data from the Gravity Recovery and Climate Experiment (GRACE) satellites, which were recently decommissioned. In future, researchers will be able to use data from the GRACE Follow-On satellites, which were launched into space last year.

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### Robots of the future: more R2D2 than C3PO

Researchers from Australia's national science agency, CSIRO, have offered a bold glimpse into what the robots of the future could look like. And it's nothing like C3PO, or a T-800 Terminator. In a paper just published in Nature Machine Intelligence, CSIRO's Active Integrated Matter Future Science Platform (AIM FSP) says robots could soon be taking their engineering cues from evolution, creating truly startling and effective designs. This concept, known as Multi-Level Evolution (MLE), argues that current robots struggle in unstructured, complex environments because they are not specialised enough, and should emulate the incredibly diverse adaptation animals have undergone to survive in their respective environment. The end result would be simple, small, highly integrated, highly specialised, and highly cost-effective robots precision engineered for their task, environment, and terrain. That adapt on their own and automatically improve their performance. MLE's approach to designing the robot would entirely depend on the terrain, climate and other factors. CSIRO initiated this collaboration with international researchers to understand the nature of the future in robotics.

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## 2. Education and Science Policy

### Panel of experts to review fish kill announced

In response to a specific request from the Leader of the Opposition, the Australian Academy of Science, in consultation with the other learned academies, has convened a group of experts to provide scientific advice on the fish deaths in the Murray–Darling river system. The expert panel has commenced work immediately to prepare independent scientific advice to support decision making aimed at creating and maintaining a healthy river system in Australia. Australian Academy of Science President, Professor John Shine, said the expert panel is multidisciplinary in nature and is drawn from the distinguished fellowships of the four learned academies. The advice from the expert panel will be provided to the Opposition Leader by 10 February 2019.

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## Supporting cutting-edge research

The Morrison Government, via Minister for Education Dan Tehan, announced A$5 million funding for 11 new research partnerships for new cutting-edge research to enhance cybersecurity and to protect domestic smart devices from cyberattacks. These projects will receive funding through the Australian Research Council (ARC) Linkage Project's scheme which supports research that brings universities and businesses together to conduct critical research collaborations that address issues affecting society.

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## Go8 welcomes Government's commitment to research infrastructure but denounces RBG cuts

The Group of Eight (Go8), comprising Australia's research-intensive universities, welcomes the Government's continued commitment to national research infrastructure with Education Minister Dan Tehan's confirmation of funding of $10 million for six projects. "While it is reassuring to see the Government's continued commitment to research infrastructure funding, this commitment is undermined by cuts announced just last month to research funding. The cuts to Research Block Grant funding of $328.5 million over three years is counterproductive to ensuring we continue to do research which changes and saves lives and adds to the economy", Go8 Chief executive Vicki Thomson said. An economic analysis undertaken for the Go8 by London Economics showed that every $1 of Go8 research income delivers almost $10 in benefits to the private sector. Go8 universities are involved in all six projects announced, and are lead agents for the following four: the Australian Plant Phenomics Facility (The University of Adelaide), Heavy Ion Accelerators (The Australian National University), the Australian Phenomics Network (The Australian National University), and the Terrestrial Ecosystem Research Network or TERN (The University of Queensland).

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## War of words on the AI front

As if anyone needed reminding that a federal election looms, a war of words has broken out between the offices of Industry Minister Karen Andrews and shadow human services minister Ed Husic over a briefing on artificial intelligence. Late last year, Husic approached Andrews' office seeking a briefing on the progress of an AI technology roadmap report being prepared by the CSIRO unit Data61 and the Department of Industry. The request was knocked by the Minister's office – not once but repeatedly – according to Husic. The government ear-marked A$29.9 million toward improving Australia's capability in AI and machine learning. While the lion's share of this funding was to have been distributed through AI and machine learning projects with the Cooperative Research Centre program, about $3 million was directed to Data61 to produce an AI technology roadmap and an AI Ethics Framework. It is understood the Artificial Intelligence Technology Roadmap report should be completed and released to the public within four to six weeks, while the AI Ethical Framework will likely take longer. It is understood that a paper will be published, to be followed by a consultation period to give the public a chance to understand what is being proposed.

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## 'Enormous' skills shift needed

The government needs to invest in and support an "enormous" skill shift to help Australians adapt to the future of work, a new Google-commissioned report has found. The report found that Australian education providers will need to alter their teaching models and skills on offer, with significant government support required to do this successfully. To keep pace with technological change and adapt to new skills needed to complement the growing prevalence of artificial intelligence and automation, Australia will need to double its total investment in education and training. The report suggests the average Australian will increase learning by a third across their lifetime. The report analysed recent changes in more than 300 jobs, 2,000 work tasks and more than 500 skills that were required to complete the tasks. It found that there will need to be large amounts of reskilling and upskilling to meet the needs of the future of work, with skills that complement new technologies needed rather than those that compete with them.

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