



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

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## 1. Science and Technology Developments

### **New \$5m research project to treat ‘untreatable’ cancers**

Cancer patients in Australia may soon have earlier access to revolutionary, highly targeted new treatment options through a \$5.1M research partnership between the national science agency CSIRO and GenesisCare, one of Australia's largest cancer care providers. Using an emerging area of science called theranostics, the project aims to develop new therapies against some of the most fatal and difficult-to-treat cancers affecting Australians, using agents that act like 'homing missiles' to find and latch onto target markers on cancer cells. Using theranostics, which combines molecular level diagnostics and therapy, CSIRO project lead Professor Rose said the project will aim to discover cancer cells' unique signatures, then design special molecules to find and attach themselves to those cells. Cancer remains the leading cause of death in Australia, with almost 50,000 deaths from cancer estimated in 2019, including 3051 deaths from pancreatic cancer, 1549 deaths from brain cancer, and 1046 deaths from ovarian cancer anticipated this year alone. The new research project forms part of CSIRO's Probing Biosystems Future Science Platform and builds on CSIRO's expertise in cancer biomarker research.

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



## Research reveals you could be unknowingly loading malicious content from "trusted" sites

New research from CSIRO's Data61, the data and digital specialist arm of Australia's national science agency, questions the 'trustability' of websites and in a world first quantifies the extent to which the trust model of today's World Wide Web is fundamentally broken. Researchers found that around half of the Internet's most popular websites are at risk of malicious activity because they depend on a chain of other third parties to import external resources — such as ad providers, tracking and analytics services and content distribution networks — which are often required to properly load content. These third parties can further load resources from other domains creating a dependency chain of up to over 30 domains, underpinned by a form of implicit trust with the original website. The research found that the larger the dependency chain, the greater the threat to malicious activity. The research also found that 1.2 per cent of third parties linked to the top 200 thousand websites were suspicious. Popular web resource Javascript, generally used to improve the user experience of the web, represents the greatest risk of malicious activity as they are designed to be executed undetected.

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

## Australia Appoints Cabinet Member Focusing on Fintech

The Australian Prime Minister Scott Morrison has appointed Senator Jane Hume as a cabinet member responsible for overseeing financial services and financial technology. Sen. Hume will assume the office of Assistant Minister for Superannuation, Financial Services and Financial Technology. She will concentrate on different matters on financial regulation, including open banking and credit reporting. Sen. Hume's appointment comes at a time when Australia falls behind in terms of startup ecosystem. Sydney dropped six places to the world's 23rd best startup ecosystem in the world while Melbourne failed to reach in the top 30, according to the latest Startup Genome report released early this month. Alex McCauley, the CEO of StartupAUS, a non-profit organization, commented that the result was "disappointing." From being 16th in the world in 2015, Australia's leading ecosystem slipped to 17th in 2017. Now, the rest of the world is overtaking the country, McCauley said.

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

## New research could lead to tuberculosis drug breakthrough

Researchers have made a breakthrough that could lead to a more effective treatment for tuberculosis, which remains one of the top 10 causes of death worldwide, according to the World Health Organization. A team of scientists, including Professor Colin Jackson from The Australian National University (ANU), has solved the mystery of how a cofactor called F420, found in the bacterium behind tuberculosis, is made. Cofactors like F420 help enzymes to speed up chemical reactions. Professor Jackson said this breakthrough could help identify new drug targets for tuberculosis. "For decades, people have been unsure about how F420, has been made" Prof Jackson said. "Understanding its make-up could allow us to better target the disease in patients. This is particularly significant as TB is the world's deadliest infectious diseases, claiming over one million lives each year." Now researchers know how the cofactor is made in Mycobacterium tuberculosis, they can also produce it in other organisms - helping unlock safer and cleaner biotechnology applications. Their research has been published in the journal Nature Communications.

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

## Plant discovery opens frontiers

University of Adelaide researchers have discovered a biochemical mechanism fundamental to plant life that could have far-reaching implications for the multibillion dollar biomedical, pharmaceutical, chemical and biotechnology industries. There are up to 80,000 fundamental-to-life enzymes working in plant or mammalian bodies, upon which almost all biochemical reactions depend. Enzymes carry out many chemical reactions, products of which can be used as building blocks or metabolites in a body, or they can serve as an energy source for every function in a body. Researchers have discovered a new enzyme catalytic mechanism – catalysis being a process which speeds up chemical reactions – which they say could impact on work in biofuels production, in food and materials processing, and in drug discovery. Their work has been published today in Nature Communications.

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



## **New single vaccination approach to killer diseases**

Scientists from the University of Adelaide's Research Centre for Infectious Diseases have developed a single vaccination approach to simultaneously combat influenza and pneumococcal infections, the world's most deadly respiratory diseases. The researchers say a single vaccination – combining vaccines from the new class of vaccines they are developing – will overcome the limitations of current influenza and pneumococcal vaccines used around the world. Published today in the prestigious journal *Nature Microbiology*, they have shown that the new Influenza A virus vaccine under development (based on inactivated whole influenza virus) induces enhanced cross-protective immunity to different influenza strains, when it is co-administrated with the new class of pneumococcal vaccine. They showed the enhancement in immunity is associated with a direct physical interaction between the virus and the bacterium. Commercial development of the new class of vaccines is being undertaken by two University of Adelaide-associated Biotech companies, Gamma Vaccines Pty Ltd and GPN Vaccines Pty Ltd, respectively.

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

## **'Submarines' small enough to deliver medicine inside human body**

Chemical and biomedical engineers from the University of New South Wales (UNSW) have shown that micro-submarines powered by nano-motors could navigate the human body to provide targeted drug delivery to diseased organs without the need for external stimulus. In a paper published in *Materials Today*, the engineers explain how they developed micrometre-sized submarines that exploit biological environments to tune their buoyancy, enabling them to carry drugs to specific locations in the body. Corresponding author Dr Kang Liang, with both the School of Biomedical Engineering and School of Chemical Engineering at UNSW, says the knowledge can be used to design next generation 'micro-motors' or nano-drug delivery vehicles, by applying novel driving forces to reach specific targets in the body.

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

## **2. Education and Science Policy**

### **Minister for Industry, Research and Technology, Karen Andrews outlines first 100 days**

Job creation and building industrial capacity would be central themes for the Morrison government across portfolios, newly reappointed Industry, Research and Technology Minister Karen Andrews says. In the next weeks, Ms Andrews expects to have built out a 100-day plan for each of the three pillars of the portfolio – Industry, Science and Technology. By the end of that period she expects to have completed policy mapping for the rest of the three year term. At the top of the agenda are big ticket decisions to be made about Australia's approach to AI capability, the potential for procurement reform to improve industry outcomes of government spending, and a re-think of what comes next for the National Innovation and Science Agenda, which will complete its four-year horizon at the end of the year. Ms Andrews said National Science and Technology Council member Prof Genevieve Bell had been appointed to lead a panel considering opportunities for Australia in the development of AI sovereign capability and was expected to meet in the next two weeks. The NSTC, which is chaired by the Prime Minister with Mrs Andrews as deputy chair, in February appointed Prof Bell to conduct further thinking on two Data61 reports – the first an AI roadmap for the country, and the second an AI Ethical Framework whitepaper.

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



## ANSTO precinct gets \$12.5m boost

Newly-appointed New South Wales (NSW) Innovation minister Kevin Anderson has unveiled a further \$12.5 million investment toward the expansion of the deep tech-focused Innovation Precinct the Australian Nuclear Science and Technology Organisation (ANSTO) at Lucas Heights. Mr Anderson reaffirmed this week the expansion of the Nandin deep technology incubator, a first of its kind incubator aimed squarely at highly technical ventures involving graduate students, industry partners and precinct tenants working together. The expansion of the Lucas Heights facility would include a next-generation nuclear medicine cluster, as well as a graduate centre, with 25 new scholarships for graduate students to develop advanced technology businesses at the innovation precinct.

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

## Transpacific partnership to drive hydrogen uptake

A new agreement between Australia and Canada will see greater collaboration between the two nations, accelerating the development of clean hydrogen technologies. CSIRO and the University of British Columbia have announced a Memorandum of Understanding aligned with the latest call to action from Mission Innovation, a global initiative of 23 countries and the European Commission working to accelerate clean energy innovation through research, development and demonstration. The collaboration will enhance research and industry partnerships between Canada and Australia on clean energy, providing opportunities for greater economic growth for both countries. Partners will share best practices and develop joint clean energy research and demonstration projects, including hydrogen refueling infrastructure. Hydrogen has the potential to significantly reduce greenhouse gas emissions and enhance the resilience of the global energy system, and could be a major clean energy commodity for Australia in years to come.

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

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