Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Embassy of Switzerland in Australia

State Secretariat for Education, Research and Innovation SERI

Science, Technology and Education News from Australia, December 2018

Table of Contents

We appreciate your feedback!
Please visit our website or contact us under canberra@eda.admin.ch

1. Science and Technology Developments

State of the Climate 2018 shows continued warming of climate and oceans

Drawing on the latest climate observations, the report provides a comprehensive analysis of Australia's climate and how it is changing. Since 1910, Australia's climate has warmed by just over 1 °C, and sea surface temperatures in the oceans surrounding Australia have increased by around 1 °C. "In line with global trends, our data shows that Australia's climate is continuing to warm, with eight of the 10 warmest years on record occurring since 2005," Director of CSIRO's Climate Science Centre Dr Helen Cleugh said. "This warming is caused by increased greenhouse gases, such as carbon dioxide, in the atmosphere". The report also provides projections for Australia's future climate which include: Further increases in sea and air temperatures, with more hot days and marine heatwaves, and fewer cool extremes; further sea level rise and ocean acidification; and decreases in rainfall across southern Australia, with more time in drought, but an increase in intense heavy rainfall throughout Australia. State of the Climate 2018 is the fifth report in a series published biennially by CSIRO and the Bureau of Meteorology.

Click here to read the article.
Click here to read the report.

Cheaper, more efficient solar technology a step closer

A new study led by The Australian National University (ANU) could lead to cheaper and more efficient solar technology. The current solar cell market is dominated by silicon-based technology, which is nearing its efficiency limit. ANU engineers, in collaboration with researchers from the California Institute of Technology, have developed a way to combine silicon with another material (known as perovskite), to more efficiently convert sunlight into electricity. The key is the way the materials are joined together to form what is known as a 'tandem solar cell' - essentially one solar cell on top of another. The ANU researchers say theirs is one of the simplest ever developed. Their structure involves one less fabrication step than standard processes, and has benefits for performance too, according to the research's co-author, Dr Daniel Jacobs. "We've already reached 24 per cent improvement in efficiency with this new structure, and there's plenty of room left to grow that figure."

Click here to read the article.
Click here to read the research paper

New optical device brings quantum computing a step closer

An international research team developed the first optical microchip to generate, manipulate and detect a particular state of light called squeezed vacuum, which is essential for quantum computation. An optical microchip has most of the basic functionality required for creating future quantum computers. Griffith University in Queensland led the project in collaboration with the University of Munster in Germany, The Australian National University (ANU) and the University of New South Wales-Canberra, supported by the Australian Research Council's Centre of Excellence for Quantum Computation and Communication Technology. The microchip - which is 1.5cm wide, 5cm long and 0.5cm thick - has components inside that interact with light in different ways. These components are connected by tiny channels called waveguides that guide the light around the microchip, in a similar way that wires connect different parts of an electric circuit.

Click here to read the article.

Turning old clothes into high-end building materials

Researchers at the University of New South Wales (UNSW) Sydney have developed an effective process to turn old clothing and textiles into high-quality building products such as flat panels. These high-end composite products can have a wood veneer look or a ceramic-style finish and were lab tested for qualities such as fire and water resistance, flexibility, acoustic and load-bearing capabilities. This follows a separate but related research exercise that converted used glass into high-quality ceramics suitable for benchtops and tiles in kitchens and bathrooms that can come in all sort of sizes, colours and finishes. Researchers led by Professor Veena Sahajwalla, Director of UNSW's Centre for Sustainable Materials Research and Technology (SMaRT), have been scientifically reforming common waste items using prototype technology developed for a laboratory-scale 'green microfactory' to be launched in 2019. Reforming old clothing and mixed waste glass into various high-quality building products represents a new way to convert low-value waste into high-value products and materials.

Click here to read the article.

2. Education and Science Policy

New members appointed to National Science and Technology Advisory Council

Six of the nation's most prominent scientists, including a Nobel Prize winner, have been appointed as board members of Australia's peak science advisory body. Professors Genevieve Bell, Barbara Howlett, Geordie Williamson and Debra Henly will join Professors Brian Schmidt and Ian Frazer on the National Science and Technology Council, which was announced recently by the Liberal National Government to boost jobs and Australian economic growth. Other members of the Council are Prime Minister Scott Morrison (Chair of the Council), Minister Andrews (Deputy Chair), Australia's Chief Scientist Dr Alan Finkel AO (Executive Officer), and Dr Larry Marshall, the Chief Executive of the CSIRO.

The Council will focus on the key science and technology challenges facing Australia, providing expert advice on issues such as health, emerging technologies and education.

Click here to read the press release.

Digital strategy quietly unveiled

The federal government has quietly released its much anticipated digital economy strategy in a document called Australia's Tech Future. The 50-page document does not make any specific recommendations, or policy changes. Instead it highlights a series of broad outcomes, from skills to open data, to government service delivery and the fundamental layer of cyber security and capability, the government is working toward to. "Embracing digital technologies will ensure Australia can continue our strong record of 27 years of uninterrupted economic growth, improve our quality of life and ensure benefit to all Australians," Industry, Science and Technology Minister Karen Andrews said. The digital economy strategy had been commissioned by former Industry Minister Arthur Sinodinos in September 2017, with the industry consultation period closing in November 2017. Shadow digital economy minister Ed Husic described the strategy as a dud, questioning the timing of its late release. "It tells you how seriously they take this, when they put out a long awaited strategy right on Christmas Eve."

Click here to read the article.
Click here to read the government's press release and here to read the publication Australia's Tech Future

Australia cuts research funding for universities

Government investment in research and development is at its lowest in 40 years. Australian scientists have expressed disappointment over an AU$328.5 million cut to research funding that had been expected over the next four years. In a budget update, the government announced that it will freeze funding increases for the programme that supports research, facilities, and training, including of PhDs, at universities. Funding for 2019 will stay the same as 2018, at AU$1.92 billion (US$1.4 billion), while the $2.17 billion budgeted for 2022 has been reduced to $2.05 billion for that year. The research funding freeze comes as the government forecasts a budget surplus of AU$4.1 billion in 2019-2020 and $19 billion by 2021-22. In his announcement about the cost-cutting measures, education minister Dan Tehan said $350 million had been invested this year to support university students in regional and remote Australia. Overall, government spending on research and development as a proportion of gross domestic product has been declining since the early 1990s. Funding for research and development is at its lowest point in 40 years, said John Shine, the president of Australian Academy of Science President, in a statement

Click here to read the article.

Adelaide HQ for space agency

South Australia has won the competitive, six-month race between the states to host Australia's space agency, with the headquarters to be based in Adelaide from 2019. The agency is to be housed in the newly-developed innovation precinct Lot Fourteen, at the former Royal Adelaide Hospital site. The federal government allocated $26 million over four years for the establishment of the agency in this year's federal budget, but did not decide on a permanent location for its base. Instead, the agency's inaugural boss Dr Megan Clark was tasked with deciding where the headquarters should be housed by the end of 2018. Every state threw its hat into the ring, kicking off intense lobbying from premiers around the country. Arguments centered on whether the agency should be based in a major city surrounded by companies and public servants like Sydney and Melbourne, in the nation's capital, or in a state with access to potential launch sites like Western Australia. South Australia won with its best-of-both-worlds bid, with a host of local space companies as well as potential for launch sites.

Click here to read the article.
Click here to read the government's press release

Keeping track for European space agency

Australia's national science agency, CSIRO, has been selected to provide maintenance and operational support for the European Space Agency's deep space tracking station at New Norcia, 130 kilometres north-east of Perth in

Western Australia. A 35-metre antenna at the tracking station, DSA-1, provides support to ESA's missions exploring our solar system. It tracks their locations, sends commands to control spacecraft, and reliably receives data collected hundreds of millions of kilometers from Earth. These missions include BepiColombo, which will explore Mercury – the closest planet to our Sun; and Mars Express, which is currently orbiting the Red Planet collecting information about its geology, atmosphere, surface environment, history of water and potential for life. ESA's ExoMars trace gas orbiter and Gaia mission are also supported.

Click here to read the article.

Gradient Institute to create ethically aware Artificial Intelligence

CSIRO's Data61, IAG and The University of Sydney announced the creation of Gradient Institute. The Institute will be an independent not-for-profit organisation founded to research the ethics of artificial intelligence (AI) and develop ethical AI-based systems. The focus for the Institute will be to create a 'world where all systems behave ethically'. This will be done not just through research, but also through practice, policy advocacy, public awareness and training people in ethical development and use of AI. The Institute will use research findings to create open source ethical AI tools that can be adopted and adapted by business and government.

Click here to read the article.