



## DISRUPTING CHINA'S TECHNOLOGY TRANSFER OPERATIONS IN AUSTRALIAN UNIVERSITIES

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**China is pursuing a national strategy focused on the acquisition of advanced technology by gaining access from foreign sources. Along with economic benefits, technological development promises to augment the future capabilities of the People's Liberation Army. Beijing is using the porousness of Australia's university system to facilitate technological modernisation. To curtail China's technology transfer operations in Australian universities, the government should adopt the Department of Defence's recommendations to strengthen the Defence Trade Controls Act, restrict visas and increase research funding.**

## CHINA'S TECHNOLOGICAL AMBITIONS

China's national strategy prioritises obtaining advanced technology with the aim of establishing itself as a technological superpower. Since 'opening up' in 1978, Beijing has sought to accelerate China's development through the acquisition of technology, mainly from foreign sources. However, in recent years, the task has become a key priority. The National Medium- and Long-Term Science and Technology Development Plan (MLP), announced in 2005, [outlines](#) China's ambition to become a global technological power. Under the MLP, industry and other sectors of Chinese society, including the People's Liberation Army (PLA), coordinate to spur technological development in targeted areas.

Beijing's policy [emphasises](#) the importance of Introducing, Digesting, Absorbing, and Re-innovating foreign technology. This policy involves targeting and acquiring foreign technology, analysing its capabilities, disseminating it to Chinese industry and encouraging its adoption in manufacturing. The MLP represents an integrated industrial policy, directed and financed by the state for the purpose of accelerating the development of China's technological capabilities.

Made in China 2025, a policy blueprint adopted in 2015, articulates the [goal](#) of becoming the world-leader in advanced industries such as aviation,

robotics, supercomputing and artificial intelligence by 2025. In accordance with China's mercantilist economic strategy, it [seeks](#) to concentrate global production of high-tech components within its borders, ensuring both its own self-sufficiency and dominance over the world market in emerging industries. This ambition was reaffirmed at the 19<sup>th</sup> National Congress in 2017, at which Xi Jinping [declared](#) China's intention to become a 'powerful nation in science and technology' by 'accelerating the development of advanced manufacturing industry'.

The strategic implications of China's drive to become a technological superpower are enormous. Along with the obvious economic advantages to be gained from concentrating global production of advanced technology within its borders, there are also huge military implications. The adoption of advanced technology could provide decisive improvements to the PLA's warfighting capabilities – threatening the military superiority currently enjoyed by the United States and its allies. This poses a serious challenge to the regional balance of power.

The PLA's leadership [appreciates](#) the importance of technological development for its future warfighting capabilities. Accordingly, Made in China 2025 [promotes](#) 'further civil-military

integration and the two-way transfer and conversion of military and civilian technologies’.

The call for integration of civilian and military technologies is a clear indication that military modernisation is a key motivator of China’s drive to become the world leader in advanced technology. As a portent of what is to come if its aspirations are realised, Beijing recently [announced](#) that it is constructing the world’s fastest wind tunnel for the purpose of testing hypersonic aircraft and missiles. The military implications of technological breakthroughs in other fields, such as robotics and artificial intelligence, make China’s technological ambitions of utmost importance. It is not in Australia’s interests for an aspiring regional [hegemon](#) to attain technologies that will provide it with decisive military advantages.

China’s ability to acquire advanced technology has been a key dimension of its meteoric rise in recent decades. Without the level of access to foreign technology it has enjoyed, it could never have caught up with the technological sophistication of other countries so rapidly. Although it now aspires to technological self-sufficiency, China, for the immediate future, remains dependent on access to foreign technology. Consequently, the sectors targeted for improvement under Made in China 2025 are

those in which China [continues](#) to lag behind other advanced countries.

To attain advanced technology China relies on an elaborate system of ‘technology transfer’ – a policy of transferring foreign technology to China through a [sophisticated array](#) of overt and covert means.

### CHINA’S TECHNOLOGY TRANSFER OPERATIONS IN AUSTRALIAN UNIVERSITIES

Australia’s university system plays a significant and unique role in China’s technology transfer operations. There are three distinct areas that should be of great concern to policymakers: formal partnerships between Australian universities and Chinese industry, the allocation of Australian Research Council (ARC) funds to projects involving Chinese defence interests and the existence of a PLA network within Australian universities.

Compared to elsewhere in the world, China’s technology transfer operations in Australia have placed a greater emphasis on the establishment of formal partnerships between Chinese industry and universities. The Torch Innovation Precinct at the University of New South Wales (UNSW), [unveiled](#) in 2016, is emblematic of this ‘special relationship’. In China, the Torch program has seen the state establish more than one hundred industrial parks, at which industry and

researchers are brought together to encourage technological innovation. The Torch Precinct at UNSW is the first to have been established outside China. It is an ambitious, \$100m project bringing UNSW into [partnership](#) with dozens of Chinese firms, at least seven of which work in industries handling technology with dual civilian and military application. One of the firms is Huawei, which in 2013 was barred from participation in the construction of the National Broadband Network due to security concerns. The UNSW Torch Precinct conducts research in a number of fields with clear military application, including advanced materials, nanotechnology, artificial intelligence and telecommunications.

Similarly, the University of Technology Sydney (UTS) has [partnered](#) with the China Electronics Group Corporation – one of China’s foremost state-owned enterprises and the principal supplier of defence electronics for the PLA. A \$20m project, the Australia China Research Innovation Centre works on a range of dual use technologies, including sensors and communications, quantum computing, artificial intelligence, autonomous systems and advanced materials.

It is vital to view partnerships between Australian universities and Chinese industry in the context of China’s aspirations to become the world’s leading technological power. These partnerships

with Australian universities are a means to expedite China’s technological development in accordance with its national strategy. Chinese funding is supplied for the purpose of steering Australian research expertise towards projects in prioritised areas, ensuring that the fruits of research will be available for Chinese industry to digest, absorb, and re-innovate.

Australian government funding, in the form of ARC grants, has also been channelled towards joint research projects between Australian universities and Chinese industry. In 2016, the ARC [awarded](#) \$400,000 to a collaborative project between the University of Adelaide and the Aviation Industry Corporation of China – China’s principal manufacturer of military aircraft – to research nanostructured carbon materials for use in the manufacture of aircraft components. Breakthroughs in this field would be of considerable use to the hypersonic military aircraft Beijing plans to test in its new wind tunnel. In the same year, the ARC also [awarded](#) \$466,000 to a collaborative project between UNSW and Huawei, researching machine-to-machine communications networks with the aim of creating a “new type of world-class wireless infrastructure”. This new infrastructure would be of great utility for espionage and military communications.

The dedication of ARC grants to collaborative projects for the ultimate benefit of Chinese defence industry is a diversion of Australia's precious research funds to the benefit of a foreign power. Though less permanent than the institutionalised collaboration between universities and Chinese firms, other [examples](#) of the ARC funding projects involving Chinese defence interests demonstrate a widespread problem. It is a redirection of the national research budget to serve interests other than Australia's.

China's technology transfer operations in Australia are not limited to collaborative research, but also include the presence of individuals with close ties to the PLA within the Australian university system. This involves a [network](#) centred on China's National University of Defence Technology (NUDT), the PLA's elite research and technology academy. Both UNSW and the University of Sydney employ engineering professors – experts on supercomputing and artificial intelligence – who are graduates of NUDT and continue to hold close relations with the institution: co-authoring numerous papers with NUDT staff and supervising NUDT graduates pursuing doctorates in Australia.

In recent years dozens of NUDT graduates have completed PhD programs at Australia's top universities in technical fields such as materials

science, robotics and computer science. After gaining their doctorates, most of these individuals have [returned](#) to China to work on military technology within PLA academies, equipped with state-of-the-art knowledge of their fields and the world-class research training offered by Australian universities.

Beijing is using the porousness of Australia's university system to further its goal of acquiring advanced technology in several ways. By funding institutional partnerships between Chinese industry and Australian universities, it gains access to Australian expertise and channels research agendas in its preferred directions, with Chinese industry poised to reap the benefits of any technological breakthroughs. China gains access to Australian government funding through ARC grants for collaborative research projects and PLA-affiliated academics employed within Australian universities. And by sending students through Australian PhD programs, Beijing gains access to elite research training and the latest knowledge in important fields.

The heavy involvement of defence industry and the PLA in China's technology transfer operations in Australian universities reveal Beijing's underlying strategic motive of acquiring advanced technology for the purpose of military modernisation. These operations pose a clear threat to Australia's national interest, not only

because they assist the technological development of a rising power, but also because they [jeopardise](#) future research partnerships between Australian universities and the US' defence sector. Australian universities are now eligible for grants from the US Department of Defense, and, in May, four were [selected](#) for defence research partnerships with American institutions for the first time. However, the continued presence of PLA-affiliated personnel in sensitive research areas could make US Defense officials reluctant to partner with Australian institutions. Australia must revise its approach to ensure that its future interests are safeguarded.

#### **POLICY RECOMMENDATIONS**

Australia must recognise the ways in which its universities are being used to further China's strategic goals and takes appropriate steps to defend its interests. To date, university administrators have proven [unwilling](#) to address concerns about their ties with Chinese defence interests, deflecting responsibility onto government. The onus is, therefore, on government to implement policies to disrupt China's technology transfer operations in Australia's universities. Three particular policy changes can assist in this endeavour.

#### *Strengthen **the** Defence Trade Controls Act*

The Defence Trade Controls Act – under [review](#) by the Department of Defence at the time of writing – exists to prevent Australia's industry, university or research sectors transferring military technology, including dual use technology, to foreign powers. When questioned about ties with Chinese military interests, university administrators have consistently noted their compliance with the Act. This simply demonstrates that the present form of the Act is insufficient to safeguard Australia's interests. As part of the review process, the Department of Defence has itself [recommended](#) that the Act be strengthened in a range of areas. The Department's recommendations, designed to address weaknesses in the Act and increase departmental oversight, should be implemented to ensure that Australian universities no longer abet the transfer of advanced technical knowledge to Chinese industry. A strengthened Act would prevent Chinese defence industry from accessing ARC funds, and place strong impediments on the manner of institutional collaboration seen at UNSW and UTS.

#### *Restrict **visas***

Restricting access to visas would be an effective means to counter the PLA network in Australia's

university system. The eligibility conditions of visas for postgraduate students in science, technology, engineering and mathematics (STEM) fields should be amended to include a national security requirement to complement the existing character requirement, as a means to deny visas to individuals with ties to the PLA or other foreign militaries. These conditions would prevent the PLA from using Australian universities as a training ground for its future technical experts. University-sponsored visas for academics should also be subject to scrutiny on national security grounds. Denying visas in such cases would disrupt the PLA's capacity to operate a network in Australian universities.

#### Increase *research* funding

Beijing's willingness to dedicate substantial funds towards research has been a major factor drawing Australian universities into partnership with Chinese industry. The Australian government should make alternative sources of research funding available for universities to reduce the temptation of Beijing's capital. As an example, in May, the government [announced](#) the Australia-US International Multidisciplinary University Research Initiative, a \$25m fund to promote collaborative defence research with American institutions. However, Australian research funding continues to [lag](#) behind other advanced countries, most of which spend twice

the proportion of their GDP to government-sponsored research. Additional increases in Australian government funding for research would further reduce the incentives for Australian universities to partner with Beijing to attain funding for their endeavours.