

Winning hearts and minds: the PRC's efforts to attract scientific talent

by Yun Jiang

Executive Summary

- Cultivating and attracting scientific talent is the focus of Xi Jinping's innovation drive, as the People's Republic of China (PRC) seeks deeper self-reliance in an era of rising strategic competition.
- While the PRC's talent-attraction policies and investment in research have lured many scientists to return, the zero-COVID policy and emphasis on ideological education and control make it more difficult for the PRC to attract and retain talent.
- As long as security and control remain the focus of Xi's policies, the challenge of attracting and retaining talent will continue.
- Overreactions by the US government to the PRC's talent-recruitment programs and the resultant suspicious research environment for scientists of Chinese heritage have perversely made the PRC a more attractive destination than it otherwise would be.
- Australia should not repeat the mistakes of the United States. It should reassure academics that they will not be targeted unfairly on the basis of their connections to the PRC. This could attract some world-class scientists who are caught between the PRC and the US.

Introduction

In recent years, scientists of Chinese heritage working in Australian universities have come under intense scrutiny. According to Australian media reports, some of these academics are "giving the Chinese Communist Party access to their technology and inventions where there is the risk they could be used for military or intelligence purposes".¹ The links of academics with the PRC were also examined in a recent Australian parliamentary inquiry.²

What is often missed in discussions about scientists of Chinese heritage is the fact that when these scientists are working in countries like Australia, they are contributing to the national development of the host country. In most cases, Beijing would prefer them to be working in PRC universities. Their presence in Australian universities is partly a result of the PRC's failure to attract and retain top-level scientists.

Since the 1990s, the PRC has rolled out talent-recruitment programs to incentivise scientists to return. The results have been poor. At the 20th National Congress of the Communist Party of China (CPC) this year, General Secretary Xi Jinping reiterated the importance of technology and the need to attract talent: "Talent [is] our primary resource".³ This phrase was even added to the CPC Constitution.⁴

This report attempts to answer the question: How effective have the PRC Government's efforts to attract returnee scientists been in the last five years? It argues that these efforts have been overwhelmed by other policy priorities, notably the zero-COVID policy and the renewed focus on political education in universities, which have curtailed academic freedom. The PRC's efforts are also coming under increasing pressure from restrictions imposed by the United States on US nationals, which affect returnees who are US citizens or permanent residents.

Pressure in the opposite direction is arising from an overreaction in the US to the PRC's talent-attraction programs. This has led to prosecutions and discrimination against scientists of Chinese heritage. These developments have driven some scientists to leave the US.

In sum, many scientists of Chinese heritage working in the US are caught in the middle. They may want to leave the US due to the worsening research and political environment but may also be reluctant to return to the PRC. This presents an opportunity for Australia. If Australia can attract some of this talent while appropriately mitigating national security risks around sensitive technologies, its research standing would benefit.

This report focuses on scientists in the higher education sector who were born and raised in the PRC and have worked overseas. It discusses the importance to the PRC of returnee talent, before outlining the PRC's policies to attract returnees in this era of rising strategic competition. It then analyses the effectiveness of the PRC's efforts to attract returnees in the last five years. Finally, the report offers recommendations for Australian policymakers, universities and academics.

Importance of talent

Technological advancement and innovation are vital for a country's economic development and national power. They are crucial for continued economic growth and military development.

Xi's report to the 20th CPC Congress devoted a whole chapter to science and technology, noting that "We must regard science and technology as our primary productive force, talent as our primary resource, and innovation as our primary driver of growth."⁵

The PRC aims to be a technological superpower while the US wants to maintain technological leadership. Due to this intensifying rivalry, the US is trying to choke off the PRC's access to strategic advanced technology.⁶

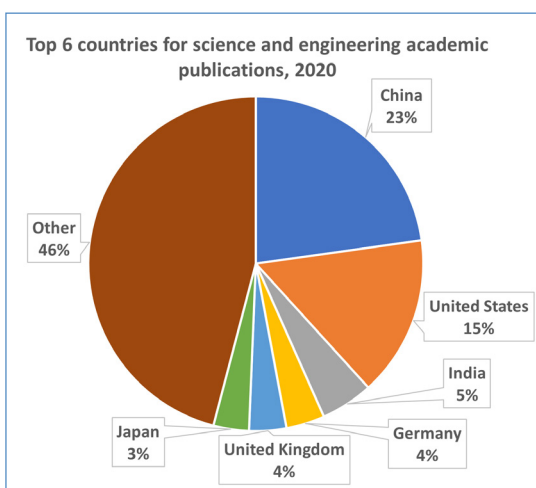
Since technological advancement relies on the knowledge of scientists and researchers, both governments prioritise attracting and retaining top talent.⁷ In October the US Government imposed restrictions on its citizens and permanent residents working with the PRC semiconductor industry.⁸

For developing countries, returnees are a significant source of talent. When their best scientific talent opts to work overseas in more developed countries, it produces a "brain drain".

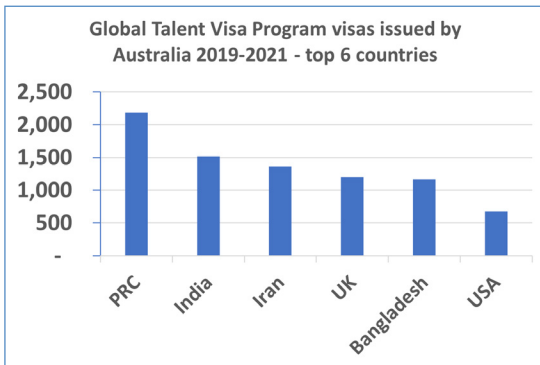
But this transfer of talent also creates an opportunity: if they subsequently return, they bring with them advanced skills and knowledge that could not have been developed at home. Scientists trained in developed countries are generally more productive. For example, the work published by returnees has considerably higher citation impact than that published by those who remained at home.⁹ Thus they made an outsized contribution to the PRC overtaking the US to become the top country for science and engineering peer-reviewed publications.¹⁰

Therefore, despite brain drain concerns, the PRC Government continues to support students going overseas. The number of PRC nationals studying overseas had been increasing every year from 2006 until the COVID-19 pandemic.¹¹

From the perspective of countries such as the US or Australia, skilled migrants are needed to sustain technological development. Each have created special visa programs, such as Australia's Global Talent Visa Program and the US



Source: US National Science Board



Source: Australian Government

EB-2 visa, to encourage skill transfer and promote innovation in high-priority industries.

For Australia, the Global Talent Visa Program, started in 2019, is intended to “harvest the world for its brightest minds” and attract up to “15,000 talented individuals a year”.¹² Priority skills for this program include artificial intelligence, critical minerals, and emerging military technology. In 2020-21, 9,600 such visas were issued and in 2021-22, 8,800 visas.¹³

Many of Australia’s skilled migrants are from the PRC. It is the most common country of birth for science, technology, engineering and mathematics (STEM) doctoral graduates who were born overseas.¹⁴ Additionally, as of 2020, up to 15 per cent of academics in engineering and information technology (IT) were born in the PRC, the highest after those born in Australia.¹⁵ For the US, 17 per cent of doctoral degrees in science and engineering in 2020 were awarded to PRC students, 90 per cent of whom stayed on after graduation.¹⁶

Thus, the mobility of scientific talent between countries is beneficial for both sending and receiving countries.¹⁷ Yet, due to rising geopolitical tensions, who scientists collaborate with and where they work are increasingly seen through the lens of strategic competition and national security.

The PRC’s policies to attract returnees

For the PRC Government, scientific talent moving overseas has not necessarily been problematic, as some are bound to return. Instead of restricting overseas studies, Beijing developed programs to attract returnees as well as encouraging those who stayed overseas to collaborate with scientists in the PRC. But these programs have raised concerns in other countries that they facilitate the illegal transfer of technology.

The PRC Government’s continued multi-decade effort to attract returnees demonstrates both its importance and its challenges. Although the PRC has enjoyed a net inflow of scientists since 2014, it remains concerned that top talent has stayed overseas.¹⁸

History of PRC talent-attraction policies

Since the late 19th century, successive Chinese governments have sent students overseas to study Western science, in the expectation that they would return to serve their country. After the establishment of the People’s Republic in 1949, the Government called upon overseas Chinese to return to help rebuild the country. However, many returnees suffered persecution and even death under Mao Zedong’s rule due to both their foreign experiences and their scientific expertise.

Developments overseas pushed some to return. Physicist and engineer Qian Xuesen is the most famous example. In the 1950s, during McCarthyism in the US, Qian was stripped of his security clearance and prevented from continuing his research. After five years of house arrest, he was deported to the PRC, where he helped to develop ballistic missile and space programs.¹⁹ To this day, he is cited regularly in the PRC as a case of returnee contribution.

Under Deng Xiaoping’s reform and opening-up, the PRC’s policies towards scientists and returnees were transformed. Restrictions were loosened, allowing self-financed individuals to pursue studies overseas. But, since many remained overseas upon completing their studies, the Government developed policies to encourage return.²⁰ The policy slogan adopted in 1993 was “support overseas study, encourage people to return, and give people the freedom to come and go”.²¹

The effort to encourage returns accelerated after 2002, when talent development was elevated to a national strategy for strengthening the country.²² The Thousand Talents Program, a controversial talent-recruitment program, was established in 2008, with the aim of attracting 2000 highly qualified individuals over 5–10 years.²³

As many are still unwilling to return full-time, the government has also embraced the “diaspora model”. This encourages cooperation and collaboration between those who remain overseas and academics in the PRC through sponsoring short-term visits and exchanges. It allowed Thousand Talents participants to keep their foreign jobs and return to the PRC for only a few months a year while still receiving the benefits of the program.²⁴ This has led to accusations that these academics are “double-dipping” and that the PRC is encouraging illegal technology transfer.²⁵

Talent policy under Xi

Attracting talent is a “foundational and strategic pillar” for the CPC’s goal of building a modern socialist country in all respects.²⁶ According to Xi, “the competition for comprehensive national power is fundamentally a competition for talent”.²⁷ Despite the PRC boasting the largest scientific workforce in the world, Xi observed in late 2021 that talent attraction is desired “more than any other time in history”.²⁸

One of the PRC’s overall development objectives for 2035 is “self-reliance and strength in science and technology”. This emphasis on self-reliance and cultivating talent domestically complements rather than replaces the goal of “attracting the brightest minds from all over”.²⁹

A central conference on talent development was held in September 2021. This was only the third conference on talent since 1949 and the first in 11 years. At the conference, Xi listed eight principles for talent development, including “gathering talents from around the world and using them”. He also announced a series of objectives on attracting talent:³⁰

- By 2025, the PRC will have substantially increased its total research and development (R&D) spending, will have attracted more top scientists, and will have a large number of scientists in strategically important technological fields.
- By 2030, the PRC will be significantly more attractive to global talent and boast some pioneers in emerging areas.
- By 2035, the PRC will have competitive advantages in talent competition in many areas and its talent-development teams will be among the strongest in the world.

Xi’s effort to increase party control over all aspects of society means that the party sets guidance on where to invest in talent development, with science and technology prioritised over the humanities. In technology, the Party wants more investment in strategic sectors, such as semiconductors and artificial intelligence, and less in those sectors driven by the market, such as e-commerce. Talent programs are therefore structured to meet these objectives.

For example, the High-End Foreign Expert Recruitment Plan, the 2019 successor to previous talent recruitment programs including the Thousand Talents Program, aims to “make full use of the important roles high-end foreign experts play in fostering the development of strategic emerging industries” among other goals.³¹

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How effective are the PRC's talent-attraction efforts?

The PRC Government's talent-attraction policy only constitutes a small part of the country's overall appeal for returning talent. Much of the PRC's attractiveness to overseas scientists depends on other factors, including the cost of living, the quality of life and the higher education system, as well the general economic and social environment.³²

Even if the PRC's talent-attraction policies and continued investment in R&D have managed to lure some scientists to return, other policy priorities, such as the zero-COVID policy and the CPC's focus on ideological education in universities, make it more difficult to attract and retain talent.

PRC efforts to attract talent

The PRC's talent-attraction programs have focused mostly on material benefits such as salary and research funding.

As the PRC has spent more on R&D, the demand for talent has increased. Additionally, the central government strategy has induced local governments and universities into a competition to attract overseas talent.³³ This has led to a rise in salaries, with Tier 1 cities such as Beijing, Shanghai, Shenzhen and Guangzhou most able to attract foreign talent.³⁴

For example, talent-attraction measures by the Beijing government include a personal bonus of up to RMB1 million (equivalent to AUD200,000). Meanwhile, the Shanghai government offers housing of no less than 150m².³⁵ Universities offer their own additional incentives, including assistance with finding schools for children and jobs for partners.

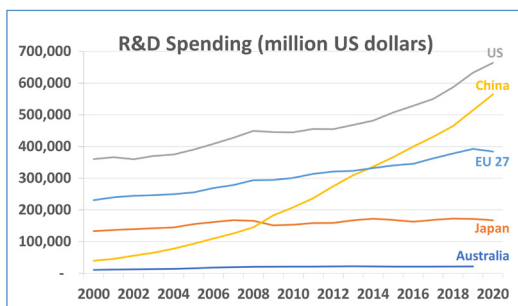
Working conditions and career advancement are two further benefits on offer. For example, professors can get more frequent access to specialised high-tech equipment in the PRC than in Australia. Having their own team of students and postdoctoral researchers gives professors more freedom and control over their research. Since the mid-2000s, the PRC has produced more PhD graduates in STEM than the US, which means there is a large pool of students and junior researchers to draw on.³⁶

Universities may also offer accelerated promotion. Some researchers have been offered a professorship in the PRC but only associate professorship or less elsewhere.³⁷ The "bamboo ceiling" in Australia, where people of Asian backgrounds are under-represented in leadership positions, may also push some to move to the PRC. In 2018, only 2 per cent of governing council members and 3 per cent of senior executives at Australian universities had an Asian background.³⁸

Most scientists have families overseas and need particular assistance to ease their return to the PRC. A change in the schooling system for children represents a significant barrier, especially due to a shortage of international schools in the PRC.³⁹ The CPC Central Committee has stressed the need for the provision of employment, education and housing for spouses and children as part of its policy guidance on a highly skilled workforce.⁴⁰

Administrative processes have also been streamlined, including immigration processing. This is important for returnees who have given up their PRC citizenship. In 2017, the government introduced a work permit system similar to Australia's points-based system. This follows a relaxation of permanent residency criteria in 2015.⁴¹

These measures are having an impact. In the three years to March 2021, more than 10 per cent of academics in PRC universities had returned from



Source: OECD



Challenges in talent attraction and retention

The focus on ideological education in universities and the deterioration of academic freedom under Xi have made the PRC a less attractive place.

overseas.⁴² Some high-profile successes include the return of Zhu Songchun, an artificial intelligence researcher, who left the University of California at Los Angeles to set up the Beijing Institute for General Artificial Intelligence at Peking University, and Yan Ning, a biologist who left Princeton to establish the Shenzhen Medical Academy of Research and Translation.⁴³

A critical part of the PRC's talent policy is improving the higher education system. A better higher education system both attracts and retains talent. In February 2022, the PRC expanded the "Double First Class" university plan, aimed at developing its universities into world-class institutions by 2050.⁴⁴ The central leadership has also called for fewer administrative burdens for academics.

However, significant barriers for returnees remain. One of their top complaints is the complexity of interpersonal relationships.⁴⁵ Despite the push for merit-based funding, knowing the right people is still important. But returnees generally do not have the same level of connections and networks as those who stayed in the country. This can limit their funding opportunities.⁴⁶

At the central policy level, priorities often conflict. For example, while Xi has called for "open, fair, and equitable criteria for selection and use of talent", he also wants academics to prioritise ideological education.⁴⁷ Political tests have been added to appointment and promotion criteria. Similarly, universities find it difficult to respond to Xi's directives that they should aim to become both "world class" and have "Chinese characteristics".⁴⁸

The focus on ideological education in universities and the deterioration of academic freedom under Xi have made the PRC a less attractive place. Scholars have been questioned by police on their academic work.⁴⁹ Some universities have started requiring academics to seek approval for attending online events.⁵⁰ The tightening of Internet censorship also hinders scientists' research. Even before the recent crackdown on academic freedom, the lack of access to tools such as Google Scholar was an inconvenience for returnees.⁵¹

Compared to countries such as Australia and the US, the PRC's immigration system remains underdeveloped. Cities and provinces have diverse requirements for registration and provide varying levels of social services for immigrants. Potential returnees are hard pressed to find authoritative information online.⁵²

Moreover, the PRC's zero-COVID policy, especially its travel restrictions, has severely damaged the country's attractiveness. Top scientific talent tends to be internationally mobile. They attend conferences and collaborate with colleagues around the world. Extended travel restrictions and snap lockdowns discourage many people from working in the PRC.⁵³

The pandemic has also exposed incidents of xenophobia. Chinese people have become less welcoming of foreigners, including those of Chinese ethnicity.⁵⁴

The above factors have made the PRC a less appealing destination for scientists. A professor of chemistry at the University of Queensland observed anecdotally that only around 20 per cent of his colleagues and students from the PRC are willing to return, compared to around 80 per cent before the pandemic.⁵⁵

Finally, the goal of talent attraction is to build up the domestic scientific and technological base. Yet, giving special treatment to returnees creates the

International environment

The US's now defunct China Initiative had a chilling effect among scientists of Chinese origin.

perverse incentive of encouraging the top talent to go overseas. The special privileges afforded to returnees implies that a foreign education is superior to a domestic one.⁵⁶ This makes the PRC's long-term goal of becoming self-sufficient even more difficult to achieve.

The PRC Government's desire to become a technological superpower, along with its illicit technology transfer practices, have led to suspicions and distrust around its talent-recruitment programs in more advanced countries.

Individual scientists who participate in these programs, or those with other links to the PRC, have come under suspicion. This has resulted in overreactions and botched prosecutions in the US. The detrimental effect on the research environment in the United States has increased the PRC's attractiveness in comparison.

US prosecution of scientists

From 2018, the US Federal Bureau of Investigation started to highlight the PRC's use of professors, scientists and students as "non-traditional collectors" of intelligence.⁵⁷ It accused the PRC Government of using the Thousand Talents Program to encourage researchers to steal intellectual property.

Under the 2017–21 administration of President Donald Trump, the US Government launched the China Initiative to investigate cases of economic espionage with "nexus" to the PRC.⁵⁸ However, no charges of economic espionage were ever made under this initiative. Instead, prosecutions were mostly for failure to disclose funding – misconduct that is usually not subject to criminal prosecution.⁵⁹

The administration of President Joe Biden ended the China Initiative amid claims of racial profiling.⁶⁰ Yet, competition with the PRC on technology remains a priority, with the administration changing its approach from maintaining "relative advantages" to maintaining "as large of a lead as possible".⁶¹ In October, Washington imposed restrictions on US citizens and permanent residents working in the PRC's semiconductor industry.

Investigations in the US inspired the Australian media to probe Australian participants in the Thousand Talents Program. A 2020 article in *The Australian* portrayed scientific collaboration as inherently zero-sum – whatever benefits the PRC must be detrimental to Australia.⁶² It also assumed that technology transfer only flows one way – from Australia to the PRC. From this perspective, any collaboration with the PRC was deemed a danger to Australia's interest.

At the same time, the Australian Strategic Policy Institute released a report on the PRC's talent-recruitment programs. Its author, Alex Joske, noted that "Talent recruitment isn't inherently problematic, but the scale, organisation and level of misconduct associated with CPC talent-recruitment programs sets them apart from efforts by other countries."⁶³ Yet, the report did not provide evidence that participants in the programs were involved in higher levels of misconduct than non-participants.

The official response in Australia was more subdued than in the US, with no similar prosecutions of scientists. The Australian Security Intelligence Organisation (ASIO) noted that "the [PRC] foreign intelligence service could target institutions, their researchers and academics, and the students" to acquire sensitive or potentially sensitive information.⁶⁴ But it also acknowledged

that openness and international collaboration “is a hallmark of the higher education and research sector”.⁶⁵

Discrimination drives talent to return

Since top scientific talent is internationally mobile, a more restrictive and suspicious research environment for scientists of Chinese heritage in other countries has the effect of making the PRC more attractive.

The US’s now defunct China Initiative had a chilling effect among scientists of Chinese origin. A poll in 2021 found that 42 per cent of scientists of Chinese origin had considered leaving the US out of fear of losing funding and of being subject to US surveillance.⁶⁶ That year, more than 1400 US-trained scientists of Chinese heritage swapped their US affiliation for a PRC one, a 22 per cent increase from 2020.⁶⁷

Possible future US restrictions on its nationals may dissuade some US scientists from working in the PRC. Current restrictions on the semiconductor industry may extend to quantum computing and biotechnology in the future.⁶⁸ Those who have obtained US citizenship or permanent residency may be reluctant to give it up in order to work for PRC organisations.

In Australia, while there have been no similar prosecutions, fears remain. As of January 2021, 40 per cent of identified participants in the talent-recruitment programs had left Australia, many to the PRC.⁶⁹

According to Brian Schmidt, vice-chancellor of the Australian National University, “People will quit putting grants in on areas of national interest just based on hearsay. We will have researchers leaving the country because they will find it unpalatable to be here.”⁷⁰ Iain Watt, a deputy vice-chancellor at the University of Technology Sydney, also noted the increasing hesitancy among scientists of Chinese heritage to apply for government grant funding.⁷¹ Shi Xue Dou, a Chinese Australian materials science professor at the University of Wollongong, remarked that many Chinese Australian scientists have chosen to self-censor due to a fear that they would be accused of being pro-China and not loyal to Australia.⁷² If this continues, these researchers may consider leaving Australia and return to the PRC.

Conclusion

Due to rising strategic competition with the US, the PRC has attached a great deal of importance to cultivating and attracting talent. Yet security and control remain the top priority.

However, these policy goals are largely contradictory. It is difficult for any country, including the PRC, to attract and retain top academic talent when security and control are their primary focus. Therefore, unless the international environment for scientists of Chinese heritage continues to deteriorate, the PRC will find it increasingly challenging to attract talent.

Implications for Australia

Australia accounts for only 1 per cent of global R&D spending.⁷³ This means most technology and innovation is created elsewhere, including in the US (31 per cent of global R&D) and the PRC (25 per cent).⁷⁴ Australia thus needs to harness technology and talent from outside the country.

Many scientists of Chinese origin in the US are considering leaving. Yet, some of them are also reluctant to return to the PRC. This presents an opportunity for Australia.

Australia has advantages as a country with a high standard of living that is seeking more skilled migrants. Thus far, Australia has got the balance mostly right on protecting national security while encouraging openness and collaboration in research. If Australia can avoid following the US in imposing similar restrictions while working to retain its own talented scientists of Chinese heritage, it can attract some of those scientists caught between the PRC and the US.

Improving working conditions for researchers will attract talent from around the world. Australia should place more value and give more support to academic talent, including PhD students. This will require an increase in public investment in tertiary institutions, which is currently among the lowest in the OECD.⁷⁵

To be sure, the Australian Government and universities also need to work cooperatively to address national security concerns around illicit transfers of sensitive technologies. The lack of clear guidance on this issue has contributed to uncertainty amongst researchers, which has led to the current situation where they are overcautious and do not apply for government grants out of fear that they will be rejected due to their ethnicity or collaboration history.

Recommendations

Australian Government

- The Government should reassure academics that they will not be targeted simply due to their connections to the PRC. The Government should issue clear guidance on how national security is assessed in government grant applications.
- The University Foreign Interference Taskforce (UFIT) should provide clearer guidance on collaboration with the PRC, especially on sensitive technologies.
- The UFIT should provide clarity on which activities and appointments are unacceptable for academics receiving government funding.
- Ministerial vetoes on academic grants should be removed to depoliticise the grant funding process.
- The government should reduce bureaucratic red tape for incoming talent, including by improving immigration processing times.⁷⁶

Australian universities

- Universities should proactively promote people from minority backgrounds into leadership positions. The bamboo ceiling has prompted some of Australia's Asian talent to seek opportunities elsewhere.⁷⁷
- Universities should raise the stipend for PhD students and reduce casual and insecure work to improve working conditions for researchers.

- Using the expertise of their China scholars, universities should provide resources to help academics in science and technology to better understand the research environment in the PRC and the potential impact of proposed research for the PRC.

Academics and researchers

- Journalist organisations such as Media Diversity Australia should develop guidelines on how to cover issues pertinent to Chinese Australians, to reduce incidences of unsubstantiated or ill-founded suggestions that academics are spies or foreign agents.
- Australian academics and scientists should form advocacy groups and speak out publicly about the value of collaboration with PRC scientists as well as contributions made by scientists from the PRC to Australia's research output.



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