JANUARY 2023

BRIEF

CHINESE MILITARY-CIVIL FUSION
SINO-ITALIAN RESEARCH COOPERATION

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The Chinese government exploits foreign research infrastructure and talent to build a world-class military. Although academic cooperation with China offers alluring investments, it may result in unintended knowledge transfer in critical areas. Considering the extent of Chinese military-civil fusion, any collaboration – with military and non-military institutions alike – is likely to boost Chinese military capabilities for there is "capacity and intention to co-opt private tech companies and academic research to advance national and defence objectives."[1]

Utilising academic exchanges to further military ambitions is a coordinated and broad long-term strategy

Utilising academic exchanges to further military ambitions is a coordinated and broad long-term strategy that has benefited from the West's limited knowledge of Chinese institutions and their links to the military. Since 2007, the People's Liberation Army (PLA) has sponsored and posted more than 2 500 scientists to North America, Australia, Europe, and beyond, some of whom conceal their connection to the Chinese military. PLA's international science and research collaboration has also grown year by year, soaring from 95 peer-reviewed articles in 2007 to co-authoring 734 in 2017.[2]

This paper does not speculate on the intentions of western researchers but brings into light a trend of the Chinese Communist Party (CCP) abusing the openness of western academia. Similarly, it does not mean to discourage any research collaboration with China but rather advises caution and raises awareness – especially in areas known to be of interest to the PLA – to avoid unintentionally contributing to the PLA's advancement.

1. THE MILITARY-CIVIL FUSION STRATEGY

Promoting science, technology, and talent acquisition to further military goals is not novel. However, despite not being an exclusively Chinese phenomenon, the current Chinese military-civil fusion (MCF, 军民融合) strategy exceeds any similar ventures in scope.

Military-civil fusion is a national strategy, inseparable from Chinese military advancement.[3] In the words of Xi Jinping (习近平), who is also the chairman of the Central Commission for Integrated Military and Civilian Development (中央军民融合发展委员会, the main overseeing body of the MCF), it is "both a national rejuvenation strategy and a policy for strengthening the military."[4] When describing the MCF, one official Chinese document states that the basic principle is to "break the barriers between sectors, push towards interchange and sharing of military and civil resources."[5]

Civilian universities in China are an integral part of the MCF strategy.[6] A head of one such university states that "Chinese universities should […] actively serve the development of military-civil fusion, contribute to realising the Chinese dream and the dream of a strong military" and "walk the path of strengthening the military with science, technology and culture."[7] Some civilian institutions support the strategy by awarding grants or establishing centres engaged

in information exchange with the military – one of the MCF goals.[8]

The Chinese defence sector is particularly interested in aerospace (including remote sensing), energy engineering (including nuclear energy), and materials studies.[9] These areas are the primary focus of the current ministry-level science and technology cooperation plan between Italy and China (in the case of advanced materials and aerospace) and otherwise well-represented in Italian higher education institutions (e.g., nuclear energy engineering at the Polytechnic University of Turin and the University of Padova).[10] These two institutions – among many others who have concluded collaboration agreements with civilian universities in China – also offer joint scholarships or double degree programmes.[11] They also partner with multiple Chinese schools, such as Beihang University or Harbin Institute of Technology, which belong to a group of seven universities known as the Seven Sons of National Defence (国防七子) that are closely linked with the Chinese defence sector and spend approximately half of their research budgets on defence research.[12] Some of the Chinese academic institutions host national defence laboratories, have a history of collaboration with the military, and see a large percentage of graduates move on to work in the defence sector.[13] That said, collaboration between Italy and China is not limited to Chinese civilian universities.[14]

2. WELCOMING A MILITARY UNIVERSITY

The Remote Sensing Laboratory (RSLab) at the Department of Information Engineering and Computer Science of the University of Trento represents one example of using foreign resources to further national defence goals. The laboratory specialises in remote sensing technologies – the gathering of information from afar using satellites or aircraft equipped with various sensors that measure temperature, topography, etc., with data often presented in some form of imagery.[15] There are many military and non-military applications for remote sensing technologies.[16] Military purposes include surveillance, land surface mapping, and early-warning systems for missile strikes, as well as support for long-range precision strike operations and naval operations such as targeting ships.[17] The RSLab can thus be an outlet for information that has a military application.

Project funding, employment records, and multiple visits by Chinese scholars point to the CCP's and the PLA's strong interest in radar technologies, as well as the intent to actively pursue it by sending researchers to relevant facilities abroad. The RSLab has hosted and co-authored articles with researchers from Chinese military universities, whose previous positions and research connect them to the defence sector. In 2014, Lorenzo Bruzzone, a director of the RSLab, wrote an article with three scholars affiliated with China's National University of Defence Technology (NUDT, 中国人民解放军国防科技大学); one of those scholars was the deputy director of the National Defence Science and Technology Laboratory on ATR (Automatic Target Recognition, 国防科技重点实验室).[18] The NUDT is directly controlled by the Central Military Commission and is the PLA's main scientific research and education establishment. It collaborates with numerous foreign universities on anti-jamming, navigation, and target recognition – the very fields that utilise remote sensing technologies.[19]

From 2017 to 2019, Qin Yao (覃尧) from the NUDT was a visiting fellow at the RSLab.[20] The research Qin did before and during his tenure at the RSLab had military applicability for target detection and could be used for the improvement of military technology. In 2016, Qin wrote an article with NUDT professor Li Biao (李飚) on infrared small target detection; the abstract began with the words "effective detection of small targets plays a pivotal role in infrared (IR) search and track applications for modern military defense or attack" such as "precise guidance and early warning," revealing the aim of his research.[21] In 2019, Qin (with Li and Bruzzone) wrote another article on infrared small target detection, listing the same applications, which indicates, in essence, that he continued his defence-related research while at the Italian RSLab.[22] His recent works and affiliations suggest that he works on similar topics at the Northwest Institute of Nuclear Technology (西北核技术研究所), a Chinese military institution subordinate to the Central Military Commission.[23]

3. MILITARY-LINKED SCHOLARS FROM CIVILIAN UNIVERSITIES

The collaboration between the Italian RSLab and Chinese academia began in 2002, with professional contacts ranging from researcher residency to co-authoring publications with various Chinese institutions, many of whom, however, were marked 'high-risk' by the Australian Strategic Policy Institute's (ASPI) China Defence Universities Tracker because of their affiliation to the Chinese military.[24] One such institution is Xidian University, which hosts the National [Defence] Lab of Radar Signal Processing (雷达信号处理国家重点实验室/雷达信号处理国防科技重点实验室), a defence lab that often obscures the 'defence' part of its name.[25] The Chinese lab researches target detection and radar imaging among other subjects and the "research serves both military and civil needs," working to meet the "large demand for radar technologies in building up the country's national defence."[26]

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Furthermore, funding for projects with Chinese participation often comes from Chinese sources, hinting that the project objectives may be mandated by and from China. Visiting Chinese scholar Zhang Kai (张凯) is one example: both before and during his tenure at the Italian laboratory, Zhang researched pansharpening (fusing multiple satellite images for higher resolution) that can also be applied for battlefield reconnaissance.[27] Zhang's Shandong Normal University profile page states that he applies his research "to military areas."[28]

In some cases, the connection with defence-related research may be via another person. Ren Shijie (任仕杰) was a visiting scholar at the RSLab researching radar image classification (dual-use technology).[29] Ren co-authored papers on the same topic with his Ph.D. mentor Zhou Feng (周峰) who is a director of the Key Laboratory of Electronic Information Countermeasure and Simulation Technology, a defence laboratory under the Ministry of Education (电子信息攻防对抗与仿真技术教育部重点实验室).[30] Zhou Feng has earned a National Defence Science and Technology Progress Award (2nd grade), and participated in many projects relating to radars that are likely military-led and classified, as parts of the project titles are redacted.[31] In a 2015 interview about his work on anti-interference and active deception of enemy radars, Zhou said, "Making a virtual squad of tanks, creating the illusion of deploying a million soldiers […], thereby misleading the opponent, is exactly the art of radar jamming and deception."[32]

Due to the CCP's efforts, civil cooperation in research might lead to foreign research and education institutions inadvertently helping the Chinese defence sector

CONCLUSION

Due to the CCP's efforts, civil cooperation in research might lead to foreign research and education institutions inadvertently helping the Chinese defence sector develop by providing access to leading experts, modern equipment, and specialist knowledge in respective areas where it may lack resources domestically. The Italian laboratory co-researching remote sensing suitable for various military applications, including for surveillance and targeting systems, is a case in point.

Background checks on the visiting Chinese scholars and co-authors listed on the RSLab's webpage revealed multiple links to defence-related research, such as target recognition and pansharpening. In some instances, the researchers themselves stated that their work was meant for military purposes. Further illustrating the Chinese presence in this Italian laboratory is the funding. With such funding usually originating from Chinese sources, it brings up a question: who ultimately determines the direction of the research?

The RSLab is not an exception but rather a clear example of the Chinese government-led initiative to exploit foreign resources and strengthen the Chinese military. To repurpose a quote by Nelson Mandela, "Education is the most powerful weapon which you can use to change the world."[33] And for now, that weapon is handed out without deep consideration or proper regulation.

Endnotes

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ISSN 2228-2076