



STRIDER

FROM INNOVATION TO WEAPONISATION

How China Exploits the UK Open
Scientific System

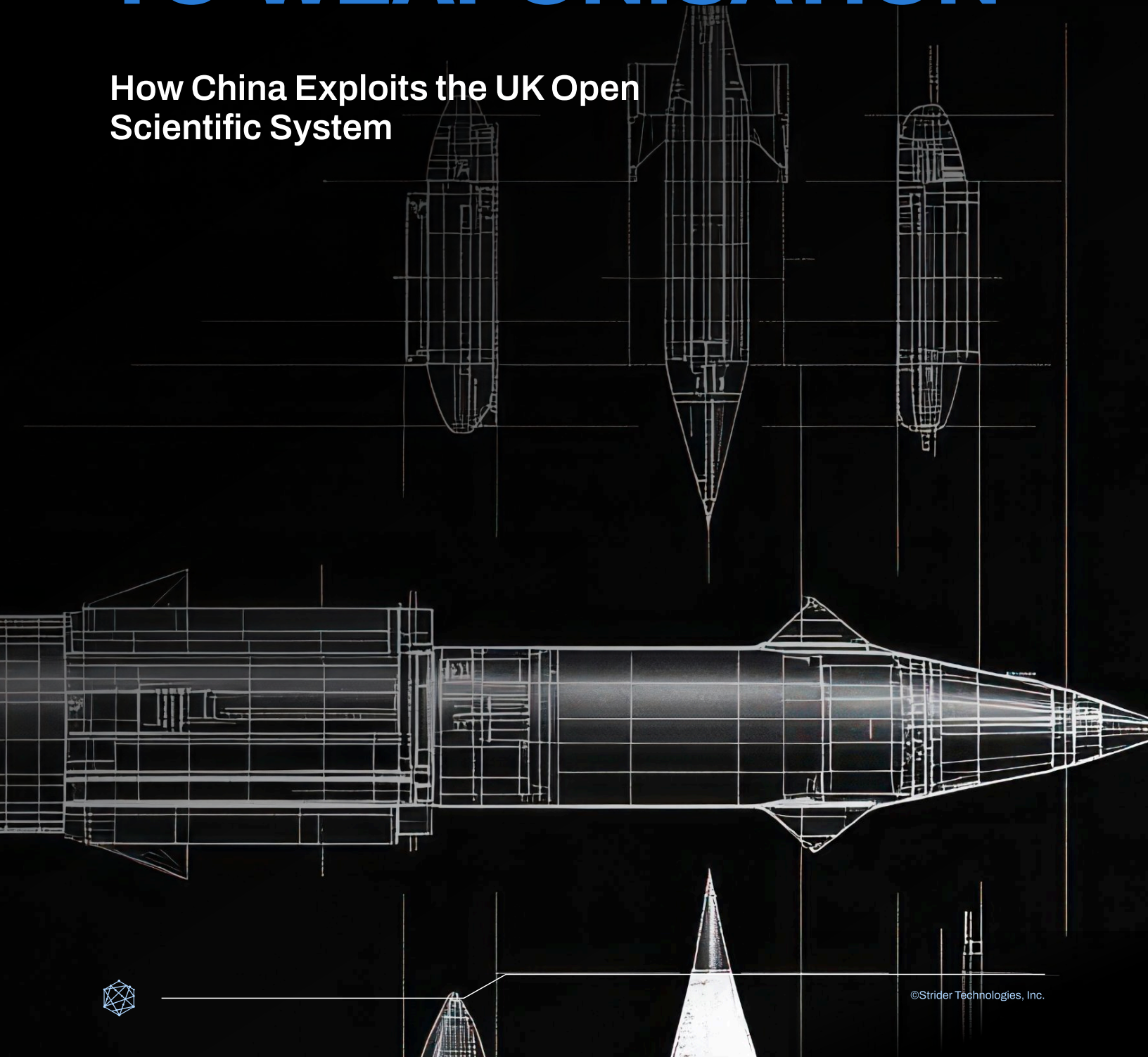




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EXECUTIVE SUMMARY

The People's Republic of China (PRC) is pursuing a state-driven strategy to achieve global leadership in science and technology (S&T). Government plans outline tactics such as leveraging international collaboration and recruiting foreign talent. While many PRC organisations contribute to this effort, research institutes affiliated with the People's Liberation Army (PLA)—which conduct R&D and production for the armed services—pose the greatest risks to UK national security and the S&T ecosystem.

In response, the UK government has strengthened research security to protect the integrity of its innovation landscape. Recent initiatives—including the establishment of the Research Collaboration Advice Team (RCAT), updated guidance from the National Protective Security Authority (NPSA), and expanded export control enforcement—reflect growing recognition of threats from state-linked research activity. However, these efforts still rely largely on voluntary compliance and public awareness and do not impose comprehensive restrictions on collaboration with PLA-affiliated research institutes (PLA-RIs).

Strider identified STEM publications showing collaboration between UK organisations and more than 50 PLA-affiliated institutes spanning military research bodies, state-owned defence conglomerates, and the 'Seven Sons of National Defence' universities.

This report concludes by recommending that UK organisations should cease STEM research collaboration with PLA-RI. Appendix I provides details about methodology and Appendix II provides brief profiles of select PLA-affiliated research institutes.

Our Findings Include:

5K

Since 2020, more than 5,000 researchers affiliated with UK organisations have collaborated on STEM research with a PLA-RI on over 8,000 publications. Topics of collaboration include strategic dual-use technologies like AI, quantum computing, and aerospace, as well as technology with a high likelihood of military applications such as anti-jamming communications, hypersonics, and laser directed energy deposition. This collaboration includes nearly 400 publications with researchers from the PLA National University of Defence Technology—an organization sanctioned by the U.S. government for risk to national security.

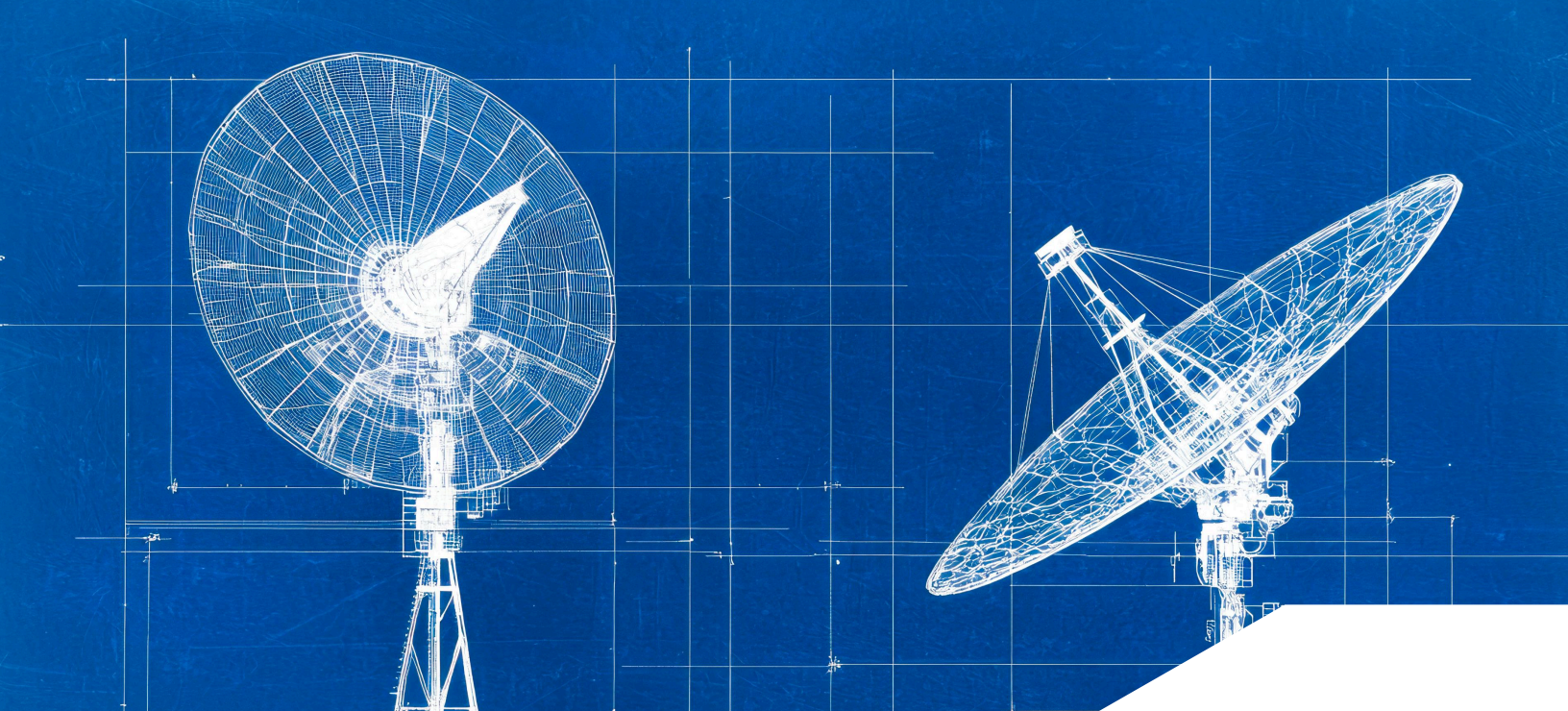


Despite increased government efforts to strengthen research security and raise institutional awareness, collaboration between UK researchers and PLA-RI institutions has remained persistently high since 2020, averaging more than 1,500 joint publications annually through 2024 (the latest year with complete data).

100+

More than 100 UK organisations have collaborated with a PLA-RI on STEM topics since 2020. Among the UK organisations that have the most instances of collaboration with PLA-RI are leading universities and government laboratories. While some leading UK companies also appear in the dataset, their levels of engagement are lower than their academic and government counterparts.





INTRODUCTION

The People's Republic of China (PRC) is pursuing a national strategy to position itself as a global leader in science and technology (S&T). General Secretary Xi Jinping has repeatedly emphasised the priorities of 'achieving high-level S&T self-reliance,' 'resolutely winning the battle over key core technologies,' and building a 'world-class military.' China's industrial policies outline specific mechanisms for advancing these ambitions, including:

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Expanding international research collaborations with leading global institutions



Recruiting top-tier foreign talent to relocate to China

A range of PRC entities are involved in implementing this strategy, including research institutes affiliated with the People's Liberation Army (PLA). These organisations are tasked with advancing the military's capabilities and play a central role in executing state-directed S&T objectives.

The United Kingdom's defence and innovation ecosystem is increasingly intertwined with academia, a reliance the Ministry of Defence (MoD) explicitly acknowledges in its Defence Industrial Strategy 2025 – Making Defence an Engine for Growth. The MoD emphasizes that sustained national security and technological advantage depend on "deep partnerships with universities and research institutions" to drive innovation in key fields such as artificial intelligence, quantum technologies, and advanced materials.

However, this very openness and dependence on academic collaboration expose the UK to potential exploitation by the People's Republic of China (PRC). As Strider's analysis shows, the PRC leverages international scientific partnerships, including with leading UK universities, to access sensitive dual-use research, recruit talent, and advance the technological capabilities of the People's Liberation Army (PLA).



This includes the theft of intellectual property, the illicit transfer of sensitive technologies, and the erosion of top-tier talent from academic institutions, national laboratories, and private-sector research organisations.



In particular, collaborations with PLA-affiliated research institutes heighten the risk that UK-origin scientific advancements will directly bolster the capabilities of the PRC military.



UK GOVERNMENT POLICY RESPONSE

In 2023, Parliament's Intelligence and Security Committee labelled the PRC a 'strategic threat' and stated that 'the UK's academic institutions provide a rich feeding ground for China to achieve both political influence and economic advantage by...obtaining Intellectual Property (IP) by directing or stealing UK academic research in order to build, or short-cut to, Chinese expertise.'

MI5 Director-General Ken McCallum, said in recent conversation with reporters: 'Do Chinese state actors present a UK national security threat? The answer is of course yes they do, every day.' In June 2025, Foreign Secretary David Lammy asserted to the House of Commons in his address about the cross-Whitehall audit of the UK-China relationship that the PRC 'is the UK's second largest research collaborator—11% of British research output included Chinese authors.' Not all research done in conjunction with PRC researchers is risky (this report focuses solely on research done with PLA-RI researchers); however, this level of collaboration is significant.

Recognising the national security threat posed by the PRC's strategy, the UK government has taken action to mitigate the risk and restrict PRC military and strategic entities from exploiting the openness of the UK research and innovation ecosystem. These efforts are part of a broader strategy to prevent illicit technology transfer and foreign government influence.



Establishment of the Research Collaboration Advice Team (RCAT):

In 2021, the Department for Science, Innovation and Technology (DSIT) established the RCAT to provide advice to academia on national security risks in international collaborations. The threats facing research are evolving and becoming increasingly complex. Therefore, DSIT led a review assessing the efficacy of all protections in place and considering future needs.



National Protective Security Authority (NPSA) and Research Collaboration Guidance:

In 2023, the government directed the NPSA within MI5 to help universities, research bodies, and businesses mitigate foreign interference risks. The NPSA issued guidance for the higher education sector on identifying and managing partnerships that may involve national security risks, including collaborations with PLA-RIs and companies.





Trusted Research Campaign:

The National Protective Security Authority (NPSA) and the National Cyber Security Centre (NCSC) created the 'Trusted Research' campaign in 2019 (most recently updated in July 2025) to raise awareness of the risks to research collaborations which may occur when working with organisations or research partners "with links to nations whose democratic and ethical values are different from our own."



Integrated Review Refresh 2023 and National Security Act 2023:

The Integrated Review Refresh formally designated the PRC as an 'epoch-defining and systemic challenge' to UK interests. The subsequent National Security Act 2023 (NSA) strengthened the UK's legal framework for countering foreign interference, introducing new offences for covert influence, espionage, and undeclared collaboration with foreign-linked entities. The Act expanded the government's powers to investigate and restrict activities that could enable foreign states to improperly access sensitive research or technology.



Foreign Direct Investment and Research Security Review Mechanisms:

The National Security and Investment Act 2021 empowers the government to block or impose conditions on acquisitions, partnerships, or funding arrangements that may risk transferring sensitive UK technologies abroad. Universities and research institutions are increasingly subject to scrutiny under this framework when entering into joint ventures or accepting funding from PRC-linked entities.

It is possible that some UK universities could be victims of breaches of NSA through inadequate compliance, lack of internal controls and poor understanding of the NSA. The UK does not prohibit collaboration with PLA-affiliated research institutes. Consequently, despite heightened awareness and new legal tools, research partnerships between UK organisations and PLA-affiliated entities continue to pose enduring risks to national security and the integrity of the UK's innovation ecosystem.



STRIDER DATA FINDINGS

Strider's analysis reveals that, despite UK government efforts to mitigate vulnerabilities within its research ecosystem, PLA-affiliated Research Institutes (PLA-RIs), acting in accordance with state directives, have continued their collaborative engagement with leading UK science and technology institutions in recent years. These partnerships may be used to cultivate relationships with UK experts as a pathway for eventual recruitment to the PRC. They also present a potential channel for the transfer of critical knowledge and technical expertise to the PLA. Although this analysis focuses on the United Kingdom, Strider data indicates a similar pattern exists across all major science and technology powers, most of whom are UK allies.

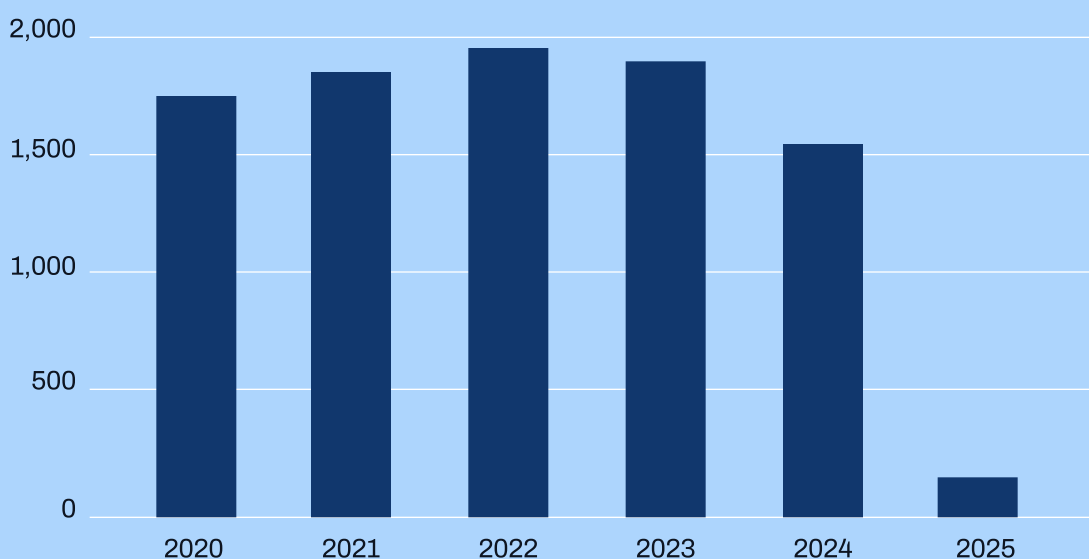
Scale of UK Collaboration with PLA-RI

Strider identified more than 100 UK organisations that have collaborated on more than 8,000 STEM publications with PLA-RI since 2020. Among the UK organisations that have the most instances of collaboration with PLA-RI are leading universities and government laboratories. UK companies that appear in the dataset have significantly lower levels of collaboration than their academic and government counterparts.

Research Collaboration Over Time

The number of joint publications between PLA-affiliated research institutes (PLA-RI) and UK organisations has remained relatively steady since 2020. A slight downward trend began in 2024, indicating a potential shift, yet collaboration levels remain notably high even after the release of new government guidance and research security review mechanisms.

Number of Publications Featuring Collaboration Between UK Orgs and PLA-RIs



Note: The publication data used in this analysis reflects an inherent lag from real time. Open-source academic and scientific databases are updated only after research passes through multiple stages of the publication and indexing process. Articles often experience a delay between submission, acceptance, and formal publication, and indexing services require additional time to validate and integrate new records. Some publishers also release metadata in batches or impose embargo periods before making information publicly accessible. As a result, publication counts for 2025 (using data available through August 2025) should be interpreted with caution, as it likely underrepresents the true level of research activity rather than indicating a substantive decline.



Research Collaboration Topics and Technologies

Much of the joint research Strider identified in this analysis involves dual-use technologies, such as the areas of science and engineering with both civilian and military applications. Notably, some of this research involves technologies with a likelihood of direct military utility, which may contribute to the PRC's offensive and defensive capabilities. While this report does not provide an exhaustive analysis of all related military technologies, the following examples illustrate key areas of concern.

Anti-Jamming Communications

Multiple joint publications focus on anti-jamming communications, a foundational technology in modern military command, control, and communications systems. These works involve researchers affiliated with a leading UK research institution and the Sixty-Third Research Institute of the PLA's National University of Defence Technology as well as the College of Communications Engineering of the PLA Army Engineering University. Anti-jamming capabilities are critical for maintaining reliable battlefield communication in contested electromagnetic environments and are central to electronic warfare and secure tactical operations.



Hypersonics

Multiple collaborative publications address hypersonics and hypersonic vehicles, a field that is almost exclusively military in nature due to its strategic relevance in global strike, missile defence evasion, and next-generation weapons platforms. These publications include authors from leading UK institutions alongside researchers from the China Aerospace and Technology Corporation (a state-owned arms manufacturer focused on rockets and missile systems), China Aerodynamics Research and Development Centre (a military research facility led by PLA officers) and Beihang University (a civilian university involved in R&D for PRC military aircraft and missile technology).



Laser Directed Energy Deposition

Several collaborative publications involve research on laser directed energy deposition between UK universities and PLA-RIs, including North University and Northwest Polytechnical University. Such research, even if not explicitly framed as defence research, have potential military relevance because they enhance capabilities in high-temperature materials, precision additive manufacturing, and rapid component repair—all of which are foundational for advanced propulsion systems, hypersonic platforms, and next-generation aerospace and weapons technologies..

PLA-RIs by UK Authors and Publication Counts (Since 2020)

PLA-Affiliated Research Institute	UK Authors	Publications
Harbin Institute of Technology	1,349	1,603
Beihang University	1,195	1,455
Beijing Institute of Technology	1,132	1,431
Northwestern Polytechnical University	855	1,052
Nanjing University of Aeronautics and Astronautics	754	1,027
Nanjing University of Science and Technology	408	546
Harbin Engineering University	341	451
PLA National University of Defence Technology	393	389
Changchun University of Science and Technology	90	180
PLA General Hospital	187	151



CONCLUSION

The findings of this report underscore a pressing and persistent challenge to the integrity and security of the UK science and technology ecosystem. Despite policy updates by the UK government, research collaboration between UK-based organisations and PLA-affiliated research institutes (PLA-RIs) has continued at significant levels. These collaborations, many of which involve dual-use and militarily sensitive technologies such as anti-jamming communications, hypersonics, and laser directed energy deposition, pose strategic risks that extend beyond academia. They contribute directly and indirectly to the advancement of the PRC's military capabilities and its broader geopolitical ambitions.

The report's data highlights a disturbing trend: since 2020 over 8,000 STEM publications have involved collaboration between PLA-RIs and more than 100 UK institutions. This engagement not only facilitates potential illicit knowledge transfer but also supports the PRC's state-directed efforts to recruit top international talent, often to the detriment of UK national interests. Despite UK government action to raise awareness and mitigate research security risks, the openness of the UK research environment continues to be exploited.



Ultimately, safeguarding the UK research enterprise demands more than compliance with government advice. It requires a proactive stance by academic institutions, government laboratories, and private-sector organisations alike. Eliminating research collaboration with PLA-RIs must be a foundational best practice both for mitigating national security risks and for preserving the integrity of international scientific cooperation. By doing so, UK institutions can help ensure that their innovations fuel progress, not the ambitions of a foreign military adversary.

For sourcing information or more insight into information detailed in this report and Strider's tools, reach out to our team via email at info@striderintel.com.



striderintel.com

This analysis was conducted using programmatic matching algorithms supplemented by human quality control measures. In datasets of this size there is a chance of inaccuracy. Additional details, validation, and specific source documents can be provided upon request.



APPENDIX I: STRIDER METHODOLOGY

Strider identified all instances of research collaboration on STEM topics between People's Liberation Army-affiliated research institutes (PLA-RIs) and U.S. organizations. Methodology and definitions for key concepts used in this report are below.

PLA-affiliated Research Institute: A “People's Liberation Army- affiliated Research Institute (PLA-RI)” is defined as one of more than fifty institutions based in the PRC that do R&D or production on behalf of the PRC's armed services. The more than fifty PLA-RI fall into one of the following three organization categories. Further details and examples of organizations within each category are provided in Appendix II.

- **PLA Research Institutes** are subordinate to the PRC Central Military Commission and support the military's R&D efforts in biomedical and defense technology research.
- **State-owned Arms Conglomerates** are major commercial enterprises owned by the PRC central government that develop and build weapons systems for the PLA.
- **Seven Sons of National Defense** are a group of PRC universities that hold top-secret credentials and close R&D relationships with the PLA and the PRC's defense industry.

Research Collaboration: “Research collaboration” is defined as the co-authorship of an academic paper involving at least one author affiliated with a PLA-affiliated research institute (PLA-RI) and at least one author from a U.S. organization. In general, research collaboration on academic papers can take many forms. Some cases involve extensive, hands-on engagement, in-person meetings, the exchange of ideas and information, joint experimentation, and even co-development of software or hardware prototypes. In other cases, interaction may be minimal, with co-authors never meeting and contributing isolated sections to a paper compiled by a lead author. To account for this variability, we limited our analysis to publications with fewer than twenty authors. While not a perfect filter, this threshold helps exclude large-scale publications where meaningful collaboration is less likely.

Regardless of the depth of engagement, co-authorship itself is a known tactic employed by the PRC government and, at a minimum, reflects a shared point of contact between listed authors.

Instance: An “instance” of collaboration is defined as a one-to-one connection between a U.S. organization-affiliated individual and a PLA-RI-affiliated individual on a single publication. A single publication can generate multiple instances if it includes several authors, and a single author can be associated with multiple instances across different publications. We use this metric—rather than focusing on unique authors or publications—because it more accurately captures the intensity of collaboration over time. For example, if one U.S. researcher co-authors twenty papers with PLA-RI personnel, the unique author count registers only one collaboration, significantly understating that individual's engagement. Similarly, if one U.S. author collaborates on a single paper with five PLA-RI co-authors, counting by publication misses the breadth of that interaction. The instance-based approach ensures a more granular and representative measure of collaborative activity.

STEM Topics: Analysis for this report was limited to scientific publications on STEM topics including Physics, Engineering, Materials Science, Computer Science, Chemistry, Mathematics, Biology, Medicine, and Geology.



APPENDIX II: PLA-RI DESCRIPTIONS

As noted in Appendix I, Strider defines People's Liberation Army-affiliated Research Institutes as a set of more than 50 institutions that conduct R&D or production on behalf of the PRC's armed services—including PLA Research Institutes, State-owned Arms Conglomerates, and Seven Sons of National Defense universities. While some of these institutes are more directly supporting military technology development than others, all have close document ties to the military. This appendix provides brief profiles of a sample of the institutes that fall under each category.

PLA Research Institutes

- **PLA Army Medical University** (中国人民解放军陆军军医大学), formerly known as the Third Military Medical University is affiliated with the PLA Ground Force. It includes six national laboratories and has won military awards for S&T progress. The Army Medical University collaborates with and supplies research and technology to defense and military organizations.
- **Chinese People's Liberation Army General Hospital** (中国人民解放军总医院) is a deputy military-level unit directly under the Joint Logistics Support Force of the Central Military Commission and headed by a Major General of the PLA. It serves as the PLA's medical college and scientific research base.
- **PLA Nanjing General Hospital of Nanjing Military Command** (中国人民解放军南京总医院) is a military medical hospital that is responsible for human resource training for the PLA and Nanjing Military Command health professionals. The hospital engages in a range of military research and talent recruitment activities.
- **The PLA National University of Defense Technology** (NUDT, 中国人民解放军国防科学技术大学) is a military R&D institute subordinate to the Central Military Commission of the CCP. NUDT's President is a Major General in the PLA. NUDT is under U.S. government sanction because it poses a risk to national security.
- **The PLA Air Force Medical University**, also known as the Fourth Military Medical University (第四军医大学唐都医院) is a PLA research institution for medical and psychological sciences. The university specializes in military preventative

medicine and medical and psychological sciences tailored for personnel engaging in air and space operations. It employs several talent program selectees.

State-owned Arms Conglomerates

- **China Academy of Space Technology** (CAST, 中国空间技术研究院) is a PRC research institute focused on R&D for outer space technologies. CAST is subordinate to the China Aerospace Science and Technology Company (CASC), a PRC state-owned defense aerospace conglomerate active in the international arms export market.
- **China Institute of Atomic Energy** (中国原子能科学研究院) is a PRC nuclear research institute under the China National Nuclear Corporation, a PRC state-owned nuclear technology company that has close ties to the PRC defense sector. The Institute has supported the development of ballistic missiles and has received awards for its contributions to national defense science and technology.
- **China Electronics Technology Group Corporation** (CETC, 中国电子科技集团公司) is a state-owned defense conglomerate that specializes in dual-use electronics. CETC is charged with "maintaining self-reliance, coordinating battle, ...and guaranteeing national defense and military electronic information equipment research." CETC researches and produces early warning, radar, electronic warfare, communication and navigation, and unmanned aerial vehicle systems. CETC and many of its subsidiaries are sanctioned by the U.S. government.



- **Commercial Aircraft Corporation of China** (COMAC, 中国商用飞机有限责任公司) is a state-owned manufacturer of commercial aircraft that the PRC government refers to as a “defense industry conglomerate.” COMAC maintains strong links to the defense industry and its leadership is drawn from former executives of state-owned military aircraft and missile manufacturers. The PRC’s primary supplier of military aircraft, the Aviation Industry Corporation of China, holds a 10% share in COMCAC.
- **Southwestern Institute of Physics** (核工业西南物理研究院) is a PRC nuclear fusion research institute under China National Nuclear Corporation, a PRC state-owned nuclear technology company.

Seven Sons of National Defense

The “Seven Sons” are a group of PRC universities subordinate to the State Administration for Science, Technology, and Industry for National Defense (SASTIND), a PRC government agency responsible for defense S&T policy. The Seven Sons have deep ties to the defense industry and military through their defense laboratories, talent development, and collaboration with defense arms conglomerates. The Seven Sons all house “talent introduction bases” that aim to “introduce overseas talents and enhance the level of foreign intelligence,” as well as “advance indigenous innovation capabilities” of the country. The Seven Sons hold top-secret security credentials and are all sanctioned by the U.S. and Japanese governments.

- **Beihang University**, also known as Beijing University of Aerospace and Aeronautics (BUAA, 北京航空航天大学) is a Seven Sons university that specializes in spaceflight research and is a leader in stealth technology. It is involved in the R&D for PRC military aircraft and missiles and sends many of its graduates to state-owned missile and defense aviation companies. BUAA hosts at least eight major defense laboratories.
- **Beijing Institute of Technology** (BIT, 北京理工大学) is a Seven Sons university that is a leader in weapons sciences. It is one of a few PRC institutions to award doctorates in weapons science, about 30% of its graduates work in the defense sector, and it hosts at least ten defense laboratories. BIT claims to conduct world-class research on missile technology, including “precision strikes, high damage efficiency, maneuver penetration, long-range suppression, and military communications systems.” BIT is the chair of the B8 Cooperation Innovation Alliance, a group of universities that collaborate with China North Industries Group Corporation (a state-owned producer of armaments) and the Chinese Academy of Ordnance Science (a government R&D institute) to advance the PRC’s national defense S&T goals.
- **Harbin Engineering University** (HEU, 哈尔滨工程大学) is a Seven Sons university that hosts PRC state research centers and key laboratories and cooperates with multiple state military-industrial entities, including the China National Nuclear Corporation and the Chinese Academy of Engineering Physics, the country’s primary nuclear weapons developer. HEU was added to the U.S. Commerce Department’s Entity List in June 2020 “for acquiring and attempting to acquire U.S.-origin items in support of programs for the People’s Liberation Army.”
- **Harbin Institute of Technology** (HIT, 哈尔滨工业大学) is a Seven Sons university described by PRC state media as having “defense technology innovation and weapons and armaments modernization as its core.” HIT is best known for aerospace research and operates a joint research center with China Aerospace Science and Technology Corporation, a state-owned defense company that specializes in long-range ballistic missile and satellite technology. HIT spends about half its budget on defense research and about 30% of its graduates go on to work in the defense sector. HIT hosts at least nine major defense laboratories. HIT is included on Japan’s End User list for export controls.
- **Nanjing University of Science and Technology** (NJUST, 南京理工大学) is a Seven Sons university that ranks among the top PRC universities for armaments sciences. About 15% of its graduates find employment in the defense sector and it has a collaborative relationship with the PRC military in fields such as signals intelligence, unmanned combat platforms, and information security. NJUST traces its origins to the PLA Military Engineering College’s Department of Artillery Engineering. NJUST is a member of the B8 Cooperation Innovation Alliance, a group of universities that collaborate with China North Industries Group Corporation (a state-owned producer of armaments) and the Chinese Academy of Ordnance Science (a government R&D institute) to advance the PRC’s national defense S&T goals.



- **Nanjing University of Aeronautics and Astronautics** (NUAA, 南京航空航天大学) is a Seven Sons university that specializes in aerospace research and works closely with PRC military aviation companies. Scientists at the NUAA College of Energy and Power Engineering sit on expert panels for the PLA. In 2018, 21% of the university's graduates who found employment were working in the defense sector. The university claims to have participated in nearly all major national aviation projects, including the development of the Chang'e 3 unmanned lunar explorer. NUAA also hosts the PRC's only national defense laboratory for helicopter technology. In 2021, the United States convicted PRC intelligence officer XU Yanjun of conspiring and attempting to steal engine technology from GE Aviation. The indictment details the involvement of a NUAA deputy director in those efforts.

- **Northwestern Polytechnical University** (NWPU, 西北工业大学) is a Seven Sons university that describes itself as "devoted to improving and serving the national defense science and technology industry." NWPU has close ties to state-owned shipbuilding and aerospace conglomerates and, through a subsidiary company, produces 90% of the PRC's military drones. About 40% of its graduates go on to work in the defense sector. In 2018, the U.S. Department of Justice charged PRC national Shuren QIN with illegally exporting devices used in anti-submarine warfare to NWPU.

