



STRIDER

FROM INNOVATION TO WEAPONIZATION

How China Exploits the U.S. Open
Scientific System

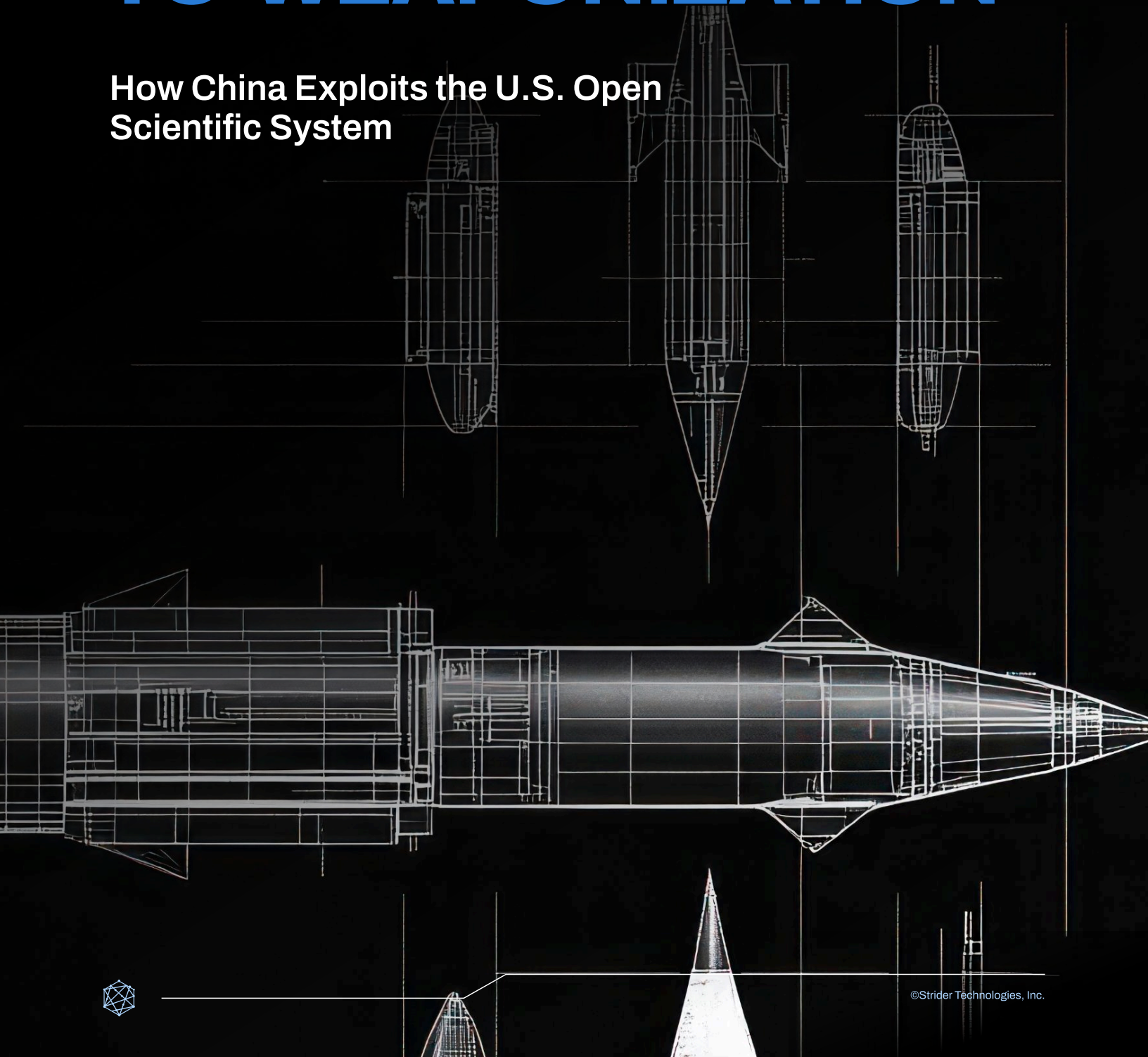




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EXECUTIVE SUMMARY

The People's Republic of China (PRC) is executing a state-driven strategy to achieve global leadership in science and technology (S&T). Government plans lay out tactics for achieving that goal, including leveraging international collaborations and recruiting foreign talent. While many PRC organizations are tasked with implementing those tactics, research institutes affiliated with the People's Liberation Army (PLA) pose the most significant risks to U.S. national security, and to the U.S. S&T ecosystem.

In response to the threat posed by the PRC strategy, the U.S. government has implemented a series of measures to safeguard its research ecosystem—targeting foreign talent recruitment, restricting PLA researchers, and tightening security protocols for federally funded research. However, these policies primarily focus on U.S. government-funded projects and stop short of prohibiting collaborations with PLA-affiliated research institutes (PLA-RI).

Strider identified STEM publications that feature collaboration between U.S. organizations and over 50 PLA-affiliated research institutes—spanning PRC military branches, PLA research bodies, state-owned defense conglomerates, and “Seven Sons of National Defense” universities.

This report concludes by recommending that U.S. organizations should eliminate STEM research collaboration with PLA-RI. Appendix I provides detailed methodology and Appendix II provides brief profiles of select PLA-affiliated research institutes.

Our Findings Include:

100K

There have been **more than 100,000 instances of collaboration between researchers affiliated with U.S. organizations and researchers affiliated with PLA-RI on STEM topics since 2017**. 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, hypersonic vehicles, and directed energy.

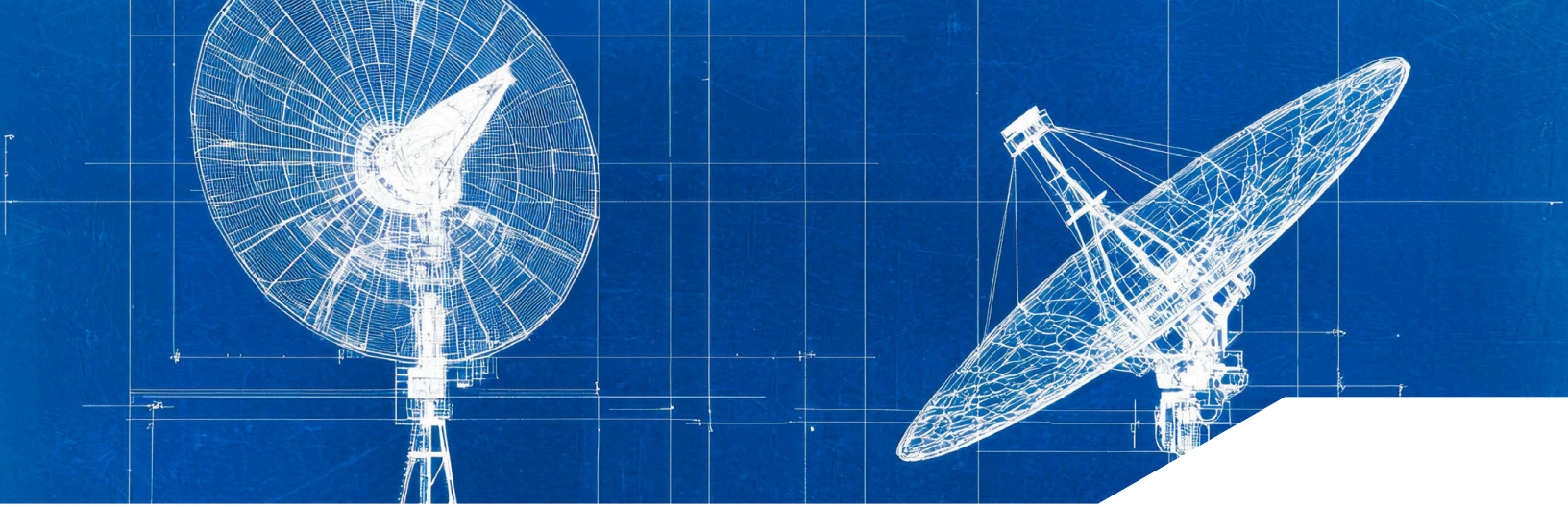


U.S. and PLA-RI collaboration has modestly declined since 2019 but remains high, even years after U.S. policy actions like NSPM-33. This collaboration facilitates PRC recruitment of top research talent and the transfer of critical expertise to the PRC military—with similar patterns observed globally.

500+

More than 500 U.S. organizations have collaborated with a PLA-RI on STEM topics since 2017. Leading U.S. universities and government laboratories are among the most active collaborators with PLA-RIs. While some leading U.S. 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 emphasized the priorities of “achieving high-level S&T self-reliance,” “resolutely winning the battle over key core technologies,” and building a “world-class military.” According to the US Department of Defense, **the PRC aims to harness emerging technologies to become a world-class military by 2049.**

China's industrial policies outline specific mechanisms for advancing these ambitions, including:



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 organizations are tasked with advancing the military's capabilities and play a central role in executing state-directed S&T objectives.

Recent investigative reporting has brought renewed scrutiny to the role of PRC influence at top U.S. universities. At Stanford University, an investigation revealed how Chinese intelligence operatives, posing as students, targeted Stanford researchers to covertly gather sensitive academic knowledge and exert influence through coercive scholarship programs and social engineering. At Harvard, it was reported that the University accepted \$560 million in gifts and contracts from the PRC and Hong Kong between 2010 and 2025. Additionally, the U.S. Department of Education launched a formal investigation into the University of California, Berkeley for allegedly failing to disclose accepting \$220 million from PRC government officials to construct a Shenzhen-based institute.

These incidents highlight how PRC-linked financial contributions and personnel exchanges can function as covert channels for influence, intelligence gathering, and technology transfer—often under the guise of legitimate academic collaboration. Far from isolated cases, these engagements are part of a broader state-directed strategy that poses systemic risks to the U.S. S&T ecosystem. 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 organizations. In particular, collaborations with PLA-affiliated research institutes heighten the risk that U.S.-origin scientific advancements will directly bolster the capabilities of the PRC military.



U.S. GOVERNMENT POLICY RESPONSE

Recognizing the national security threat posed by the PRC's strategy, the U.S. government has taken action to mitigate the risk and restrict PRC military and strategic entities from exploiting the openness of the U.S. research and innovation ecosystem. The U.S. government acknowledges that the PRC seeks to "exploit open United States and international research environments to circumvent the costs and risks of conducting research, thereby enhancing their economic and military competitiveness at the expense of the United States, its allies, and partners." These efforts are part of a broader strategy to prevent illicit technology transfer and foreign government influence.



Proclamation on the Suspension of Entry as Nonimmigrants of Certain Students and Researchers from the People's Republic of China

This May 2020 proclamation issued by President Trump aimed to prevent China's "Military-Civil Fusion" strategy from exploiting U.S. research in AI, quantum computing, biotechnology, and aerospace by suspending entry of PRC graduate students and researchers with ties to PRC military-linked universities.



State Department Order to the PRC Ambassador to Close the Houston Consulate and Remove All Chinese Military Researchers in the U.S.

In July 2020, Assistant Secretary of State David Stillwell told the PRC Ambassador that the Houston consulate must close within 72 hours and that all Chinese military researchers in the U.S. must be removed. It was later revealed that the officials at the Houston Consulate had been directing active duty PLA personnel in the United States how to avoid detection and how to destroy evidence.



Presidential Memorandum on United States Government-Supported Research and Development National Security Policy (NSPM-33)

Issued by President Trump in January 2021, NSPM-33 aimed to safeguard U.S. government-funded R&D from foreign government exploitation.

The memorandum and subsequent guidelines require recipients of federal funding to disclose potential conflicts of interest, including affiliations with foreign governments, participation in talent programs, and foreign government funding support. The memorandum requires research institutions to implement cybersecurity protocols, foreign travel monitoring, research security training, and enhanced export compliance measures.





Amendment and Extension of the U.S.-PRC Science and Technology Agreement

In December 2024, the State Department updated and amended this agreement—first signed in 1979—narrowing the scope to solely focus on basic research, explicitly excluding cooperation in critical and emerging technologies.



CHIPS and Science Act

This bill, which became law in August 2022, provides billions of dollars in federal funding for R&D, manufacturing, and workforce development for the semiconductor industry. Recipients of CHIPS and Science Act funding are prohibited from materially expanding their semiconductor manufacturing in China, barred from licensing their technology to PRC organizations, and prohibited from participating in joint research with PRC organizations if those efforts involve sensitive technology related to semiconductors.



U.S. Research Protection Act

This bill, which passed the House of Representatives in March 2025, amends the CHIPS and Science Act by broadening the definition of “malign foreign talent recruitment programs” to include programs that offer both direct and indirect compensation or incentives to researchers, closing loopholes that previously allowed foreign entities to exploit U.S. research through indirect means.



New Visa Policies Put America First, Not China

In May 2025, the State Department announced plans to “aggressively revoke visas for Chinese students, including those with connections to the Chinese Communist Party or studying in critical fields.”

While these measures reflect a heightened awareness of research security issues, they are largely limited to restricting U.S. government-funded research from involving participants in foreign malign talent programs or those receiving foreign government support. They do not comprehensively address direct research collaboration between U.S. and PLA research institutions or researchers affiliated with those institutions.



STRIDER DATA FINDINGS

Strider's analysis reveals that, despite U.S. government efforts to mitigate vulnerabilities within the American research ecosystem, PLA-affiliated Research Institutes (PLA-RIs)—acting in accordance with state directives—have continued their collaborative engagement with leading U.S. science and technology institutions in recent years. These partnerships may be used to cultivate relationships with U.S. 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 States, Strider data indicates a similar pattern exists across all major science and technology powers, most of whom are U.S. allies.

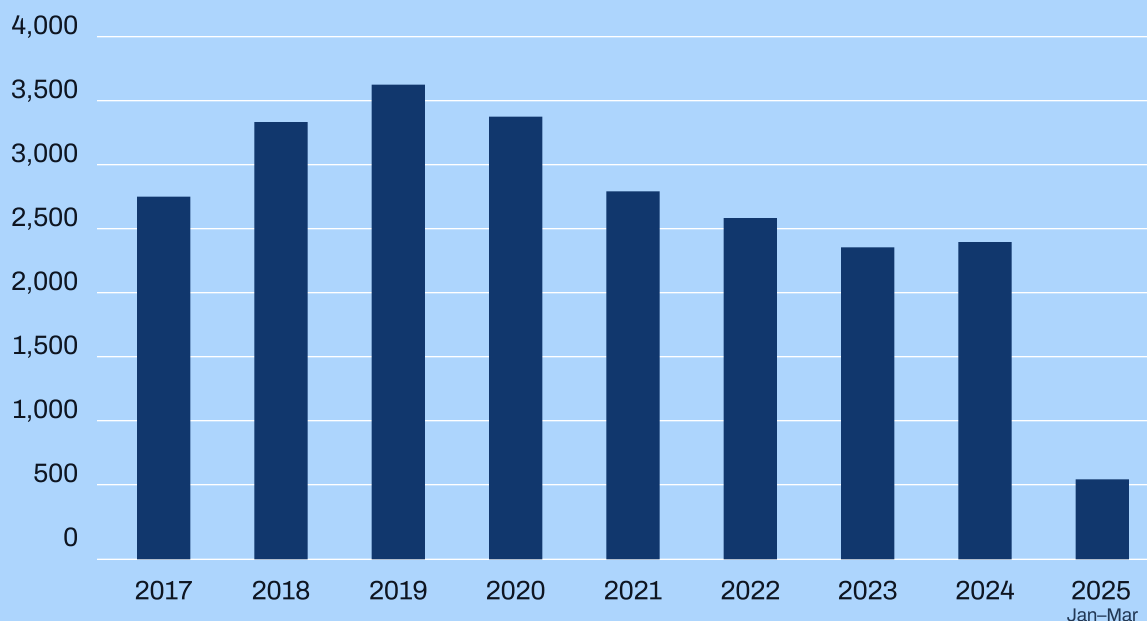
Scale of U.S. Collaboration with PLA-RI

Strider identified more than 500 U.S. organizations that have collaborated on more than 100,000 instances with a PLA-RI on STEM topics since 2017. Among the U.S. organizations that have the most instances of collaboration with PLA-RI are leading universities and government laboratories. U.S. companies that appear in the dataset have significantly lower levels of collaboration than their academic and government counterparts.

Research Collaboration Over Time

Following actions of the first Trump Administration—including the removal of PLA-affiliated researchers and heightened national focus on research security—the number of joint publications between PLA-affiliated research institutes (PLA-RI) and U.S. organizations began to decline in 2019. This downward trend has continued, yet collaboration levels remain notably high even four years after the release of NSPM-33. The 2025 publication count appears lower because this report only includes data through March 2025.

Number of Publications featuring Collaboration Between U.S. Orgs and PLA-RI





Research Collaboration Topics and Technologies

Much of the joint research Strider identified in this analysis involves dual-use technologies—areas of science and engineering with both civilian and military applications. Notably, some of this research involves technologies with a high 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

Several joint publications focus on anti-jamming communications, a foundational technology in modern military command, control, and communications systems. These works involve researchers affiliated with both U.S. institutions and the Sixty-Third Research Institute of the PLA's National University of Defense Technology. Anti-jamming capabilities are critical for maintaining reliable battlefield communication in contested electromagnetic environments and are central to electronic warfare and secure tactical operations.



Surveillance

Several collaborative publications focus on research directly tied to methods that enhance the accuracy, efficiency, and resilience of visual intelligence systems which are directly related to surveillance, reconnaissance, and target recognition and tracking technologies. These publications include authors from U.S. institutions working with researchers from the PLA National University of Defense Technology and Beihang University, a Seven Sons university that is involved in the R&D for PRC military aircraft and missiles.



Hypersonic Vehicles

Multiple collaborative publications address hypersonic vehicles, a field that is almost exclusively military in nature due to its strategic relevance in global strike, missile defense evasion, and next-generation weapons platforms. These publications include authors from U.S. institutions working with researchers from the College of Automation Engineering at Nanjing University of Aeronautics and Astronautics—a university with well-documented ties to China's military aerospace programs.





Directed Energy

Several collaborative publications involve directed energy technologies, a domain of interest to militaries for applications such as high-energy lasers, microwave weapons, and non-kinetic strike systems. Although directed energy research can have civilian applications (e.g., in manufacturing or medical technologies), its military relevance is substantial, particularly in counter-drone systems, missile defense, and anti-satellite capabilities. Notably, some of these collaborations involve U.S.-affiliated researchers and counterparts from the National Defense Key Disciplines Laboratory of Light Alloy Processing Science and Technology—a PLA-affiliated entity that supports advanced materials development for military use. While the academic content may appear non-military in isolation, such partnerships raise the risk of unintended contributions to the PRC's directed energy weapons programs.



Advanced Materials Science

Several of these collaborative publications are in the field of advanced material science, such as the development of nanomembranes and high ductility strain-hardening cementitious composites. This research category has both military and civilian applications; however, when the research is conducted with PLA-affiliated organizations, the research raises the risk of unintended contributions to PLA technology and weapons systems.

PLA-RI Organizations by Collaboration with United States Organizations (Since 2017)

PLA-affiliated Research Institute	Instances	Publications
Harbin Institute of Technology	22,794	4,668
Beihang University	16,584	4,189
Beijing Institute of Technology	14,494	3,601
Northwestern Polytechnical University	12,750	2,773
Nanjing University of Science and Technology	8,094	1,911
Nanjing University of Aeronautics and Astronautics	6,423	1,715
Chinese PLA General Hospital	4,182	671
PLA Army Medical University	3,947	490
Harbin Engineering University	3,868	910
PLA National University of Defense Technology	2,680	756



BEST PRACTICES FOR INDUSTRY AND RESEARCH INSTITUTES

To mitigate the strategic risks posed by PLA-affiliated research institute connections to U.S. research ecosystems, industry leaders and research institutions should not conduct STEM research with PLA-affiliated research institutes. US allies and partners should do the same.

CONCLUSION

The findings of this report underscore a pressing and persistent challenge to the integrity and security of the U.S. science and technology (S&T) ecosystem. Despite multiple rounds of policy interventions by the U.S. government, research collaboration between U.S.-based organizations 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, hypersonic vehicles, and directed energy—pose strategic risks that extend far beyond academia. They contribute directly and indirectly to the advancement of the People's Republic of China's military capabilities and its broader geopolitical ambitions.

The report's data highlights a disturbing trend: over 100,000 instances of collaboration involving more than 500 US institutions since 2017. 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 U.S. national interests. Even with policy instruments such as NSPM-33, visa restrictions, and legislative measures like the CHIPS and Science Act, the openness of the U.S. research environment continues to be exploited.

Ultimately, safeguarding the U.S. research enterprise demands more than compliance with government funding rules. It requires a proactive, values-driven stance by academic institutions, government laboratories, and private-sector organizations 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, U.S. institutions can help ensure that their innovations fuel progress, not the ambitions of a foreign military adversary.

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.



Ultimately, safeguarding the U.S. research enterprise demands more than compliance with government funding rules. It requires a proactive, values-driven stance by academic institutions, government laboratories, and private-sector organizations alike.

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.



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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.

