



CHINA-UNITED STATES

How research landed on front line of US battle with China

Lindsay Ellis and Nell Gluckman, *The Chronicle of Higher Education* 08 June 2019

The email sparked panic. “Effective immediately, the Johns Hopkins School of Medicine is temporarily halting the appointment of visiting scientists,” wrote a medical school administrator to the neurology department last fall.

[*This is an article from **The Chronicle of Higher Education**, America’s leading higher education publication. It is presented here under an agreement with University World News.*]

Researchers who saw it felt they knew what it was really about: China. The country wasn’t named, but excerpts of the message rippled through Chinese social media, newspapers and websites. The implications were devastating: Here was one of the most prominent medical schools in the United States, banning scientists from a crucial research partner out of a fear that they would steal ideas or – worse – that they could be spies.

Johns Hopkins administrators were dismayed for a more immediate reason. The email was inaccurate, announcing a policy that didn’t exist, a spokeswoman for the medical school told *The Chronicle*. “The whole thing was a nightmare for us.”

But this “nightmare” did not come out of the blue. It was easy for some to believe the Hopkins email was a real policy change as tensions mounted between the two countries.

Reports of sensitive information ending up in China had appeared in the news earlier in the year. Government agencies and elected officials had warned university leaders that they needed to act. An international science research partnership that had grown stronger over 40 years suddenly seemed to be decaying, and the Hopkins email felt like a natural next phase of that decay.

Warning of bad actors

The email came in response to a call from the National Institutes of Health’s director, who warned that bad actors could exploit the open research environment and peer-review process cherished by American universities. Hopkins was reinforcing the NIH’s message,

but the spokeswoman said the university had no intention of banning foreign researchers.

Still, scholars wanted a more forceful gesture of solidarity with the Chinese researchers on campus, the spokeswoman, Audrey M Huang, said. One academic told her that he was considering leaving Hopkins, she said. And other researchers, outside Hopkins, took the episode as further evidence that the country that had long embraced Chinese researchers might no more.

The US and China have entered a new era of their complex relationship. This phase is combative and competitive – some say it's the genesis of a new Cold War. To US officials, university laboratories are on the front lines. They're where the tools that will control the future of medicine, warfare and the economy are being developed.

The theft of that work, they say, could unfairly benefit a growing rival. In the hands of an authoritarian regime, these tools can also be used for surveillance and suppression. So some American universities are discouraging certain work in China and rejecting money from some Chinese companies – knowing that if they don't act fast enough on their own, lawmakers will clamp down.

Universities in a bind

But universities are in a bind. One of the tenets of American higher education is that collaboration among the best minds will yield progress in science and technology, and China is America's top collaborator in published scientific research. Campuses are loath to jeopardise that relationship, fearing the loss of talent, money and future discoveries if walls are built up too high.

There have been charges of theft, but it's not entirely clear to college leaders how big the problem is. The uncertainty has bred mistrust and suspicion. Swaths of US researchers of Chinese descent feel unfairly targeted.

About 500 miles from Johns Hopkins, Duxin Sun saw reports of the email and the policy. With so many rumoured new restrictions, it had become hard to discern what was real and what wasn't. He thought the story sounded too extreme to be true. But in the past year, Sun, a pharmaceutical sciences professor at the University of Michigan at Ann Arbor who moved to the United States from China in 1994, has started to pay more attention to the political rhetoric about China.

He fears that the very thing that attracted him to America may be at stake.

If higher education starts to question its openness, he said, "we start our own self-destruction."

Sun earned his bachelor's and masters degrees in pharmacy in Shanghai in the late 1980s and early 1990s, studying inflammation and cardiovascular disease. The field was big, but he connected with a Vanderbilt professor at a Montreal conference. That professor wanted a

research assistant – and quickly recruited Sun.

Sun soon wanted to do more. He quit the lab and earned his PhD in pharmaceutical sciences at the University of Michigan. After a few years in industry, he was hired as an assistant professor at Ohio State University, taking a 30% pay cut, he said.

He couldn't have done his work, which focuses on cancer treatment, without collaborating with other researchers. "I stepped on their shoulders," Sun said. "They helped me."

Era of normalised cooperation

The Michigan professor's trajectory is one that many in academe cherish. But it wouldn't have been possible before the US and China normalised scientific relations in the 1970s. In that decade, after an era of estrangement, the two nations flirted with cooperation – and then made it official.

First, an American plant physiologist and a geneticist visited China in 1971 – thought to be the first scientists to do so in decades, *The New York Times* **reported**. It was front-page news: "US Biologists in China Tell of Scientific Gains", read the headline. The following year, 11 Chinese doctors visited American hospitals, sharing news of Shanghai's new birth-control efforts, the *New York Times* **reported**.

In 1979, an agreement between President Jimmy Carter and Deng Xiaoping, China's vice premier, sparked larger-scale science-and-technology collaborations between agencies, universities and individuals.

For China, the benefit was clear: Cooperation and exchange would help its scientists catch up to innovative Western practices and strengthen the country's economic muscle. For the US, the arrangement meant new opportunities to recruit top students and scholars – and the immeasurable possibilities of scientific discovery in a new place.

Over the past four decades, however, the dynamic has shifted.

Chinese science took huge strides as the nation invested deeply in research, according to a **2104 assessment** prepared on behalf of the US-China Economic and Security Review Commission. Meanwhile, that report found, the US had less money to go around.

Chasing foreign funding and talent

Facing that shortage, American universities chased foreign funding and talent. China provided. Chinese graduate students in science and engineering fuelled publications.

In the year ending in November 2018, the US and China were each other's top research collaborators, according to **the Nature Index**, which tracks natural science collaborations in papers published in 82 top science journals.

The US's upper hand in this partnership was slipping. Its new reliance on China, however, did not come with tight, centralised oversight of the relationship. Not all American universities knew which of their professors were participating in programmes hosted by Chinese universities. Some faculty members didn't report all of their foreign research to US granting agencies.

And as the Chinese Communist Party consolidated power, tensions grew between the two governments. China-watchers worried about allegations of human rights violations by the government of Xi Jinping, who assumed power in 2012.

Could groundbreaking research, exported to China, be used to control speech, track down citizens, and detain ethnic minorities? Could it help create weapons? And is collaborating with a university the same thing as collaborating with the Communist Party?

A few noteworthy cases brought concern.

Tianjin University professors who earned **their PhDs at the University of Southern California** were charged in 2015 with **stealing trade secrets** that could bolster military operations, according to the FBI.

Last year, China reportedly tested a so-called invisibility cloak that can shield objects from detection. Some US officials believed the technology was taken from a Duke University lab by a former researcher.

This past February, US-China research relationships were again front-page news. But ***The New York Times'* headline** this time around was far bleaker: "American DNA Expertise Helps Beijing Crack Down."

Chinese authorities, according to the report, were comparing genetic material provided by a Yale University geneticist with the DNA of the Uighur people, a Muslim minority **that the Chinese government has interned en masse**.

Labs become battlegrounds

Robert Daly, director of the Wilson Center's Kissinger Institute on China and the United States, put it plainly as he addressed an open forum at the University of Colorado at Boulder in March.

Beijing and Washington agree that leading in technology and innovation will be key to making the global rules, Daly told the forum. Think artificial intelligence. The Internet of Things. Electric vehicles. 5G. The nation that most quickly develops and sells these technologies will be the "pre-eminent nation looking forward".

That's why campus laboratories aren't just hot spots for international collaboration. They're seen by some US officials as battlegrounds.

The dynamic will remain true for decades, Daly told the gathered crowd, which included research and compliance officials and international-affairs staff members. “And it’s going to pose challenges to all of you.”

The open forum was Daly’s fifth meeting that day in Boulder – at least. He’s become a go-to expert for research universities looking to teach their faculty and staff about the geopolitical realities that may shape their work. “Every AAU [Association of American Universities], APLU [Association of Public and Land-grant Universities] institution wants to get him on their campus,” an administrator said, introducing Daly.

For Daly, higher education needs a nuanced solution. Universities must broadcast the benefits of collaboration to sceptical US officials, he said. Chinese scholars in the US have provided immense benefits to American higher education and society at large. But higher education has become the heart of the conflict between the US and China, he said in an interview, and campuses need to take precautions.

It’s not just about economic theft. One administrator at a top public research university told Daly that a possible partner, who proposed a collaboration on global positioning systems to study natural disasters, was deeply involved in surveillance and re-education camps. Even nominally private enterprises are “subject to the control of the Chinese Communist Party – and increasingly so,” he told the Boulder audience, without naming the university.

Need to protect universities’ work

Daly’s warnings join a chorus of messages to university leaders that they need to protect their work before the power is taken out of their hands.

Richard N Haass, president of the Council on Foreign Relations, warned higher education leaders in March that if universities don’t develop rules to govern their relations with the Chinese government, “it’s going to be done for them by Congress or the executive branch.”

In April, at a Senate hearing on the NIH’s budget, Roy Blunt, Republican of Missouri, wanted to know how the agency was holding university leaders’ feet to the fire.

“Foreign governments are initiating systematic ways to influence our research and frankly to take advantage of our research by stealing it,” he told Francis S Collins, the director. “NIH has to be sure that the research community is fully aware of the threats.”

Collins tried to assure the senator that he and the universities that receive NIH funding are taking unprecedented steps to protect their cutting-edge work. In August 2018, he wrote a letter to more than 10,000 NIH grantee institutions warning of the exploitation of the peer-review process and saying researchers had not disclosed funding from foreign governments.

“There was initially some surprise and maybe even denial that that could be happening in these institutions,” Collins told the Senate panel. “We are now seeing statements from some of those institutions, very strongly worded, to their own faculty saying, ‘We realise we have a

problem, too’.”

And the agency has gone further than warning letters. Three scientists were ousted from MD Anderson Cancer Center at the University of Texas after receiving letters from the NIH questioning their conduct.

MD Anderson said they had shared grant applications they obtained as peer reviewers with third parties in China and failed to disclose appointments or other sources of funding from China, according to documents reviewed by *The Chronicle*. (This was first reported by the ***Houston Chronicle*** in April.)

Then, in May, **Emory University announced** that two faculty members were no longer employed after an investigation found they had “failed to fully disclose foreign sources of research funding and the extent of their work for research institutions and universities in China”.

Emory said its investigation was prompted by an NIH letter, and one of the professors disputed the allegations in a statement to *Science Magazine*.

Agency investigation

The NIH is investigating scientists in at least 55 institutions for a range of questionable behaviour, according to Michael S Lauer, deputy director for extramural research. One area of concern is when US-funded scientists set up identical labs in China, he said, and don’t report their Chinese grants for that work. He called that practice “double dipping” – and arguably a waste of US taxpayer money.

“What makes me hit my head against the wall is when we and the American institutions know nothing about what’s going on,” Lauer said.

“We have heard administrators from American institutions saying, I had no idea that one of the most prominent members of my faculty was spending three months in China running a huge operation there.”

The NIH is not the only agency to act. The State Department has put restrictions on Chinese students seeking visas to study in certain areas, according to *The New York Times*, while the Departments of Energy, Defense, and Commerce have announced plans to pare back research in “sensitive” countries, consider new ways to protect technology from theft, and tighten export controls.

To bring these agencies together, US Senators Marco Rubio, Republican of Florida, and Mark R Warner, Democrat of Virginia, have proposed an office at the White House to protect intellectual property and sensitive information. Bipartisan legislation in the House, supported by the Association of American Universities and several major research universities, would coordinate that effort out of an existing White House office.

Rubio has gone so far as to call China and its state-directed institutions a “long-term threat to US economic and national security.”

“American universities would be wise to wake up to that fact,” **he said in an April statement**. He did not respond to *The Chronicle*’s request for comment.

Universities prodded to take action

The message that universities are naïve actors is one **echoed by the FBI**, which has also prodded campus leaders to take action. Christopher Wray, the director, praised some universities for taking on the issue at an event at the Council on Foreign Relations in April.

Still, he said, “the academic sector needs to be much more sophisticated and thoughtful about how others may exploit the very open collaborative research environment that we have in this country and revere in this country”.

Professors say this message undervalues enormous contributions, long-held and productive relationships, and the care with which scientists approach their work. They also point to examples of Chinese-American scientists who have been wrongly accused.

In 2015, for example, Xiaoxing Xi, a physics professor at Temple University, was charged with sharing sensitive information with China, but all the charges were later dropped. He is now suing the FBI agent who brought the case, saying he falsified information.

University leaders at **Yale University**, Stanford University and **University of California at Davis** have spoken out in support of international scholars. They say they are listening when US officials tell them to pay attention. Still, some say they need more clarity on what to look for.

Working with intelligence community

“University associations have been working with the intelligence and security communities to try and obtain firm examples that illustrate the threat we face so that we can defend against those threats,” said Tobin Smith, vice president for policy at AAU. “The more general the statements, the harder it is for us to come up with real solutions.”

In December, China’s New York consulate general approached Ohio State with a proposal. Two officials from the consulate’s science-and-technology section wanted to meet university administrators and tour nanomedicine and manufacturing facilities the following week.

A university administrator said no, citing the short notice and suggesting a possible future visit. Feng Hu, the vice consul, responded: Could they still contact faculty members directly to set up a meeting?

In no uncertain terms, Provost Bruce A McPherson said no: “Your proposed visit on Dec 19 cannot be permitted.”

But the delegation came anyway. On 19 December, two people visited the university's electro-science laboratory, the chemical-and-bioengineering building, and the Thompson Library, spokesman Benjamin Johnson wrote in an email.

"We understand that consular officials met with some university community members independently," he wrote. They did not access secure locations with "stringent entry requirements", and when they were seen entering the library that afternoon, they were asked to leave campus.

The visit may have simply been an opportunity for scientists to show off their work. Tours like this are normal on college campuses. But US agencies have urged more scrutiny. Just that week, a group advising the NIH director called scholars' visits "potential entry points for unwanted information gathering" in a presentation on foreign influences on research integrity.

Ohio State told the State Department's Office of Foreign Missions about the visit.

Damaging message

The episode shows how a new era in US-Chinese relations upends old norms. It's hard, though, to imagine how to root out the very few collaborations that have raised suspicions without damaging the many important ones.

"You don't want to send the message to arguably the largest talent pool in the world," Daly said in an interview, "that they are a despised class in America."

To walk this line, universities are paring back certain research relationships and adding more scrutiny to others, looking more carefully at the contracts they sign.

A major change is that some campuses are discouraging their faculty members from participating in Chinese talent-recruitment programmes, part- and full-time visiting appointments some see as an honour.

The FBI has said these programmes are part of a Chinese strategy of "luring" expertise to their universities. Scholars who participate, the agency warned, could be violating export-control and espionage laws: "A simple download of intellectual property or proprietary information has the potential to become criminal activity," **an FBI pamphlet reads.**

The warning is sinking in at the University of California at San Diego. At least a half-dozen people by January had opted out of these programmes after hearing about the risks, said Sandra A Brown, the university's vice-chancellor for research. But it's hard for university leaders to keep track of who's participating. Brown said faculty members have been approached outside their university email addresses.

Picking a Chinese scientist as a partner in research has begun to raise questions, too. In

April, the Massachusetts Institute of Technology **said it would start scrutinising more carefully** “elevated risk” collaborations between its faculty and people or entities in China, Russia and Saudi Arabia.

Universities reject Chinese funding

Universities are also rejecting Chinese money for research. Heavyweights like Cornell and Stanford universities and MIT have halted new research agreements with Huawei, a Chinese telecommunications company under scrutiny by the US government.

The American Council on Education, writing to its member presidents and chancellors in May about the risk posed by China, wrote: “Some foreign governments play a major role not only as a financier but also in directly or (more often) indirectly shaping the partnership’s form and content.”

At a University of Michigan forum hosted by the institution’s Chinese faculty association, Mary Gallagher, director of the Center for Chinese Studies, said US universities need to stick to their values of openness. That’s why American higher education is so appealing, she said.

In an interview, Gallagher said pamphlets like the FBI’s urge restrictions that mirror China’s suspicion of outsiders. That “undermines our long-term ability to compete and attract scientists from all over the world”.

Duxin Sun attended that meeting. The administrators responded to faculty members’ concerns and expressed support for members of the association of Chinese professors. Sun felt reassured by his institution’s stance.

He believes universities absolutely must enforce conflict-of-interest rules. And in sensitive research areas, restrictive guidance is necessary.

Painting all Chinese scholars with broad brush

But so much of the political rhetoric surrounding that guidance, he thinks, paints all Chinese scholars with a broad brush. Sure, there are qualifiers, saying that the majority of collaborative science is done honourably. But the take-home message is “so clear, so loud,” he said: All Chinese merit suspicion.

In Denton, Texas, the very same week as Daly’s talk in Boulder, there was a buzz in the air as Chinese and American academics plotted the future of education technology.

It was a drone. The device was zooming around outside a high-ceilinged ballroom above a race track where researchers were eating steak and mashed potatoes.

Any thought of a new Cold War was far away from this conference, hosted by the University of North Texas (UNT). Here, the possibilities for collaboration with China seemed endless.

Attendees took turns playing race-car simulation games set up at the back of the ballroom. Through goggles, they watched live video filmed by the drone. A local country band, the Raised Right Men, played while they discussed their work.

The university's president, Neal J Smatresk, said they were in the middle of a technology revolution. And the research they did would make the world a better place. "We're proud to have you here, deep in the heart of Texas."

Smatresk celebrates UNT's relationships with companies like the Dallas Cowboys, places where his students might get jobs. Building similar relationships with Chinese companies is only natural, the president says.

"Who does business in China?" Smatresk asked during an interview. "Pretty sure Apple does, pretty sure Google does, pretty sure GM does, pretty sure Ford does. You know what I'm saying? We do business with China."

Institutions feel pressure to pull back

This is the brass-tacks statement of what American institutions stand to lose if they retrench too quickly or restrict too much when it comes to China. Many universities feel pressure to pull back from the US's global trade foe to avoid risks. But institutions like the University of North Texas are making the case that the ramifications of shutting China out are even more dire.

At the conference, Stephen Attenborough, commercial director at Virgin Galactic, told a riveted audience about his company's plans for commercial space travel.

Astronauts have told him that they feel dramatically changed when they look down on Earth. They see how thin and fragile the atmosphere looks from outer space, almost like the skin of an apple. While looking at it from that perspective, Attenborough said, they have a realisation: "We're all in this together."

At the end of the talk, one of the conference attendees stood to ask a question. He wanted to know if the service that Virgin Galactic was offering – a promise that with a US\$250,000 investment, you can be among the first to travel commercially in space – is open to Chinese citizens.

Virgin Galactic's rocketship falls under US regulations, and there have been rules about what technology people from certain countries, like China, could see.

"Yes and no," Attenborough said. Now it is permitted, he said, but the company hasn't done any marketing in China.

The answer, like so many about Chinese engagement, is not so simple.

Lindsay Ellis, who reported from Boulder, is a staff reporter. Follow her on Twitter

@lindsayaellis, or email her at lindsay.ellis@chronicle.com. Nell Gluckman, who reported from Denton, writes about faculty issues and other topics in higher education. You can follow her on Twitter @nellgluckman, or email her at nell.gluckman@chronicle.com.

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