

The Wire *China*

COVER STORY

Death of a Quantum Man

Stanford physics professor Zhang Shoucheng, a potential Nobel laureate, was among the first casualties of the U.S.-China trade war. But when the world loses a brilliant scientist, who really wins?

BY SHEN LU — MAY 3, 2020

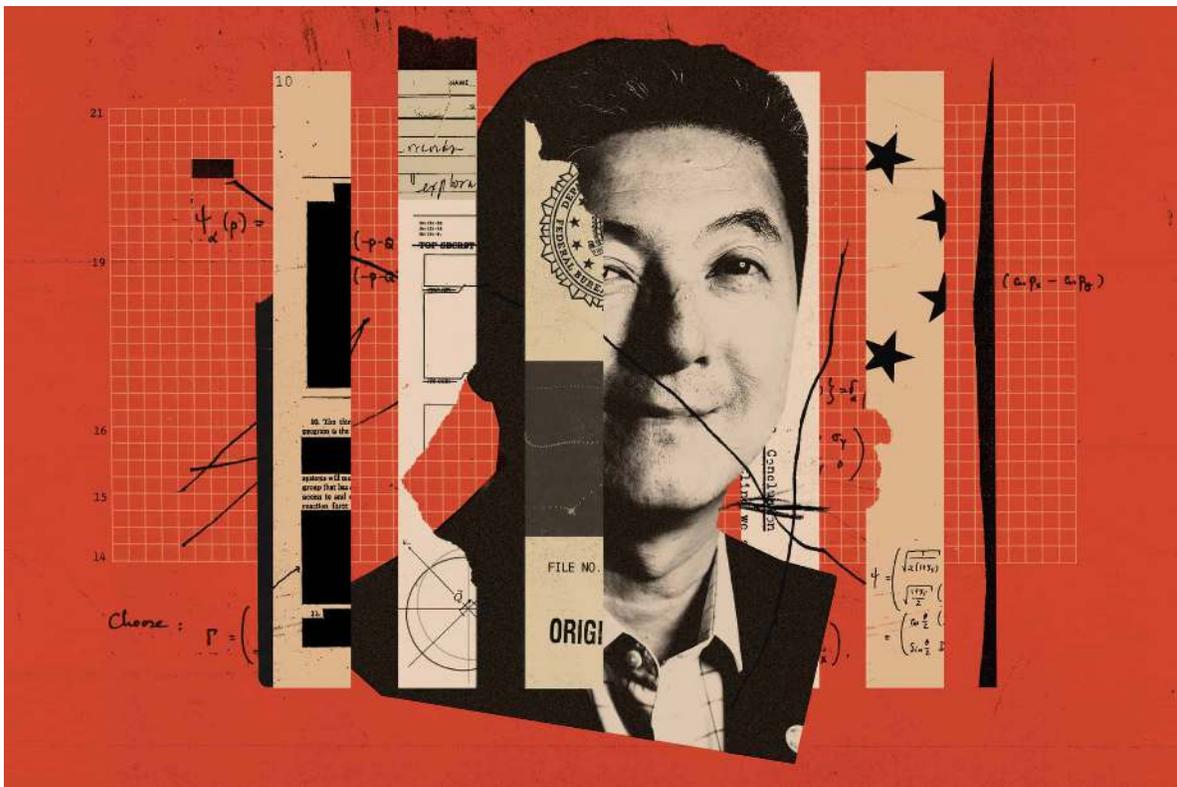


Illustration by Mike McQuade

Eight months before he killed himself, Zhang Shoucheng was giving a presentation about quantum computing, artificial intelligence, and blockchain encryption to a room full of Google employees. Dressed in a navy blue blazer, the theoretical physicist and Stanford University professor was engaging and confident as he used the Dan Brown novel *Angels and Demons* to help explain Paul Dirac's 1928 theory of antimatter.

Zhang was known for scientific theories and discoveries that could revolutionize computer technology, and he drew inspiration from Dirac's story.

"At the time," Zhang said of Dirac's theory, "no one believed him, but do you know what he said? He said, 'My equation is so beautiful, you guys simply just go look for it.'"

Zhang seemed unabashed and optimistic about this kind of collaboration, and yet his own involvement in industry had recently landed him in hot water. Five years earlier, in 2013, Zhang had started his own venture capital firm, originally called Danhua Capital, which invested hundreds of millions of dollars in technology startups.

Zhang was especially admired in his native China, and Danhua's financial backers included Chinese state-owned investment funds and the internet giants Alibaba and Baidu. Beijing regularly honored Zhang with laurels and research posts, coaxing him to give back to his homeland, and his fund became a lightning rod for U.S. apprehension over damaging technology transfer to China. Congressional testimony and a series of government reports in 2018 identified Danhua as a potential Chinese government instrument for acquiring strategic technology from the U.S. tech start-ups that it backed. Zhang's connections to Beijing had even drawn attention from the FBI.

Despite immense global recognition for his accomplishments, a cloud of suspicion was forming over him. When he died on December 1, 2018, in San Francisco, with a suicide note tucked into his left shirt pocket, observers in both the U.S. and China cried foul.

THE SUSPICIONS

The Wire has found no evidence that Zhang or Danhua did anything illegal, but in the days after his death a swirl of theories formed online. The most extreme claimed that the Chinese government had murdered Zhang to prevent the FBI from discovering the full extent of Chinese espionage. Or that the CIA murdered him to send a message to China.

None of these theories were backed up by evidence and in a statement to *The Wire*, the Zhang family has said he was not being investigated by U.S. authorities at the time of his death. And yet for many online commentators, things just didn't add up. If he wasn't guilty of something, why would someone as charming, celebrated, and successful as Zhang take his life?

In his suicide note, Zhang wrote, "Extreme depression insomnia just like 2015, can't carry on anymore," according to the San Francisco Medical Examiner report, which *The Wire* obtained.

That year, Zhang had been admitted to the Stanford hospital for what the examiner called "a psychiatric related concern," and after his death, his family released a statement saying that he had recurring battles with depression.

His wife told police investigators he had been under a lot of stress from work and was depressed due to "his failed dealings in venture capital investments and crypto currency." While it's unclear if Danhua had suffered losses, a friend of Zhang's told *The Wire* that he may have been in over his head. His investment strategy had been fast and furious — the "spray and pray" approach, as his friend noted.

His wife also told investigators that Zhang had suffered from "a persistent cough, lots of anxiety and near-nightly insomnia" after a trip to China for a science conference about three weeks before his death. But Zhang made no prior attempts to kill himself and his wife said he "had not expressed any suicidal intent."

Evidence of antimatter was discovered five years later in cosmic-ray radiation, making Dirac's equation, Zhang told the audience, "one of the greatest predictions of all humanity — that something conceived of beauty also turned out to be true."

It was April 2018, and at 55 years old, Zhang had a light dusting of grey in his thick black hair, a square face, and only a faint accent. Born in Shanghai, he had studied in Berlin and New York before settling in at Stanford and becoming a naturalized U.S. citizen. As the winner of numerous awards and often touted for the Nobel Prize, he lectured and collaborated across the U.S., Europe, and China. According to the Nobel Laureate Robert Laughlin, Zhang held a unique status among scientists as "a superstar on three continents."

Zhang often spoke romantically about the scientific pursuit of truth in nature, but he was also savvy about his work's applications in private industry. He helped set the foundation for the discovery of topological insulators, new forms of matter that conduct electrons efficiently on their surfaces while their cores do not carry current.

Exclusive: Acclaimed physicist Zhang Shoucheng shares passions for scien...



Developers like Google (<https://research.google/teams/applied-science/quantum/>), Airbus (<https://www.telegraph.co.uk/finance/newsbysector/industry/12065245/Airbuss-quantum-computing-brings-Silicon-Valley-to-the-Welsh-Valleys.html>) and Huawei (<https://intl.huaweicloud.com/en-us/solution/hq/index.html>) are racing to leverage these materials and others into transistors that could make conventional microchips obsolete and deliver "quantum computing" — massive new levels of processing power with far less energy consumption.

At his Google talk, Zhang showed a slide of a businessman and a cap and gown graduate walking towards each other to shake hands.

"This is a wonderful new world," he said, "where collaboration between academia and industry can really lead to great progress."

The timing of Zhang's death fuels most of the suspicion that he was under U.S. government scrutiny. Just a few weeks earlier, the U.S. Department of Justice and the FBI announced an [initiative \(http://bit.ly/2PF1625\)](http://bit.ly/2PF1625) to “identify priority Chinese trade theft cases, ensure that we have enough resources dedicated to them, and make sure that we bring them to an appropriate conclusion quickly and effectively.”

Eleven days before he died, the U.S. Trade Representative's Office issued a report that unfavorably highlighted correlations between technologies that the Chinese government regarded as strategic priorities and those under development at the U.S. companies that Danhua was backing.

And the day Zhang died, Meng Wanzhou, the chief financial officer at the Chinese telecom giant Huawei, was arrested in Canada, at the request of the U.S., for sanctions fraud. The U.S. government alleged she had lied to banks about a Huawei subsidiary in Iran in order to do business there. Observers saw the high-profile arrest as a sign that the U.S. was serious about prosecuting Chinese businesses and worried about China as a national security risk. One of Danhua's portfolio companies had worked with Huawei.

Taken together, these developments made “Zhang and his associations increasingly radioactive,” Arthur Herman, director of the Hudson Institute's initiative on quantum technology, wrote in *Forbes* at the time, “especially with the increased scrutiny of China's infiltration of Silicon Valley.”

THE ACADEMIC RISE



A young Zhang

Zhang came of age during China's Cultural Revolution but was spared the forced relocations to the countryside that millions of other Chinese youth endured. His parents were both engineers in Shanghai, and his father brought him banned literature and texts to read, allowing Zhang to teach himself physics and chemistry in his attic.

After a time when China had halted virtually all schooling and deemed knowledge useless, Zhang took the national college entrance exam and earned admission to college at the age of 15. Soon after, he won one of the first, elite national scholarships to study physics in Berlin. From there he did his graduate work at the State University of New York at Stony Brook, where one of his mentors was Nobel Laureate Chen-Ning Yang, another physicist who had migrated from China.

In 1993, Zhang landed at Stanford and found much to admire in an education system that encouraged free inquiry. He and his wife, Barbara, settled into their California life. Barbara, who Zhang met in kindergarten in Shanghai, worked as a software engineer at IBM, and the couple had two children, Brian and Stephanie.



Zhang with his wife and children.

By 2005 Zhang had made his first big theoretical prediction when his team at Stanford proposed the existence of a new state of matter, called the quantum spin Hall insulator. The following year, he successfully predicted that mercury telluride would help realize the quantum spin Hall insulator, establishing him as one of the leaders in the field of topological insulators.

Zhang would go on to collect some of the biggest prizes in science, such as the Dirac medal and the Benjamin Franklin Medal, whose previous winners included Albert Einstein, Madame Curie and Stephen Hawking.

In 2009, the Chinese government tapped Zhang for its Thousand Talents Program (<http://www.waizi.org.cn/file/52404.html>), a public plan to fast-track China's science and innovation research. The program identifies and rewards foreign scientists, focusing mostly on those with Chinese roots, and then recruits them to work at Chinese universities. Designees typically receive a cash prize worth as much as \$140,000, attractive positions running well-funded labs in China, and an array of other perks sometimes worth millions.

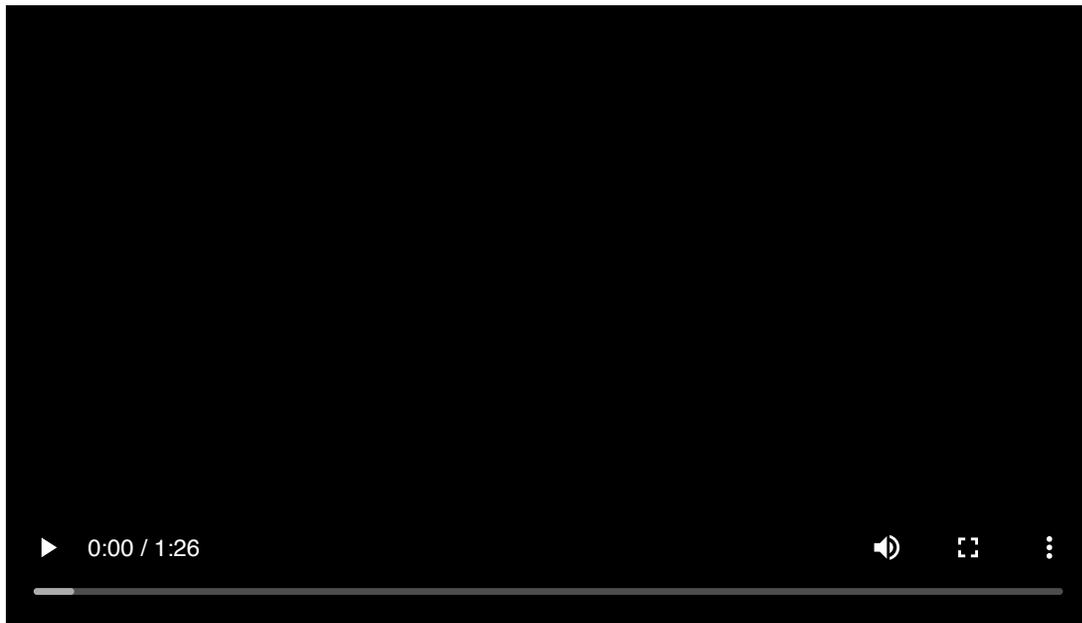
Zhang was awarded a professorship at Tsinghua University in Beijing, China's premier science and technology school, and was later named co-director of Tsinghua's Quantum Science and Technology Research Center. Despite his considerable teaching and research commitments at Stanford, and federal research grants provided by the U.S. Department of Energy, he began shuttling back and forth between the two universities, spending at least three months a year in China, according (http://casad.cas.cn/sourcedb_ad_cas/zw2/ysxx/ygwjysmd/201312/t20131223_4003258.html) to the Chinese Academy of Sciences, to which he also belonged.

While China has said the program was designed to increase international cooperation in science, the FBI has identified Thousand Talents as a promoter of Chinese espionage. Prosecutors in the U.S. have since accused a number of its participants of plots to transfer trade secrets to China, and the program has recently disappeared from China's public propaganda sites and some search engines.

Some time in 2010 or 2011, *The Wire* has learned, FBI agents spoke with Zhang to discuss his participation, warning him to “be cautious,” according to Sean McCormack, a spokesman for the Zhang family. “It wasn’t an interrogation,” McCormack told *The Wire*. “More of a briefing.”

McCormack says that, at the time of his death, Zhang hadn’t had anything to do with Thousand Talents “for years and years.” The family estimates he stopped participating around 2013, and, responding to a request by *The Wire* under the Freedom of Information Act, the FBI said it wasn’t able to find any records related to Zhang.

But in January 2018, Zhang raised eyebrows again when Beijing presented him with a high honor: China’s International Science and Technology Cooperation Award. Zhang and the other award winners, including Louisiana State University physics and astronomy professor Earl Ward Plummer, were flown first-class to Beijing as guests of the state and presented with a gold medal at a ceremony in the Great Hall of the People presided over by President Xi Jinping.



A CCTV clip of the ceremony for China’s International Science and Technology Cooperation Award. The man speaking in English is LSU professor Earl Ward Plummer.

In a speech in Shenzhen, China, just a few months later, Zhang talked about science’s ability to transcend national borders. Speaking in Chinese, he noted that China was in a unique position.

“Our efforts with artificial intelligence and quantum computing are aimed at solving problems that face all of humanity,” he said, “so we should not focus on our own parts but the entire world. And in this situation, China has a major opportunity. We do well with applied technology, but can China develop its own original technology?”

THE INVESTMENTS

Though a theoretical physicist, Zhang searched for real world applications and often visited the technology startups that grew up around the Stanford campus. But near the end of his life, his business ventures were proving to be increasingly problematic.

During his early years in Silicon Valley, Zhang fostered close relationships with Chinese-American entrepreneurs. In 1999, he co-founded a local Chinese-business networking group that boasts of hosting a meeting where Alibaba's Jack Ma convinced (<https://www.hysta.org/our-vision>). Yahoo co-founder Jerry Yang to buy a \$1 billion stake in the Chinese Internet giant in one of the biggest deals of the emerging internet.

He wasn't interested in going into venture capital himself, he once told a Chinese reporter, until a delegation from China's Zhongguancun Development Group showed up at Stanford in 2013. Named for Beijing's high-tech hub, the ZGC Group is financially backed by the local government. Soon after, Zhang and one of his graduate students founded Danhua Capital, whose name joins together Chinese abbreviations for Stanford and China. ZGC Group was among the first investors.

Within five years, Danhua had raised \$400 million and held stakes in over 100 fledgling businesses, according to PitchBook, a venture-capital tracking service. Many of them were developing so-called dual-use technologies exploitable for both commercial and military purposes: encryption and decryption, artificial-intelligence software used in robotics as well as facial and voice recognition, and "big data" systems used to harness vast amounts of information for analysis and prediction.

Chinese state media called Danhua the Beijing municipality's "first overseas technology investment fund." In addition to ZGC, its investors included China International Capital Corp., the state-backed Chinese investment bank, and Beijing Shougang Fund, which is owned by the central government and the Beijing municipality.

In China, Danhua is also known by a longer name capitalizing on the cachet of Zhang's employer — Zhongguancun Stanford Emerging Technology Venture Capital Fund (<http://www.zgc-aipark.com/index.php?m=content&c=index&a=lists&catid=52&siteid=1&h=wap%25202/10>). — even though Stanford has no direct investment in it. ZGC openly views Danhua as a conduit for technology transfer. "Zhongguancun capital goes out and foreign advanced technology and human capital is brought in," ZGC says on its website.

THE SPOTLIGHT

In 2018, the Pentagon's National Defense Strategy report made clear that China was a strategic competitor with enormous technological capabilities. And by then, others in Washington began to signal that one of the new battlegrounds would be America's college and university campuses, which each year welcome more than 300,000 international students from China.

Some politicians in Washington see that as a threat. Just last week, Senator Tom Cotton, R-Ark., said that Chinese students in the United States should be limited to studying the humanities.

"If Chinese students want to come here and study Shakespeare and the Federalist Papers, that's what they need to learn from America," Cotton told Fox News. "They don't need to learn quantum computing."

But for Zhang, teaching Chinese students in America about quantum computing was something to celebrate. In a speech to the Association of Chinese Students and Scholars at Stanford in 2014, he welcomed the students and impressed on them the value and great privilege of being able to study at a private university like Stanford.

“For students who have studied under the indoctrinated and regimented education system in China,” he said in Chinese, “their technical knowledge is very solid, but there is a lack of curiosity-driven learning.” Now that they had arrived at Stanford, he said, “I advise everyone to breathe in the air of free choice.”

With his life encompassing China’s emergence from its post-revolutionary isolation and its transformative economic boom, Zhang often spoke of bringing together his native and adopted homes.

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“The bridge between China and the U.S. is one of the biggest challenges of globalization,” Zhang told *The Washington Post* in 2016. “It’s a critical moment of transition. If we don’t do it well, it will be a great lost opportunity.”

But as the U.S.-China relationship deteriorated over the next two years, cracks started to appear on Zhang’s bridges. Things came to a head in 2018, not only with the Trump administration’s trade war, but also with escalating rhetoric — and evidence — about Chinese espionage. The bridge Zhang was used to traversing had changed dramatically.

In January of that year, Danhua was mentioned in a [Pentagon](https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_(1).pdf) ([https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_\(1\).pdf](https://admin.govexec.com/media/diux_chinatechnologytransferstudy_jan_2018_(1).pdf)) report warning that Chinese venture investors linked to the state were accessing “the crown jewels of U.S. innovation.”

In March, the U.S. Trade Representative’s office issued the findings of an [investigation](https://ustr.gov/sites/default/files/Section%2520301%2520FINAL.PDF) (<https://ustr.gov/sites/default/files/Section%2520301%2520FINAL.PDF>) that named Danhua again as a potential siphon of valuable intellectual property to China. It made no allegation of theft or illicit transfers, however, and in the wake of the scrutiny, Zhang told Reuters that most of Danhua’s investors were publicly listed companies and that the firm would fully comply with any new legislation and regulations.

Three months later, at a Senate hearing, U.S. defense and intelligence officials [highlighted how](https://www.judiciary.senate.gov/meetings/a-thousand-talents-chinas-campaign-to-infiltrate-and-exploit-us-academia) (<https://www.judiciary.senate.gov/meetings/a-thousand-talents-chinas-campaign-to-infiltrate-and-exploit-us-academia>). Beijing’s Thousand Talents program had created a pipeline to transfer

and steal military and commercial technology from the U.S.

And then in July, at hearings in the U.S. House, Elsa Kania, a defense analyst at the Center for a New American Security, named Danhua as example of venture funds that invested Chinese government money in U.S. companies specializing in technologies that reflected Beijing's strategic priorities.

Kania told *The Wire* that she first looked at Zhongguancun, the government-backed company, and then found information on Danhua. And while she'd seen no evidence of illegality or wrongdoing by Zhang or Danhua, she thought it was notable that China has highlighted topological insulators — Zhang's signature discovery — as a development priority. (<http://www.cas.cn/zt/kjzt/zgkxysewbzxdjz/njtwzkxrgqywt/>) and has achieved parallel advances in the area.

Also in July, FBI Director Christopher Wray told Congress (<https://www.judiciary.senate.gov/meetings/07/23/2019/oversight-of-the-federal-bureau-of-investigation>) that the agency had opened more than 1,000 investigations into Chinese espionage. In Senate hearings, he said that China and its Communist Party were “using not just government officials, but private-sector entities, nontraditional collectors, et cetera, to steal their way up the economic ladder at our expense.”

The reports and hearings rallied bipartisan support behind a new law, the Foreign Investment Risk Review Modernization Act, enacted in August 2018. The law's requirements include mandatory reporting and security reviews of venture-capital investments by foreigners in certain strategic fields.

The law dramatically stemmed Chinese money flowing to Silicon Valley, as venture funds ran away from risking months-long reviews and possible denials. Chinese venture capital funding in the U.S. last year plummeted 51 percent from 2018 levels, according to Rhodium Group, which researches Sino-American capital flows.

Zhang's fund, perhaps seeing the writing on the wall, was already taking steps to appear less Chinese. It was now doing business under a new name — Digital Horizon Venture Capital, or DHVC. By August, it had eliminated the Chinese-language version of its website and also scrubbed its mission statement. Gone was a passage stressing “unique” ties between Silicon Valley and China, and “in-depth knowledge in cutting-edge technologies.” The website's domain name was now dh.vc (<https://www.dh.vc>), replacing the previous danhuacap.com. Danhua and its managers didn't return phone calls and emails seeking comment.

The firm also shifted away from Silicon Valley and U.S. tech investments — the area that Zhang knew best. American start-ups once made up almost the entire portfolio, but by 2018 nearly 60 percent of Danhua's investments were made with Chinese and other non-American companies, according to Pitchbook. The portfolio was moved heavily into encryption and blockchain-technology companies that support online payment systems as alternatives to national currencies — an area in which China is attempting to lead the world.

Despite these changes, Danhua could not shake the federal government's spotlight. In late November, the new USTR update on technology transfer — known as a 301 report for the relevant section of the trade laws — hammered at venture capital links to China again. This

time, Danhua was the subject of an entire section, which cited its funding from Baidu, Alibaba and other Chinese investors “with state connections and strong interests in technology.”

3. Illustrative Examples of Chinese Venture Capital Investments

Available evidence indicates that the Chinese government has created and supported a web of entities that have established a presence in Silicon Valley and other U.S. technology centers to invest in high-technology U.S. startups and engage in a variety of VC investment related activities, to further the industrial policy goals of the Chinese government. VC firms invest in dozens, and sometimes hundreds, of startup companies, creating a diverse set of portfolio companies. VC firms then engage with their portfolio companies and to varying degrees have access to information, technology, and the ability to influence and potentially coerce management. The following cases exemplify this pattern of activity.

a) *Digital Horizon Capital (Formerly “Danhua Capital”)*

As discussed in Section IV.C.3 of the Section 301 Report, Zhongguancun Development Group (ZDG), an SOE established by the Beijing municipal government, established an investment arm in Silicon Valley in October 2014 – ZGC Capital Corporation. ZGC Capital Corporation subsequently founded the ZGC Innovation Center @ Silicon Valley in May 2016. The Section 301 Report also noted that ZGC Capital has partnered with Stanford University, engaged in talent recruitment, made VC investments – including Meta, Everstring, and Optimizely – and invested in other VC funds – including Plug & Play, KiloAngel, and Danhua.

ZDG continues to support VC investments in Silicon Valley and elsewhere. In total, it has backed at least 59 investment funds, including Danhua Capital.²⁸⁴

In May 2013, Beijing’s Mayor, Wang Anshu, attended the Danhua Capital signing ceremony in Silicon Valley.²⁸⁵ In a press release posted on the ZDG website, ZDG stated that Danhua Capital would focus on supporting original and disruptive technologies developed at Stanford and nearby universities to work with the ZGC Group Silicon Valley Incubator Center and guide those projects back to Zhongguancun (in Beijing) to commercialize, thereby advancing the strategy whereby “Zhongguancun capital goes out and foreign advanced technology and human capital is brought in.”²⁸⁶

Danhua was mentioned in the Nov. update to the USTR’s 301 report

(<https://ustr.gov/sites/default/files/enforcement/301Investigations/301%20Report%20Update.pdf>).

This is pg. 46.

One such investor was iFlytek, a Chinese champion in voice-recognition technology that was sanctioned (<https://www.federalregister.gov/documents/2019/10/09/2019-22210/addition-of-certain-entities-to-the-entity-list>) by the U.S. last year for abetting human-rights abuse. The company has been implicated in selling its systems to the authorities in Xinjiang province to aid their efforts to track and identify Uighurs and other Muslims, hundreds of thousands of whom have been taken from their homes and placed in concentration camps. Just recently, MIT said it would be examining its collaboration with iFlytek though it declined to say why.

Zhang must have also known that the federal government was tightening controls over federally funded research. At Stanford, he was affiliated with the SLAC National Accelerator Lab that the university operates for the US Department of Energy. His colleagues at Stanford say that even before his death, the federal agency began tightening controls on foreign access to the lab, and discouraging national labs from working with China.

Around the time of his death, the deputy secretary of energy issued a memo that said that while openness is the bedrock of research and development, new policies were being put into effect because some foreign countries had “exploited the openness of the U.S. system to their benefit, and the detriment of U.S. national interests.”

Zhang’s collaboration with scientists from China was in jeopardy.

THE STRESS

Zhang was holding a copy of the U.S. Trade Representative's 301 report the day before he died, according to a friend. He seemed visibly anxious, tapping the table with his fingers, as the two had tea.

"His company's name was listed," the friend said, "and he was worried about that. He wanted to know what it meant, you know, what would that likely result in."

The friend, however, was perplexed. There was no allegation of wrongdoing in the report, and Zhang said that he wasn't being investigated by U.S. law enforcement.

According to Jeremy Wu, a retired federal employee who maintains a database of federal prosecutions of the Economic Espionage Act, this kind of "name and shame" effort by the U.S. government can take a serious toll on individuals.

"Once your name is out there, you're already damaged no matter what," he told *The Wire*. "You could be totally innocent, but you don't have a chance to prove yourself anymore."

Wu didn't follow Zhang's particular story very closely, but said that the broader approach of the U.S. government often amounts to racial profiling, with ethnically Chinese scientists in America often demonized and stigmatized as a result.

Zhang didn't talk about his investments with his academic colleagues nor did he talk much about the growing antagonism between the U.S. and China. But Zhang's friend noted that incidents like the USTR report "tended to make him more anxious than they would most people."

Laughlin, Zhang's friend and colleague at Stanford, noted that Zhang was less outspoken about race than some of the other ethnically Chinese scientists in the department. But one time, more than a year before his death, Laughlin said that Zhang was worried that the U.S. had taken a racist turn and was afraid.

"He asked what was happening in this country," Laughlin said. "I answered that we were having a political problem, that it would eventually go away, and that the new menacing face of the USA was no more the complete truth than the previous happy, accepting face had been."

Laughlin said that Zhang's wife later told him the talk had comforted him at the time. But in the months before his death, the entrepreneurial scientist was getting little sleep and growing worried, erratic and insecure. Those close to him say he started to feel like his reputation was at risk.

"He had become somewhat more secretive, somewhat more flamboyant in his scientific claims, and somewhat less clear in his mathematics — as though he was reaching harder to be seen as accomplishing great things," Laughlin recalled. At the time, Laughlin wrote it off as normal academic stress.

Just days before he died, Laughlin said Zhang came to his office and was "very despondent" over not winning the Breakthrough Prize in Fundamental Physics. Two other physicists had just won the valuable honor, which comes with \$3 million in cash, and Zhang had shared a previous

award with the same pair for the topological insulator discovery.

Zhang had been a rumored Nobel winner in 2014, and colleagues say he was disappointed when he did not get the award. So being passed over for a major prize a second time stung. Laughlin assured him that his reputation was high in the field and tried to light his fire to go out and do “even better and more glorious work than the last.” Zhang responded “that all he wanted was to be recognized for his work,” Laughlin recalled.

Zhang’s friends and colleagues say he had taken too much on his shoulders during the last few years of his life and his ambitions had grown, which might have contributed to his death.

“I invest 100 percent of my time in teaching, 100 percent of my time in research, and 100 percent of my time in investment,” Zhang told reporters (<https://mp.weixin.qq.com/s/entfoFXi4Ekq5cZnni5mWA>) in China in 2016.

“But there’s no such thing as 300 percent,” his Stony Brook colleague Peter van Nieuwenhuizen said.

THE END

On the day he died, Zhang and his wife had been visiting their newly-purchased apartment in the Rincon Hill neighborhood of San Francisco. The pair’s children were fully grown; Brian, was married and pursuing a Ph.D. in statistical genetics at the University of Oxford, and Stephanie, was getting a masters in educational technology at Stanford. The apartment, which Zhang and Barbara were renovating, offered a new neighborhood away from the Stanford house they had raised their family in as well as sweeping views of the Bay Bridge.

They were about to leave when Zhang said he had to return to the apartment to pick up a phone charger that he’d left behind. Barbara waited in the car. A couple of minutes later, she called and told him she had found the charger in his bag. Zhang replied that he was retrieving an additional cord, but her husband never returned. Soon after, Professor Zhang was found dead at the age of 55.

A common theme throughout Zhang’s life was the desire to resolve tensions between seemingly disparate subject areas, whether they be academia and industry, physics and philosophy, and even China and the United States. But friends say Zhang did not comprehend some of the battles that were taking shape in Silicon Valley or on the university campus.

Steven A. Kivelson, his longtime friend and Stanford colleague, said Zhang was a scientist who viewed the free exchange of ideas as central to his mission, and helping China develop its science program seemed like a noble cause.

“Shoucheng was proud of the advances that China was making in science. But that doesn’t mean he was uncritical of the Chinese government,” Kivelson said. “He was concerned about restrictions there. He was also a student of American history, and proud of the independence and the freedom that his adopted country stood for. He wanted outstanding individuals to have those same freedoms.”

Zhang's family declined to be interviewed for this article. But they have found their own way to talk about his legacy.

“He saw connections between the first line of *Anna Karenina* by Leo Tolstoy and the second law of thermodynamics,” Brian Zhang said five months after his father died. “His mind stretched really far to see different areas.”

Brian was speaking at a multi-day conference that the Stanford Physics Department held in Zhang's honor; and he was referring to something his sister Stephanie had noted at the event. With an international audience that included two Nobel laureates and various accents on display, the conference made clear how globalized innovation has become. It made no mention of Zhang as a casualty in the U.S.-China trade war, but it seemed to highlight the fact that when the world loses a brilliant scientist, nobody wins.

Over the course of the conference, there were references to a story that Zhang liked to tell about a 1981 visit he made to Göttingen, Germany, a historic university town in Lower Saxony.



Zhang in Germany at the gravestone of Otto Hahn, the chemist who discovered nuclear fission.

The 18-year-old Zhang was confused at the time about which direction his career should take. Theoretical physics, he knew, wasn't very practical, and he started to consider giving up on his dreams. He was wandering around when he came across the old Stadtfriedhof, a cemetery where a number of famous scientists and scholars were laid to rest, including eight Nobel laureates such as physicist Max Born and chemist Otto Hahn.

“Their gravestones are very simple,” Zhang once told (<http://n.miaopai.com/media/ptSvwwgc2v5pdnLpx5evpU3tEbH4cYtWa>) a reporter. “It has their name, their birth year, and year of their passing, but everyone has one formula after. And that is the moment I realized that if you want to leave something behind, this is the best way.”

Barbara buried Zhang in San Mateo, overlooking Half Moon Bay, where the couple liked to walk together. Engraved on the tombstone is one of Zhang's equations, which builds off of Dirac's famous equation and describes the motion of spinning electrons:

$$H = A\Gamma \cdot \mathbf{k} + \Gamma_5 M(\mathbf{k})$$

Below it is Stanford's motto, written in its original German. Its translation is "The Wind of Freedom Blows."



Shen Lu is a writer whose work has appeared in *ChinaFile*, the *Columbia Journalism Review*, *The New York Times*, and *The South China Morning Post*, among other publications. [@shenlulushen](https://twitter.com/shenlulushen)
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