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On the Cusp:

CUSPEA and China-US Academic Exchanges, 1972-Present

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ABSTRACT

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China-U.S. Physics Examination and Application (CUSPEA) selected 915 students to complete doctoral training in physics and adjacent disciplines in ninety-seven departments in the US and Canada between 1979 and 1989, through rigorous exams in physics and English. The program started at a time when China had just moved away from Mao's radical revolution agendas to economic reforms. In 1979, not only were standardized tests such as GRE and TOEFL not available in China, but most Chinese college students also knew little about academia on the other side of the Pacific.

Through oral history interviews and archival materials, the thesis examines the start of CUSPEA, the experience of CUSPEA alumni, and its long-term impacts. The thesis argues that academic freedom was essential to the success of CUSPEA. The first chapter discusses the start of CUSPEA, focusing on China's post-Cultural Revolution reforms, the roles of Chinese American physicists, and the American physics community's interest in recruiting talented Chinese students. The second chapter explores the experiences of CUSPEA alumni. In particular, CUSPEA alumni pursued intellectual freedom in both China

and the US, through shifting academic interests, participation in politics, and entrepreneurial pursuits beyond physics. The final chapter assesses the outcomes of CUSPEA, examining the divergence between the expectations of CUSPEA's initiators and the actual career trajectories of alumni. Finally, this thesis comes to the conclusion that in the context of current geopolitical tensions between China and the US, free academic exchanges, such as CUSPEA, will not be possible in the near future.

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CONTENTS

ABBREVIATIONS

CAS	Chinese Academy of Sciences
CCP	Chinese Communist Party
C. N. Yang	Chen-Ning Yang
CSCPRC	Committee on Scholarly Communication with the People's Republic of China
CUSPEA	China-U.S. Physics Examination and Application
MIT	Massachusetts Institute of Technology
NIH	National Institutes of Health
NSF	National Science Foundation
T. D. Lee	Tsung-Dao Lee
USTC	University of Science and Technology of China
UW	University of Washington

Introduction

China-U.S. Physics Examination and Application (CUSPEA)

China-U.S. Physics Examination and Application (CUSPEA) selected 915 students to complete doctoral training in physics and adjacent disciplines in ninety-seven departments in the US and Canada between 1979 and 1989, through rigorous exams in physics and English. The program started at a time when China had just moved away from Mao's radical revolution agendas to economic reforms. In 1979, not only were standardized tests such as GRE and TOEFL not available in China, but most Chinese college students also knew little about the academia on the other side of the Pacific. How was this pioneering program made possible? What were the goals of CUSPEA initiators? What was the experience of CUSPEA alumni? What were the outcomes of CUSPEA? How did CUSPEA's initiators react to the unexpected outcomes?

Modernity Through Physics

China's Cultural Revolution (1966-1976) was a period of political chaos. A significant element of the Cultural Revolution was the suspension of formal education at the collegiate level. For an entire decade, young people could not receive formal training in universities. Pedagogy stopped as students were mobilized to participate in revolutionary activities.[1] The Cultural Revolution ended in 1976 following Mao's death, marking the turn

[1] Joel Andreas, *Rise of the Red Engineers: The Cultural Revolution and the Origins of China's New Class*, Contemporary Issues in Asia and the Pacific (Stanford, California: Stanford University Press, 2009), 87-93.

from radical revolutionary policies to pragmatic economic development. In 1977, under Deng Xiaoping's leadership, the Ministry of Education reinstated the College Entrance Examination, restoring higher education that had been interrupted during the Cultural Revolution.[2] This shift in education policies represented Deng's vision for China's modernization. As Deng ascended to power in The Third Plenary Session of the 11th Central Committee of the Chinese Communist Party, he executed the "Four Modernizations" agenda so that China could catch up with the West through modernizing agriculture, industry, national defense, and science and technology.[3] Modernity meant economic development through advanced science and technology for the Chinese political authority.

Chinese American physicists also sought to contribute to China's economic development through advanced science and technology via academic exchanges and training in the West. The modernization goals of Chinese American physicists resonated with the "Four Modernization" agenda proposed by the Chinese government, opening up channels for talented students to receive advanced training that would otherwise not be available. After Kissinger visited China in 1971, Chinese American Nobel Laureate in physics Chen-Ning Yang visited China in 1971, followed by another Nobel Laureate in physics, Tsung-Dao Lee (T. D. Lee), who visited China in 1972. Even before the end of the Cultural Revolution in 1976, during T. D. Lee's visits to China in 1972 and 1974 emphasized the importance of science and technology to China's modernity and the necessity for China to resume college education and send students to the West to receive advanced training in science and technology. In 1979, on the cusp of the new reform era, T. D. Lee initiated the China-U.S. Physics Examination and Application (CUSPEA) to select Chinese students to complete

[2] Ezra F. Vogel, *Deng Xiaoping and the Transformation of China* (Cambridge, MA: Belknap Press of Harvard University Press, 2011), 205-207.
[3] Vogel, *Deng Xiaoping and the Transformation of China*, 245-247.

doctoral training in physics and adjacent disciplines, particularly in the subfields that could directly contribute to China's economic developments, such as condensed matter physics and material science. As T. D. Lee emphasized in his letter to CUSPEA students, the advancement of science would contribute to the development of agriculture and industry.[4] From the perspective of Chinese American physicists, physics is an important stepping stone for China's technological, industrial, and agricultural development, and thereby, economic development.

For CUSPEA alumni, modernity was beyond the notion of economic development through advanced science and technology. Instead, modernity was shaped by lived experience, as CUSPEA alumni navigated the stark contrast between the United States and Maoist China, changing political environments, and different academic institutions. Apart from economic development, academic freedom, active engagement in politics, and new business ideas were all components of modernity for CUSPEA alumni. In my oral history interviews with three CUSPEA alumni, they all mentioned their subfield switch. They appreciated the flexibility of US academia, while the switch would have been impossible in Chinese universities modeled after the Soviet model. A number of CUSPEA alumni posted blogs about Chinese politics, talked about the importance of curiosity in research and criticized the education system in China. Beyond academia, Zhang Chaoyang, the founder and CEO of Sohu, a leading Chinese website, studied at Massachusetts Institute of Technology (MIT) through CUSPEA. Zhang did not pursue a career in physics but played an important role in the rise of the internet in China, contributing to China's modernity with his business mind rather than physics.

[4] Wu, Tang 吴塘 and Liu Huaizu 柳怀祖, eds. *CUSPEA Shinian (Dier Ban)*. CUSPEA十年 (第二版) [A Decade of CUSPEA (Second Edition)]. (Beijing: Peking University Press, 2002), 44-45.

The different visions between CUSPEA's initiators and CUSPEA alumni led to outcomes unexpected by CUSPEA's initiators. Most notably, around half of CUSPEA alumni stayed in the US and left academia. However, despite the discrepancies, CUSPEA alumni were allowed maximum freedom to determine their profession and country of residence. This freedom should not be taken for granted, as was the case with previous exchanges between China and the West, such as the Chinese Educational Mission in late Qing. The Qing court terminated the program when most of its participants had not finished their degrees because it was concerned that the participants would be Americanized. The flexibility of CUSPEA was what made it successful. Thus, academic freedom is essential to the success of academic exchanges.

Historiography

The thesis engages with the fields of modern China, the history of physics, and the transnational history of science. In the field of modern China, past research on higher education focuses on the social aspects, particularly class analysis, while its exchanges with the West are under-explored. In the history of physics, existing scholarship has examined how a particular theory or concept was accepted elsewhere in the world. However, the physics educational institutions outside of the West have been understudied. While some historians of science have discussed China-US academic exchanges, they focus on individual efforts instead of looking at the institutions and channels that made knowledge exchanges possible. The thesis fills the research gap of how physics knowledge was transferred to China as commissioned by Chinese political authority and academia in both China and the US, rather than looking at how a specific theory or concept was accepted in China. In particular, the thesis examines how the channel of knowledge transfer, CUSPEA, was established by

Chinese political authority and academia in both China and the US. The thesis also looks into the lived experience of people carrying the knowledge across borders, in this case CUSPEA alumni, through oral history interviews. The thesis also contributes to the understanding of Chinese modernity in the transition from the Mao era to the new reform era.

Scholarship regarding the history of Chinese students who studied abroad provided valuable insights regarding the modernization of China. In *Seeking Modernity in China's Name*, Weili Ye examined how Chinese students' experiences in the US in the early twentieth century, including political participation and academic choices, embodied modernity and shaped China's future.[5] *China's First Hundred* by Thomas E. LaFargue discusses the Chinese Educational Mission between 1872 and 1881, through which thirty Chinese young boys learned Western technologies and culture and contributed to China's railway, mines, modern navy, etc.[6] Scholarship published in China on the history of study abroad focused on the politically active Chinese students in Japan who significantly influenced the 1911 Revolution. While modernity is the central theme of the history of Chinese students who studied abroad, existing scholarship focused on the late Qing and Republican periods when China was navigating itself through reform and revolution with political thoughts and technologies from the West. There is limited historical work on Chinese students who studied abroad after the end of the Mao era.

Past research in the history of physics has focused on how concepts and theories about physics were produced in the West. Only recently have historians of physics started to study how knowledge produced in the West was understood and accepted elsewhere. David

[5] Weili Ye, *Seeking Modernity in China's Name: Chinese Students in the United States, 1900-1927* (Stanford: University Press, 2001), 1-16 .
[6] Thomas E. LA Fargue, *China's First Hundred: Educational Mission Students in the United States, 1872-1881* (Pullman, Wash: Washington State Univ Pr, 1987), xi-xiv.

Kaiser is important in bringing other parts of the world to attention by exploring how the Feynman Diagram was created in the United States but subsequently learned and used in the Soviet Union and Japan. Kaiser argues that the booming post-war textbook industry and the new academic institution of postdoc contribute to the popularization of the Feynman Diagram across the world, while the exchange of unwritten understandings must be through in-person discussions.[7] While Kaiser focuses on the United States as the center of knowledge production, Danian Hu's *China and Albert Einstein* focuses on China, examining the fate of Einstein's theories in China in the twentieth century when the political environment was constantly shifting. In particular, Hu discusses the diverse backgrounds of Chinese scholars who introduced Einstein's theory of relativity to Chinese audiences and explores why the Communist regime initially resisted these ideas as the regime perceived the theory as incompatible with Marxist ideology.[8] While the conceptual examination of the transnational history of physics illustrates the intellectual foundations of the physics academia and the shifting political context, it fails to account for the social and political background in which the channel of knowledge transfer across borders as an institution was established . Moreover, the experience of those who carried the knowledge across the border in the unstable political terrain is under-explored.

In the broader field of the history of science, academic exchanges between the People's Republic of China and the United States were of vital importance. Historian of science Zuoyue Wang explores the role Chinese American scholars played in these exchanges. Wang focuses on prominent figures, such as Tsung-Dao Lee, Chen-Ning Yang,

[7] David Kaiser, *Drawing Theories Apart: The Dispersion of Feynman Diagrams in Postwar Physics* (Chicago: University of Chicago Press, 2005), 7-23.
[8] Danian Hu, *China and Albert Einstein: The Reception of the Physicist and His Theory in China 1917-1979* (Cambridge, MA: Harvard University Press, 2005), 182-189.

Chang-Lin Tien and Chien-Shiung Wu. These individuals built bridges between the two countries through their reputation in the United States and connections in China.[9] However, Wang also points out that the constraints imposed by U.S. national security policies limited the flow of knowledge and personnel during the Cold War. These restrictions indicated the precarity of academic exchanges across borders, which were vulnerable to shifts in political environments.[10] Building upon Wang's work, the thesis seeks to explore how the channels of exchanges were facilitated through a nuanced interplay between different actors, including the Chinese and US governments, and academia in both China and the US, beyond aforementioned individual efforts.

While historians research the start of the exchanges between China and the United States, recent geopolitical tensions push scholars in political science to explore the imminent threat to the exchanges. *The War for Chinese Talent in America* by David Zweig examines the competition between the United States and China over skilled Chinese talent in STEM. Since the mid-1990s, China has pursued strategies to encourage overseas Chinese talent to catch up with the West in technological advancements. In 2018, the U.S. responded with the China Initiative, which targeted Chinese American scientists in the U.S. who were academically tied to China. Though the initiative was aimed at intellectual property theft, innocent Chinese American scientists were faced with wrongful accusations and job losses. The initiative also disrupted the collaborative research between the two sides of the Pacific.

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[9] Wang, Zuoyue, "Chinese American Scientists and U.S.-China Scientific Relations: From Richard Nixon to Wen Ho Lee," in *The Expanding Roles of Chinese Americans in U.S.-China Relations: Transnational Networks and Trans-Pacific Interactions*, ed. Peter H. Koehn and Xiao-Huang Yin (Armonk, NY: M.E. Sharpe, 2002), 207–34.

[10] Wang, Zuoyue, "Controlled Exchanges: Public-Private Hybridity, Transnational Networking, and Knowledge Circulation in US-China Scientific Discourse on Nuclear Arms Control," in *How Knowledge Moves: Writing the Transnational History of Science and Technology*, ed. John Krige (Chicago, IL: The University of Chicago Press, 2019), 368–410.

Many Chinese scientists were disillusioned by the hostile environment and returned to China, weakening U.S.-China scientific exchanges as a whole.[11] Even after the formal end of the China Initiative, Chinese American scholars continue to face harsh pressure from the National Science Foundation (NSF) and the National Institutes of Health (NIH). Recently, Jane Wu, a Chinese American neuroscientist at Northwestern University, committed suicide following the shutdown of her lab due to her ties to China. Geopolitical tensions now threaten the channel of knowledge exchange between China and the US. The recent geopolitical tension is especially relevant to CUSPEA, as CUSPEA alumni witnessed the opening of the channel, crossing significant boundaries in their lives. Still, the channel they have been part of for decades is under severe pressure. Recent scholarship, inspired by the geopolitical tension between China and the United States and the China initiative, explore how the channel of knowledge exchange is under threat.

Nuances of the Methodology of Oral History

Historical writings based on oral history are a "doubled voice", where both the voice of the narrators and the voice of the historians are presented.[12] It is therefore of vital importance to critically analyze the interviews from a historical perspective, particularly how the power dynamics between me and my narrators and intersubjectivity shaped the sources. Through my interviews with three CUSPEA alumni and a senior professor who witnessed the start of China-US scientific exchanges, I try to reconstruct the lived experience of CUSPEA alumni. The oral history interviews provided the opportunity to discover narratives of CUSPEA alumni that were distinct from the ones the official CUSPEA yearbook published

[11] David Zweig, *The War for Chinese Talent in America: The Politics of Technology and Knowledge in Sino-U.S. Relations*, Asia Shorts; Number 20 (New York: Association for Asian Studies, 2024), 125-153.
[12] Miescher, Stephan F. *Making Men in Ghana*. Bloomington: Indiana University Press, 2005, xix.

in China that indicated the attitudes of the Chinese government, as well as the previous generation of Chinese American physicists who left China before 1949.

My background and research questions shaped the direction of the interview, inserting my voice as an interviewer to the historical record. Since CUSPEA completely changed the life trajectories of many CUSPEA alumni, I decided to conduct life history interviews rather than only discussing their CUSPEA experience. To make the interview more conversational, I came up with an interview guide that included topics to cover instead of writing out specific questions. The interview usually started from how their interests in science first arose in middle school and high school, then went on to cover college admission, undergraduate training, preparations for CUSPEA, arrival in the U.S., doctoral training, and career after PhD. My physics background allowed them to be more technical when discussing their academic experiences. In contrast, my background in Chinese history led them to assume that I would know the background of the historical events they brought up.

Conducting and interpreting oral history interviews is intertwined with power dynamics and legal concerns. My narrators are senior professors or engineers with advanced degrees from prestigious institutions in their 60s or 70s, while I am an undergraduate student interested in their experiences. Due to the power difference, I had a tough time establishing a professional relationship with my first narrator, a senior professor of physics at UCSB. My first narrator was in the position of judging whether I was qualified to interview him in the first conversation, giving a test for a young student as a senior established professor.[13] My subsequent interviews went much more smoothly, as I got in touch with them through the introduction of my first narrator and another professor in the history of science.

[13] Anonymous Informant #1. The Start of China-U.S. Scientific Exchanges. Interview by Yuxuan Hu, May 2024.

Structure

The thesis argues that academic freedom is essential to academic exchanges. The first chapter discusses how CUSPEA was made possible. The first chapter looks into the modernization goals of the Chinese government and Chinese American physicists and the desire to attract talent from China to the American physics community. The Chinese government aimed to boost China's economic development through advanced knowledge in science and technology, expecting all CUSPEA alumni to return to China upon completion of doctoral training. Chinese American physicists believed that basic research would play an important role in China's economic development. The American physics community was eager to make up for the decline in enrollment in physics graduate programs with excellent students from China. The second chapter will focus on the lived experience of CUSPEA alumni. They took advantage of academic freedom to explore new subfields of physics, learn about opportunities outside of academia, and participate in politics. The third chapter will focus on the outcomes of CUSPEA and the future of China-US academic exchanges. In particular, the chapter argues that the flexibility of CUSPEA led to its success. However, the current geopolitical tension between China and the US and the sentiment of nationalism in China have made free academic exchanges such as CUSPEA impossible.

Chapter 1: The Start of CUSPEA

This chapter discusses why CUSPEA started and how CUSPEA's initiators envision the goals and outcomes of the program. When CUSPEA began in 1979, China had only stepped out of the Cultural Revolution for three years. Chinese American physicists, many of whom personally experienced the Japanese invasion and were deeply concerned with China falling behind in science, aimed to expedite China's development through advanced training in science. The Chinese political authority shifted its focus from Maoist revolutionary agenda to pragmatic goals of modernizing China by the end of the twentieth century. Both Chinese American physicists and China's top political leaders saw sending students to the US for doctoral training in physics as an important channel to modernize China.

The American physics community knew little about China because of the travel restrictions enacted during the Cold War. While it seemed unreasonable to allocate a significant amount of resources to admit PhD students from an unfamiliar country through a special channel, physics departments in the United States were going through a significant decline in graduate student enrollment in the 1970s. The American physics community soon discovered that outstanding Chinese students could make up for the decline, as the first Chinese physics PhD students at Columbia performed exceptionally well in the qualifying examinations. Chinese American physicists and Chinese political leaders' concerns for China's modernity and the demand for talented students in PhD programs in physics led to

the start of CUSPEA. The desire for modernity led to the special visa arrangement that prohibited CUSPEA students from staying in the US after completing the degree. However, the differentiating goals of the Chinese government and the American physics community led to different reactions towards CUSPEA students switching to other disciplines.

Science and Education in the Cultural Revolution

It is impossible to understand the urge to modernize China in the late 1970s without an overview of the scientific and educational landscape during the Cultural Revolution. The Cultural Revolution (1966-1976) was a time of political chaos in China. The Communist Party aimed to prevent the emergence of an elitist intellectual class during the Cultural Revolution, significantly transforming education and scientific institutions.[14] The radical revolutionary policies during the Cultural Revolution devalued basic research in the sciences and diminished the academic preparation of college students. One of the most important policies in the Cultural Revolution was the replacement of the College Entrance Examinations with "Mass Recommendation."[15] The outcome of the The College Entrance Examinations was not satisfactory to many radical communists, including Mao, as students with a privileged family background and cultural capital were much more likely to have outstanding performances in the examinations and enter top universities.[16] Students from rural areas or workers' families, which were the backbone of the socialist regime, were disadvantaged in the examinations. The Mass Recommendation system for college admissions focused on candidates' political credentials instead of academic credentials. As the admission quotas were passed down to work units and communes, the mass and local cadres would determine the candidacy based on class background and individual

[14] Andreas, *Rise of the Red Engineers*, 11-12.
[15] Andreas, *Rise of the Red Engineers*, 189.
[16] Andreas, *Rise of the Red Engineers*, 67.

performance in terms of communist ideals and moral qualities. Without rigorous examinations of candidates' academic qualifications, the recommendation system negatively impacted the academic preparation of college admits.[17]

The research institutions also went through significant changes during the Cultural Revolution, as research and production became closely related. Universities' administrations and research institutes prioritized research that had a direct application to improve production, while basic research in science was ostracized and criticized as capitalist. The political leadership during the Cultural Revolution also indicated that universities and research institutions should prioritize research that could benefit industrial and agricultural production. As the American Solid State Physics Delegation observed in 1975, all research the delegation learned about in China was device-based and closely related to industrial production and national defense. The delegation thus concluded that the subfield could be called solid state engineering rather than solid state physics in China. Many universities set up factories to combine research and teaching. The Delegation also noted that not only did the university curriculums have a heavy emphasis on manufacturing apparatuses, students and professors in universities also spent a significant amount of time, as much as a third of the working hours, to aid the production of the factories.[18] Notably, the political movements in the first three years of the Cultural Revolution were very disruptive, as many researchers and professors were criticized and sent into exile. After Lin Biao, Mao's successor at the time, defected and died in 1971, the passion for political movement at the research institutes and universities went down, leaving room for academic research to resume. The restoration

[17] Andreas, *Rise of the Red Engineers*, 190.
[18] American Solid State Physics Delegation, *Solid State Physics in the People's Republic of China: A Trip Report of the American Solid State Physics Delegation: Submitted to the Committee on Scholarly Communication with the People's Republic of China*, CSCPRC Report; No. 1 (Washington: National Academy of Sciences, 1976), 69, 105, 137.

was partial as access to literature published in the West was limited, and studying foreign languages was not politically acceptable until the end of the Cultural Revolution.[19]

The Third Plenary Session of the 11th Central Committee of the Chinese Communist Party held in December 1978 marked a historical change for China. It was in this session that China's de facto leader, Deng Xiaoping, announced to the world that the emphasis of China's politics had shifted from class struggle to socialist modernization during the Cultural Revolution.[20] The party sought to promote socialist democracy and reiterated the goals of the Four Modernizations, aiming to modernize China's agriculture, industry, defense, and science and technology by the end of the twentieth century.[21] However, the significant changes in China's politics did not happen uniformly overnight. In particular, policies in science and education took the lead in departing from the radical revolutionary line during the Cultural Revolution as early as 1977.

Reform-minded leader Deng Xiaoping returned to political leadership after the end of the Cultural Revolution in 1977 as the vice premier managing science and education. Soon after assuming power, Deng hosted a science and technology symposium and invited a number of established scholars, including those who were ostracized during the Cultural Revolution for political reasons. The attendees were upset about the situations in universities and research institutions, citing the declining academic performance of recommended students and the widening gaps in academic research between China and the US, as well as

[19] Anonymous Informant #5, Reflections on My Academic Career, interview by Yuxuan Hu, trans. Yuxuan Hu, December 2024.
[20] Vogel, *Deng Xiaoping and the Transformation of China*, 247-248.
[21] Central Committee of the Chinese Communist Party (中国共产党中央委员会), "'Zhongguo Gongchandang Di Shiyi Jie Zhongyang Weiyuan Hui Di Sanci Quanti Huiyi Gongbao' 中国共产党第十一届中央委员会第三次全体会议公报 [The Communiqué of the Third Plenary Session of the 11th Central Committee of the Communist Party of China]," People's Daily Online - Communist Party of China News Network, December 22, 1978, accessed January 20, 2025, http://cpc.people.com.cn/GB/64162/64168/64563/65371/4441902.html.

emphasizing the importance of intellectuals and knowledge in China's modernization.[22] The symposium marked a departure from the radical science and education policies that emphasized equality and engagement with the masses during the Cultural Revolution. Under Deng's directive, new policies on science and education began to take shape. The science and education policy turned to a pragmatic line of selecting academically capable students through the College Entrance Examinations, sending students to the West for advanced academic training, reestablishing basic research, and connecting with Chinese American scholars to aid in China's development.

Most importantly, Deng and his fellow colleagues recognized the importance of science and technology in China's modernization agenda and that China had fallen behind the West.[23] The National Science Conference in 1978 was portrayed as "the springtime of science" after a decade of disruptions in teaching and research because of the Cultural Revolution. At its opening, Deng Xiaoping stated that the key to meeting the four modernization goals is to modernize science and technology. Without modern science and technology, it is impossible to establish modern agriculture, modern industry, and modern national defense.[24] Later that year, Gu Mu, the vice premier in charge of economics, led an economic delegation to Europe. Amazed by new equipment used in agriculture and industry, as well as the high quality of living in Western Europe, Gu reached the same conclusion as

[22] Luo Pinghan (罗平汉), "'Yinling Kejiao Lingyu De Boluanfanzheng: 1977 Nian Kejiao Gongzuo Zuotanhui' 引领科教领域的拨乱反正:1977年科教工作座谈会 [Leading the Rectification of Science and Education: The 1977 Science and Education Work Symposium]," People's Daily Online - Communist Party of China News Network, February 12, 2015, accessed January 20, 2025, http://cpc.people.com.cn/GB/68742/index.html.
[23] Vogel, *Deng Xiaoping and the Transformation of China*, 200-210.
[24] Deng, Xiaoping (邓小平). "'Zai Quangguo Kexue Dahui Kaimushi Shang De Jianghua' 在全国科学大会开幕式上的讲话 [Speech at the Opening Ceremony of the National Science Conference]." *People's Daily* (人民日报), March 22, 1978.

Deng, that China was falling behind the West, and it was of great importance to develop science and technology to modernize China and its economy.[25]

Seeking Help From Abroad

While Deng and his colleagues prioritized science and technology in their reform agenda, China was not capable of training a large number of qualified scientists and engineers that could help China to catch up with the West in advanced science and technology. Universities and research institutes in China did not award doctorate degrees until 1982.[26] To reach the ambitious modernization goals, sending students and scholars abroad for advanced training thus became an appealing option. On June 23, 1978, Deng Xiaoping, in a meeting with leaders of the Ministry of Education and the Chinese Academy of Sciences, pointed out that sending students abroad was a way for China to catch up rapidly regarding advanced science and technology. On October 10, 1978, in a meeting with West German press and media delegations, Deng again mentioned the huge gap between science and technology in the West and the situation in China.[27] Deng's intent to send students abroad also influenced the negotiations between China and the US to establish formal diplomatic relationships, where the Chinese requested to send seven hundred students and scholars to the US right after the establishment of the formal diplomatic relationship.[28] By the end of 1979,

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[25] Vogel, *Deng Xiaoping and the Transformation of China*, 221-227.
[26] China Academic Degrees and Graduate Education Development Center (中国学位与研究生教育信息网), "1982年3月4日 新中国培养的第一个博士 [March 4, 1982: The First Doctor Trained in New China]," accessed January 24, 2025, https://www.cdgdc.edu.cn/zgxw30n/info/1086/1513.htm#:~:text=1982%E5%B9%B43%E6%9C%884,%E7%9A%84%E7%AC%AC%E4%B8%80%E4%B8%AA%E5%8D%9A%E5%A3%AB%E3%80%82.
[27] Ministry of Education of the People's Republic of China (中华人民共和国教育部), "出国留学——中国开放的前奏 [Studying Abroad: A Prelude to China's Opening-Up]," accessed January 24, 2025, http://www.moe.gov.cn/jyb_xwfb/xw_zt/moe_357/s3580/moe_2448/moe_2470/tnull_41369.html.
[28] Vogel, *Deng Xiaoping and the Transformation of China*, 321-323.

there were a significant number of Chinese students and scholars in the US and Western Europe.[29]

It was rare for Chinese students and scholars to attend a university abroad to seek a degree in 1978 and 1979.[30] Notably, students and scholars sent abroad in the early days of the reform were usually established scholars or newly admitted graduate students at Chinese institutions. They were usually older and would only stay abroad for a limited period of time. Deng and the leaders of the Chinese Academy of Sciences, therefore, took T. D. Lee's advice that there should be a channel to send students to the most reputable research universities in the US, where the elites who would lead the world in decades were trained.[31] With Lee's initiative and the support of Deng, CUSPEA became one of the first and most successful attempts to send students to universities in the US for doctoral degrees. Similar mathematics, chemistry, and biology programs were also established, albeit at a smaller scale compared to CUSPEA. For the bright students who were part of the programs, their mission was not as simple as academic success. As clearly stated in multiple People's Daily articles, the party expected that the selected few who went abroad should contribute to the Four Modernizations after returning to China by studying science and engineering, disciplines that were closely related to the modernization projects.[32]

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[29] Ministry of Education of the People's Republic of China, Studying Abroad: A Prelude to China's Opening-Up.
[30] Lampton, David M., Joyce A. Madancy, and Kristen M. Williams, *A Relationship Restored: Trends in U.S.-China Educational Exchanges, 1978-1984* (Washington, D.C.: National Academies Press, 1986), https://doi.org/10.17226/899, 31-33.
[31] 李政道 (Tsung-Dao Lee). *Li Zhengdao Wenlu.* 李政道文录 *[Essays of Tsung-Dao Lee]*. 杭州 (Hangzhou): 浙江文艺出版社 (Zhejiang Literature and Art Publishing House, 1999), 27-28.
[32] Columnist, "'Woguo Shoupi Fumei Liuxue De Fangwen Xuezhe Lijing Fangyi Fuzongli Mianli Tamen Keku Xuexi Meiguo Xianjin Kexue Jishu, Wei Sige Xiandaihua Chuli' 我国首批赴美留学的访问学者离京方毅副总理勉励他们刻苦学习学习美国先进科学技术, 为实现四个现代化出力 [The First Group of Visiting Scholars to Study in the United States Depart Beijing; Vice Premier Fang Yi Encourages Them to Work Hard and Learn Advanced Science and Technology from the U.S. to Contribute to the Four Modernizations]," *People's Daily* (人民日报), December 27, 1978; Columnist, "'Laoji Zuguo Renmin Zhutuo, Xionghuai Zhenxing Zhonghua Dazhi: Wo Liuxue Renyuan Qinfen Xuexi Weiguo Zhengguang' 牢记祖国人民嘱托, 胸怀振兴中华大志——我留学人员勤奋学习为国争光 [Remember the Entrustment of the People, Harbor the Ambition to Rejuvenate

Seeds of Modernity: Chinese American Physicists' Visits

Chinese American scientists had not been able to visit China for over two decades after 1949. Not only was the political tension of the Cold War preventing them from visiting a socialist country, but China's communist regime also viewed them as suspicious as the capitalist worldview corrupted them. The diplomatic relationship between China and the US began to unfreeze, following Ping-Pong Diplomacy in 1971. Chinese American scientists who were concerned with China's situation thus took advantage of the more relaxed travel restrictions to visit China at a time when the Cultural Revolution had not ended. The first among them was Chinese American Nobel Laureate in physics C. N. Yang, who visited China in 1971 and 1972.[33] In Yang's extended conversation with Premier Zhou Enlai in 1972, Yang stated the importance of teaching and theoretical research. With Yang's suggestion, Zhou Enlai supported Zhou Peiyuan, an influential physicist, to publish a long article in *Guangming Daily*, a party-run newspaper, that emphasized that theoretical research of sciences also played a vital role in revolutionary activities and production.[34] Following Yang, the other Chinese American Nobel Laureate in physics, T. D. Lee, visited China in 1972. In 1974, when T. D. Lee visited China for the second time, he arrived at Fudan University and met Premier Zhou Enlai and Chairman Mao Zedong. Lee was deeply concerned that an entire generation could not receive proper training in science because of the radical education policies of the Cultural Revolution. With severe political tension, in a report to the central

China—Our Overseas Students Work Hard to Bring Glory to the Nation]," *People's Daily* (人民日报), April 4, 1982.

[33] 杨振宁 (Chen-Ning Yang). *Yangzhenning Wenji*. 杨振宁文集 *[Collected Works of Chen-Ning Yang]*. 上海 (Shanghai): 华东师范大学出版社 (East China Normal University Press, 2000), 190-191.

[34] "'Yang Zhenning Huiyi Gaige Kaifang Qian De Liuci Fanghua' 杨振宁回忆改革开放前的6次访华 [Chen-Ning Yang Recalls Six Visits to China Before Reform and Opening Up]." 中国新闻周刊 *[China NewsWeek]*, December 12, 2016. Accessed January 24, 2025. https://www.inewsweek.cn/2/2016-12-12/3275.shtml; 周培源 (Peiyuan Zhou), "'Dui Zonghe Daxue Like Jiaoyu Geming De Yixie Kanfa' 对综合大学理科教育革命的一些看法 [Some Views on the Scientific Education Reform in Comprehensive Universities]," 光明日报 *[Guangming Daily]*, October 6, 1972.

committee, Lee pointed out that China should train talents in science starting from a young age, similar to how Jiang Qing, Mao's wife and a radical revolutionary, trained her ballet dancers in Shanghai.[35] Lee even confronted the Gang of Four in an in-person meeting, where Lee insisted on the importance of training young talents in science.[36] Lee and Yang's visits contributed to the partial adjustment of science and education policies and brought some scientists in exile back to universities and research institutes. However, the intense political situation during the Cultural Revolution did not allow for further changes, as Lee and Yang brought up.

Figure 1. Mao Zedong meets with Tsung-Dao Lee.[37]

[35] 中国高等科学技术中心编 (China Center of Advanced Science and Technology, ed.), *Li Zhengdao Wenxuan.* 李政道文选(科学和人文) *[Selected Works of Tsung-Dao Lee: Science and Humanities]*. 上海 (Shanghai): 上海科学技术出版社 (Shanghai Scientific and Technological Publishers, 2008), 57-61.
[36] 李政道 (Tsung-Dao Lee). *Li Zhengdao Wenlu.* 李政道文录 *[Essays of Tsung-Dao Lee]*, 18.
[37] Institute of High Energy Physics of the Chinese Academy of Sciences 中国科学院高能物理研究所, "Mao Zedong Yu Li Zhengdao Huitan 毛泽东与李政道会谈" [Mao Zedong Meets with Tsung-Dao Lee], last modified August 5, 2024, https://ihep.cas.cn/zt/dnlzd/fc/202408/t20240805_7240823.html. (accessed January 20, 2025)

It was not until the end of the Cultural Revolution that Chinese American physicists could significantly influence China. The Chinese government's attitude towards Chinese American scientists shifted significantly, considering them valuable resources that could help China achieve its modernization goals with their connections in the West. In particular, T. D. Lee and C. N. Yang played an important role in facilitating academic exchanges between China and the West and providing advice on revising science and education policies. Lee and Yang motivated many Chinese Americans to contribute to China's modernity. One of the most notable efforts was the 1980 Guangzhou Conference on Elementary Particle Physics, the first international conference in physics held in China after the end of the Cultural Revolution. Lee and Yang invited a number of physicists of Chinese descent who were working outside of China, mostly in the US.[38] Not only were attendees from overseas surprised by research progress in China despite the disruption in the Cultural Revolution, but Chinese American attendees were also deeply invested in China's modernization. As one attendee who was working in the US recalled to me, in his short meeting with Deng Xiaoping, he emphasized the importance of physics to China's development.[39]

Besides organizing academic conferences, in the summer of 1979, Lee also hosted a series of lectures on field theory and statistical mechanics to present the frontier of physics research to researchers in Beijing. While Lee was aware of the huge gap between China and the US in physics research, he was also impressed by the talent of some Chinese physicists. Lee thus asked his home department, the Department of Physics at Columbia University, to mail PhD qualifying examination problems to Beijing to test the academic aptitude of

[38] Guangzhou Conference on Theoretical Particle Physics (1980), *Proceedings of the 1980 Guangzhou Conference on Theoretical Particle Physics* (Science Press, 1980), 1-2.
[39] Anonymous Informant #1, The Start of China-U.S. Scientific Exchanges, interview by Yuxuan Hu, May 2024; Anonymous Informant #5, Reflections on My Academic Career.

Chinese physicists. The stellar results urged Lee to persuade Columbia's physics department to admit five top performers in the Chinese Academy of Sciences (CAS) system to enroll in Columbia's physics PhD program with full scholarships. As they delivered record-breaking results in the formal qualifying examinations after arriving at Columbia, Lee selected ten more students and had the idea of inviting more schools to accept Chinese students through a special channel, which later became CUSPEA, as GRE and TOEFL had not been made available in China.[40] As Chinese American scientists and the Chinese government shared the goal of modernizing China's science, technology, and education, the Chinese government adopted many suggestions by Chinese American scientists. For example, Lee's suggestion to Zhou Enlai in 1974 to train young talents in science led to the establishment of the youth class at the University of Science and Technology of China in 1978. Other adopted proposals include the construction of Beijing Electron Positron Collider and setting up postdoctoral scholar programs in China, among others.[41] One of the most influential was CUSPEA. The aforementioned shared concerns of China's modernity in science and education between Chinese American physicists and the Chinese government shaped the operation of CUSPEA in a number of ways. The most significant was the visa arrangement for the program. Instead of a student visa (F-1 visa) that allows visa holders to work for a few years in the US after the completion of the degrees, all CUSPEA students held the exchange scholar visa (J-1 visa), which prohibited them from working in the US after the completion of their degrees.[42] In

[40] Anonymous Informant #1, The Start of China-U.S. Scientific Exchanges; 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban) CUSPEA 十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 3, 280-281.
[41] 李政道 (Tsung-Dao Lee). *Li Zhengdao Wenlu.* 李政道文录 *[Essays of Tsung-Dao Lee]*, 19-23.
[42] Anonymous Informant #2, CUSPEA as a Bridge, interview by Yuxuan Hu, trans. Yuxuan Hu, May 2024; Anonymous Informant #4, CUSPEA and Academic Career, interview by Yuxuan Hu, trans. Yuxuan Hu, August 2024; 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban). CUSPEA十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 182.

other words, Chinese American physicists and the Chinese government expected most, if not all, CUSPEA alumni to return to China to contribute to China's modernization after completing their PhDs. As CUSPEA was in full swing in 1980, Lee wrote a letter to students who came to the US through CUSPEA, stating that they should consider the needs of China when deciding subfields and might contribute to developments in industry and agriculture with knowledge in basic science.[43]

Chinese Talent in American Physics Departments

As of 1979, universities and scholars in the US knew little about academia in China after nearly three decades of interruption in the communication between the two sides of the Pacific. It was, therefore, curious why physics departments in the US were willing to accept Chinese students through CUSPEA, a channel that was nowhere close to the usual procedure. While Chinese American physicists were concerned about China's modernity because of personal ties, most American physicists who were not ethnically related to China did not have the similar motivation to help with China's modernity. Instead, the physics community in the US admitted Chinese students through CUSPEA for a number of pragmatic concerns. To begin with, the 1970s marked a decline in enrollment for graduate programs in physics. According to the National Research Council's report on physics education in the US, PhD enrollment in physics dropped by 40% in the 1970s.[44] Qualified students from China thus played an important role in making up for the decline in enrollment.[45]

[43] 李政道 (Tsung-Dao Lee). *Li Zhengdao Wenlu.* 李政道文录 *[Essays of Tsung-Dao Lee]*, 124-125.
[44] National Research Council, *Physics in a New Era: An Overview* (Washington, D.C.: National Academies Press, 2001), 103.
[45] Lampton, David M., Joyce A. Madancy, and Kristen M. Williams, *A Relationship Restored*, 153-154.

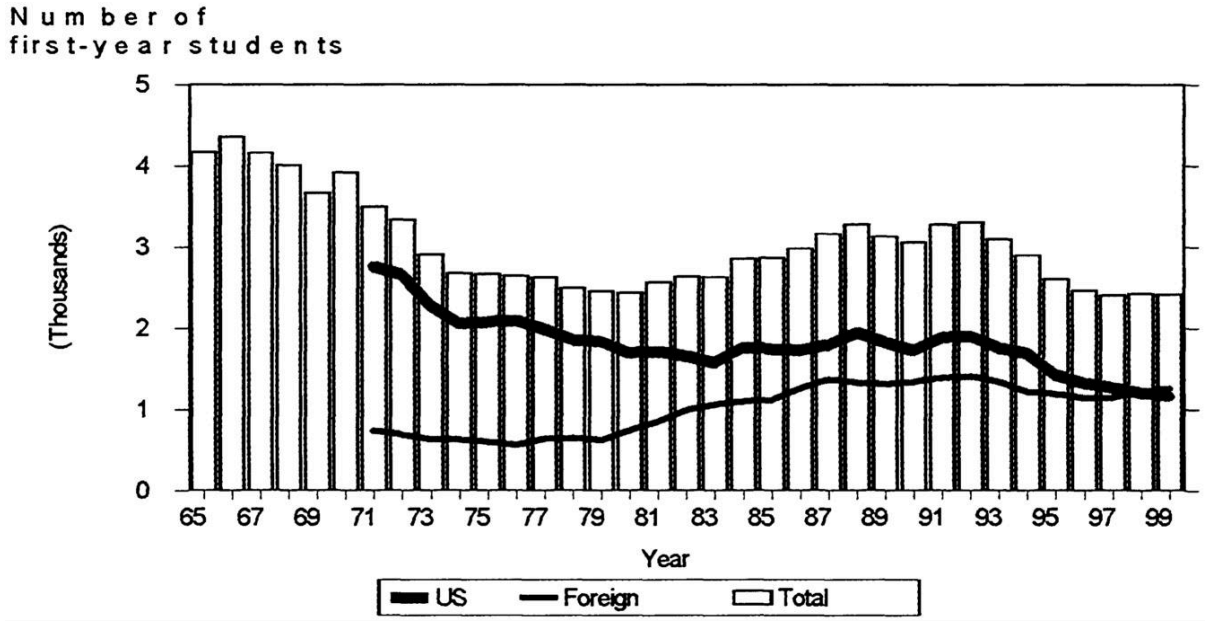

Figure 2. First-year U.S. and foreign physics graduate students, 1965 to 1999.[46]

Moreover, students from China were very successful in their coursework and research. The National Academy of Sciences report on Chinese international students noted that Chinese students were particularly capable in securing competitive fellowships compared to their American counterparts and students from other countries.[47] Sam Treiman, a professor of physics at Princeton who interviewed CUSPEA candidates in 1983, noted that despite the disruption of education in the Cultural Revolution, CUSPEA candidates had excellent academic preparation.[48] The first five CUSPEA students at Columbia University all scored top ten in the qualifying exams that year, including the record high score by one of them.[49] Finally, universities in the US sought to establish their reputation and influence in China through academic exchanges after the newly rekindled diplomatic relationship between China and the US. An example of this was when the comparative literature program

[46] National Research Council, *Physics in a New Era*, 103.
[47] David M. Lampton, Joyce A. Madancy, and Kristen M. Williams, *A Relationship Restored*, 57.
[48] The 1983 Report on Interviewing the CUSPEA Students by Jack Sandweiss, Letha Sandweiss, Joan Treiman, Sam Treiman, box 2, folder China-US Physics Examination and Application Program, Ernest Henley Papers, Special Collections, the University of Washington, Seattle, WA.
[49] 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban). CUSPEA十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 8.

at the University of Washington (UW) wrote to Ernest Henley, the Dean of Arts and Sciences at UW who had engaged in China-US academic exchanges extensively as a physicist, to request funding to admit Chinese students to study comparative literature, because the discipline did not exist in China. It was in the university's interest to train Chinese students in the discipline to expand the influence of UW in China.[50] Furthermore, it was noteworthy that the delegations commissioned by the Committee on Scholarly Communication with the People's Republic of China (CSCPRC) of the National Academy of Sciences played a significant role in introducing the situations in China to the academia in the US. The delegation's reports published by the National Academies Press included a detailed analysis of specific disciplines, such as solid state physics, as well as observations of the social and political situation in China. The American delegations in the 1970s were high-profile. For instance, the American Solid State Physics Delegation included two Nobel Laureates and a number of fellows of the American Physical Society and the National Academy of Sciences.[51] The delegations often received attention outside of their immediate fields of interest. For instance, Ernest Henley was contacted by Andrew Nathan, a political scientist at Columbia, for the travel report to China because Henley was part of the high energy physics delegation to China in 1977.[52] The delegations' reports informed American academics interested in learning about China's academia, society, and politics, paving the way for academic collaboration once the opportunities were available.

At the same time, it is noteworthy that the American physics community's priorities were profoundly different from the goals of the Chinese government. While the American

[50] A Letter Regarding Recruiting Chinese Students to the Comparative Literature Program by Ernst Behler, box 6, folder Mail 1984, Ernest Henley Papers, Special Collections, the University of Washington, Seattle, WA.
[51] American Solid State Physics Delegation, *Solid State Physics in the People's Republic of China*, 166-180.
[52] A Letter Requesting the Formal Report of the China Visit by Andrew Nathan, box 2, folder Mail '78-'79, Ernest Henley Papers, Special Collections, the University of Washington, Seattle, WA.

physics community intended to train the best physicists of the next generation through CUSPEA, the Chinese government aimed to modernize China's science and technology. The Chinese government was, therefore, more open to CUSPEA students switching from physics to other STEM disciplines during their graduate training. As a physics professor who worked in the US recalled to me, there has been some discontent in the American physics community regarding the CUSPEA students who switched their fields to engineering immediately after coming to the US.[53] The official CUSPEA yearbook published in 2001 in China, however, spoke highly of the contribution of CUSPEA alumni in areas that were more closely related to the real world applications, who would play a key role in helping China reach top status in science and technology.[54]

Conclusion

CUSPEA was made possible in a specific context. China had just made its historical transition from radical revolutionary policies to modernization under the reform-minded and pragmatic political leaders. Seeking to modernize China with science and technology, China's political leaders supported the endeavor to send students abroad with the expectation that they would return to contribute to the Four Modernization with advanced training. Chinese American physicists were concerned with China's situation after nearly three decades of travel restrictions, aiming to help their motherland with overseas connections and the most advanced physics. The American physics community intended to recruit the most talented students from China to make up for the decline in physics graduate program enrollment in the 1970s and influence China's academia. The resonance of the needs and concerns of the Chinese government, Chinese American physicists, and the American

[53] Anonymous Informant #1, The Start of China-U.S. Scientific Exchanges.
[54] 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban). CUSPEA 十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 263.

physics community thus led to the start of CUSPEA. There were, however, divergent comments on CUSPEA students who switched to engineering after coming to the US because of different motivations between the Chinese government and the American physicists.

Chapter 2: The CUSPEA Experience

CUSPEA alumni longed for academic and political freedom. In the chaotic years of the Cultural Revolution, despite the interruption of formal education, CUSPEA alumni tried hard to create a free space for knowledge and keep up with the developments in science through a limited selection of books. After landing in the US, CUSPEA alumni took advantage of the flexible academic institution. The newfound academic freedom allowed CUSPEA alumni to explore other subfields of physics and opportunities beyond academia, introducing new ideas to China about work-life, business, and how academia should operate through writings, interviews, and entrepreneurial efforts. For CUSPEA alumni, politics and academia were intertwined. Influenced by student activism in China in the 1980s and the political freedom in the US, a number of CUSPEA alumni have actively participated in politics through writings on Chinese history and American politics to this day.

The Cultural Revolution: Seeking Freedom to Learn in the Political Chaos

During the Cultural Revolution, college education came to a stop due to political tensions. Secondary education shifted its focus from academic studies to practical skills, such as farming and political training. Despite the interruption in education, CUSPEA alumni looked for unconventional ways to engage with the limited amount of materials about science through their jobs or free time after school. CUSPEA alumni, therefore, managed to keep in touch with scientific knowledge, sometimes even the latest research in the West, through

various channels other than regular schooling. As the interview report of CUSPEA candidates in 1980 suggested, it was surprising for the interviewer to find out that the candidates demonstrated remarkable passion for physics and a deep grasp of physics concepts even though the candidates were educated during the Cultural Revolution.[55] For the Anonymous Informant #3, who entered the University of Science and Technology of China (USTC) in 1962 as a mechanics major, the Cultural Revolution disrupted his undergraduate training in mechanics and English. In 1966, he was assigned to become a boiler worker at a Steel Factory without finishing his undergraduate degree. The Lin Biao incident in 1971 led to the partial modification of the leftist radical revolution line, contributing to the restoration of production.[56] Because of his English skills, he got the opportunity to work in the material room, taking care of all the material from the Western world for the factory with special access to the restricted area of state-run bookstores where foreign materials were sold, and was able to catch up with the scientific and technological advances in the West, a privilege unavailable to most people. Through journals like Scientific American, he became familiar with the research focus in the US and the names of renowned universities in the US. The material room became his free and safe space to learn about science and the US.[57]

Anonymous Informant #2 and Anonymous Informant #4, who tested into USTC right in the first College Entrance Examination after the Cultural Revolution in 1977, also benefited from self-learning outside the classroom. For Anonymous Informant #2, the Cultural Revolution also meant plenty of free time to explore the subjects they were

[55] 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban) CUSPEA十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 155-161.
[56] Lin Biao had been the official successor of Mao Zedong from 1969 to 1971. In 1971, as Mao lost trust on Lin, Lin left China for the Soviet Union via plane on Sept. 13th. As the plane crashed in Mongolia, Lin passed away.
[57] Anonymous Informant #3, College, Cultural Revolution, CUSPEA, interview by Yuxuan Hu, trans. Yuxuan Hu, June 2024.

passionate about, as exams were not stressful. Anonymous informant #2 took advantage of the freedom and self-studied a lot of science in his free time. He recalled, "Though the schools did little teaching, I did not lose anything in the Cultural Revolution years."[58] While he spent all of their elementary and secondary school years during the Cultural Revolution, they learned tremendously from the textbooks and popular science books published before the Cultural Revolution, contributing to their success in the 1977 College Entrance Examination.[59] He states, "College students of my generation read the same popular science books when there were not many options." Their experience was emblematic of the CUSPEA alumni who gained access to knowledge through unconventional channels in the chaotic years of the Cultural Revolution. CUSPEA alumni made the most of what was accessible, even in the most chaotic years in modern Chinese history. It is thus not surprising that they thrived and achieved great things when they got to the US, where there were abundant resources and academic freedom.

Navigating the Two Academic Systems

For CUSPEA alumni, while the undergraduate training in China laid solid foundations in math and physics, it was in the US where they unleashed their creativity, exploring beyond their immediate field of focus. The Chinese academic institution was modeled after the Soviet system, which emphasized rigor and lacked flexibility, and differed significantly from the US system where personal choice was of vital importance. In the late 1970s and early 1980s, curriculums in Chinese universities were hyper-specialized, and students were asked to declare their specialization before matriculation. For example, at USTC, physics students had to choose between nuclear and solid state physics before starting

[58] Anonymous Informant #2, CUSPEA as a Bridge.
[59] Anonymous Informant #2, CUSPEA as a Bridge, interview by Yuxuan Hu, trans. Yuxuan Hu, May 2024; Anonymous Informant #4, CUSPEA and Academic Career.

their first year of college. Students in the two different tracks took different classes and had little chance of communicating with each other.[60] Students also had little power to determine where to work after graduation as they would be assigned a job according to the needs of the state and their specialization. It was not until the 1990s that college graduates had more flexibility in determining their jobs.[61]

Moreover, the undergraduate curriculums in China focused on mathematical rigor but lacked training in experimental physics. The undergraduate training involved rigorous Soviet textbooks, such as Landau's theoretical physics textbooks and Demidovich's mathematical analysis textbook. According to Anonymous Informant #4, the rigor of the curriculum helped him tremendously in doctoral research in high energy theory.[62] However, as indicated in the interview reports of CUSPEA candidates, physics students in China in the 1980s lacked the exposure to experimental training and research projects due to constraints of the apparatus. Therefore, only a few candidates had a clear sense of research.[63] By contrast, Anonymous Informant #2 and Anonymous Informant #3 recalled that American textbooks focused on illustrating the definitions and physical images, which was very refreshing from the math-intensive Soviet-style training. Notably, the textbooks they mentioned were typically used for lower-division physics classes in the US, which were much less mathematically complicated than the usual undergraduate training in China. The exposure to the American textbooks helped my narrators solve CUSPEA exam problems, including several problems

[60] Anonymous Informant #2, CUSPEA as a Bridge; Anonymous Informant #4, CUSPEA and Academic Career.
[61] Central Committee of the Chinese Communist Party 中国共产党中央委员会 and State Council 国务院, "Zhongguo Jiaoyu Gaige He Fazhan Gangyao 中国教育改革和发展纲要 [Outline of China's Education Reform and Development]," accessed February 20, 2025, https://www.waizi.org.cn/law/5047.html.
[62] Anonymous Informant #4, CUSPEA and Academic Career.
[63] 吴塘 (Wu, Tang) and 柳怀祖 (Huaizu Liu), eds. *CUSPEA Shinian (Dier Ban) CUSPEA 十年 (第二版) [A Decade of CUSPEA (Second Edition)]*, 155-166.

on rough estimation of order of magnitudes, which were not the kind of problems they have encountered in regular curriculums.[64]

The academic system in the US represents personal choice and academic freedom. After arriving in the US, many CUSPEA alumni benefited from the opportunities to learn about fields beyond their immediate specialization.[65] While some CUSPEA alumni switched to different subfields of physics during graduate and postdoctoral training, others took advantage of various resources available and entered the industry. For instance, Anonymous Informant #3 switched from high-energy experiment to high-energy theory, as he figured out that he was not fond of coding and computational methods when he was doing experimental work in graduate school. Anonymous Informant #2 noted that when he arrived at graduate school, he found out that the department was much stronger in high energy physics than condensed matter physics, which he was originally planning to work on, so he switched to high energy physics. As a postdoc, he switched back to condensed matter as the postdoc program allowed him significant freedom to choose what to do. Both switches would have been impossible if they had stayed in China for doctoral training in physics. The switch also allowed him to learn about new methodologies and encounter new ideas for research.[66]

CUSPEA alumni believed that academic freedom contributed to their scholarly success. They shared their understanding of becoming a good scholar and contributing to science innovations by unleashing individual creativity in an academically free environment. Some CUSPEA alumni posted influential articles on Chinese websites and magazines that

[64] Anonymous Informant #2, CUSPEA as a Bridge; Anonymous Informant #3, College, Cultural Revolution, CUSPEA.
[65] Anonymous Informant #2, CUSPEA as a Bridge; Anonymous Informant #3, College, Cultural Revolution, CUSPEA.
[66] Anonymous Informant #2, CUSPEA as a Bridge; Anonymous Informant #3, College, Cultural Revolution, CUSPEA; Anonymous Informant #4, CUSPEA and Academic Career.

are popular among intellectuals in China. By sharing their unconventional ideas about innovation and scientific careers, CUSPEA alumni contributed to the shift in academic culture and institutions in China beyond producing knowledge in physics. For example, Xiao-Gang Wen, a professor of MIT and CUSPEA alumna, wrote an article titled "Innovation is Child's Play," in which Wen emphasized the importance of curiosity and the courage to pursue what is intriguing to individual scholars. Wen also pointed out that the science policies in China push scholars to publish more articles but do not encourage groundbreaking innovations that are based on curiosity and interest. Wen himself is a practitioner of studying and researching like a child. Wen switched from subfields multiple times as a doctoral student and postdoc. He also worked on topological order because of its mathematical structure, even though his research was one of the only groups working on the topic. Notably, Wen's article reaches a wide range of audiences beyond academia. On WeChat alone, Wen's article got 16.8k reads as of February 2025.[67]

Another example is Zhaoping Li, a physicist turned neuroscientist, who delivered a speech titled "Don't Be Afraid of Being Unique as a Scientist." The speech was later published and gained a wide circulation. Li was unique among physics students during her undergraduate years as one of the only female students in the department. As a graduate student in physics at Caltech, Li found her interest in the interface of biology and physics, having many committee members outside the physics department, which was very unusual. Later in her scientific career, she left the US for the UK, where there was stable financial support for her research projects, even though staying in the US was the mainstream option.

[67] Xiao-Gang Wen 文小刚, "Wen Xiao-Gang: Chuangxin Jiushi Haizi De Youxi 文小刚:创新就是孩子的游戏 [Wen Xiao-Gang: Innovation is the Game for Kids]," Weixin Official Accounts Platform Fanpu, October 11, 2019, https://mp.weixin.qq.com/s/zyvYV-ydmMoniWQyRnzvGw.

She contended that groundbreaking innovations often emerge from unique ideas by unique scientists that were not necessarily accepted by the mainstream.[68]

Beyond Academia

Academic freedom also means the freedom to look for opportunities beyond academia. Among CUSPEA alumni who left academia to work in the business world, Zhang Chaoyang is among the most influential. Zhang arrived at MIT in 1986 through CUSPEA. After completing his PhD in physics, he stayed at MIT for postdoctoral training. Zhang mentioned that people did not have a cult for scientists in the US, while in China, scientists had a much higher status. The transition led Zhang to explore possibilities beyond physics, as he realized that his passion was elsewhere other than in academic research. Moreover, a new discovery in physics would not directly contribute to the modernization of China or the improvement in people's lives. Inspired by Netscape and Yahoo, he started an internet company and became the first Chinese national to secure venture capital in 1996. The company later became Sohu, one of the leading Chinese websites and the first Chinese Internet company to be listed in Nasdaq.[69] In recent years, Zhang utilized his influence and started a lecture series on various topics in physics, from introductory undergraduate level to graduate level topics. [70] As of February 2025, there are over 2.4 million followers on Zhang's

[68] Zhaoping Li (李兆平), "'Zuo Kexue Buyaopa Yuzhong Butong' 做科学不要怕与众不同 [Don't be Afraid of Being Unique as a Scientist]," in *Shengming Zhiguang-"Zhanwang Shiye, Tantao Rensheng" Jiangyanlu (Dier Ji)* 生命之光——"展望事业、探讨人生"讲演录(第二辑) *[The Light of Life - Lectures on "Looking Forward to Career and Exploring Life" (Volume 2)*, ed. Yi Rao (饶毅) (Beijing: Higher Education Press, 2012), 69-93.
[69] Zhang Chaoyang (张朝阳), "'Zhang Chaoyang Rushi Shuo: Wo Biye Yu MIT' 张朝阳如是说:我毕业于MIT [Zhang Chaoyang Said: I Graduated from MIT]," Sohu, August 26, 2003, accessed February 15, 2025, https://goabroad.sohu.com/80/50/article212495080.shtml.
[70] Shenqian Atom (深潜atom), "'Zai Zhang Chaoyang De Wulike Li, Wo Kandaole Zhenshi De Zhishi Zhibo' 在《张朝阳的物理课》里, 我看到了真实的知识直播 [In Zhang Chaoyang's Physics Classes, I See Real Knowledge Livestream]," Sohu, March 18, 2022, accessed February 15, 2025, https://www.sohu.com/a/530745806_100150.

physics channel on Douyin.[71] While Zhang and many CUSPEA alumni left academia, they have also influenced China tremendously by bringing back new business models, introducing new ideas about careers, and popularizing science through public outreach efforts.

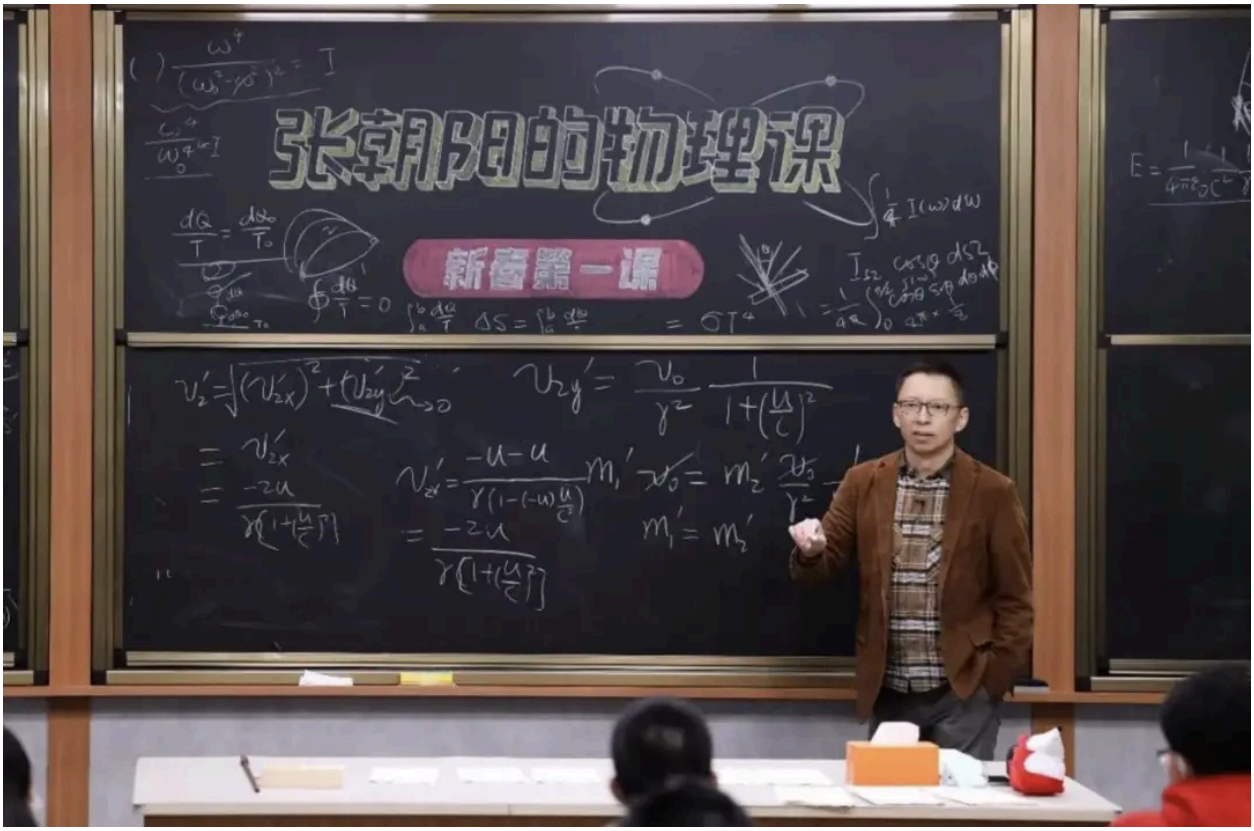

Figure 3. Zhang Chaoyang delivering a lecture on special relativity through Sohu and Douyin.[72]

Politics and Academic Freedom

For CUSPEA alumni and physicists in both China and the US, academic freedom is indispensable from democracy and political freedom. CUSPEA alumni are concerned about the relationship between academia and politics, actively participating in discussions through

[71] Zhang Chaoyang (张朝阳), "'Zhang Chaoyang De Wulike' 张朝阳的物理课 [Zhang Chaoyang's Physics Classes]," Douyin, accessed February 15, 2025, https://www.douyin.com/user/MS4wLjABAAAApIEQAQbDECJWlDDvDKCwpvpLAskFmeUxnIIrAAL9mNoDBYxAJxED5RCBTISu7zcY.

[72] Shenqian Atom (深潜atom), "'Zai Zhang Chaoyang De Wulike Li, Wo Kandaole Zhenshi De Zhishi Zhibo' 在《张朝阳的物理课》里，我看到了真实的知识直播 [In Zhang Chaoyang's Physics Classes, I See Real Knowledge Livestream]," last modified March 18, 2022, https://www.sohu.com/a/530745806_100150. (accessed February 15, 2025)

political blogs and reflections of personal experience. For instance, a number of CUSPEA alumni wrote about the liberal climate of USTC and criticized the authoritarian polity in China. One CUSPEA alumna created an online museum for the Cultural Revolution.[73] Upon a closer look at the intellectual and political context of the 1980s, we could understand the motivation for their concerns. In particular, the liberal political climate in the 1980s, the role model of Fang Lizhi, the vice president of USTC, and T. D. Lee, and the June Fourth movement in 1989 urged young Chinese students to think about political reform and the roles of universities.

The 1980s in China was a decade of profound economic transformation, cautious political reform, and growing social unrest. Under Deng Xiaoping's leadership, the country shifted from a planned economy to a market economy, as the government allowed private enterprise, foreign investment, and rural decollectivization. While the economic reform lifted millions out of poverty, people became angry about inflation, corruption, and growing inequalities by the end of the 1980s. Politically, the decade was marked by a struggle between reformists and hardliners within the Communist Party. Hu Yaobang and Zhao

[73] Wang Kebin (王克斌), "'Wang Kebin: Chongpo Jiquan De Guaiquan' 王克斌:冲破极权的怪圈 [Wang Kebin: Breaking the Vicious Circle of Totalitarianism]," Huaxia Wenku, May 5, 2014, accessed February 15, 2025, http://hx.cnd.org/2014/05/05/%e7%8e%8b%e5%85%8b%e6%96%8c%ef%bc%9a%e5%86%b2%e7%a0%b4%e6%9e%81%e6%9d%83%e7%9a%84%e6%80%aa%e5%9c%88/; Wang Kebin (王克斌), "'Wang Kebin: Kao CUSPEA' 王克斌:考CUSPEA [Wang Kebin: Taking CUSPEA]," Huaxia Wenku, December 18, 2015, accessed February 15, 2025, http://hx.cnd.org/2015/12/18/%e3%80%90%e5%8d%8e%e5%a4%8f%e6%96%87%e6%91%98%e3%80%91%e7%8e%8b%e5%85%8b%e6%96%8c%ef%bc%9a%e8%80%83cuspea/; Hua Xinmin (华新民), "'Hua Xinmin: Fang Jiaoshou Loushiming' 华新民:方教授陋室铭 [Hua Xinmin: Professor Fang's Inscription on the Humble House]," Huaxia Wenku, April 6, 2022, accessed February 15, 2025, http://hx.cnd.org/2022/04/06/%e5%8d%8e%e6%96%b0%e6%b0%91%ef%bc%9a%e6%96%b9%e6%95%99%e6%8e%88%e9%99%8b%e5%ae%a4%e9%93%ad/; Zhang Min (张敏) and Hua Xinmin (华新民), "'Zhang Min: Zhuanfang Wangshang Wangshang "Wenge Bowuguan" Chuangbanren en Hua Xinmin' 张敏:专访网上"文革博物馆"创办人华新民 [Zhang Min: Interview of the Online "Museum of the Cultural Revolution", Hua Xinmin]," Huaxia Wenku, December 21, 2023, accessed February 15, 2025, http://hua-xinmin.hxwk.org/2023/12/21/%e5%bc%a0%e6%95%8f%ef%bc%9a%e4%b8%93%e8%ae%bf%e7%bd%91%e4%b8%8a%e6%96%87%e9%9d%a9%e5%8d%9a%e7%89%a9%e9%a6%86%e5%88%9b%e5%8a%9e%e4%ba%ba%e5%8d%8e%e6%96%b0%e6%b0%91/.

Ziyang, both reform-minded leaders, pushed for greater political openness, including limited press freedom and discussions on democracy. However, their efforts were met with resistance from conservative party elders, who feared that political liberalization would weaken Communist rule.

In 1986, a wave of student protests erupted across multiple cities, including Shanghai, Beijing, and particularly in Hefei at USTC. Encouraged by prominent astrophysicist Fang Lizhi, who was vice president of USTC and a vocal critic of authoritarianism, students demanded political reform, free elections, and an end to official corruption. The protests were quickly suppressed. Fang Lizhi was dismissed from the party, while Hu Yaobang, the general secretary who was sympathetic to the students, was forced to resign in early 1987. The Anti-Bourgeois Liberalization Campaign in 1987, following the crackdown of student demonstrations, showed that the government was reluctant to allow significant political change. Fang Lizhi played an important role in CUSPEA and influenced a number of CUSPEA alumni, shaping their political views and political engagements. Fang served on the CUSPEA committee and composed the preface of CUSPEA practice problems.[74] More importantly, Fang was a symbol of a reform-minded scientist who uphold democratic values and contributed to academic freedom, correcting the mistakes of the Cultural Revolution, even if he was ostracized and dismissed from the party. As he recalled in his autobiography, he believed that China needed a university where creativity and independent thoughts could

[74] Fang Lizhi 方励之, "Xu" 序 [Preface], in *Meiguo Wuli Shiti Yu Jieda Di Liujuan: Liangzi Lixue* 美国物理试题与解答第六卷:量子力学 [American Physics Test Questions and Answers Volume Six: Quantum Mechanics], ed. Zhang Yongde 张永德, Zhu Dongpei 朱栋培, and Fan Hongyi 范洪义 (Hefei: University of Science and Technology of China Publishing House, 1987), i-ii.

thrive. He managed USTC according to his ideals, setting the guiding principles of USTC to be Science, Democracy, Creativity, and Independence.[75]

The decade ended in tragedy with the 1989 Tiananmen Square protests. Sparked by the death of Hu Yaobang and fueled by frustrations over corruption and political stagnation, student-led demonstrations in Beijing called for democracy, government accountability, and economic fairness. However, hardliners in the Communist Party, such as Deng Xiaoping and Premier Li Peng, responded with military force. On June 3-4, 1989, the People's Liberation Army brutally suppressed protesters, killing hundreds, possibly thousands. Fang Lizhi, though not involved in the 1989 protests, was labeled a counterrevolutionary and forced to seek asylum at the U.S. embassy. This crackdown signaled the end of political liberalization in China, reinforcing one-party rule while continuing economic reforms.[76] T. D. Lee and a group of theoretical physicists from around the world working on quantum gravity and string theory attended a symposium on Fields, Strings, and Quantum Gravity in Beijing that began on May 29 and was canceled on June 4, 1989. Witnessing the tragic event, T. D. Lee wrote in the preface of the proceedings of the symposium that "it is only through innumerable interactions like this, in many disciplines and over a period of years, that China can achieve modernization." T. D. Lee wrote the preface not only to "honor their memory and grief" but also to openly call for the open and free political environment to remain to maintain active academic exchanges and China's progress towards modernity.[77]

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[75] Fang Lizhi 方勵之, *Fang Lizhi Zizhuan* 方勵之自傳 [Autobiography of Fang Lizhi], edited by Li Shuxian 李淑嫻 (Taipei: Tianxia Yuanjian Chuban Youxian Gongsi, 2003), 340-341, 364.
[76] Jeremy Brown, *June Fourth: The Tiananmen Protests and Beijing Massacre of 1989*, New Approaches to Asian History (Cambridge, United Kingdom: Cambridge University Press, 2021), 1-31.
[77] T. D. Lee, "Preface", in *Fields, Strings, and Quantum Gravity: Proceedings of the CCAST (World Laboratory) Symposium Workshop Held at the Temple of the Sleeping Buddha, Beijing, People's Republic of China, May 29-June 10, 1989 (Cancelled June 4, 1989)*, eds. Hanying Guo, Zhaoming Qiu, and Henry Tye (New York: CRC Press, 1990), ix-xi.

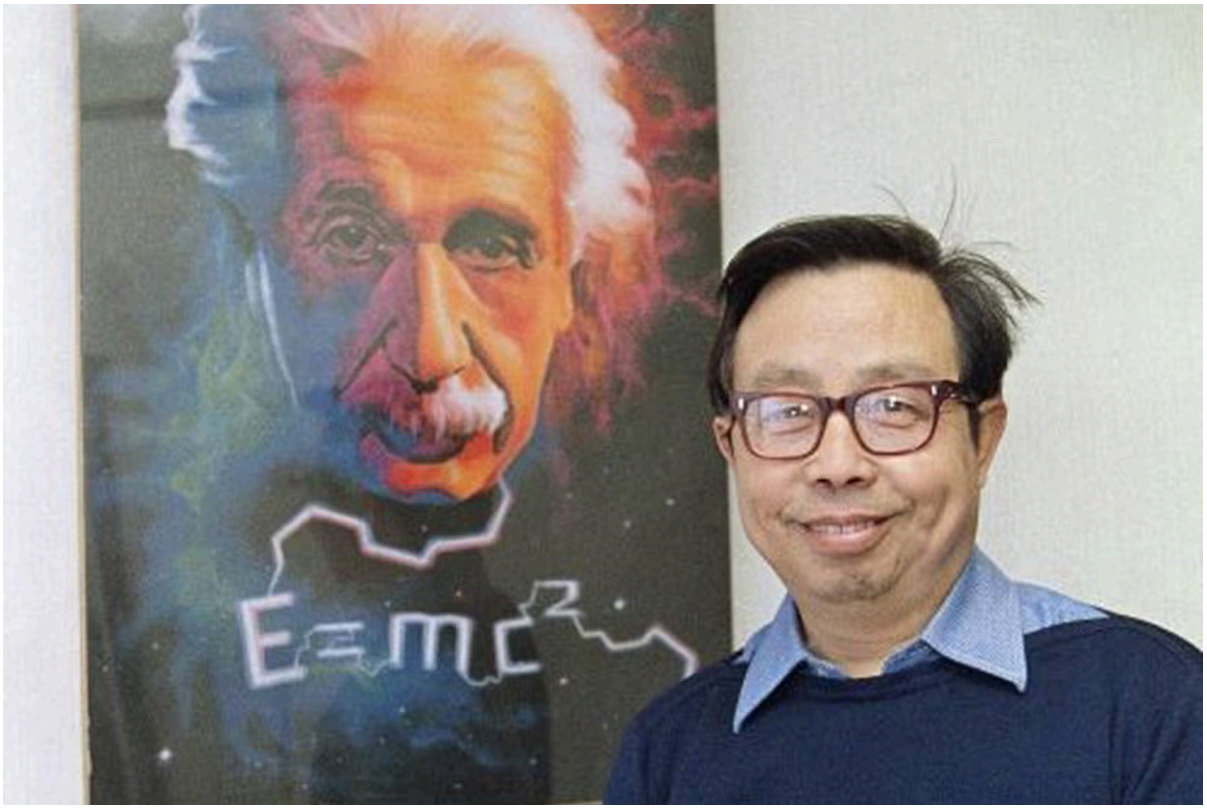

Figure 4. Fang Lizhi. In the 1980s, Fang was a scientist and activist who influenced an entire generation of young students and scholars.[78]

[78] Michael Wines, "Fang Lizhi, Chinese Physicist and Seminal Dissident, Dies at 76," *The New York Times*, April 7, 2012, sec. World, https://www.nytimes.com/2012/04/08/world/asia/fang-lizhi-chinese-physicist-and-dissident-dies-at-76.html.

Figure 5. Tiananmen in May 1989. Protesters occupied Tiananmen Square for democratic reforms.[79]

Conclusions

CUSPEA was a liberating experience where CUSPEA alumni embraced academic freedom. They not only achieved what was unthinkable should they not participate in CUSPEA but also influenced China in a number of ways. By sharing ideas about innovations in science and the operation of academia, CUSPEA alumni influenced the perceptions of Chinese intellectuals regarding academic work. Outside of academia, CUSPEA alumni founded influential companies like Sohu that introduced new business models and lifestyles to China. CUSPEA alumni also actively participated in political activities as students and wrote about their experience in the Cultural Revolution and the 1980s in recent years,

[79] "Tiananmen Square: What Happened in the Protests of 1989?," June 3, 2019, https://www.bbc.com/news/world-asia-48445934.

expressing their views of democracy and a just society. The differences between China and the US, the rapid changes in China in the 1980s, and the flexibility allowed by CUSPEA's initiators contributed to the unexpected but diverse outcome of CUSPEA. How did CUSPEA's initiators react to the outcomes? Can the success of CUSPEA be replicated today? What is the future of China-US academic exchanges as the geopolitical tension between China and the US escalates?

Chapter 3: The Outcomes of CUSPEA and Future of China-US Academic Exchanges

CUSPEA did not turn out the way that CUSPEA's initiators expected. While the Chinese government expected the majority of CUSPEA alumni to return to China, most stayed in the US. T. D. Lee forecasted that CUSPEA alumni would contribute to China's modernity with their training in basic science. Still, several CUSPEA alumni did not finish doctoral training in physics and switched to other fields, such as engineering and finance. The American physics community also had mixed comments regarding CUSPEA. The American physics community was impressed by the outstanding academic performance of CUSPEA alumni, a number of whom became outstanding scholars, elected as fellows of the American Physical Society and the National Academy of Sciences. While some bright physicists came to the US through CUSPEA, it was frustrating for physics departments in the US that CUSPEA students were switching to other fields or could not finish their degree due to the degradation of their mental health. The Chinese government became more open to CUSPEA alumni who stayed in the US after the political incident in 1989, stating that Chinese working overseas could contribute to China's modernity through short-term visits to China and training Chinese graduate students.. Though CUSPEA was widely considered successful, none of the expectations outlined in the first chapter were fully met.

Compared to CUSPEA's predecessors, CUSPEA's initiators were tolerant of unexpected outcomes. Despite some frustrations, the Chinese government and the American

physics community allowed CUSPEA alumni to choose their professions and countries of residence freely, which was key to the diverse outcomes of CUSPEA in both academia and business. However, flexible academic exchanges akin to CUSPEA are not likely today. The US government discouraged academic exchanges in STEM between China and the US due to national security concerns and the intensification of geopolitical tensions. Nationalism in China has led to the condemnation of Chinese scholars who work overseas for betraying their homeland. Therefore, free exchanges, such as CUSPEA, likely will not happen again between China and the US in the near future.

Immigration Policies

In 1979, China was eager to modernize itself through advanced technologies. The Chinese government anticipated that all CUSPEA alumni would return to China to contribute to the modernity of their home country with their knowledge. However, CUSPEA alumni regarded overseas experience as very valuable to their career and tried hard to work around the immigration restrictions to expand their overseas experience. All CUSPEA alumni held J-1 visas when they first arrived in the United States, which did not allow them to work in the U.S. after finishing their studies unless they could find another position that sponsored an H visa.[80] Anonymous informant #2 who found a postdoc position at UCSB recalled that UCSB was particularly generous in sponsoring H visas for postdocs, while some people in his CUSPEA cohort had a difficult time searching for a position that could maintain their legal status in the US.[81] Anonymous informant #4 was aware of the restriction early in his graduate school career, so he was planning to return to China for a position at the Institute of

[80] J-1 visa is the visa type for exchange scholars. In the late 1970s and early 1980s, the Chinese Government financially sponsored most of the J-1 scholars. However, government funding did not sponsor CUSPEA alumni's studies in the U.S. The arrangement was likely to ensure that CUSPEA alumni would return to China after completing their doctoral training.
[81] Anonymous Informant #2, CUSPEA as a Bridge.

Theoretical Physics, Chinese Academy of Sciences, right after finishing his PhD in 1987.[82] The June Fourth Movement in 1989 changed the situation dramatically. The Chinese Student Protection Act of 1992 allowed all Chinese citizens physically in the US from 1989 to 1990 to secure a green card regardless of their visa status. While I discussed the travel restrictions and political situation after June Fourth with my narrators, due to the topic's sensitivity, I did not explicitly ask my narrators how they secured residency in the US, as they are currently employed in the US . Anonymous informant #4, who was working in Australia in 1989, mentioned that he canceled his plane ticket back to China after June 4 and subsequently looked for positions elsewhere in the world.[83] The political event in 1989 had a significant impact on the outcome of the CUSPEA. Even the official CUSPEA yearbook published in China in 2002 implied that a significant number of CUSPEA alumni did not return due to the political chaos in 1989.[84]

The Chinese government changed its expectations for overseas scholars after the June Fourth Movement in 1989. In particular, the Chinese government believed that Chinese scholars could still contribute to China's modernity even if they were working overseas. Overseas scholars often return to China over the summer to offer intensive lecture series and talks about the latest research, make connections, collaborate with colleagues in China, and take on graduate students and postdoctoral scholars from China. According to David Zweig, Chinese scholars working overseas often feel obliged to contribute to their home country because of emotional ties. They disproportionately collaborate with scholars from China and take on Chinese graduate students.[85] Notably, CUSPEA alumni played an important role in

[82] Anonymous Informant #4, CUSPEA and Academic Career.
[83] Anonymous Informant #4, CUSPEA and Academic Career.
[84] Wu, Tang 吴塘 and Liu Huaizu 柳怀祖, eds. *CUSPEA Shinian (Dier Ban)*. CUSPEA十年 (第二版) [A Decade of CUSPEA (Second Edition)], 9.
[85] Zweig, *The War for Chinese Talent in America*, 9-61.

maintaining the academic ties between China and the US after June Fourth, when there was significant hostility between China and the West. According to Huaizu Liu, an official in the Chinese Academy of Sciences, there was a policy by the Chinese government that overseas students could not leave China after returning to China. Still, CUSPEA students had the privilege of going abroad again after returning for short-term visits to give talks about advancements in the US. The officials in CAS were also concerned about maintaining ties with the West and would even accompany the CUSPEA students who returned for short-term visits to the airport to ensure that they could clear the passport control and continue their study and research overseas.[86] One of my narrators also noted that CUSPEA served as a bridge that introduced many research areas and topics unfamiliar to China's academia.[87]

The Flexibility of CUSPEA

To alumni of the program, the program presented challenges to living in a completely different world and the opportunity to hold on to career decisions beyond the job assignments in the planned economy. As CUSPEA alumni looked back on their careers, it was precisely the program's flexibility that led to the general consensus of the program's success. While good physicists emerged through the program, good entrepreneurs, engineers, and businesspeople could also take advantage of the flexibility and freedom in the US. It was precisely the flexibility that contributed to the success of the program, compared to other study abroad programs in modern Chinese history. For instance, the government severely limited the scope of the Chinese Educational Mission in the late 19th century and the exchange scholars sent to the UK in the early 1970s. While the exchange scholars were in the

[86] Huaizu Liu (柳怀祖), "'Li Zhengdao De CUSPEA: Ta Gaibianle Zhongguo Yidai Jingying De Mingyun' 李政道的CUSPEA：他改变了中国一代精英的命运 [T. D. Lee's CUSPEA: He Changed the Life Trajectories of a Generation of China's Elites]," Weixin Official Accounts Platform Sai Xiansheng, October 31, 2021, https://mp.weixin.qq.com/s/3VZrsH_lpbcKf7bHKycOYw.
[87] Anonymous Informant #2, CUSPEA as a Bridge.

UK, they could not communicate with locals regarding anything other than academic topics, go out alone— or even complete their degree, as the government was concerned that the scholars would refuse to return to China or become politically dissident. The restrictive measures significantly limited the scope of academic exchanges and the professional growth of the exchange scholars.[88] The Chinese Educational Mission also abruptly came to an end as the Qing court was concerned that the young Chinese students in the US would assimilate as Americans. As a result, most of the young students did not finish their degrees when they were called back to China.[89] The restrictions imposed on the students and scholars abroad limited the scope of exchanges and their subsequent influence. By contrast, though CUSPEA did not meet the expectations of its initiators, students were allowed significant freedom to choose their career, leading to the blossoming of the career of its alumni and significant influence on China beyond academia.

The Future of China-US Academic Exchanges

In January 2024, a short video of a conversation with a homeless person in New York spread like wildfire on the Chinese Internet. The vlogger that posted it found out that the person he spoke to received a PhD in physics and worked in Wall Street before becoming homeless. Chinese netizens soon identified the individual as Sun Weidong, a CUSPEA alumni who came to the US in 1989. Sun was a talented student who tested into Fudan University, one of the best universities in China, at the age of 16, and came to the US through CUSPEA at the age of 20.[90] Chinese netizens, however, showed hostility towards Sun. A

[88] Xiong Weimin (熊卫民) and Zhu Yinzhen (朱胤臻), "'Shangge Shiji 70 Niandai Yiduan Gongpai Liuxue Wangshi' 上个世纪70年代一段公派留学往事 [A Recount about Government-Sponsored Overseas Study in the 1970s]," Weixin Official Accounts Platform Zhishi Fenzi, October 31, 2024, https://mp.weixin.qq.com/s/z22ZHSTs2pLUw9vmJ0-v9A.
[89]Thomas E. La Fargue, *China's First Hundred* (Pullman, WA: State College of Washington, 1942), 53-67.
[90] New York Dr. Sun Weidong and His Friends 纽约孙卫东博士和他的朋友们, "Who Are We," https://www.sunweidongandyou.com/. (accessed February 20, 2025)

common accusation was that Sun went abroad through a state-sponsored program and should have come back to China to contribute to his home country, but he became a US citizen. His homelessness was thus well-deserved for betraying his home country.[91] The reaction of Chinese netizens signaled the growing hostility between China and the US. As Chinese netizens viewed the US as the most important competitor of China, overseas Chinese should return to serve the country. The climate when CUSPEA started, however, was profoundly different. In 1982, *People's Daily*, the most important newspaper run by the Chinese Communist Party (CCP), praised the outstanding academic performance of Chinese students who studied in the US, winning the glory for China.[92]

The US government also increasingly views Chinese American scientists as suspicious and a potential threat to national security. In 2018, the Department of Justice launched the China Initiative, targeting Chinese American scientists who illegally transferred intellectual property to China or have suspicious financial ties with Chinese universities or research institutions. Even though none of the CUSPEA alumni were charged under the China Initiative, a number of outstanding Chinese American scholars who came to the US in the 1980s were directly affected. Gang Chen, a professor of Mechanical Engineering at MIT, was arrested by the FBI because he failed to disclose a research grant from a Chinese university in the funding application for the Department of Energy in January 2021. The charge, however, was dismissed as it was not required by the federal government to disclose funding from China in 2022. The charge changed Gang Chen's career. Deeply disappointed

[91] Zhihu 知乎, "Liumei Boshi Sun Weidong Liulang Meiguo 留美博士孙卫东流浪美国" [Sun Weidong, PhD Holder Who Stayed in the US, is Homeless in the US], https://www.zhihu.com/topic/29205541/hot. (accessed March 17, 2025)
[92] Columnist, "'Laoji Zuguo Renmin Zhutuo, Xionghuai Zhenxing Zhonghua Dazhi: Wo Liuxue Renyuan Qinfen Xuexi Weiguo Zhengguang' 牢记祖国人民嘱托, 胸怀振兴中华大志——我留学人员勤奋学习为国争光 [Remember the Entrustment of the People, Harbor the Ambition to Rejuvenate China—Our Overseas Students Work Hard to Bring Glory to the Nation]," *People's Daily* (人民日报), April 4, 1982.

at how the US government treated him, Chen would not apply for any federal funding in the future.[93] The hostility toward Chinese American scientists did not end with the termination of the China Initiative in 2022. In July 2024, neurologist Jane Ying Wu at Northwestern University committed suicide following the forced removal of her laboratory by Northwestern University after two decades of professorship at Northwestern. Her ties with Chinese research institutes prevented her from securing funding from the National Institutes of Health, and led to the eventual removal of her lab.[94]

Chinese American scientists have played an important role in facilitating academic exchanges between China and the US through short-term visits and training graduate students and postdoctoral scholars from China.[95] The Chinese government also established programs encouraging overseas scholars to take research trips to China and work part-time in Chinese universities and research institutes, such as the Thousand Talents Plan. Some Chinese American scientists also received substantial amounts of research funding from China. Amidst the escalating tensions between China and the US, the ties with China, particularly research funding from China and participation in the Thousand Talents Plan, became suspicious in the eyes of the US government, which increasingly views China as a competitor in science and technology.[96]

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[93]Gang Chen, "Statement," accessed March 17, 2025, https://web.mit.edu/nanoengineering/statementhome.shtml;
Kimmy Yam, "MIT Professor Wrongfully Accused of Spying for China Helps Make a Major Discovery," NBC News, August 25, 2022, https://www.nbcnews.com/news/asian-america/mit-professor-wrongfully-accused-spying-china-helps-make-major-discove-rcna44637.

[94] Ling Xin, "Exclusive | China-Born Neuroscientist Jane Wu Lost Her US Lab. Then She Lost Her Life," South China Morning Post, August 31, 2024, https://www.scmp.com/news/china/science/article/3276370/china-born-neuroscientist-jane-wu-lost-her-us-lab-then-she-lost-her-life.

[95] Zweig, *The War for Chinese Talent in America*, 9-61.

[96] Zweig, *The War for Chinese Talent in America*, 63-101.

Figure 6. South China Morning Post cover on the suicide of Jane Ying Wu.[97]

While the significant shifts in the political and intellectual climate do not mark the end of China-US academic exchanges and collaborations, the focus of the scientific

[97] Xin, Ling. "Exclusive | China-Born Neuroscientist Jane Wu Lost Her US Lab. Then She Lost Her Life." South China Morning Post, August 31, 2024. https://www.scmp.com/news/china/science/article/3276370/china-born-neuroscientist-jane-wu-lost-her-us-lab-then-she-lost-her-life.

collaborations and exchanges will shift to topics of chief concern to both countries and humanity. Climate change, public health, and cancer research are among the most important. At the same time, some areas in physics, engineering, and computing would be too sensitive to share with geopolitical competitors. Large-scale exchange programs such as CUSPEA would not have been successful without the collaborative diplomatic relationship between China and the US throughout the late 1970s and 1980s. In the near future, programs like CUSPEA will not likely be possible anymore, as the exchanges and collaborations will be limited in scale and on selected disciplines. Like CUSPEA's predecessors, future exchanges will likely be constrained as a result of national security and geopolitical concerns. CUSPEA and the diverse career of its alumni were also the product of the liberal political climate in China and the friendliness between China and the US in the 1970s and 1980s.

Conclusion

CUSPEA in a Nutshell

CUSPEA started at a pivotal point of modern Chinese history. As China moved away from the radical revolutionary lines of the Cultural Revolution, China's de facto leader, Deng Xiaoping, stressed the importance of science and technology for China's modernity and economic development, identifying sending students and scholars abroad for advanced training as an effective path to modernize China's science and technology. Deng expected that the majority of students and scholars abroad would return to China to contribute to China's modernization. Chinese American physicists were eager to utilize their overseas connections to help the country where they grew up after three decades of travel bans. Worried about the disruptions in education and research, they asserted that basic science research was vital to achieving economic development goals. Training young scientists was a crucial step in promoting basic research. For the American physics community, talented young physics students from China could make up for the significant decline in graduate program enrollments in the 1970s and potentially promote the image of the institutions in China.

However, none of these goals were fully met. The majority of CUSPEA alumni stayed abroad instead of going back to China. Many CUSPEA alumni did not go into basic research or stay in physics but made the leap to engineering or business. Why were the

outcomes of CUSPEA unexpected? How did CUSPEA's initiators react to the unexpected outcomes? How have CUSPEA alumni influenced China? A reflection of the life experiences and careers of CUSPEA alumni would help address the first question. To begin with, CUSPEA alumni have gone through the Cultural Revolution and China's 1980s. The chaos of the Cultural Revolution and the West-leaning intellectual environment in the 1980s pushed CUSPEA alumni to reflect on China's communist regime and prefer Western liberal democracy. In particular, influenced by its vice president Fang Lizhi, USTC, where 30% of CUSPEA alumni got their undergraduate degrees, was a hub for student activism and democratic thoughts. The June Fourth Movement in 1989 was a decisive point when many made the decision to stay abroad. Moreover, the flexibility of US academic institutions allowed CUSPEA alumni to seek opportunities outside of physics and reflect on how academia should work. CUSPEA alumni who stayed in academia recognized the importance of flexibility and curiosity in scientific research. They actively publicized their thoughts and observations in China when academic research was based on quotas. CUSPEA alumni who switched to engineering or business often took advantage of resources outside of physics departments for new opportunities and ideas. For example, Zhang Chaoyang was the first Chinese to secure investments from venture capitalists. Zhang also got help from the MIT Media Lab as a doctoral student and postdoc in physics. Zhang introduced new business models and ideas about work-life to China and started a public-facing lecture series in physics with millions of followers. While CUSPEA did not directly contribute to China's economic development through physics, CUSPEA alumni have introduced new ideas about academia, creativity, and business, influencing millions of people with their fresh perspectives and outreach efforts such as writing and public lecture series.

While the unexpected outcomes led to distress among the American physics community and the Chinese government, none of the key actors in CUSPEA stopped the students from staying in the US or switching to another field. CUSPEA alumni were allowed the highest degree of freedom in determining their careers and the country they wished to reside in. The flexibility contributed to the success of the careers of CUSPEA alumni, which profoundly shaped the landscape of China's academia and business world. However, such flexible academic exchanges are diminishing today due to nationalism in China and the geopolitical tension between China and the US. After all, academic freedom is the prerequisite to successful academic exchanges.

Revisit the Historiography

The thesis tried to put modern Chinese history and the transnational history of science in conversation, looking into how exchanges of scientific knowledge and flow of scientists are made possible, and how the exchanges shape the careers of the scientists and their home country. Existing scholarship has addressed such questions regarding the China-US academic exchanges. In particular, Zuoyue Wang has revealed in depth the crucial roles Chinese American scientists have played in facilitating academic exchanges between China and the US after the defrosting of China-US diplomatic relationship. However, existing work focuses on individual efforts, lacking evaluations of important exchange programs and joint agreements that played crucial roles in promoting the transpacific flow of scientific knowledge and scientists. Therefore, the thesis attempts to evaluate the start and outcomes of CUSPEA to add to the literature on China-US academic exchanges. While the US government was not involved in CUSPEA, the US government was an active player in China-US academic exchanges. For instance, the U.S.–China Agreement on Cooperation in

Science and Technology was an agreement between the Chinese and US governments. While beyond the scope of the thesis, future scholarship could examine the role of the US government in establishing the channels of the exchanges.

This thesis also contributed to the historiography of overseas Chinese students, where existing historical accounts focus on the late Qing and Republican China. The thesis thus provided a case study of Chinese students who arrived in the US in the 1980s, making up the gap of time period in the historiography. By examining the historical background of China's 1970s and 1980s and the experience in both China and the US, the thesis revealed the motivations behind the career aspirations and public outreach efforts of CUSPEA alumni and their influence on China.

Notably, this thesis has not touched upon the role of Chinese academia in facilitating CUSPEA and how scholars in China have reacted to CUSPEA. It is difficult to separate the Chinese government from prominent Chinese scientists in the historical analysis of China's 1970s because the party-state and prominent intellectuals worked closely in the early reform years. For instance, Qian Sanqiang, the facilitator of the 1980 Guangzhou Conference, was a member of the CCP committee in the Chinese Academy of Sciences and participated in the nuclear weapon project. Zhou Peiyuan, a physicist and the president of Peking University, was a member of the standing committee of the National People's Congress. Chinese scholars who played a key part in making CUSPEA possible were high-level officials of the party-state hierarchy, who could work directly with decision makers such as Vice Premier Fang Yi. Figures such as Qian Sanqiang and Zhou Peiyuan shared the same vision of modernization as the Chinese government, believing that science and technology would play a crucial role in China's modernization. They also manifested the notion with their careers,

where they applied their knowledge to the nuclear weapons project in the 1960s and helped train China's next generation of scientists through key administrative posts. Moreover, there are limited archival sources regarding Chinese that researchers based in the US could access. The time and funding limits also make it difficult to identify the roles of prominent Chinese scientists.

Science, Scientists, and Nations

Amidst the political tension on both sides of the Pacific, science has become vital in concerns of national interests. The idealistic belief that international collaboration in science benefits everyone could not win the support of administrations and taxpayers. Instead, universities and research institutions in the US have to show that such collaboration with China could tangibly benefit the US. In China, the trade wars with the US and the technology blockade in key areas such as high-performance computing have triggered a new wave of nationalism and transformed the role of science and technology. Scientists and engineers are now expected to develop advanced science and technology without the aid of the West to win the competition in research and development with the West, particularly the US. Chinese scientists have moved away from the ideal that science could promote democracy and enlightenment, which was widely held by the intellectuals in the 1980s, such as Fang Lizhi and Xu Liangying, a historian of physics and Fang's close friend. After all, scientists have nations, interests, and political beliefs. Their political and intellectual environment also shapes the production and exchange of scientific knowledge and the careers of scientists.

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