

The Failure of Uncertainty Within United States' Immigration Law in the Competition for

Critical Chinese-Born STEM Grads

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Abstract

It is difficult to overstate the information technology sector's role in the United States economy. According to the Brookings Institute, "(i)n 2017 alone, the IT industry's contribution to real economic output in the United States exceeded that of the professional and business services, finance and insurance, and manufacturing sectors."¹ The Covid-19 pandemic further accelerated this growth – 49 members of the Fortune 500 are now tech companies.²

In the battle for economic and national-security supremacy, Chinese-born students and scientists studying and working at United States' universities have emerged as a singular vital component in each nation's strategic ambitions. In the United States, foreign-born graduates of computer science (CS) and computer engineering (CE) graduate programs constitute a majority of the future CS workforce.³ There is an acute shortage of computer science talent within the United States,⁴ making retention of foreign-born, namely Chinese-born, graduates essential.

The United States must provide foreign-born STEM graduates with a high degree of confidence that they may remain in the country long-term, rather than sent back home after their short-term visas expire. The current immigration system provides no such certainty. Chinese-born STEM graduates are left to hope for the best in an inadequate system of H-1B visa lotteries, residency authorizations tied to specific employers, and stop-gap STEM OPT work authorizations subject to political whims.⁵ Our system fails to recognize the outsized pressures Chinese STEM graduates face from their country of origin, as well as the critical role foreign-born STEM graduates play in the United States' national interest. This article seeks to explain the importance of Chinese-born STEM grads to the US economy, and how current US immigration policy is failing the country and these would-be immigrants.

1) BACKGROUND

A) THE UNITED STATES FACES A VAST STEM TALENT SHORTAGE

The United States tech economy will remain encumbered for the foreseeable future by an extraordinarily difficult to resolve constraint —far too few Americans have the CS and CE skills

¹ Makada Henry-Nickie et al., *Trends in the Information Technology sector*, THE BROOKINGS INSTITUTION (Mar. 29, 2019), <https://www.brookings.edu/research/trends-in-the-information-technology-sector/>.

² Fortune Editors, *Fortune 500*, Fortune (Aug. 19, 2022), <https://fortune.com/fortune500/search/?sector=Technology>.

³ In 2020, 64.6% of graduates of United States' CS and CE PhD programs were nonresident aliens. Stuart Zweben and Betsy Bizot, *2020 Taulbee Survey: Bachelor's and Doctoral Degree Production Growth Continues but New Student Enrollment Shows Declines*, COMPUT. RSCH. ASS'N, <https://cra.org/wp-content/uploads/2021/05/2020-CRA-Taulbee-Survey.pdf>.

⁴ See *Harvey Nash/KPMG CIO Survey 2019*, HARVEY NASH AND KPMG, Graph 14, <https://www.hnkpmgciosurvey.com/charts/home> (finding that 67% of US technology company CIOs report a "skills shortage preventing the organization from keeping up with the pace of change" in 2019, up from 58% in 2015).

⁵ Valerie Strauss, *The Trump administration is moving to restrict international students. Why that's a bad idea.*, WASH. POST (Jun. 18, 2020) <https://www.washingtonpost.com/education/2020/06/18/trump-administration-is-moving-restrict-international-students-why-thats-bad-idea/> ("The administration is also considering pausing or ending the post-study optional practical training (OPT) work program for international students in this country.")

demanding by the US tech sector.⁶ Many of the most crucial open positions in tech require highly specialized skills—skills that are often only available through a master’s-level program of study.⁷ And that talent deficit is on the rise. There were 1,038,828 job vacancies in computer occupations in March 2021, an 11% growth from March 2020. CS remains one of the fastest growing fields in the United States, predicted by the Bureau of Labor Statistics to grow nearly three times faster than the United States average.⁸ The Bureau of Labor Statistics (BLS) has predicted that nearly 550,000 new jobs will be available for CS and CE professionals by 2028, evidence the talent deficit will continue for at least five more years.⁹

This talent deficit has real world consequences. A 2019 survey of US technology companies found that 67% of Chief Information Officers reported that “a skills shortage is preventing the organization from keeping up with the pace of change.”¹⁰ The talent deficits are most acute in areas of computer and data science, with the top three areas being big data/analytics, cyber security, and artificial intelligence.¹¹ Research shows when multinational corporations are unable to employ sufficient talent within the United States, their solution is often to move their research and development operations overseas.¹²

⁶ *Updated Analysis: Employment Data For Computer Occupations From Jan. 2020 to Mar. 2021*, NAT’L FOUND. FOR AM. POLICY (Mar. 2021), <https://nfap.com/wp-content/uploads/2021/03/Employment-Data-for-Computer-Occupations-From-January-2020-to-March-2021.NFAP-Policy-Brief.March-2021-1.pdf>.

⁷ Kristin Burnham, *Computer Science Careers: What Can You Do With a Master’s Degree*, NE. UNIV. GRADUATE PROGRAMS (Jul. 10, 2020), <https://www.northeastern.edu/graduate/blog/popular-master-in-computer-science-jobs/>.

⁸ *Computer and Information Research Scientists*, U.S. Bureau of Lab. Statistics (Apr. 18, 2022)

⁹ Burnham, *supra* note 7.

¹⁰ See *Harvey Nash/KPMG CIO Survey 2019*, HARVEY NASH AND KPMG, Graph 14, <https://www.hnkpmgci survey.com/charts/home> (finding that 67% of US technology company CIOs report a “skills shortage preventing the organization from keeping up with the pace of change” in 2019, up from 58% in 2015).

¹¹ *Id.*

¹² See Britta Glennon, *How Do Restrictions on High-Skilled Immigration Affect Offshoring? Evidence from the H-1B Program*, CATO INST. 4 (Sep. 23, 2020), https://mackinstitute.wharton.upenn.edu/wp-content/uploads/2019/07/FP0450_WP_2020Mar.pdf (asserting that the paper “provides the first empirical evidence to support the hypothesis that restrictions on high-skilled immigration cause the offshoring of skilled jobs); Maria Abi-Habib and Karan Deep Singh, *Trump Cracks Down on Visas. Indian Firms May Benefit*, N.Y. TIMES (Oct. 2, 2020) (quoting Sandeep Kishore, chief executive officer of Zensar Technologies, an Indian firm that employees 9,500 people globally, as saying “[The United States] risks giving up its edge. If we can’t bring this talent into the U.S., we’ll place them in our office overseas.”)

Fortunately, the United States has an ace up its sleeve—American universities draw talent from across the world. The US has some of the world’s premier STEM graduate degree programs.¹³ And a critical share of the degrees awarded annually by these programs go to foreigners.¹⁴ This has become increasingly true over the last two decades, during which time the share of postsecondary STEM degrees awarded to foreign-born students has increased by 315%.¹⁵ In CS PhD programs, the enrollment trend toward nonresident aliens is particularly acute.¹⁶ And just as critically, students coming to the US for school are interested in remaining in the country to work. Intention-to-stay rates among international CS and CE PhD graduates are between 85 and 90%.¹⁷

I) CHINESE-BORN CS GRADUATE-DEGREE RECIPIENTS ARE ESSENTIAL TO ADDRESSING THE TALENT SHORTAGE

China represents the single-largest country of origin for foreign-born graduates earning science and engineering doctoral degrees from US universities.¹⁸ In 2019, 5,742 Chinese-born temporary visa holders were awarded doctoral degrees in science and engineering fields. India was

¹³ *World University Rankings by Subject 2022: Engineering & Technology*, QUACQUARELLI SYMONDS (2002), <https://www.topuniversities.com/university-rankings/university-subject-rankings/2022/engineering-technology>.

¹⁴ Stuart Anderson, *International Students Remain a Primary Source of U.S. Tech Talent*, FORBES, <https://www.forbes.com/sites/stuartanderson/2021/08/19/international-students-remain-a-primary-source-of-us-tech-talent/?sh=54252246650d>.

¹⁵ *Foreign STEM Students in the United States*, CONG. RSCH. SERV. 1 (Nov. 1, 2019), from SY1988-1989 to SY 2016-2017 (the most recent year for which data is available). <https://crsreports.congress.gov/product/pdf/IF/IF11347>.

¹⁶ In SY 1994-1995 just over 35% of enrollees were nonresident aliens, by FY 2018-2019 that share had risen to 65%. Stuart Zweben and Betsy Bizot, *2019 Taulbee Survey: Total Undergrad CS Enrollment Rises Again, but with Fewer New Majors; Doctoral Degree Production Recovers From Last Year’s Dip*, COMPUT. RSCH. ASS’N., <https://cra.org/wp-content/uploads/2020/05/2019-Taulbee-Survey.pdf>.

¹⁷ Remco Zwetsloot et al., *Trends in U.S. Intention-to-Stay Rates of International Ph.D. Graduates Across Nationality and STEM Fields*, CENT. FOR SEC. AND EMERGING TECH. (Apr. 2020), <https://cset.georgetown.edu/publication/trends-in-u-s-intention-to-stay-rates-of-international-ph-d-graduates-across-nationality-and-stem-fields/>.

¹⁸ *Top 10 countries of origin of temporary visa holders earning U.S. doctorates, by country of citizenship and field of study: 2010–19*, NAT’L CTR. FOR SCI. AND ENG’G STAT., <https://nces.nsf.gov/pubs/nsf21308/assets/data-tables/tables/nsf21308-tab026.pdf>.

the second largest country of origin that year, with just 1,905 doctorates awarded. South Korea came in third at 822.¹⁹

Intention-to-stay rates among Chinese-born graduates are exceptionally high, with approximately 90% seeking to remain in the United States after graduation.²⁰ This is good news, because the number of Chinese-born recipients of United States STEM PhDs remains on an upward trajectory, constituting a 66% increase in the last 10 years.²¹ Chinese-born STEM students are also a particular boon because, according to many administrators and academics, Chinese students and scholars “are among the most qualified students in the world and will (continue to) conduct cutting edge research.”²² A recent study of the contributions of Chinese-born STEM graduates working in the United States found that “they are helping to power American dominance over a strategically important field (A.I.), one that can enable computers of the future to make decisions, identify faces, find criminals, pick military targets, and drive vehicles.”²³

II) THE UNITED STATES’ TECH SECTOR REMAINS DOMINANT, BUT CHINA IS ON THE RISE

While the US tech sector remains globally dominant, China has made competitiveness in high-tech sectors a central national priority.²⁴ The Chinese Communist Party (CCP) recently unveiled its 14th five-year plan, “call(ing) for increased investment in a number of emerging

¹⁹ *Id.*

²⁰ Zwetsloot, *supra* note 17.

²¹ NAT’L CTR. FOR SCI. AND ENG’G STAT., *supra* note 18.

²² Anastasya Lloyd-Damnjanovic and Alexander Bowe, *Overseas Chinese Students and Scholars in China’s Drive for Innovation*, U.S.-CHINA ECON. AND SEC. COMM’N 7 (Oct. 7, 2020), https://www.uscc.gov/sites/default/files/2020-10/Overseas_Chinese_Students_and_Scholars_in_Chinas_Drive_for_Innovation.pdf.

²³ Paul Mozur and Cade Metz, *A U.S. Secret Weapon in A.I.: Chinese Talent*, N.Y. TIMES (Apr. 13, 2021), <https://www.nytimes.com/2020/06/09/technology/china-ai-research-education.html>.

²⁴ Joe McDonald, *China’s leaders say tech growth top priority amid US tension*, ASSC. PRESS (Dec. 18, 2020), <https://apnews.com/article/technology-beijing-xi-jinping-china-economic-growth-75ee97bdb9f5ddf87587e6a2916c7cf>.

sectors, from cryptocurrencies to quantum computing.”²⁵ This is in keeping with the substantial increase in R&D investment per researcher that China has made in the last several years, making significant strides towards closing the gap with the United States (in 2016 China invested \$252,157 per researcher, as compared to \$356,085 in the United States).²⁶ Recent comments by Chinese Premier Li Keqiang underscored the centrality of R&D expenditures in China’s national priorities, with China committing to increase its high-tech R&D investments by more than 7% per year between 2021 and 2025.²⁷ In order to effectively leverage that increased investment in emerging technologies, China has invested heavily in its STEM university infrastructure. A recent report by Georgetown University’s Center for Security and Emerging Technology found that, since the mid-2000s, China has consistently graduated more STEM PhDs than the United States, a fact that the center regards as “a key indicator of a country’s future competitiveness in STEM fields.”²⁸ “Between 2016 and 2019, the number of students entering STEM doctoral programs at Chinese universities increased nearly 40 percent.”²⁹ The center expects those trends to continue between 2022 and 2025. In contrast, “there is no evidence to suggest a similar spike in new enrollment in STEM PhD programs at U.S. universities during the same period.”³⁰

B) CHINA VIEWS EMERGING TECHNOLOGIES – AND US STEM GRADS – AS ESSENTIAL TO ITS ECONOMIC AND GEOSTRATEGIC PRIORITIES

²⁵ James Thorne, *What China's five-year plan could mean for venture capital's tech sectors*, PITCHBOOK (Mar. 15, 2021), <https://pitchbook.com/news/articles/china-five-year-plan-venture-capital-tech>.

²⁶ *Foreign-Born Students and Workers in the U.S. Science and Engineering Enterprise*, NAT’L SCI. BD. 1 (2020), <https://www.nsf.gov/nsb/sci/one-pagers/Foreign-Born.pdf>.

²⁷ Arjun Kharpal, *China spending on research and development to rise 7% per year in push for major tech breakthroughs*, CNBC (Mar. 4, 2021), <https://www.cnbc.com/2021/03/05/china-to-boost-research-and-development-spend-in-push-for-tech-breakthroughs.html>.

²⁸ Remco Zwetsloot et al., *China is Fast Outpacing U.S. STEM PhD Growth*, CTR. FOR SEC. AND EMERGING TECH. (Aug. 2021), <https://cset.georgetown.edu/publication/china-is-fast-outpacing-u-s-stem-phd-growth/>.

²⁹ *Id.* at 3.

³⁰ *Id.*

Beyond China's conventional approach to advancing its high-tech industry through R&D investment and an expansion of its STEM graduate infrastructure, China has attempted to leverage the sizable population of Chinese-born students and researchers abroad to illegally extract intellectual property to advance its high-tech sector.³¹ This commitment stems from China's view that the development of China's science and technology sector represents not only a critical and growing element of the Chinese economy, but also key to the growth of China's geopolitical power.^{32,33} China funds thousands of graduate students' studies in the United States, encouraging them to develop as much expertise as possible before returning to China to contribute to the country's integrated technological and military priorities.³⁴ More problematic is China's exploitation of Chinese-born students and researchers as vehicles for the direct transmission of emerging technologies to the Chinese technology sector. A 2019 report by the FBI entitled "*China: The Risk to Academia*" states that "the Chinese government uses some Chinese students – mostly postgraduate students and postdoctoral researchers studying science, technology, engineering, and mathematics – and professors to operate as non-traditional collectors of intellectual property."³⁵

At times, China has been explicit about the role it believes Chinese STEM students studying abroad should play in its national priorities. In 2015, Chinese president Xi Jinping articulated the need to maintain the CCP's influence over Chinese students abroad and to ensure

³¹ Lloyd-Damnjanovic and Boyd, *supra* note 22 at 4.

³² *Id.*

³³ See Michael Brown and Pavneet Singh, *China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation*, DEF. INNOVATION UNIT EXPERIMENTAL 19, 20 (Jan. 2018) <http://nationalecurity.gmu.edu/wp-content/uploads/2020/02/DIUX-China-Tech-Transfer-Study-Selected-Readings.pdf> (noting a program called "Spring Light" pays overseas Chinese scientists and engineers to return home for short periods of lucrative service: teaching, academic exchanges, or working in government-sponsored labs. "Spring Light" also includes a global database of Chinese scholars to match technology needs with pools of overseas talent.")

³⁴ Ryan Fedasiuk, *The China Scholarship Council: An Overview*, CTR. FOR SEC. AND EMERGING TECH (Jul. 2020) <https://cset.georgetown.edu/publication/the-china-scholarship-council-an-overview/>.

³⁵ *China: The Risk to Academia*, FED. BUREAU INVESTIGATION 2 (2019), <https://www.fbi.gov/file-repository/china-risk-to-academia-2019.pdf/view>.

that they can be mobilized when needed.³⁶ At the same time, he argued publicly that Western countries' leadership of the world depended on their mastery of advanced technologies, and that China "must adopt an asymmetrical strategy of catching up."³⁷

This reflected President Xi's view that there existed "a (Western) stranglehold" over emerging technologies, one from which "it would be impossible for (China) to catch up (through conventional means) by 2050."³⁸

In August 2020, the US Department of State reaffirmed China's forced enlistment of Chinese-born students and researchers in technological exfiltration schemes in a report entitled "The Chinese Communist Party on Campus: Opportunities & Risks," in which it outlined the role that the Chinese Communist Party (CCP) of the PRC plays in United States' universities. The report found that "the PRC's talent recruitment and knowledge acquisition programs target some Chinese, U.S., and foreign students, scholars, and researchers in key science, technology, engineering, and math fields to exploit the world's open research environment. Acceptance of PRC funding can result in contractual obligations to comply with PRC directives to engage in illicit activities, such as theft of intellectual property and transfer of technology to China."³⁹

I) CHINA BACKS DEMANDS MADE OF UNITED STATES-BASED STEM GRADS WITH THREATS AND INTIMIDATION

China has demonstrated a willingness to enforce the demands it makes of Chinese-born students and researchers studying and working abroad through a program of transnational

³⁶ Alex Joske, *The party speaks for you*, AUS. STRAT. POL. INST. (Jun. 9, 2020), <https://www.aspi.org.au/report/party-speaks-you>.

³⁷ 习近平论国家安全：让他“夜不能寐”的五大问题 - 纽约时报, N.Y. TIMES CHINA (May 14, 2018), <https://cn.nytimes.com/china/20180514/xi-jinping-china-national-security/>.

³⁸ Lloyd-Damnjanovic and Boyd, *supra* note 22 at 10.

³⁹ *The Chinese Communist Party on Campus: Opportunities & Risks*, U.S. DEPT. OF STATE 2 (Sept. 2020) <https://www.state.gov/wp-content/uploads/2020/09/CCP-on-campus-FINAL.pdf>.

intimidation. Among its more conventional methods include internet campaigns designed to stigmatize and humiliate people, known as “human flesh searches.”⁴⁰ Other forms of intimidation are designed to apprise students and faculty that their conduct in the United States remains under surveillance by the Chinese state, including conspicuous attempts to record them in public settings, and even direct statements from PRC affiliates letting academics know that their conduct is being monitored.⁴¹ The PRC has gone to unusual lengths to remind Chinese-American communities that its influence extends within the United States’ borders, including painting and equipping cars to look like Chinese police vehicles before enlisting operatives to drive those vehicles in simulated “patrols” through immigrant communities in California.⁴²

Of particular concern to Chinese-born students and academics studying in the US are campaigns of harassment of family and friends who remain in China.⁴³ “‘They use pressure, leverage, threats against family, they use proxies,’ said FBI Deputy Assistant Director Bradley Benavides, chief of the China branch of the bureau’s counterintelligence division. ‘Certainly, they are good at getting what they want.’”⁴⁴ On numerous occasions, the PRC has resorted to direct physical violence. A report by Freedom House found 214 incidents in which the PRC resorted to physical intimidation since 2014, including physical assaults in the United States and beating and drugging individuals in Australia before returning them to China by boat.⁴⁵ A case in which Chinese authorities threatened the daughter of a detained Chinese-born Swedish citizen led the

⁴⁰ Anastasya Lloyd-Damnjanovic, *A Preliminary Study of PRC Political Influence and Interference Activities in American Higher Education*, WILSON CENTER 91 (Aug. 2018), <https://files.eric.ed.gov/fulltext/ED588378.pdf>.

⁴¹ *Id.* at 99.

⁴² Sebastian Rotella and Kirsten Berg, *Operation Fox Hunt: How China Exports Repression Using a Network of Spies Hidden in Plain Sight*, PRO PUBLICA (Jul. 22, 2021), <https://www.propublica.org/article/operation-fox-hunt-how-china-exports-repression-using-a-network-of-spies-hidden-in-plain-sight>.

⁴³ Anastasya Lloyd-Damnjanovic, *supra* note 40 at 109.

⁴⁴ Sebastian Rotella and Kirsten Berg, *supra* note 42.

⁴⁵ *China: Transnational Repression Case Study*, FREEDOM HOUSE (2021), <https://freedomhouse.org/report/transnational-repression/china>.

deputy bureau chief of the *Financial Times* to remark that the case “makes us wonder whether the [Chinese] state sees itself as the governor of ethnic Chinese people wherever they may be, rather than a state constrained by international law and diplomatic protocols.”⁴⁶

For a Chinese-born doctoral recipient in CS or CE who seeks to remain in the United States while rebuffing demands to redirect intellectual property to the PRC, the potential consequences of having her extension of work authorization and residency arbitrarily denied at some future date and thereby being forced to return to China, remain opaque but implicitly alarming. While the express consequences faced by a Chinese graduate of a US university who failed to comply with state directives while abroad are unsurprisingly unclear, China’s increasing extraterritorial application of its criminal law,⁴⁷ 99.96% criminal conviction rate,⁴⁸ and embrace of extrajudicial mass detention⁴⁹ do not bode well for Chinese who spurn the PRC’s demands while abroad. And the evidence in other areas suggests China will expend significant resources to demonstrate to Chinese individuals living in the United States that it is willing to go to exceptional lengths to gain compliance. Operation Foxhunt, a campaign that uses extradition teams to remove individuals accused of “financial crimes” (real or imagined) committed in China who presently reside abroad, is particularly chilling. In the United States, the techniques employed by these teams have included “subject(ing) relatives in China to harassment, jail, torture, and other mistreatment, sometimes recording hostage-like videos to send to the United States.”⁵⁰

⁴⁶ Sean R. Roberts, *Why Did the United States Take China’s Word on Supposed Uighur Terrorists?*, FOREIGN POLICY (Nov. 10, 2020), <https://foreignpolicy.com/2020/11/10/why-did-the-united-states-take-chinas-word-on-supposed-ughur-terrorists/>.

⁴⁷ Lindsey W. Ford, *Extending the long arm of the law: China’s international law enforcement drive*, THE BROOKINGS INST. (Jan. 15, 2021), <https://www.brookings.edu/blog/order-from-chaos/2021/01/15/extending-the-long-arm-of-the-law-chinas-international-law-enforcement-drive/>.

⁴⁸ Guodong Du, *What is the Conviction Rate in China? – China Law in One Minute*, CHINA JUSTICE OBSERVER (Nov. 16, 2020), <https://www.chinajusticeobserver.com/a/what-is-the-conviction-rate-in-china>.

⁴⁹ *Xinjiang: Large numbers of new detention camps uncovered in report*, BBC (Sep. 24, 2020), <https://www.bbc.com/news/world-asia-china-54277430>.

⁵⁰ Sebastian Rotella and Kirsten Berg, *supra* note 42.

2) UNITED STATES IMMIGRATION PROGRAMS FAIL TO PROVIDE CHINESE-BORN GRADUATES WITH CONFIDENCE IN CONTINUED RESIDENCY NECESSARY TO RESIST PRC DEMANDS

Given the essential role that Chinese-born STEM postgraduates play in the US economy, and the aggressive role that the PRC plays in attempting to exercise control over Chinese students and workers in the United States, the US government must provide those graduates and workers with confidence that they can remain in the country. Unfortunately, current US immigration law provides no such certainty, relying on temporary work-authorization programs⁵¹ and regulatorily-based stop-gap student work authorizations⁵² that are subject to the political whims of successive administrations,⁵³ while concurrently depriving visa applicants agency over their visa petitions by relegating them to the status of “beneficiaries” of visa petitions filed by their employers.⁵⁴

A) H-1B PROGRAM

A central element of the uncertainty faced by Chinese STEM graduates is the H-1B program, which allows US employers to temporarily employ foreign workers in specialty occupations “requiring theoretical and practical application of a body of highly specialized knowledge in a field of human endeavor” which require the attainment of at least a bachelor’s degree.”⁵⁵ H-1B visas are granted as part of a lottery process in which employers seeking to higher H-1B-eligible workers file registrations with the United States Citizenship and Immigration

⁵¹ Petition for a Nonimmigrant Worker Pursuant to Section 101(a)(15)(H)(i)(b) of the Immigration and Nationality Act, 8 U.S.C. § 1101(a)(15)(H)(i)(b), UNITED STATES CITIZENSHIP & IMMIGR. SERV. (Sep. 30, 2005), [https://www.uscis.gov/sites/default/files/err/D7%20-%20Intracompany%20Transferees%20\(L-1A%20and%20L-1B\)/Decisions_Issued_in_2005/SEP302005_12D7101.pdf](https://www.uscis.gov/sites/default/files/err/D7%20-%20Intracompany%20Transferees%20(L-1A%20and%20L-1B)/Decisions_Issued_in_2005/SEP302005_12D7101.pdf).

⁵² *Optional Practical Training Extension for STEM Students (STEM OPT)*, UNITED STATES CITIZENSHIP AND IMMIGR. SERV. (Feb. 26, 2021) <https://www.uscis.gov/working-in-the-united-states/students-and-exchange-visitors/optional-practical-training-extension-for-stem-students-stem-opt>.

⁵³ Valerie Strauss, *supra* note 5.

⁵⁴ *Questions and Answers: Appeals and Motions*, UNITED STATES CITIZENSHIP & IMMIGR. SERV. (Sep. 2 2021) <https://www.uscis.gov/forms/all-forms/questions-and-answers-appeals-and-motions>.

⁵⁵ UNITED STATES CITIZENSHIP & IMMIGR. SERV., *supra* note 51.

Services (USCIS) on behalf of prospective H-1B beneficiaries.⁵⁶ USCIS conducts an annual lottery to determine which H-1B employer petitions it will consider. If an employer has their registration randomly selected in the lottery, they then have a chance to file a petition for H-1B status on behalf of the worker they are seeking to hire, thus the employer serves as the petitioner and therefore exercises discretion over the content the petition filed with USCIS.⁵⁷

In 2022, employers filed 308,613 H-1B lottery registrations with USCIS for a total of 85,000 new H-1B visas.⁵⁸ This shortfall has serious consequences, as H-1B visas have traditionally served as the critical element of the international STEM degree holder workforce pipeline. They “generally represent the only practical way for high-skilled foreign nationals, including international students, to work long-term in the United States and have the chance to become employment-based immigrants and United States citizens.”⁵⁹ Here, the operative word is “chance.” Even for those fortunate enough to receive H-1B status, receiving such status does not necessarily confer a clear path to permanent residency or citizenship.

D) H-1B STATUS EXTENSION RATES ARE VARIABLE, SUBJECT TO *DE NOVO* REVIEW

H-1B petitions grant legal status to work in the US for three years, after which individuals need to apply to have their status extended. Historically, approval rates for extension of H-1B status have varied tremendously based on the political priorities of the current administration. For

⁵⁶ *H-1B Electronic Registration Process*, UNITED STATES CITIZENSHIP & IMMIGR. SERV. (Nov. 19, 2021), <https://www.uscis.gov/working-in-the-united-states/temporary-workers/h-1b-specialty-occupations-and-fashion-models/h-1b-electronic-registration-process>.

⁵⁷ See *The H-1B Visa Program: A Primer on the Program and Its Impact on Jobs, Wages, and the Economy*, AM. IMM. COUN. (May 26, 2021), https://www.americanimmigrationcouncil.org/sites/default/files/research/the_h1b_visa_program_a_primer_on_the_program_and_its_impact_on_jobs_wages_and_the_economy_0.pdf (explaining the primacy of the employers role in the H-1B petition process).

⁵⁸ UNITED STATES CITIZENSHIP & IMMIGR. SERV., *supra* note 51.

⁵⁹ Stuart Anderson, *The Story Of How Trump Officials Tried To End H-1B Visas*, FORBES (Feb. 1, 2021) <https://www.forbes.com/sites/stuartanderson/2021/02/01/the-story-of-how-trump-officials-tried-to-end-h-1b-visas/>.

example, under President Trump in the 2018 – 2019 fiscal year, denial rates for employer requests for H-1B extensions surged to 12%, Under President Biden in 2021, they fell to 3%.⁶⁰ These fluctuations are enabled, in part, because applications for an extension of H-1B status are subject to *de novo* review – meaning that a past determination by the United States Customs and Immigration Service (USCIS) that an individual (and their underlying employment) qualifies for H-1B status is not probative of whether a subsequent administration will determine that that same individual (and their employment) qualify for H-1B status – even where the material qualifications of both remain unchanged.⁶¹ In some cases this has meant that individuals who have been living and working in the United States for over a decade find themselves in the position of being forced to return to their country of origin.⁶²

At times, political pressure on USCIS adjudicators to raise denial rates has resulted in denials of status extension unconstrained by basic logic. Reporting has uncovered cases where, for example, H-1B visa renewals have been denied on the basis that an engineer is *too* qualified, stating that their job could be performed by an individual without a college degree.⁶³ Similarly, USCIS denied a petition by a pharmaceutical company seeking to hire an associate director of pathology on the basis an individual could fill the position without a college background.⁶⁴

II) H-1B VISA STATUS IS TIED TO AN EMPLOYER

⁶⁰ Stuart Anderson, *New Research: H-1B Denial Rates Stay Lower in FY 2021 Following Trump's Legal Setbacks*, NAT'L FOUND. FOR AM. POLICY (Aug. 30, 2021), <https://nfap.com/wp-content/uploads/2021/08/H-1B-Denial-Rates-Through-First-Two-Quarters-of-FY-2021.DAY-OF-RELEASE.August-2021.pdf>.

⁶¹ *Building a wall out of red tape*, REVEAL (Nov. 30, 2019), <https://revealnews.org/podcast/building-a-wall-out-of-red-tape/>.

⁶² *Id.*

⁶³ *Id.*

⁶⁴ *Id.*

Because H-1B recipients are beneficiaries of their employers' H-1B petitions, rather than petitioners in their own right, they do not retain an independent right to appeal their status denials,⁶⁵ meaning that they must rely on their employer's willingness to incur the costly process of filing an appeal in federal district court, as opposed to cutting their losses and pursuing a new H-1B petition for a different employee. Evidence indicates that the vast majority of employers determine that those costs are unjustifiable. One report found that in 2019, employers of H-1B workers failed to appeal negative decisions in 98% of cases.⁶⁶ Incidents like these reported in the media undoubtedly create doubt in the minds of foreign-born STEM grads that remaining in the United States provides a reliable path to continued work authorization, and eventually, permanent residency.

Even where individuals are granted H-1B visas, their work and residency status remains continually precarious in that, if an H-1B visa holder has their at-will employment terminated, the individual is required to find another position within their specialty occupation within 60 days or face deportation.⁶⁷ This proved particularly problematic in the early stages of the Covid-19 pandemic when layoffs frequently occurred without advance notice.⁶⁸ According to *Bloomberg*, this left many H-1B holders with “only bad options,” with some laid-off H-1B holders being forced to leave the country while others enrolled in United States colleges to obtain a student visa and ride out the recession. Some recipients even resorted to quickly arranged marriages with US

⁶⁵ UNITED STATES CITIZENSHIP & IMMIGR. SERV., *supra* at note 54.

⁶⁶ David North, *H-1B Employers Are Highly Unlikely to Appeal an H-1B Denial*, CTR FOR IMM. STUDIES (Nov. 1, 2019), <https://cis.org/North/H1B-Employers-Are-Highly-Unlikely-Appeal-H1B-Denial>.

⁶⁷ *What is an employer's responsibility when an employee's H-1B is terminated*, SHRM (Aug. 1, 2018), <https://www.shrm.org/resourcesandtools/tools-and-samples/hr-qa/pages/employerresponsibilitywhenemployeewithanh1bvisaisterminated.aspx>.

⁶⁸ Kyle Knapp, *What Happens If an H-1B Holder Loses Their Job?*, ALLLAW, <https://www.alllaw.com/articles/nolo/us-immigration/what-happens-h-1b-holder-loses-job.html>.

citizens or H-1B holders who were able to retain their employment to be eligible to receive other forms of residency authorization and remain in the country.⁶⁹

III) H-1B VISA HOLDERS TRAVELING ABROAD STRANDED BY THE COVID-19 RESTRICTIONS

The COVID-19 pandemic has revealed an added potential insecurity in H-1B status. In April 22, 2020, President Trump suspended entry to the United States of individuals with non-immigrant visas (such as H-1Bs), citing a “risk to the United States Labor Market During the Economic Recovery Following the 2019 Novel Coronavirus Outbreak,”⁷⁰ which he later extended through March 31, 2021.⁷¹ President Biden likewise extended the ban, further stranding H-1B visa recipients who had travelled abroad without a definite timetable of when they would be allowed to return.⁷² A report by a leading labor and employment law firm characterized “(t)he employment changes caused by the pandemic, combined with President Donald Trump’s recent proclamation prohibiting certain H1-B, H-2B, L-1, and J-1 visa beneficiaries from entering the United States, (as) forever chang(ing) how U.S. employers engage non-U.S. nationals.”⁷³ This has created a series of “cataclysmic choices” for individuals and employers with H-1B workers stuck outside the United States, especially in instances where remote work arrangements could potentially create a

⁶⁹ Olivia Carville, *Laid-Off H1-B Visa Holders Have Only Bad Options*, BLOOMBERG (Jun. 12, 2020), <https://www.bloomberg.com/news/newsletters/2020-06-17/laid-off-h1-b-visa-holders-have-only-bad-options>.

⁷⁰ Proclamation No. 10052, 85 Fed. Reg. 38263 (Jun. 22, 2020) <https://www.presidency.ucsb.edu/documents/proclamation-10052-suspension-entry-immigrants-and-nonimmigrants-who-present-risk-the>.

⁷¹ Proclamation No. 10014, 85 Fed. Reg. 23441 (Apr. 22, 2020) <https://trumpwhitehouse.archives.gov/presidential-actions/proclamation-suspension-entry-immigrants-nonimmigrants-continue-present-risk-united-states-labor-market/>.

⁷² Ryan Bourne and Davie Bier, *Don't H-1B visa holders matter? Biden is mistreating foreign workers, and nobody seems to care*, DAILY NEWS (Jul. 13, 2021) <https://www.nydailynews.com/opinion/ny-oped-dont-h1b-visa-holders-matter-20210713-inbdhsau2bcodn2gwyh4wkq3k4-story.html>.

⁷³ Diana J. Nehro and Ceridwen J. Koski, *Workforces Stranded Abroad Due to COVID-19 and Presidential Proclamation? Implications of Remote Work When Employees Cannot Enter the United States*, OGLETREE DEAKINS (Jul. 7, 2020), <https://ogletree.com/insights/workforces-stranded-abroad-due-to-covid-19-and-presidential-proclamation-implications-of-remote-work-when-employees-cannot-enter-the-united-states/>.

tax presence in foreign jurisdictions.⁷⁴ The consequences of the travel freeze for the talent pipeline from China are already being felt; a survey of United States higher-education groups found that United States universities were experiencing a 32% decrease in graduate student applications from China.⁷⁵

B) AN INSUFFICIENT NUMBER OF H-1BS TO ADDRESS STEM TALENT SHORTAGE HAS LED TO AN EXPLOSION IN THE STEM OPT PROGRAM

The demand for highly-skilled CS graduate-degree holders (an area in which Chinese-born immigrants remain the largest country of origin) and other STEM postgraduates far outstrips the talent available through the H-1B pipeline. An analysis by the National Foundation for American Policy in March 2021 found that “there are nearly 20 times more job vacancy postings in computer occupations than new H-1B petitions typically used by companies in computer occupations each year.”⁷⁶ As the US tech sector has grown, the annual cap on new H-1B visas (allocated across economic sectors irrespective of national priorities) has remained unchanged since 2006, with 65,000 visas awarded to individuals with a bachelor’s degree or higher, and an additional 20,000 spots reserved for individuals with a master’s or doctoral degree.⁷⁷

In the absence of an adequate number of H-1B visas to fulfill the demands of the United States’ tech sector, a large number of STEM grads have been forced to rely on USCIS’s Optional Practical Training Program (OPT) and its special extension program for STEM graduates to work

⁷⁴ Genevieve Douglas, *India Travel Ban Means U.S. Visa Workers Remain Stuck Abroad*, BLOOMBERG LAW (May 3, 2021) <https://news.bloomberglaw.com/daily-labor-report/india-travel-ban-means-u-s-visa-workers-remain-stuck-abroad>.

⁷⁵ Virginia Gewin, *Student immigration: The gamble of going abroad*, NATURE (Aug. 17, 2017), <https://www.nature.com/articles/nj7667-361a>.

⁷⁶ *Updated Analysis: Employment Data for Computer Occupations from January 2020 to March 2021*, NAT’L FOUND. FOR AM. POLICY 1 (Mar. 7, 2021), <https://nfap.com/wp-content/uploads/2021/03/Employment-Data-for-Computer-Occupations-From-January-2020-to-March-2021.NFAP-Policy-Brief.March-2021-1.pdf>.

⁷⁷ *The H-1B Visa Program*, AM. IMM. COUN. (May 26, 2021), <https://www.americanimmigrationcouncil.org/research/h1b-visa-program-fact-sheet>.

in the United States after graduation. While the OPT program was ostensibly designed to provide grads with the opportunity to obtain practical training in their field after completion of a degree from an accredited United States university,⁷⁸ it has grown to the extent that it now serves as an essential source of STEM talent for the United States' economy.⁷⁹ Examples of the critical role that STEM OPT plays in the tech sector are legion; for example, “84% of noncitizen AI PhDs working in the United States have used OPT at some point.”⁸⁰ Unlike the H-1B program, the number of STEM OPT work authorizations is not limited by statute; consequently, the number of authorizations granted has surged over time, increasing by nearly 1,200% since its creation in 2008.⁸¹ 30,000 students from the PRC alone currently work under STEM OPT authorization in the United States.⁸²

D) STEM OPT IS A GROUNDED IN USCIS REGULATIONS, VULNERABLE TO CURTAILMENT, ELIMINATION BY SUBSEQUENT ADMINISTRATIONS

Despite the critical role the STEM OPT program plays in providing the United States with STEM talent, it remains an inadequate, regulatorily-based stop-gap measure with even more liabilities than the H-1B program, both for employers and status recipients. The fact that congressional statute does not explicitly authorize the STEM OPT, instead allowing agency interpretation of its enabling statute,⁸³ means that the program could be curtailed or even eliminated by an administration hostile to the program – a course of action the Trump

⁷⁸ UNITED STATES CITIZENSHIP AND IMMIGR. SERV., *supra* note 52.

⁷⁹ Rachel Rosenthal, *The STEM Graduate System Is Broken. Here's How to Fix It*, BLOOMBERG (Mar. 10, 2021) <https://www.bloomberg.com/graphics/2021-opinion-optional-practical-training-problems-stem-graduates-deserve-better-jobs-opportunities/>.

⁸⁰ Evan Burke, *Trump-Era Policies Toward Chinese STEM Talent: A Need for Better Balance*, CARNEGIE ENDOWMENT FOR INT'L PEACE (Mar. 25, 2021), <https://carnegieendowment.org/2021/03/25/trump-era-policies-toward-chinese-stem-talent-need-for-better-balance-pub-84137>.

⁸¹ Rachel Rosenthal, *supra* note 79.

⁸² *Id.*

⁸³ 73 Fed. Reg.18944 (Apr. 8, 2008).

administration reportedly considered.⁸⁴ While a United States District Court has ruled that the STEM OPT program represents a permissible interpretation of its statutorily-delegated authority, entitled to judicial deference,⁸⁵ the United States Supreme Court has yet to rule on the legality of the program. And unlike H-1B status, STEM OPT work authorization cannot be renewed; individuals who are not accepted in the H-1B lottery while on STEM OPT or have their H-1B petitions denied often must pursue an additional degree to maintain their work authorization. So-called “visa mills,” which provide students with work authorization while providing little substantive coursework, have sprung up at alarming rates as a mechanism for providing students with continued work authorization in the United States after the term of their STEM OPT authorization expires.⁸⁶

3) CONCLUSION

Given the unpredictable, byzantine US employment-based immigration system upon which foreign-born STEM graduates rely, as well as the systematic pressure and intimidation inflicted by the CCP on Chinese-born STEM students in the United States,⁸⁷ it is perhaps a testament to the United States’ enduring appeal as a nexus of innovation and (imperfect) freedoms that so many Chinese-born students roll the dice and take the risk of resisting their government’s pressure by remaining in the United States while refusing to participate in China’s campaign of technological exfiltration. But those are risks that those graduates should not be forced to bear, especially given the critical role those individuals play in both United States economic and national security

⁸⁴ Michelle Hackman and Melissa Korn, *Trump Administration Expected to Limit Work Program for Foreign Graduates*, THE WALL STREET J. (May 23, 2020), <https://www.wsj.com/articles/trump-administration-expected-to-limit-work-program-for-foreign-graduates-11590242401>; Stuart Anderson, *Next Trump Immigration Target: OPT For International Students*, FORBES (MAY 4, 2020), <https://www.forbes.com/sites/stuartanderson/2020/05/04/next-trump-immigration-target-opt-for-international-students/>.

⁸⁵ Wash. Alliance of Tech. Workers v. U.S. Dept. of Homeland Sec., No. 1:2014cv00529 (D.D.C. 2015).

⁸⁶ Rachel Rosenthal, *supra* note 79.

⁸⁷ Anastasya Lloyd-Damnjanovic, *supra* note 40.

objectives. If the US is to remain preeminent in its scientific great-power competition with an emerging China, it will need more than a \$250 billion investment,⁸⁸ it will need the intellectual capital that thousands of Chinese-born STEM students and scientists in the United States have shown their express willingness to provide.

⁸⁸ Tony Ramm, *Senate approves sprawling \$250 billion bill to curtail China's economic and military ambitions*, WASH. POST (Jun. 8, 2021), <https://www.washingtonpost.com/us-policy/2021/06/08/senate-china-science-technology/>.