BOSTON TECH HUB FACULTY WORKING GROUP
REPORT SERIES

International Students & Scholars in STEM in the U.S.


HARVARD Kennedy School
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The Boston Tech Hub Faculty Working Group Report Series was designed to provide a brief overview of various tech policy topics. These papers are not meant to be exhaustive.

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Boston Tech Hub Faculty Working Group Report Series

This report is part of a 3-part series of research primers produced by the Technology and Public Purpose (TAPP) Project focused on the strengths, weaknesses, opportunities, and challenges faced by the Boston tech hub.

Report Topics

1. Funding Part 1: Tech Hub Competition and Federal R&D Funding
2. Funding Part 2: Tech Hub Competition and Private Funding of the Innovation Life Cycle
3. International Students and Scholars in STEM in the United States

The report authors would like to thank the Boston Tech Hub Faculty Working Group speakers and attendees for their perspectives on the topics covered in each report.

About the Boston Tech Hub Faculty Working Group

The Boston Tech Hub Faculty Working Group (FWG), founded by former Secretary of Defense and Belfer Center Director Ash Carter and Harvard John A. Paulson School of Engineering and Applied Sciences Dean Frank Doyle, holds monthly discussion-based meetings with senior faculty and Boston-based practitioners/decision makers across the public and private sectors that explore and answer the question: How do we resolve the dilemmas posed to public good and public purpose, created by technology's unstoppable advances?

For the Spring 2022 FWG series, the working group focused on Boston's competitive edge in science, technology, and innovation.

Session Topics

- Tradition of S&T Excellence: Boston's History of R&D during WWII, the Cold War, and beyond.
  Speakers: David Kaiser, Sheila Jasanoff, Robin Wolfe Scheffler, G. Pascal Zachary, and Kate Zernike
- How can Boston acquire increased federal R&D funding?
  Speakers: France Córdova, Eric Evans, Susan Hockfield, and John Holdren
- How can Boston compete with other tech hubs for private funding from companies and investors?
  Speakers: David Cox, Vilas Dhar, David Fialkow, Katie Rae, and Vicki Sato
- How will Boston universities address the challenges of recruiting, training, and retaining international STEM students and scholars?
  Speakers: Nicole Elkin, Rebecca Keiser, David Kris, and Richard Lester

Executive Summary

This paper is part of a 3-part series of research primers focused on the opportunities and challenges faced by U.S. technology hubs. When considering innovation and competitiveness, human capital is a critical contributor to success. Whereas reports 1 and 2 focus on sources of funding, this report focuses on labor and talent, specifically on international students and scholars studying and working in the STEM fields.

The United States has long been a leader in international education and research. Boston, home to many world-class universities and research institutions, hosts thousands of international students and scholars each year. A majority of these students and scholars are pursuing degrees or careers in the Science, Technology, Engineering, and Math (STEM) fields. STEM students and scholars contribute substantially to the American economy, generating billions in revenue for their home institutions while producing cutting-edge research and patents. In advanced fields such as artificial intelligence and cybersecurity, where there is a shortage of native-born graduates, international STEM students and scholars help fill the talent gap and sustain the highly-skilled workforce the United States needs to maintain its competitive edge in science and innovation. Recent developments, however, have cast doubt on the United States' ability to keep attracting top STEM talent from around the world.

This report explores the primary factors contributing to the recent drop in international student enrollments in the United States. First, restrictive federal immigration policies have prevented international STEM talent from coming to study or work in the United States. Second, the rise of xenophobic rhetoric has contributed to an unwelcome atmosphere for foreign students and scholars. Third, heightened government concerns over academic espionage, research security, and foreign interference has led to greater scrutiny and surveillance of foreign-born academics. Lastly, the global competition for foreign STEM talent has grown fiercer as other countries like China and Canada are ratcheting up efforts to attract and retain international STEM students and scholars.

Losing the race for international students and scholars would be a blow to the United States' global leadership in science and technology. University leaders and policymakers must adopt innovative solutions to bolster the foreign STEM talent pipeline. We outline several recommendations to consider to advance U.S. competitiveness including developing new immigration pathways for highly skilled STEM workers, expanding and streamlining existing programs, and refining a national strategy for welcoming immigrants. We also provide suggestions for strengthening the integrity of the American research ecosystem including: enhancing collaboration and training between authorities and researchers, improving security structures and procedures, and aligning grant requirements across agencies.

Overview of International Students and Scholars

How many international students are in the United States? The U.S. hosted 1,075,496 international students in the 2019/20 academic year.[1] Out of these 1,075,496 students, 39% were pursuing undergraduate degrees, 36% were pursuing graduate degrees, 5% were in non-degree granting programs and 21% were pursuing their Optional Practical Training (OPT).[2] In 2019/2020, 75% of all students were continuing students while 25% were new students.

Where are these students coming from and where are they going? The top 5 countries of origin for international students in the U.S. in 2019/2020 were China with 372,532 students, India with 202,014 students, South Korea with 52,250 students, Saudi Arabia with 37,080 students, and Canada with 26,122 students.[3] International students in the United States are studying in universities located in every state with California, New York, Texas and Massachusetts remaining the top states hosting international students.

How many international students are pursuing STEM fields? 54% of all international students in the United States are pursuing studies in STEM fields. The most common fields studied by international students include: Engineering (studied by 21% of international students), Math and Computer Science (20%), Business and Management Studies (16%). International students are particularly dominant in STEM graduate programs: two-thirds of graduate students in computer science and electrical engineering programs are international.[4]

As shown in Figure 1 below, international students represent an increasing proportion of all STEM degrees earned across the U.S.[5]

Figure 1: STEM Degrees Earned by Foreign Students, **1988-2017**

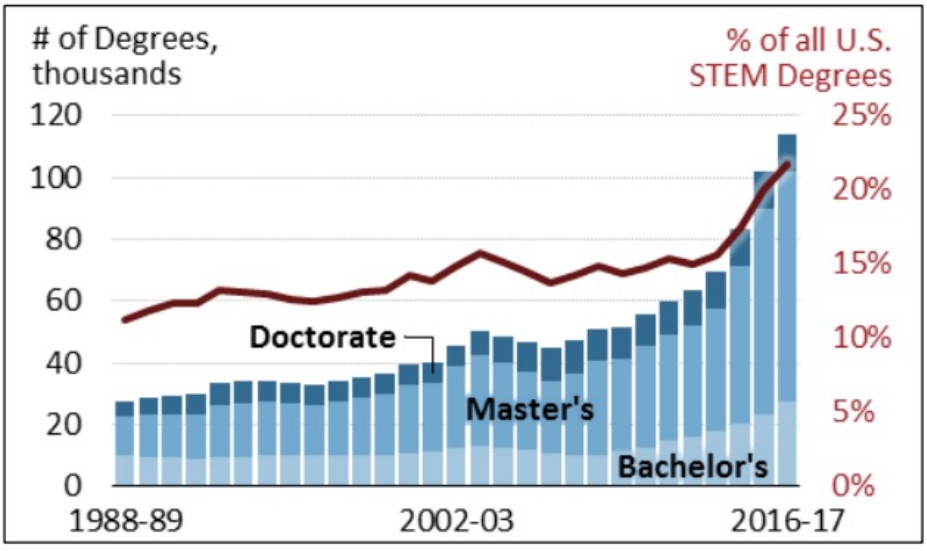

Figure 1. Reprinted from "Foreign STEM Students in the United States," (Washington, D.C.: Congressional Research Service, 2019), https://crsreports.congress.gov/product/pdf/IF/IF11347.

The Importance of International Students and Scholars in the U.S.

International scholars play a critical role in STEM patent production and innovation. The United States is one of the world's leading innovation and science hubs. It has consistently ranked as one of the top countries in the World's Global Innovation Index, ranking as the third best country worldwide for innovation in 2021.[6] According to the same index, the U.S. derives its innovation strength from its leadership in issued patents, the quality of its research universities, as well as the amount of private and public investment in Research & Development (R&D). Research shows that international students and scholars contribute significantly to patents and research innovation – a 10% increase in international students in the United States would increase patent application by 4.5% and university patent grants by 6.8%.[7] Looking at employment data, foreign born workers make up to 19% of the STEM workforce in the United States and account for 45% of overall doctoral workers in science and engineering.[8]

The ability to recruit global talent is a key factor that has contributed to the leadership of the United States in science and research.[9] International students account for over 56% of graduate enrollments in the fields of engineering and computer science. When looking specifically at PhD students, international students pursuing STEM PhDs account for 40% of all STEM PhDs, with this number closer to 60% for fields such as computer science. Furthermore, 49% of U.S.-trained science and engineering postdoctoral researchers were born overseas, while the corresponding number at the faculty level was 29%.[10]

International undergraduate students represent a significant portion of university funding. International students are important players in the U.S. economy, generating $41 billion in 2019 and representing the 5th largest service export in the same year.[11] International students help subsidize the enrollment of domestic students at certain universities through subsidizing tuition fees, which tend to be higher for international students.[12] This was particularly pronounced for public universities, where international students constitute an important source of funding.

International Students and scholars can help to close the growing STEM Talent Gap. The U.S. Bureau of Labor and Statistics estimates that there is both a surplus and a shortage in the U.S. STEM talent market.[13] While there is a debate around a potential surplus in fields such as physics, biomedical engineering and chemistry, researchers agree that other fields such as artificial intelligence, computer science and cybersecurity are suffering from labor shortages. Data shows that even in 2010, a period with relatively high unemployment, just 5.9% of STEM workers were unemployed compared with 9.6% of the overall American worker population.[14] International students can play an important role in filling jobs that would otherwise go unfilled in these emerging fields and technologies.

Enrollment and Employment Trends

The enrollment of international students in the United States is declining. The number of international students enrolled in the U.S. has grown consistently over the last 40 years. However, the number of international students has been declining since 2016, before the onset of the COVID-19 pandemic. Recent data from the U.S. Department of State *Open Doors* report, prepared by the Institute of International Education (IIE), shows that this decline has now persisted for 4 consecutive years.[15] The only similar decline was seen during the early 2000s after the 9/11 attacks.

Figure 2: International Student Enrollment in U.S. Universities, 1980-2020

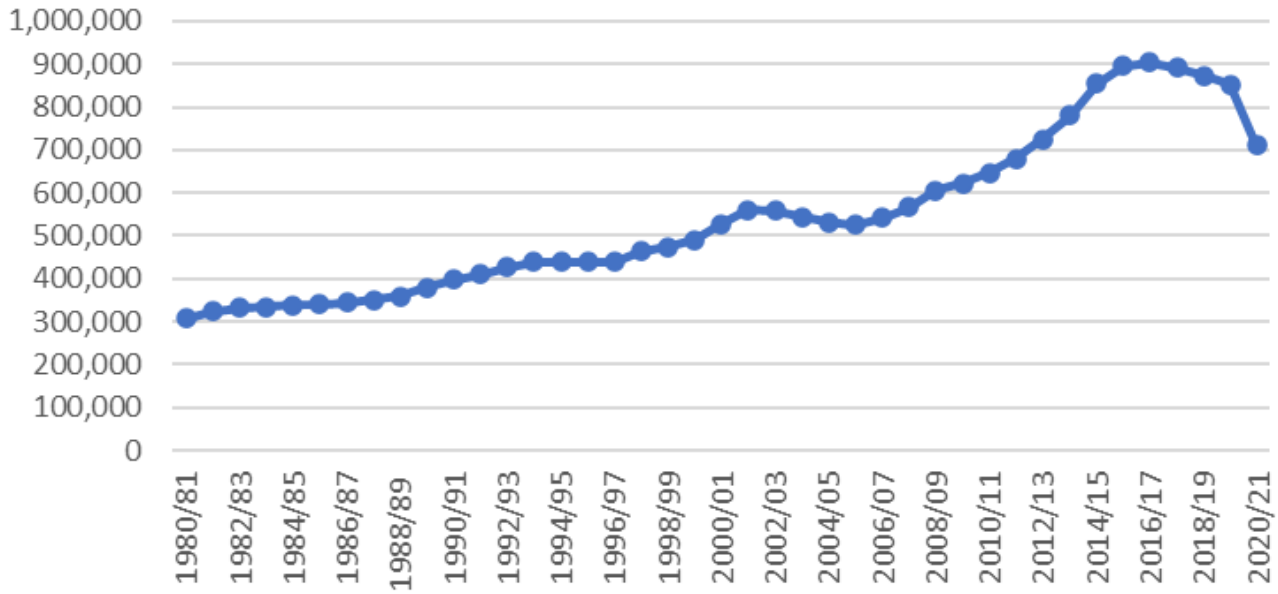

Figure 2. Reprinted from Open Doors 2021 (Washington, D.C.: Institute of International Education, 2021), https://www.iie.org/Research-and-Insights/Open-Doors

The declining trend is also true for international students enrolled in science and engineering, where the decline in the total number started in 2016 and was exacerbated by the COVID-19 pandemic.

Figure 3: International students in S&E enrolled at U.S. higher education institutions, by academic level: 2012-20

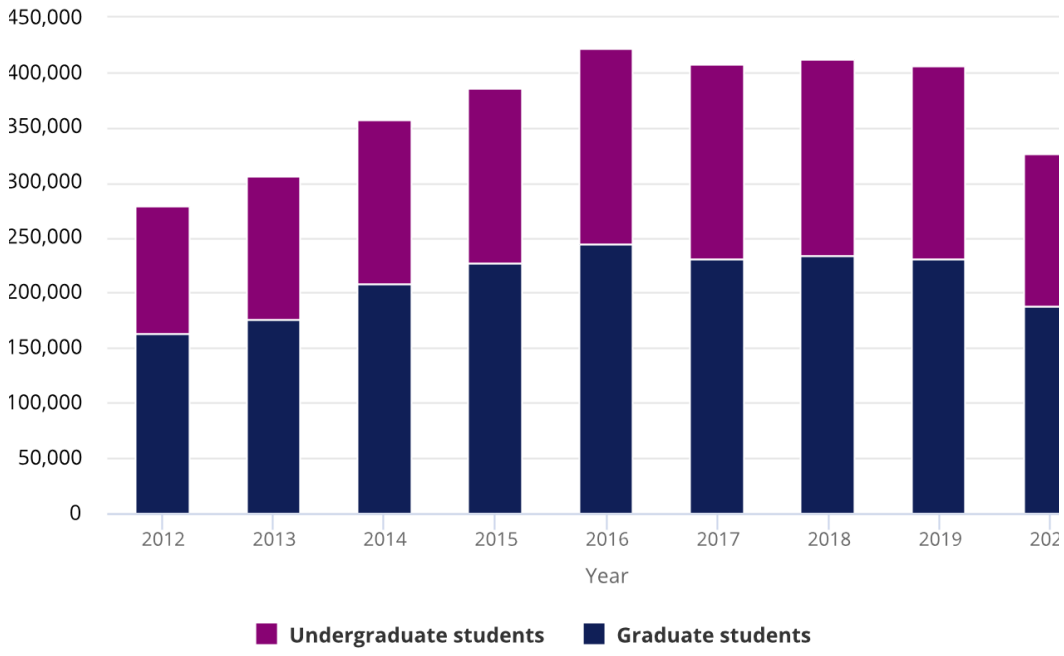

Figure 3. Reprinted from National Science Board, National Science Foundation. 2022. Science and Engineering Indicators 2022: The State of U.S. Science and Engineering. NSB-2022-1. Alexandria, VA. Available at https://ncses.nsf.gov/pubs/nsb20221

For more than 70 years, the number of international students in the United States has been constantly rising.[16] From about 25,000 international students in 1948 to more than a million in recent years, international students have become an important part of the American higher educational system.

The nearly 10% reduction in new students seen in two years following the 2016/2017 academic year has led scholars and researchers to study the reasons behind such a decline. Several factors emerge explaining this trend including the political environment surrounding immigration in the United States, tighter interpretation of student visa enforcement, and competition from universities in other countries.[17]

The decline caused by the COVID-19 pandemic is also notable, contributing to an unusual decrease in both the total number of international students and in new enrollments. Specifically, border closures and other challenges to global mobility have led to a 15% decrease in total international students in the U.S. and a 45% decrease in new enrollment compared to the previous academic year. However, it is important to highlight that the decline in international students trend started well before the pandemic, and that it might be caused by more structural issues. The pandemic's impact may be limited in time as early reports from the 2021/2022 academic year show a rebound in the number of international student enrollment[18].

U.S. visa policies may discourage foreign STEM PhDs' contributions to U.S. tech startups.[19] In the pursuit of innovation in emerging fields such as artificial intelligence, startups and entrepreneurship ventures are leading the way to discover and commercialize new products and innovations. However, while foreign STEM PhDs account for an important fraction of all STEM PhD students in the United States, they are less than half as likely to work in startups than their American counterparts.[20] This discrepancy is not explained by foreign PhDs' preferences for established firm jobs, risk tolerance, or preference for higher pay. Rather, research shows differences in visa sponsorship between startups and established firms (as startups are less willing to sponsor visas because of the administrative load) suggest that visa policies deter foreign PhDs from working in startups. Furthermore, the United States does not have a startup visa, which may deter international students and scholars from founding startups.

International Students in the Boston Area

Massachusetts is home to top research and academic institutions and thus is a highly desirable location for international students. Massachusetts ranks as the 4th state nationally with the most international students and scholars, just behind Texas, New York and California.[21] In the 2020/2021 academic year, Massachusetts hosted more than 66,000 international students and scholars with five leading universities (Northeastern, Boston University, Harvard, MIT and UMass Amherst) accounting for ~60% of international students and scholars.[22]

It appears that the trend of declining international students and scholars that started in the United States in 2016 has not necessarily affected Massachusetts. In fact, Massachusetts universities continued to attract international students in record numbers until the COVID-19 pandemic.[23] At Harvard University and MIT specifically, the number of international students and scholars consistently increased for 6 years before declining significantly starting in 2019/2020.

Figure 4: Number of International Students at Harvard and MIT, **2015-2022**

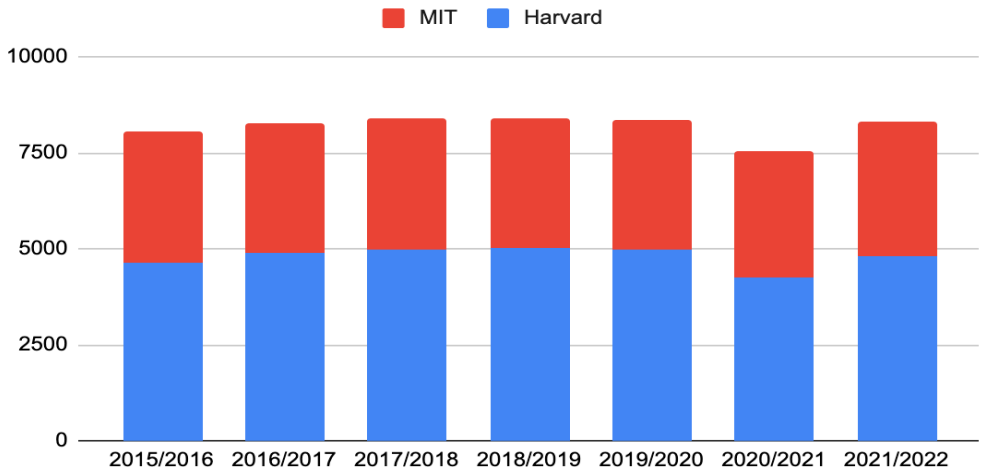

Figure 4. Source of Data: Harvard International Office and MIT Registrar

Employment of Immigrants in Massachusetts

Immigrants make up to 17% of the state's population and play an important role in the Massachusetts economy.[24] Data shows that a fifth of Massachusetts workforce is foreign born, with immigrants working in many top sectors including healthcare, science, and service industries. Immigrants constitute ~30% of the workforce in the fields of computer and mathematical sciences; life, physical, and social science; and healthcare support.[25] 40% percent of immigrants in Massachusetts have earned at least a college degree and less than 20% do not have a highschool degree.[26]

Immigrants in Massachusetts are also successful in climbing the economic ladder over time, as recent research has shown that second generation immigrants in Massachusetts have amongst the highest incomes in the country, surpassing even that of native born Americans.[27]

Understanding Key Disruptions to the International STEM Talent Pipeline

Restrictive Immigration Policies

Many higher education administrators and experts agree that restrictive federal immigration policies and widespread anti-immigrant rhetoric – particularly in the aftermath of the 2016 elections – are significant factors driving the downward trend in international student enrollments.[28] As seen in Figure 5, the proportion of U.S. higher education institutions listing visa issues as the top reason for the drop in new enrollments rose from 34% in 2016 to 86.9% in 2019.

Figure 5: Top 12 Reasons for Declining Enrollments, **2016-2019**

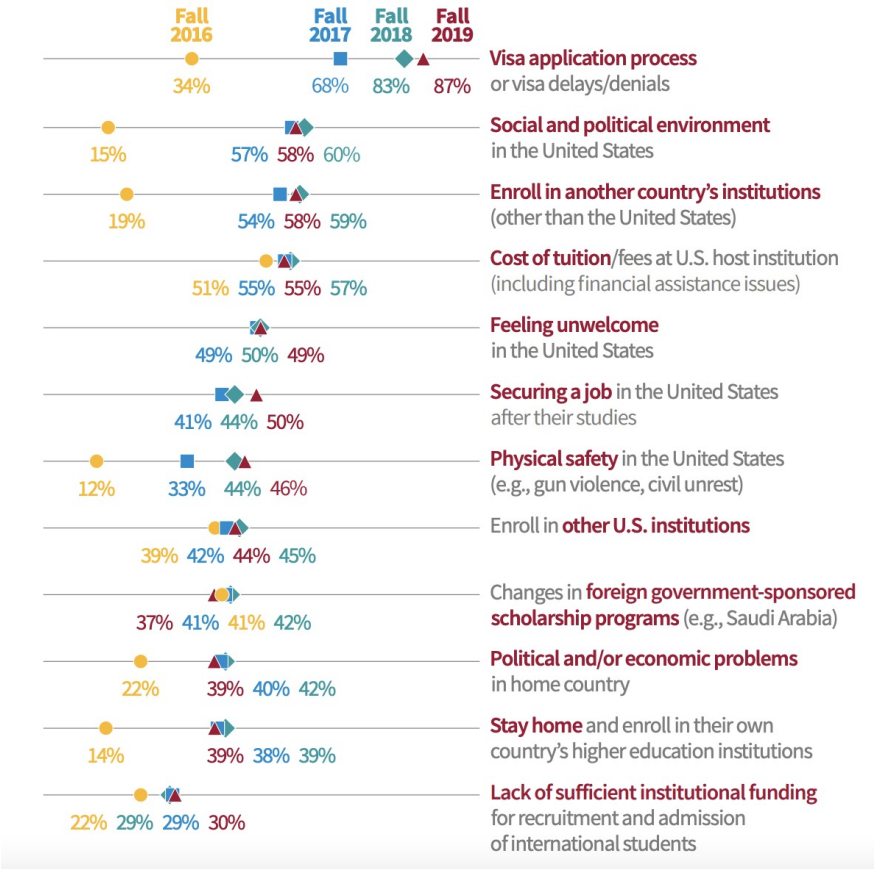

Figure 5. Reprinted from Losing Talent: An Economic and Foreign Policy Risk America Can't Ignore (Washington, D.C.: NAFSA, 2020), https://www.nafsa.org/policy-and-advocacy/policy-resources/losing-talent-economic-and-foreign-policy-risk-america-cant-ignore

Notably, U.S. visa policies are hindering foreign scholars and researchers working in critical STEM fields like artificial intelligence. In one survey conducted among migrant AI researchers, 69% of those residing in the U.S. indicated that visa and immigration issues posed a serious threat to their abilities to

conduct high-quality AI research.[29] Although retention rates among international students and scholars have historically remained, immigration issues are having a negative impact – among AI PhDs who left the United States after graduation, 23% cited immigration-related concerns and 33% picked the U.S. immigration system as an extremely relevant factor in their decisions to leave.[30]

U.S. immigration pathways have long been criticized for being costly, lengthy, and limited. International students and scholars coming here on temporary visas like the F-1 or J-1 visas have to navigate a time-consuming and costly application process.[31] Students who wish to remain in and work in the United States after graduation also face significant barriers. The application process for the Optional Practical Training (OPT) and STEM OPT programs, which allow students to stay and work for up to 36 months after graduation, involves high fees and extended wait times.[32] Demand for "high skilled" H-1B visas, one of the main immigration avenues for international students and scholars wishing to work in the United States, far outstrips annual caps (though applications sponsored by universities, nonprofits, and government research institutions are exempt from counting against the annual H-1B visa limit).

International students applying for employment-based green cards also encounter protracted wait times as a result of numerical caps and per-country quotas.[33] Green card applicants from China and India – the leading countries of origin for foreign-born STEM PhD students and scholars – face wait times that are years longer than the average.[34] Research from the Cato Institute shows that some Indian petitioners have died while waiting in line, and that three-quarters of recent Indian petitioners might not receive green cards.[35] According to immigration experts, restrictive pathways to permanent residency are driving skilled STEM workers to other countries. For example, from 2016 to 2019, the number of Indians applying for permanent residency in Canada from U.S. destinations doubled.[36] In 2015, Business Roundtable ranked the United States 9th out of 10 countries for immigration policies favorable to competing for foreign talent, particularly in science and technology fields.[37]

Immigration Policies under the Trump and Biden Administrations

In recent years, Congress has introduced a number of bills that would have altered immigration pathways for international students. Seeking to maintain a strong STEM workforce and America's competitive edge in innovation and technology, legislators introduced bills like the Keep STEM Talent Act of 2021 that exempted foreign students with graduate degrees in STEM from a U.S. university from counting against visa caps.[38] Similarly, the EAGLE Act of 2021 would eliminate per-country caps for employment-based green cards, significantly reducing wait-times for Chinese and Indian petitioners.[39] On the other hand, legislators worried about foreign students crowding out native-born Americans have introduced bills like the Fairness for High Skilled Americans Act of 2021, American Jobs First Act of 2021, and the Responsible Practical Training Act of 2021 that would restrict or eliminate the OPT and H-1B programs.[40] However, none of these or other similar bills have successfully been passed into law.

While legislative action has stalled, both the Trump and Biden administration have made substantial changes to the policies and regulations governing student visas and temporary worker programs. Driven by heightened anxiety over foreign competition in the workforce and visa fraud, the Trump administration sharply raised visa fees; cracked down on student visa overstays; heightened visa vetting procedures, including increasing incidences of extended security checks; and proposed imposing a fixed time limit of 2 or 4 years on student visas.[41] Experts criticized these regulatory changes for imposing extensive monetary and time costs on student visa holders.[42]

Figure 6: Denial Rate for New **H-1B** Petitions, by Fiscal Year

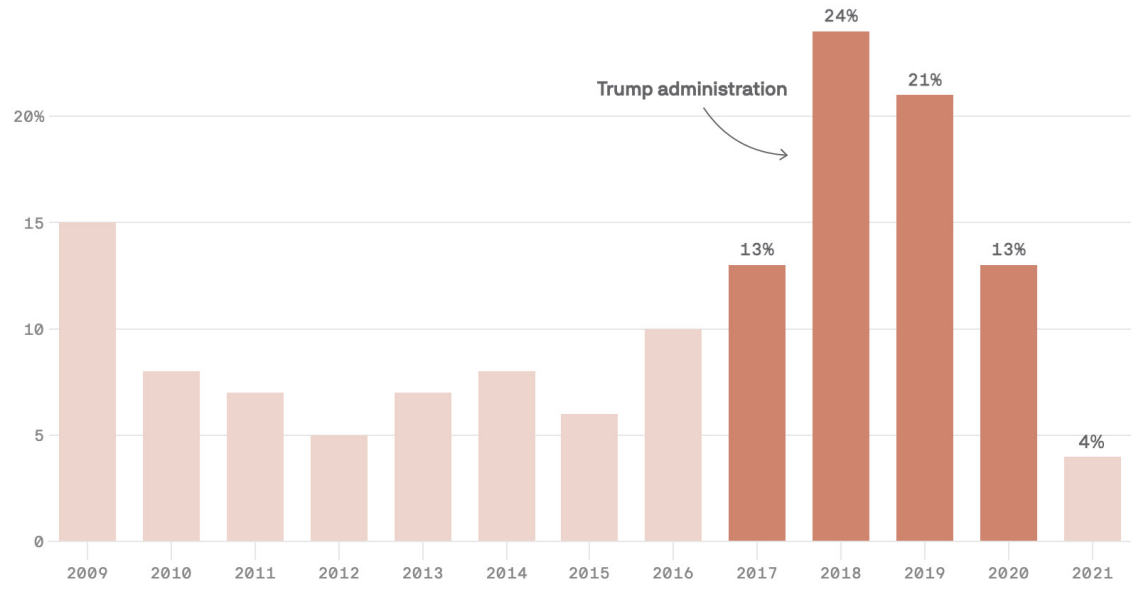

Figure 6. Source: USCIS Data and Axios (2021)

The Trump administration also attempted to curb temporary worker programs. In October 2020, DHS arrested 15 students and revoked or declined to renew 1,100 OPT permits as part of the first phase of Operation OPTical Training, a law enforcement effort to root out OPT-related fraud.[43] The definition of OPT fraud included students working in areas unrelated to their studies.[44] The Trump administration also made several regulatory changes to the OPT and H-1B programs that resulted in skyrocketing application processing delays and denial rates. One study by the Cato Institute finds that denial rates for employment authorization documents, required for students participating in the OPT program, more than doubled from 4.7% in 2015 to 9.6% in 2018.[45] As shown in Figure 6, denial rates for initial H-1B petitions were 24% in FY 2018, compared to just 6% in FY 2015.[46] To "protect American jobs from unfair international competition," Trump tried to replace the H-1B lottery with a wage-based selection system intended to divert visas away from IT companies that outsource low-wage jobs.[47] However, some experts argued that it would disadvantage entry-level workers – according to one analysis, an international

student was 54% more likely to get an H-1B visa under the lottery system than the wage-based selection system as recent graduates lack labor experience and are paid at a lower level.[48]

Trump made a number of changes to immigration policies during the COVID-19 pandemic, such as halting the issuance of new temporary worker visas and green cards.[49] Immigration and Customs Enforcement (ICE) also sought to prohibit foreign students taking online-only courses from remaining in the United States during the pandemic, prompting widespread outcry and a legal challenge from over 200 universities led by Harvard and MIT.[50] ICE eventually rescinded the policy change for students already in the country, but continued to bar newly enrolled students from entering.[51] Since most newly enrolled students were still in their home country, the impact of the virus and pandemic-related travel restrictions were particularly noticeable – IIE reported that new international student enrollment (including students studying virtually outside of the United States) declined by 43% in fall 2020.[52]

Since assuming office, Biden has sought to reverse many of the Trump administration's regulations. For example, the Biden administration withdrew the proposed fixed period of stay rule for student visas; rescinded Trump's temporary ban on green cards; loosened guidelines around visa reviews and extended in-person interview waivers; and eased COVID-19 travel bans for incoming students.[53] Biden also announced plans to expand the STEM OPT program, launch a STEM initiative for research exchange, and enlarge eligibility for STEM PhD candidates to apply for O-1A visas (for individuals with extraordinary ability or achievement).[54]

At the same time, the Biden administration has announced significant hikes in student visa application fees.[55] While Biden eventually allowed Trump's suspension of temporary worker visas to expire and revoked the rule on a wage-based H-1B selection system following litigation, he has promised to establish "a wage-based allocation process."[56] Meanwhile, education groups such as NAFSA, Association of International Educators, and the American Council on Education (ACE) have urged the Biden administration to consider additional policies and practices to support international students in the wake of the COVID-19 pandemic, including prioritizing student visa processing and providing OPT application flexibility.[57]

Increasing Concerns Around Tech Transfer

International students and scholars in the United States have faced increased scrutiny in recent years from both the government and the public. Concerns about the integrity of American research and innovation, especially on academic campuses, is one of the main drivers for this heightened suspicion. Security fears center around hostile nations or entities recruiting foreign students and scholars to engage in acts of espionage and theft of U.S. research and intellectual property, particularly of sensitive dual-use technologies such as quantum technology, advanced electronics and intelligent manned vehicles.

Testifying before a U.S. Senate hearing on worldwide threats in February 2018, FBI Director Christopher Wray raised concern over "the use of nontraditional collectors, especially in the academic setting, whether it's professors, scientists, students."[58] Among other things, a 2019 FBI report identified visiting students and professors, language and cultural training opportunities, and joint research opportunities as tactics used by foreign adversaries to target U.S. academia.[59] Alarm over "nontraditional collectors" taking advantage of the free and open university research environment is compounded by worries of foreign malign influence being exerted on university campuses, such as through foreign direct investment in the U.S. higher education system or the presence of campus entities like Confucius Institutes.[60]

Additionally, analysts have been increasingly concerned about completely legal means of tech transfer due to the movement of talent. This is caused by (1) U.S. policies that inadvertently create an unwelcoming environment for international students and scholars, ultimately discouraging them from staying in the U.S. and (2) completely legal recruitment programs that seek to attract top research talent back to home countries.

Efforts at bolstering U.S. research security are aimed at preserving America's leadership in technology and innovation in a context of increasing global competition. In a 2019 report, the FBI stated that foreign state adversaries sought to "illicitly or illegitimately acquire U.S. academic research and information to advance their scientific, economic and military development goals" while simultaneously reducing U.S. competitiveness.[61] Trump's January 2021 National Security Presidential Memorandum 33 (NSPM-33) also stated that "some foreign governments, including the People's Republic of China, have not demonstrated a reciprocal dedication to open scientific exchange, and seek to exploit open United States and international research environments to circumvent the costs and risks of conducting research, thereby increasing their economic and military competitiveness at the expense of the United States."[62]

Additionally, efforts at addressing domestic xenophobia and attracting/retaining talent will also preserve America's leadership in science and technology innovation and address tech transfer challenges.

A Focus on China

Unsurprisingly, in the midst of deteriorating relations and escalating competition, China has become a notable target of initiatives to combat espionage and intellectual property (IP) theft in academia. The Trump administration started limiting the duration of visas for Chinese students studying in certain high-tech fields in 2018 out of IP theft concerns. [63] That same year, the administration launched the China Initiative with the goal of countering Chinese economic espionage, particularly in research labs and universities.[64] Spearheaded by former Attorney General Jeff Sessions, the law enforcement initiative brought charges against numerous scholars and academics at U.S. institutions over alleged ties to the Chinese government and military. Trump also issued in May 2020 a White House Proclamation

suspending the entry of Chinese students and researchers with ties to China's "military-civil fusion" schools.[65] Proclamation 10043 accused the People's Republic of China of engaging "in a wide-ranging and heavily resourced campaign to acquire sensitive United States technologies and intellectual property" and of co-opting "post-graduate students and postdoctoral researchers, to operate as non-traditional collectors of intellectual property."[66]

Opinions differ, however, as to the effectiveness of these policies in actually combatting national security threats posed by Chinese students and scholars.[67] From its inception to the end of Trump's presidency in January 2021, the China Initiative resulted in charges in 61 cases.[68] However, only five of the charges were on allegations of economic espionage – the rest centered on making false statements, failure to disclose ties to China, or wire fraud.[69] This led to criticism of the China Initiative for racial profiling and government overreach, especially since most research done at universities is unclassified and eventually published.[70]

While the China Initiative primarily focused on academics, Proclamation 10043 blocked both Chinese graduate students and research scholars affiliated with Chinese institutions linked to the Chinese Communist Party's (CCP) military-civil fusion strategy. However, experts have criticized the scope of the Proclamation as "unclear" and so broad that it could possibly encompass all STEM fields.[71] A few months after Proclamation 10043 went into effect, the administration had revoked the visas of over 1,000 Chinese students and scholars deemed to be "high-risk" and ineligible for a visa under Proclamation 10043.[72] In August 2021, a State Department official stated that only one to two percent of all PRC student visa applications had been refused under Proclamation 10043, but university officials and students say that the Proclamation's effects reverberate beyond just denial rates, including hindering research collaboration and stowing fears among students of not being "accepted in America."[73] Meanwhile, many security experts acknowledge that the vast majority of Chinese students – "ninety nine point nine percent," according to one senior counterintelligence official – come here to study with no malicious intent.[74]

The Trump administration was particularly concerned about China's talent recruitment programs, which attempt to entice top talent to China by offering benefits such as higher salaries, greater research funding, and permanent residency.[75] There are over 200 talent recruitment programs, and the United States is a major target – a report partly funded by the Department of State found that 146 of 600 talent recruitment stations world-wide were located in the United States.[76] The most prominent of these talent recruitment programs is the Thousand Talents Plan (TTP), which was launched by the CCP in 2008 as part of its objective to become the world leader in S&T by 2050. A Senate report identified TTP as a grave threat to U.S. research security, alleging that TTP members were incentivized to misappropriate U.S. federal funding, steal U.S. intellectual capital, run "shadow" labs in China, and recruit or sponsor other students and scholars to conduct national security research.[77] The Senate report cited numerous cases of TTP-affiliated individuals at higher education institutions who failed to properly disclose foreign ties

in grant applications or who hired other TTP members to work on U.S. national security projects.[78] As of 2017, China had recruited over 7,000 foreign-trained scientists and experts through TTP, including several Nobel Laureates.[79]

However, assessments of TTP's success are mixed. Stay rates among Chinese PhD graduates have remained consistently high – according to the National Science Foundation, from 2005 to 2015, the stay rate for U.S. doctorate recipients with temporary visas was 87.2%.[80] According to one expert, top PhD holders lured to China under TTP are unlikely to permanently abandon research positions in the West, instead opting to hold a short-term position in China alongside a tenured position in an American university.[81] Similarly, one paper found that, despite recent investments by the CCP, returnee rates for Chinese STEM PhD graduates educated in the United States remain consistently low.[82] The highest-quality talent program recruits typically return only part-time, and many leave China again within a few years – one survey showed that among 918 returnees, 68% wanted to go abroad again.[83] Despite the pervasive alarm about a "reverse brain drain," Chinese talent recruitment programs can sometimes be ineffective at retaining the talent they recruit. While data is hard to find, one 2012 article in the state-owned *People's Daily* newspaper cited a survey estimating that half of all overseas Chinese returnees leave again.[84] Another article in the *South China Morning Post* cited several examples of prominent foreign-trained scholars and researchers who had returned to China, only to later go abroad again.[85] These departing returnees have become common enough that a term has been coined for them – *guihai* ("returning overseas"), a play on the term *haigui* ("sea turtles") often used to describe Chinese returnees.[86]

Nonetheless, the Trump administration's concerns about China's talent recruitment programs led to crackdowns within federal agencies of nondisclosure of foreign ties. In concert with law enforcement efforts by the FBI and the DOJ, the National Institutes of Health launched a sweeping probe in 2018 into potential IP theft at research institutions throughout the country.[87] One hundred and eighty researchers, most of whom were Chinese or of Chinese descent, were reportedly investigated.[88] Meanwhile, in 2019, the Department of Energy (DOE) announced plans to restrict its grantees from participating in talent programs operated by "sensitive" countries like China and Russia and began developing a list of research areas in which collaborations between DOE laboratories and the sensitive countries would be restricted.[89] At the same time, the administration emphasized the need to harmonize rules and procedures for monitoring foreign influence across federal agencies and universities.[90]

To that end, in May 2019, the National Security and Technology Council (within the White House Office of Science and Technology Policy) launched the Joint Committee on the Research Environment (JCORE), which was co-chaired by representatives from several federal agencies and was tasked with improving the collective safety, integrity and productivity of the U.S. research enterprise.[91] In January 2021, Trump signed NSPM-33, which directed federal agencies and other participants in the

U.S. research enterprise to jointly take action to strengthen U.S. research security.[92] NSPM-33 was accompanied by a JCORE report outlining recommended practices for research institutions to better secure the U.S. research enterprise.[93]

The Biden Administration's Approach to Research Security

While affirming a renewed commitment to international education, the Biden administration has also maintained Trump's focus on research security. In July 2021, the State Department and the Department of Education released a joint statement outlining policies to support international education while at the same time protecting national security and intellectual property.[94] The DOJ ended the China Initiative in February 2022, but replaced it with a broader strategy to combat threats from hostile nations, including China, Iran, North Korea and Russia.[95] Meanwhile, Proclamation 10043 remains in effect. In August 2021, the Office of Science and Technology Policy (OSTP) hosted a community forum with representatives from universities and research organizations to discuss implementation of NSPM-33.[96] The National Science and Technology Council (NSTC) also published implementation guidance focusing on enhancing disclosure policy, oversight and enforcement, and research security programs at research organizations.[97]

Although none have passed into law, there are also legislation proposed in the current Congress that seek to address foreign influence and espionage in academia. Examples include the Protect our Universities Act of 2021, the Foreign Influence Transparency Act of 2021, and the SECURE CAMPU.S. Act of 2021. Among other things, these proposed bills would prohibit foreign students from participating in sensitive research projects, impose stringent guidelines for foreign funding disclosures from universities, and ban participation in foreign talent recruitment programs.

Response from Universities and Research Institutions

These policy changes and proposals have pushed universities and research associations to raise objections over how constraints on international students and scholars are threatening the United States' ability to attract and retain top foreign talent and therefore its lead in science and innovation.[98] There are legitimate national security interests at risk – according to Department of Defense statistics, nearly a quarter of all foreign efforts to obtain sensitive or classified information in 2014 were routed through academic institutions.[99] However, students in master's and bachelor's degree programs generally pose less risk than researchers but can still suffer under the same restrictive policies.[100] Many have criticized the policies and attention directed towards foreign malign influence in academic research settings, and particularly the focus on Chinese students and scholars, as being too broad, ineffective, and detrimental to research.

Universities have already taken steps to ensure the security of their research and protect against foreign interference. In 2019, the Association of American Universities (AAU) and the Association of Public and

Land-Grant Universities (APLU) conducted a survey to identify and share actions taken by universities to address growing concerns about foreign security threats.[101] AAU also commissioned a study on ways to allay government concerns about intellectual property theft while preserving the openness of fundamental research at universities.[102]

At the same time, AAU, APLU and other organizations and universities have published statements recognizing the importance of international students to advancing American research and innovation and pushing for the U.S. to reform its immigration system to welcome more international students.[103] So far, universities have had a hard time adapting to the constantly changing regulatory landscape. AAU, the American Council on Education (ACE) and other higher education organizations have frequently sent letters to ICE, DHS and other government agencies requesting guidance on visa rules relating to international students.[104] Ultimately, universities want to balance efforts to improve research security with a commitment to maintaining a free, open, and welcoming environment for international students.

Perceptions of Domestic Xenophobia

The overall impact of U.S. policies and regulations towards international STEM students and scholars is growing unease and widespread perceptions of xenophobia. According to IIE's 2019 Fall Enrollment Snapshot, higher education institutions identified the U.S. political and social environment (57.9% of survey respondents) and feeling unwelcome in the United States (48.6%) as factors contributing to the decline in new international student enrollment.[105] In addition, 45.8% of institutions also pointed to student and parental concerns about physical safety in the United States.[106] STEM scholars and researchers have also been negatively impacted – according to a survey by the American Physical Society (APS), 43% of international physics graduate students and early career scientists currently living in the United States perceive it as an unwelcoming country for international students and scholars, and 45% of international early career physicists said that the U.S. government's current approach to research security made them less likely or much less likely to decide to stay long-term.[107]

Chinese students and scholars have been especially affected by the increased scrutiny. As seen in Figure 6, around 40% of Chinese scientists felt racially profiled by the U.S. government and over half were anxious over being surveilled. Many reported experiencing professional challenges as a result of their race/nationality/country of origin, and some were deterred from wanting to stay in the United States.[108]

Figure 7: Perceptions of Xenophobia Among Chinese vs. Non-Chinese Scientists

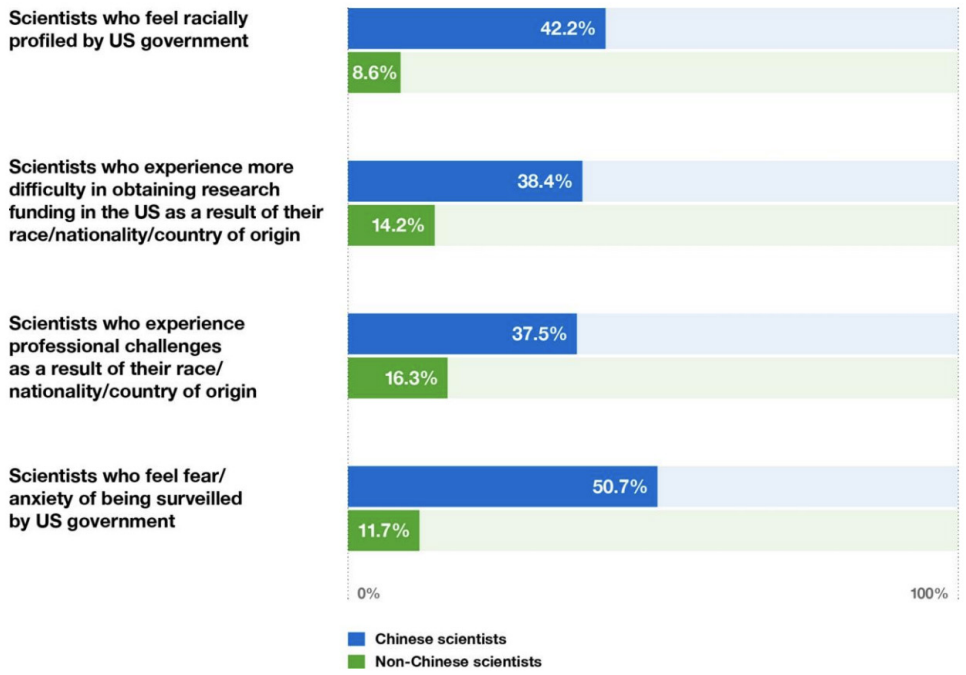

Figure 7. Reprinted from Jenny Lee and Xiaojie Li, Racial Profiling Among Scientists ofChinese Descent and Consequences for the U.S. Scientific Community (Committee of 100 and University of Arizona, 2021), https://www.committee100.org/wp-content/uploads/2021/10/C100-Lee-Li-White-Paper-FINAL-FINAL-10.28.pdf.

Research efforts have suffered as a result of the current policies. Leaders at U.S. universities say that the increased government scrutiny is causing widespread "angst" on campus, affecting institutional collaboration and making faculty wary of bringing students in from abroad.[109] Lack of institutional clarity on U.S. government and university rules surrounding international collaborations have also negatively impacted research projects and productivity, prompting greater reluctance to pursue federal grants and collaborative opportunities involving China-based researchers.[110] In the APS survey, nearly 1 in 5 physics professionals indicated that they had withdrawn from opportunities to engage with colleagues outside of the country because of current U.S. research security guidelines.[111] This could have profound implications for U.S. competitiveness in scientific research – studies show that international collaborations lead to the most influential, oft-cited research.[112]

Growing International Competition to Attract and Retain Foreign Students

Other countries share the United States' concerns about academic research integrity and national security. In 2019, a Foreign Affairs Committee report found "alarming evidence" about the extent of Chinese influence on UK campuses.[113] In 2020, the Australian government launched an inquiry into

foreign interference at universities, leading to a report that singled out Confucius Institutes and recruitment programs like TTP as "possible avenues of technology transfer and espionage."[114] In 2021, Canada imposed mandatory national security risk assessments on projects that receive federal funding and involve foreign researchers or private-sector organizations.[115] These countries have begun developing and implementing policies meant to bolster national security in universities – the UK, for example, passed the National Security and Investment Act in 2021.

However, at the same time that many countries have heightened scrutiny on foreign interference and academic espionage, they have also ramped up efforts to attract and retain foreign talent. Even as new international student enrollment in U.S. universities has fallen continually since 2016, other countries have seen soaring numbers of international students. Between 2015 and 2019, new international student enrollment in Australia increased by 66% and in Canada by 73%.[116] Moreover, in countries like Canada and the United Kingdom, much of this growth in international students has occurred in STEM fields.[117]

- **China:** Aside from its foreign talent recruitment programs, in recent years China has made a concerted push to appeal to international students and scholars by offering a range of government-sponsored scholarships and establishing bilateral exchange programs with Belt and Road countries (countries taking part in China's flagship global infrastructure development strategy).[118] In September 2010, the Chinese Ministry of Education launched the Study in China plan with the goal of hosting 500,000 international students by the end of 2020.[119] Although COVID-19 disrupted international migration flows, China has become the third biggest destination for international students globally, behind the United States and the United Kingdom.[120]
- **Canada:** Canada has sought to simplify and expand immigration pathways to actively recruit top foreign talent. In 2015, Canada established the Express Entry program, which fast tracks applications for permanent residency from highly-skilled immigrants. Candidates are scored on a number of criteria and those who meet the cutoff get invitations to apply. Between 2017 and 2019, over 20,000 noncitizen U.S. residents sought and received invitations to apply, and the number of successful admissions from the U.S. rose by 128%, indicating that skilled foreign talent in the U.S. is leaving for Canada. In recent years, Canada has introduced new permanent residency programs for international graduates – for example, students with a master's degree from an Ontario university can immigrate through the Masters Graduate Stream.[121]
- In sharp contrast to the Trump administration, Canada's response to the COVID-19 pandemic has focused on encouraging students to keep studying and working in the country. In February 2021, Canada's Minister of Immigration announced that international

students completing their entire degrees outside of Canada can still apply for post-study work permits.[122] Later in April 2021, the Canadian government announced the establishment of a new immigration stream for essential workers and international students already in the country.[123] And in its 2022 - 2024 Immigration Levels Plan, Canada outlined ambitious immigration targets to fill labor shortages and grow Canada's economy. Among other things, the plan seeks to streamline visa application processes and raises visa caps to accommodate international graduates of Canadian schools.[124]

- **United Kingdom:** In 2019, the UK announced a new International Education Strategy aiming to attract 600,000 international students by 2030 by creating a "welcoming environment" for international students, including through extending post-study leave periods and reviewing visa policies.[125] The UK met its target of 600,000 international students in 2020, a decade ahead of schedule.[126] In 2021, the British government published an update to the International Education Strategy which called for a robust response to the pandemic, diversifying international student recruitment and streamlining the student visa application process.[127] The UK also replaced its Tier-1 (exceptional talent) visa with the Global Talent program in February 2020. The Global Talent visa offers unlimited, fast-track visas to top scientists, researchers and mathematicians.[128]

- **France:** In 2018, France unveiled "Welcome to France," a plan to more than double the number of international students in the country in the next decade by simplifying visa procedures, reforming tuition fees, and boosting English language course offerings at French universities.[129] France also offers the French Tech Visa, or Talent Passport, an uncapped visa that serves as a residence permit allowing highly-skilled workers to stay for up to four years.[130]

- **Japan**: In 2018, Japan adopted a goal of attracting 300,000 more international students by 2020.[131] To achieve this goal, the Japanese government has sought to boost the number of English-language degree programs, subsidize scholarships, and help increase the ratio of foreign students landing jobs in Japan from 30% to 50%.[132]

- **South Korea**: In 2015, South Korea laid out a goal to host 200,000 international students by 2023.[133] At the same time, it introduced policies including an expansion of English-language programs, increased employment supports (including eased visa restrictions), scholarship funding, and subsidies to support the recruitment and marketing efforts of Korean universities.[134] International student enrollment in South Korea has risen steadily in the past decades, increasing nine-fold from 17,000 in 2004 to about 160,000 in 2019.[135]

- **Australia:** Australia offers the Temporary Graduate Visa, which allows international students to stay and work for up to four years after graduation, depending on the degree obtained.[136] Australia also has the Global Talent visa, a permanent visa available to individuals with internationally recognized achievements in target sectors such as academia and research.[137] In 2016, Australia released the National Strategy for Education 2025, the nation's first comprehensive strategy

for expanding its international education sector.[138] In 2021, the government released the Australian Strategy for International Education 2021 - 2030 with the goal of helping Australia's international education sector recover.[139] Among other things, the plan highlighted the importance of research integrity while calling for a flexible legislative and policy framework to ensure Australia's continued growth and global competitiveness.[140]

Ultimately, maintaining leadership in research, technology, and innovation will require balancing national security interests with the free and open academic environment that enables cutting-edge research collaborations and breakthroughs. In the midst of a global race for top foreign talent, the United States must develop policies that will protect against malign foreign influence while continuing to welcome and retain the best and the brightest from around the world.

Recommendations

The primary question we aim to address with these recommendations is: **What can the U.S. do to better attract and retain STEM talent while improving research security in U.S. academic institutions?**

Improving STEM Immigration Pathways and Strategies

The U.S. should refine immigration policies to keep pace with competitors and further develop programs to attract and retain STEM talent.

- **Explore new immigration pathways for highly skilled STEM workers similar to Canada's Express Entry program:**
    - The United States could provide a direct pathway to permanent residence for skilled workers present in the U.S. or overseas. This program would allow highly skilled migrants to get permanent residency in less than 6 months without a lottery system.
    - Criteria such as age, level of education, proficiency in English, Foreign and American work experience and overall connections to the United States could be taken into consideration in order to score, rank and select candidates.
    - Such a system would allow the U.S. to favor international students and scholars in STEM fields by giving higher scores to relevant degrees and experiences.
- **Consider expanding the reach, scope, and duration of the Optional Practical Training (OPT) program**
    - The Biden Administration's recent push to attract STEM talent via Executive Order 14102 allowed for more fields of study to be included in OPT.141 Universities should work to grow qualified educational programs and continue to lobby for expansion of the program.
    - While OPT represents an accessible solution to bring foreign talent to the U.S., reforms could increase incentives for recipients. Researchers have suggested switching oversight authority from the DHS to the Labor Department and paying foreign students in line with U.S. wage standards rather than the current wage guidelines.142
- **Investigate ways to address the backlog created by annual green card limits**
    - The United States government can increase the number of resources dedicated to processing green card applications. It could also digitize application processes, including processes to apply for required employment authorization documents that are required for the Green Card application itself.

- In addition to digitization, the government can also expand premium priority processing services to all categories of employment based green cards. This would allow faster processing times but also help with covering the costs of expanding resources.

- **Create a U.S. Startup and Entrepreneurship visa with a pathway to permanent residency**
  - The U.S. can create a special type of visa for international students who want to pursue entrepreneurial ventures after graduating from the U.S. universities.
    - Congress has considered on a bipartisan basis iterations of a startup/entrepreneurship visa since 2009, though none have become law. Most recently, the America COMPETES Act of 2022 included a provision on this topic, called the W Startup Visa.143
  - The visa would allow foreigners to create business, raise funds and employ other people while residing in the United States.
  - The visa could then transform into permanent residency depending on certain criteria such as profitability of the company, number of people employed and/or amount of funding raised.
- **Develop a national strategy for welcoming international students**
  - In addition to assisting with xenophobic rhetoric, a cohorent national strategy on attracting STEM talent could align stakeholders around common goals.
  - Such a strategy would also send a strong message that the United States is welcoming foreign talent and would help the U.S. compete internationally with other countries such as the U.K. and Canada, which are forthcoming about their goals to attract and retain top STEM talent.

Strengthening Research Security

In collaboration with federal government agencies, universities and the government can take several measures to harden defenses against IP-theft and foreign security risks in STEM research.

- **Align federal research grant proposal requirements**
  - Universities often shoulder much of the administrative burden of reviewing disclosure forms and grant requirements. Creating standard formats across agency grants would help universities manage potential foreign influence risks and reduce administrative burden (particularly when applying for grants from multiple agencies).
  - University administrators need additional guidance and clarity from agencies in what should

be reported as a foreign conflict of interest.

- Standardize rules regarding disclosure in participation in foreign talent recruitment programs across federal agencies.

- **Improve collaboration between agencies and universities**
  - University administrators need more guidance on the steps agencies recommend to identify, analyze, and mitigate foreign influence threats. Guides and templates from with which to review foreign contracts, grants, and gifts could help streamline processes and clarify threats.
  - Establishing a point of contact or liaison for federal security officials could help university administrators streamline inquiries and responses
  - Develop robust requirements for research that may lead to commercial IP - identify and disclose potential research early. Universities could also explore establishing research communication agreements that could help deter IP theft.
- **Provide training to universities to build awareness and expertise around foreign conflicts of interest**
  - Agencies could provide training on foreign influence in federally funded research to improve universities' ability to identify and mitigate risks among their researchers
  - Create high level cross-university working groups. Several institutions have already created task forces of senior faculty and administrators that are working together on the issue of security threats from foreign entities.[144]
    - Several AAU and APLU member institutions have created cross-campus working groups and task forces comprising senior faculty and administrators working together to deal with the issue of security threats from foreign entities.
- **Develop more secure university structures and processes**
  - Universities could establish foreign-affairs review office to complement the compliance control office. This office could be a similar body to an institutional review board.
  - Ensure that universities have a security review process for travel and provide safeguards for traveling faculty.
- **Focus on partnership between federal authorities and researchers, not punitive measures**
  - Researchers have advocated for the creation of a public-private research security clearinghouse that would provide researchers with information, training, decision support, and non-punitive means of interfacing with federal partners.145 This entity could be modeled

after partnerships in other domains such as the role that the National Cyber-Forensics and Training Alliance (NCFTA) plays for cybersecurity.

Potential Discussion Question/Topics

- **National Security.** How can federal agencies and universities better cooperate to protect sensitive U.S. research on campuses while conserving the collaborative environment scholars and students need to thrive? Should there be a core set of principles that guide American research universities' interactions with China?
- **IP Theft.** How can potential threats to American intellectual capital be properly addressed while preserving the concept of fundamental research? What are the inherent risks to academia actively engaging with foreign entities for activities such as recruitment, research, sponsorship, funding, academic collaboration, and student development? How has the definition of intellectual capital changed and influenced this issue?
- **Immigration Reform.** How can the U.S. streamline visa processes and reform the immigration system to better target individuals engaging in academic espionage while retaining critical foreign STEM talent? What would be the impact of the reduction in international STEM students in the United States on the domestic population of STEM students? What talent programs can the U.S. government put in place to target and attract top STEM scholars and students around the world?
- **International Competition for STEM Students:** As countries like Canada, Australia and the UK reform their immigration regimes and put in place programs to attract more international STEM talent, the U.S. is at risk of falling behind as a top study destination. Fewer international students in STEM would also impact U.S. technological advancement and innovation.
    - **China's Ambitions:** China has ambitions to become a world leader in S&T within the next decades. It has put in place national strategies and recruitment programs to meet its goals. In 2019, China surpassed the U.S. for the first time in the number of patents filed.[146] Competition with U.S. research and China's effort to take advantage of knowledge-production in academic institutions has also become of increasing concern to policymakers in recent years. However, attempts to restrict Chinese students and scholars have been widely criticized for being too broad, ineffective and detrimental to research.

Annex 1: U.S. Immigration Pathways for STEM Students and Scholars

U.S. Immigration Pathways for STEM Students and Scholars			
Pathway	**Relevant Population**	**Duration**	**Cap/No Cap**
F-1 Visa	Students studying full time at academic institutions	Temporary (typically duration of studies)	No cap
J-1 Visa	Professors, scholars (including short-term visiting lecturers), interns, trainees	Temporary (up to 5 years)	No cap
M-1	People pursuing non academic or vocational training	Temporary (1 year, with ability to extend for up to 3 years)	No cap
OPT (and STEM OPT extension)	Students and recent graduates from U.S. universities	Temporary (1 year, with 2 year extension for graduates with degrees in certain STEM fields)	No cap
H-1B Visa	Workers in "specialty occupations"	Generally temporary (3-6 years, with possibility for extensions in some cases)	Capped (85,000 visas per year, with 20,000 reserved for master's program graduates; applications sponsored by universities and colleges, nonprofits, and government research institutions are exempt from cap)
O-1A	Individuals of "extraordinary ability"	Temporary (3+ years)	No cap
Employment-based Green Card	Employees of U.S. firms; "extraordinary ability" individuals	Permanent	Capped (140,000 annually, with 7% per-country quota for employment and family-based green cards combined)

Annex 2: Relevant Trump and Biden Administration Immigration Policies

Relevant Immigration Policies under the Trump Administration		
Policy	**Description**	**Status**
Fixed period of stay visas	Impose a fixed time limit of up to four years for student visas, and up to two years for students from certain Asian, African and Middle Eastern countries.	Proposed (withdrawn by Biden administration in June 2021)
Chinese student visa limits	New student visa screening procedures permitting U.S. consular officials to restrict visas for Chinese students studying in "sensitive" fields like aviation and robotics to one year, with possibility of renewal.	Implemented
Student unlawful presence	Cracked down on F-1, J-1 and M-1 visa overstays by tightening guidelines for calculating the accrual of unlawful presence and imposing harsher penalties such as 10-year bans on re-entry.	Proposed (implementation blocked by a judicial injunction)
Operation OPTical Illusion	A law enforcement effort targeted at international students engaged in OPT fraud, which could include working in areas unrelated to their study.	Implemented
Visa application fees	New U.S.CIS fee rule proposed to raise visa application and processing fees for H-1B and green card petitions, among others.	Proposed (blocked by judicial injunction)
Visa vetting procedures	As part of the Extreme Vetting Initiative (later renamed Visa Lifecycle Vetting), the Trump administration expanded the scope of visa review to include more years of travel history and social media activity.	Implemented
H-1B regulatory changes	The Trump administration made several changes to the H-1B visa program, including raising the minimum wage required and narrowing the range of jobs open to H-1B workers. The new regulations led to skyrocketing visa delays and denial rates.	Implemented (later blocked by judicial injunction)
Wage-based H-1B selection system	Sought to replace the H-1B lottery with a wage-based selection system that was intended to "protect American jobs from unfair international competition."[147]	Implemented (later revoked by the Biden administration)
Proclamations 10014 and 10052 *(Suspension of Entry of Immigrants Who Present a Risk to the United States Labor Market During the Economic Recovery Following the 2019 Novel Coronavirus Outbreak)*	In response to COVID-19 pandemic, Trump temporarily halted issuance of green cards for new arrivals and of temporary worker visas including the H-1B and J-1 visas.	Implemented (green card suspension revoked by Biden in February 2021; temporary worker visa suspension expired in March 2021)

Proclamation 10043 *(Suspension of Entry as Nonimmigrants of Certain Students and Researchers From the People's Republic of China)*	Suspended entry of Chinese students and scholars with connections to China's "Military-Civil Fusion Strategy."	Implemented
Barring entry/stay of students enrolled in online-only courses	In July 2020, ICE published guidelines prohibiting international students taking online-only courses from remaining in the United States during the pandemic. Newly enrolled international students were also barred from entering the country.	Partially implemented (Trump administration withdrew guidelines on current international students in the United States after widespread litigation, but ban on entry of new international students remained in place)
Relevant Immigration Policies under the Biden Administration		
Policy	**Description**	**Status**
Early Career STEM Research Initiative	A new initiative within the DOS's Bureau of Educational and Cultural Affairs intended to facilitate foreign participation in STEM research, training or educational exchange visitor programs with U.S. host organizations, including businesses.	Implemented
STEM OPT expansion	22 additional STEM fields eligible for STEM OPT program	Implemented
J-1 STEM academic training (AT) extension	AT period for students on J-1 visas extended from 18 months to 36 months	Implemented
O-1A eligibility	DHS clarified guidelines for how people with "extraordinary abilities" in science and other fields, including STEM PhDs, can qualify for O-1A work visas.	Implemented
National interest waiver	U.S.CIS updated policy guidelines to streamline requests for national interest waivers from green card applicants with advanced STEM degrees but no job offer from a U.S. employer.	Implemented
NIV application fees	DOS proposed to raise the fees for non-immigrant visa applications, including F-1, J-1, and M-1, from $160 to $245.	Proposed
Dual-intent standard	Loosened standards for consular officials to assess students' ties and likelihood to return to their home countries after graduation, recognizing that students' present intents could change.	Implemented
Interview waiver	Waived in-person interviews for certain visa applicants, including those who have previously been issued any U.S. visa.	Implemented (through December 31, 2022)
National interest exemption	Students and academics who "provide vital support for critical infrastructure" or who have F-1 and M-1 visas are allowed to enter the U.S. despite COVID-19 travel restrictions.	Implemented

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