April 2022

The Long-Term Stay Rates of International STEM PhD Graduates

CSET Issue Brief

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Executive Summary

This issue brief examines how many international STEM PhD graduates choose to stay in the United States after earning their degrees and explores how those graduates navigate the U.S. immigration system. Our analysis is based on data collected through the National Science Foundation's (NSF) Survey of Doctorate Recipients (SDR), a survey that collects information on the demographics and employment trends of PhD graduates from U.S. universities (see Box 1 for details).

We found that a large majority of foreign nationals who earn STEM PhDs in the United States remain in the country many years after graduating. Specifically, we found that:

1. **Long-term stay rates are high.** As of February 2017, roughly 77 percent of the more than 178,000 international STEM PhD graduates from U.S. universities between 2000 and 2015 were still living in the country.

2. **Stay rates remain high even among older graduates.** Since 2000, at least 65 percent of every year's graduating class has stayed in the United States, and since 2004, no graduating class has had a stay rate below 73 percent.

3. **Stay rates are similar across STEM fields.** Though stay rates for different fields vary across individual years, no one STEM discipline has consistently higher or lower stay rates than the others.

4. **Chinese and Indian nationals account for nearly half of all international STEM PhD graduates in the United States, and most stay long after graduation.** In February 2017, approximately 90 percent of Chinese nationals and 87 percent of Indian nationals who completed STEM PhD programs in the United States between 2000 and 2015 were still living in the country, compared to 66 percent of graduates from other countries. Due to country caps on green cards, Indian graduates have more difficulty obtaining permanent residency than other international students.

5. **International STEM PhD graduates follow a similar path through the U.S. immigration system.** The plurality of graduates who completed their degrees between 2004 and 2011 had obtained permanent residency by February 2017, and among those who graduated before 2004, nearly half had become naturalized U.S. citizens.

Box 1. National Science Foundation Survey Data

Our analysis relies on data from the NSF's SDR, a biennial panel survey that collects information on the demographics and employment trends of PhD graduates from U.S. universities. The survey includes PhD graduates who hold a research doctorate in a science, engineering, or health-related field. We use data from the 2017 survey, which was administered to a sample of 124,580 PhD graduates who earned their degrees prior to July 1, 2015. Survey respondents described their immigration status as of early February 2017.[1]

Initially, we analyzed the stay rates of international STEM PhD graduates using data from the 2019 SDR. We decided to use the 2017 SDR instead after NSF warned of possible bias in estimates of stay rates based on 2019 data, due to higher rates of nonresponse among PhD graduates who lived outside the United States.[*] Our analysis of the 2019 data found virtually no change in overall stay-rate trends between the two surveys (e.g., the stay rate for all international STEM PhD graduates was roughly 77 percent in both the 2017 and 2019 SDR). Still, given the potential issues in the 2019 survey, we cannot definitively conclude that trends remained the same. We hope to reexamine stay-rate trends with greater certainty using the forthcoming 2021 SDR.

SDR data is not publicly available due to privacy considerations. Researchers can request access to the data through an NSF license request. The use of NSF data does not imply NSF endorsement of the research, research methods, or conclusions contained in this report.

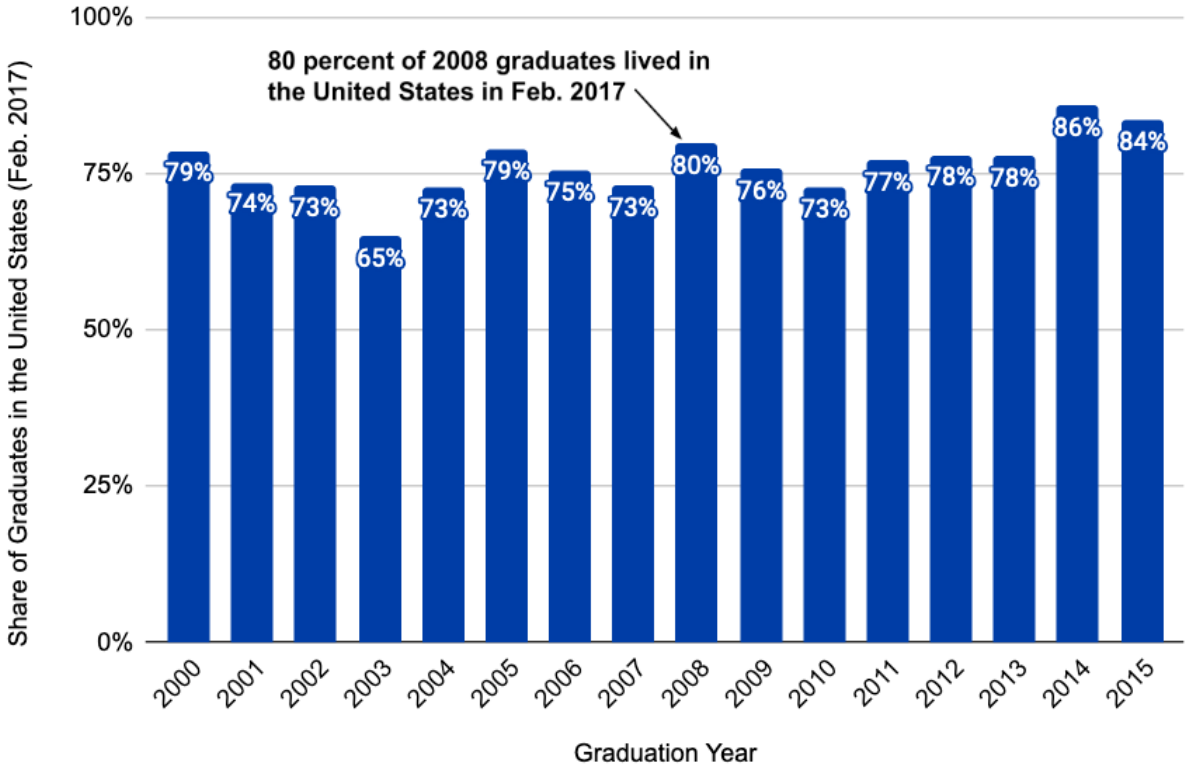
[*] Specifically, the NSF recommended that researchers "exercise caution when conducting any small domain analysis and estimation as the potential nonresponse bias may be non-ignorable at small domain levels such as country of origin." In other words, this bias would prevent us from obtaining reliable estimates on the stay rates of students from individual countries, such as China and India.

How Long Do International STEM PhD Graduates Stay in the United States?

One of the United States' greatest advantages in attracting STEM talent is the strength of its higher education system. U.S. universities remain a top destination for students around the world, particularly at the graduate level.[2] International students accounted for more than 40 percent of the roughly 500,000 doctoral degrees awarded by U.S. universities between 2000 and 2019.[3] Those who stay in the country after receiving their degrees strengthen the domestic STEM workforce and make valuable contributions to the economy and society.[4]

As shown in Figure 1, the large majority of international students who earn their PhDs from U.S. universities stay in the country for many years after graduation. As of February 2017, approximately 77 percent of international STEM PhD holders who graduated between 2000 and 2015 were still living in the United States. Since 2000, at least 65 percent of every year's graduating class has stayed in the United States, and since 2004, no graduating class has had a stay rate below 73 percent. Generally, stay rates have fluctuated with the health of the U.S. economy. Graduates left the country at higher rates immediately following the dot-com crash in 2000–2001 and the Great Recession in the late-2000s. In both cases, stay rates rose back up as the economy recovered.

Figure 1. Stay Rates of International STEM PhD Graduates



Source: 2017 NSF Survey of Doctorate Recipients (see Appendix A).*

Stay rates among international PhD graduates are similar across STEM disciplines. Table 1 shows the stay rates among PhD graduates in different academic fields. Though rates vary across fields in individual years, no one STEM discipline has consistently higher or lower stay rates than the others. Overall, international STEM PhD graduates are much more likely to remain in the United States after graduation than those who earn PhDs in non-STEM fields. Between 2000 and 2015, the stay rate for international PhD graduates who did not study STEM was approximately 55 percent, compared to 77 percent among STEM graduates. The remainder of this paper focuses specifically on STEM PhD graduates.[5]

* It is important to note the data referenced in Figure 1 and throughout the rest of this brief does not reflect the immigration patterns of a single group of individuals over time. Rather, it provides a snapshot of the immigration status of different graduate cohorts as of February 2017, unless otherwise specified.

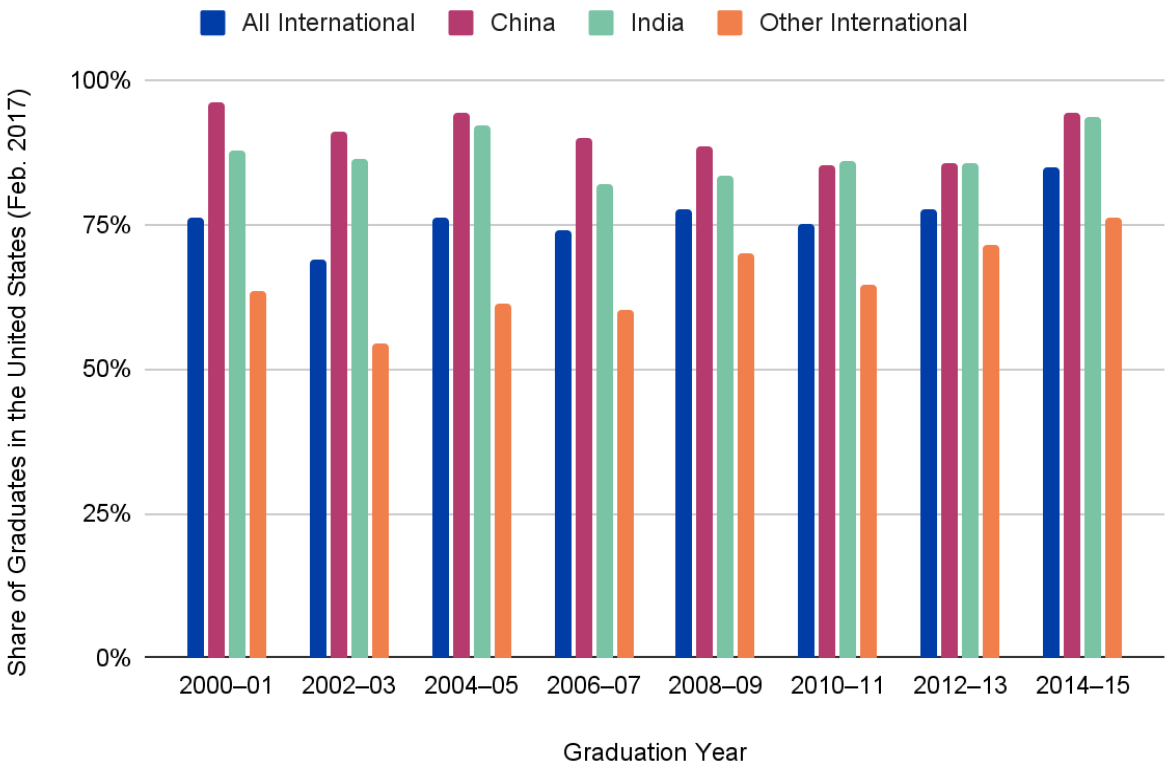
Table 1. Stay Rates of International PhD Graduates as of February 2017 by Field

Field	Graduation Cohort				
	2000–2003	2004–2007	2008–2011	2012–2015	All Years
STEM	73%	75%	76%	81%	77%
CS/Math	68%	77%	75%	82%	76%
Engineering	75%	79%	78%	82%	79%
Life Sciences	69%	73%	78%	81%	76%
Physical Sciences	78%	71%	71%	77%	74%
Non-STEM	52%	53%	57%	58%	55%
All (STEM + Non-STEM)	69%	72%	74%	78%	74%

Source: 2017 NSF Survey of Doctorate Recipients.

Stay rates also varied significantly based on graduates' nationalities, as shown in Figure 2. For example, Chinese and Indian nationals were far more likely to stay in the United States after graduation than other international graduates. As of February 2017, about 90 percent of Chinese nationals and 87 percent of Indian nationals who earned STEM PhDs between 2000 and 2015 were still living in the United States, compared to just 66 percent of graduates from other countries. The data also suggests that of the Chinese and Indian graduates who leave the United States, most do so immediately after graduation, while other international students are more likely to trickle out of the country over time.

Figure 2. Stay Rates of Chinese, Indian, and Other International STEM PhD Graduates as of February 2017



Source: 2017 NSF Survey of Doctorate Recipients (see Appendix B for more detailed data).

Prior research suggests there are three major categories of factors that affect international graduate students' decisions to stay or leave the country where they obtained their degree: professional opportunities, immigration rules, and personal and cultural considerations. Graduates are more likely to stay when immigration restrictions are lower and when they have fewer job prospects and social ties in their home country.[6]

How International STEM PhD Graduates Move Through the U.S. Immigration System

Most foreign graduate students who attend U.S. universities enter the country under F-1 student visas. These visas generally authorize students to remain in the country for the duration of their studies. The subsequent immigration process for international graduate students typically includes some combination of the following steps:

temporary residency (e.g., an H-1B visa), permanent residency (i.e., a "green card"), and ultimately citizenship through naturalization. Box 2 explains each of these steps in greater detail.

Box 2. Understanding the Immigration System

After graduation, people who hold F-1 student visas can take a number of different paths through the U.S. immigration system.

All graduates who hold F-1 visas are eligible for a period of **Optional Practical Training**, which permits them to work on a full-time basis in the United States while retaining their F-1 student visa status. STEM graduates may take up to three years of OPT while non-STEM graduates are only eligible for one year.[7] After finishing their studies or expending their OPT, graduates can apply for a different temporary work visa or, in some cases, permanent residency.

Graduates can obtain **temporary residency** if their employer is willing to sponsor them for a "non-immigrant" work visa. The most common of these authorizations is the H-1B visa. H-1Bs are typically valid for three years, with an option to extend for one additional three-year period.[8] Other types of non-immigrant work visas exist—such as L-1 visas and J-1 visas—though they are not commonly used by former international graduate students.[9]

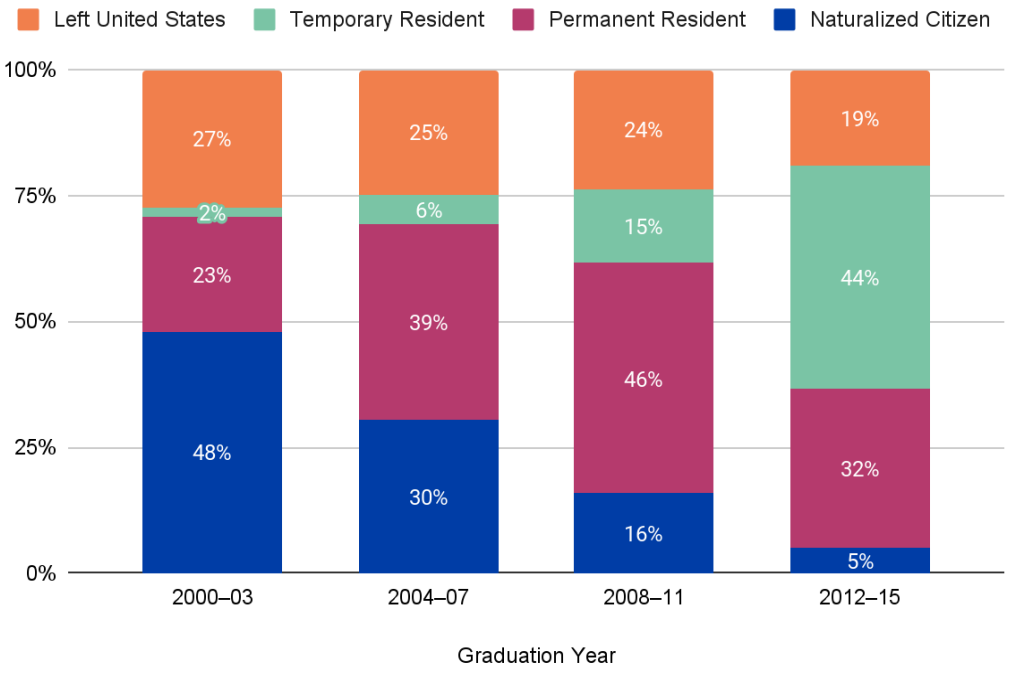
Employers can also sponsor international students and non-immigrant workers for **permanent residency**, otherwise known as green cards.[10] Green cards are awarded on a first-come-first-serve basis, with caps on the proportion of visas that can go to applicants from a single country. These caps have created extensive backlogs for applicants from certain populous countries, like China and India.

Permanent residents can begin the **naturalization** process after holding a green card for three or five years. However, some forgo the naturalization process and instead choose to remain in the United States by renewing their green cards every 10 years. From an employment perspective, the main benefit of citizenship is that it opens the door to defense- and government-related jobs that otherwise exclude non-U.S. citizens.

This progression through the U.S. immigration system is depicted in Figure 3, which shows the immigration status of different cohorts of international STEM PhD graduates. In general, the more time that has passed since an individual earned their degree, the further along they are in the immigration process.

For the first few years after earning their doctorate, international STEM PhD graduates are most likely to live as temporary residents. A plurality of foreign nationals who graduated six to 13 years before February 2017 had obtained green cards, and a plurality of those who graduated 14 or more years before had become naturalized citizens. Of the roughly 80,000 international students who earned STEM PhDs from U.S. universities between 2000 and 2007, approximately 56,000 (70 percent) had become permanent residents or naturalized citizens by February 2017.

Figure 3. Immigration Status of International STEM PhD Graduates as of February 2017



Source: 2017 NSF Survey of Doctorate Recipients (see Appendix C for detailed data).[11]

However, some graduates have a harder time putting down roots in the United States than others. While international students generally compete on a level playing field when applying for student visas and temporary residency, their ability to secure permanent residency is heavily influenced by their nationality.

Under current immigration laws, no more than 7 percent of green cards awarded in a given year can go to individuals from any single country.[12] These "country-based caps" create lengthy backlogs for people coming from populous countries with large numbers of applicants, most notably China and India. One study projected that a Chinese national who applied for EB-2 or EB-3 permanent residency in 2020 would need to wait more than a decade to have their application processed. For Indian nationals, the expected wait time was upwards of 80 years.[13]

U.S. policymakers have recently sought to streamline this choke point in the immigration system—in February 2022, the U.S. House of Representatives approved a measure that would exempt STEM PhD holders from country-based green card caps.[14] However, as of the publication of this brief, it is unclear whether the measure will be enacted into law.

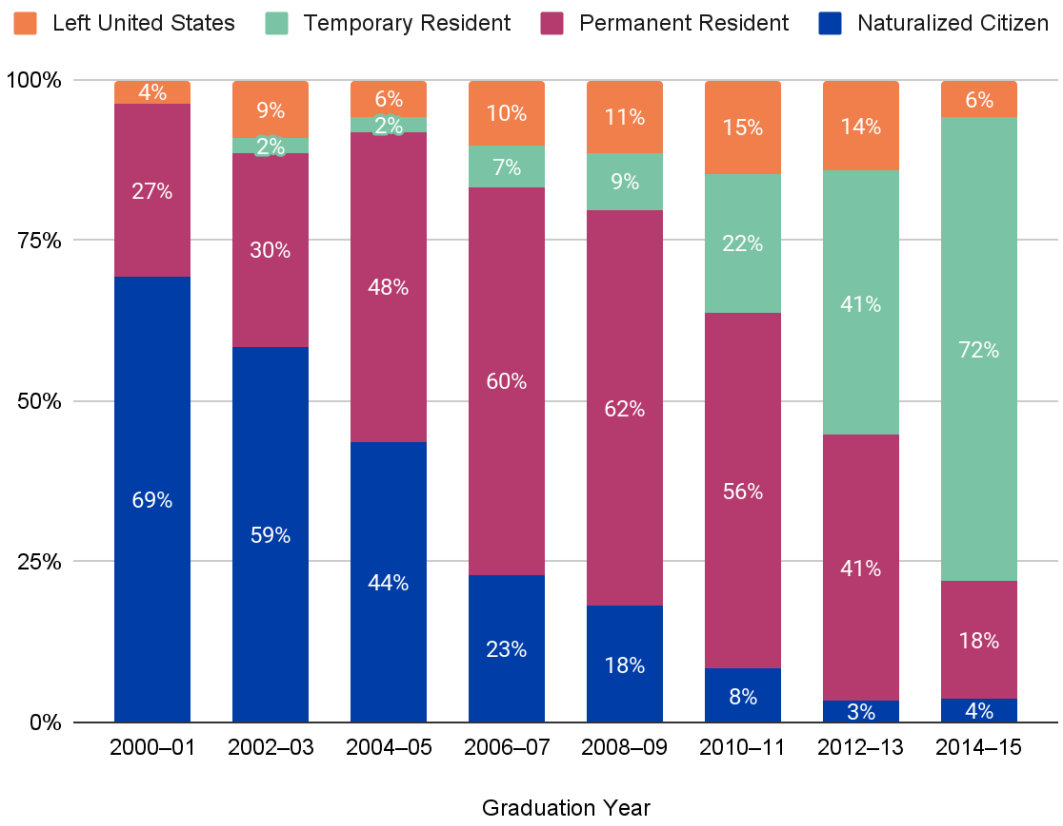
The remainder of this section takes a closer look at Chinese and Indian nationals who obtain STEM PhDs from U.S. universities and explores how their journey through the immigration system compares to other international PhD graduates. Chinese and Indian students accounted for nearly half of the international STEM PhD graduates in the United States between 2000 and 2015, and the vast majority stay in the United States after earning their degrees.[15]

China

More than 55,000 Chinese nationals graduated from STEM PhD programs at U.S. universities between 2000 and 2015, accounting for nearly one-third of all international graduates. As of February 2017, about 50,000 of those graduates (90 percent) still lived in the United States.

As shown in Figure 4, Chinese STEM PhD graduates have generally followed the same path through the immigration system as other international graduates. Most Chinese nationals stayed in the United States as temporary residents in the years immediately following graduation, but very few relied on temporary visas to stay in the country over the long term. A majority of Chinese nationals secured green cards within about six years of graduation, and most ultimately chose to become naturalized citizens.[16] Compared to other international STEM PhD graduates, Chinese nationals are much less likely to leave the United States after earning their degrees.

Figure 4. Immigration Status of Chinese STEM PhD Graduates as of February 2017, by Graduation Year



Source: 2017 NSF Survey of Doctorate Recipients (see Appendix D for detailed data).

In recent years, some U.S. policymakers have pushed to restrict the number of visas awarded to Chinese STEM students, arguing that too many return to China and work on projects that undermine U.S. economic and national security. However, our findings suggest these fears of a "reverse brain drain" are largely unfounded, at least among STEM PhD graduates.[17] If anything, available data supports the Chinese Communist Party's concern that China is losing STEM talent to the United States and other countries.[18]

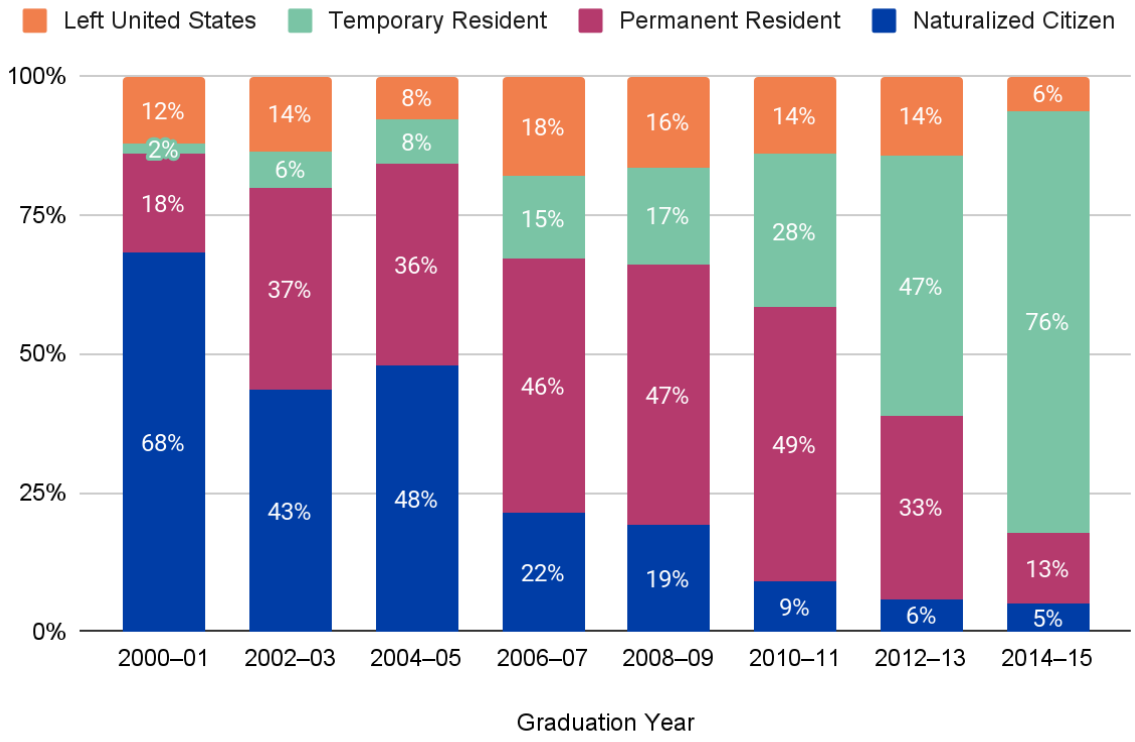
India

Nearly 28,000 Indian nationals earned STEM PhDs from U.S. universities between 2000 and 2015, accounting for roughly 16 percent of all international graduates during

that period. Like their Chinese counterparts, a large majority of Indian graduates (87 percent) stay in the United States after graduation. However, their journey through the immigration system tended to take more time than for other international graduates.

Figure 5 shows the immigration status of Indian STEM PhDs who graduated between 2000 and 2017.[19] Indian nationals have followed the same general trajectory as other international students, living as temporary residents immediately after graduation, and later obtaining permanent residency and eventually citizenship.

Figure 5. Immigration Status of Indian STEM PhD Graduates as of February 2017, by Graduation Year



Source: 2017 NSF Survey of Doctorate Recipients (see Appendix E for detailed data).

However, the share of graduates who maintain long-term temporary visas is higher among Indian nationals than those from other countries. In February 2017, about 12 percent of Indian STEM PhD graduates who earned their doctorates between 2004 and 2007 were living as temporary residents, compared to just 5 percent of Chinese nationals and 6 percent of international graduates overall. This trend is largely a product of the country caps for green cards, as discussed above.

In recent years, demand for green cards among Indian nationals has far exceeded the supply, creating an extensive backlog.[20] As of April 2021, more than 380,000 Indian nationals were still awaiting employment-based green cards after having their applications approved.[21] This trend is relatively recent—everyone in the current backlog applied for permanent residency in 2010 or later[22]—which explains why the delay is not reflected in Figure 5. If this backlog persists, it is reasonable to expect that a larger percentage of recent Indian PhD graduates will maintain long-term temporary residency or leave the United States altogether.[23]

Conclusion

U.S. universities remain a top destination for students around the world, particularly at the graduate level. International students accounted for more than 40 percent of the roughly half million STEM PhDs awarded by U.S. universities between 2000 and 2019.[24] Those who stay in the country after receiving their degrees strengthen the domestic STEM workforce and make valuable contributions to the economy and society.

We found more than 77 percent of the roughly 178,000 international students who obtained STEM PhDs from U.S. universities between 2000 and 2015 were still living in the country as of February 2017. Stay rates remain high even among older graduates—at least 65 percent of every year's graduating class since 2000 remains in the United States, and since 2008, no graduating class has had a stay rate below 73 percent. Furthermore, we found graduates who specialized in STEM were far more likely to stay in the United States than those who studied non-STEM fields, though stay rates across STEM disciplines were generally consistent.

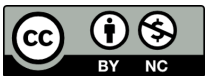
Additionally, we found stay rates vary significantly by nationality. Chinese and Indian nationals—who collectively account for almost half of the international STEM PhD population—remained at much higher rates than graduates from other countries. PhD graduates who remain in the United States generally follow a similar path through the immigration system, with the majority first living as temporary residents, then obtaining permanent residency, and then becoming naturalized citizens. However, due to country caps on green cards, Indian nationals face longer wait times than applicants from other countries. If the current backlog of permanent residency applicants persists, it is reasonable to expect that a greater share of Indian nationals will rely on long-term temporary visas or leave the United States altogether.

Authors

Jack Corrigan is a research analyst at CSET, where James Dunham is a data scientist. Remco Zwetsloot is a trustee fellow in the International Security Program at the Center for Security and International Studies, and was formerly a research fellow at CSET.

Acknowledgements

The authors would like to thank Catherine Aiken, David Bier, Amy Burke, Wan-Ying Chang, Jacob Feldgoise, Shelton Fitch, Rita Konaev, Igor Mikolic-Torreira, Leigh Ann Pennington, and Darius Singpurwalla for their valuable feedback, reviews, and editorial support.



Document Identifier: doi: 10.51593/20210023

Appendices

Appendix A. Data Table for Figure 1

Table A1. Stay Rates of International STEM PhD Graduates, 2000–2015

Graduation Year	N (Stayed)	N (Left)	Stay Rate
2015*	5,324	1,050	84%
2014	12,143	2,024	86%
2013	11,252	3,227	78%
2012	10,791	3,068	78%
2011	10,161	3,038	77%
2010	8,844	3,310	73%
2009	9,539	3,051	76%
2008	9,531	2,408	80%
2007	9,883	3,653	73%
2006	9,031	2,939	75%
2005	10,033	2,710	79%
2004	6,058	2,267	73%
2003	5,076	2,752	65%
2002	6,179	2,291	73%
2001	6,109	2,195	74%
2000	6,575	1,799	79%

Source: 2017 NSF Survey of Doctorate Recipients.

* The most recent graduation cohort appears to be smaller due to lags in data collection.

Appendix B. Stay Rates by Country

Table B1. Stay Rates of International STEM PhD Graduates by Nationality, 2000–2015

	All International		All International (excl. China/India)		China		India	
Year	N (total)	Stay Rate	N (total)	Stay Rate	N (total)	Stay Rate	N (total)	Stay Rate
2014–2015	20,541	85%	10,336	76%	6,813	94%	3,392	94%
2012–2013	28,338	78%	15,670	71%	7,637	86%	5,031	86%
2010–2011	25,353	75%	12,940	65%	7,413	85%	5,000	86%
2008–2009	24,529	78%	13,236	70%	7,401	89%	3,892	84%
2006–2007	25,506	74%	12,246	60%	8,449	90%	4,811	82%
2004–2005	21,068	76%	11,279	61%	7,175	94%	2,614	92%
2002–2003	16,298	69%	9,550	54%	5,256	91%	1,492	86%
2000–2001	16,678	76%	9,974	64%	5,296	96%	1,408	88%

Source: 2017 NSF Survey of Doctorate Recipients.

Appendix C. Stay Rates and Immigration Statuses of International STEM PhD Graduates

Table C1. Immigration Statuses of International STEM PhD Graduates as of February 2017

	Left United States		Naturalized Citizens		Permanent Residents		Temporary Residents	
Graduation Cohort	N	% Total	N	% Total	N	% Total	N	% Total
2012–2015	9,369	19%	2,476	5%	15,499	32%	21,536	44%
2008–2011	11,807	24%	7,868	16%	22,856	46%	7,351	15%
2004–2007	11,569	25%	14,108	30%	18,202	39%	2,696	6%
2000–2003	9,037	27%	15,853	48%	7,428	23%	659	2%

Source: 2017 NSF Survey of Doctorate Recipients.

Appendix D. Immigration Statuses of Chinese Nationals

Table D1. Immigration Statuses of Chinese STEM PhD Graduates as of February 2017

	Left United States		Naturalized Citizens		Permanent Residents		Temporary Residents	
Graduation Cohort	N	% Total	N	% Total	N	% Total	N	% Total
2014–2015	394	6%	246	4%	1,247	18%	4,926	72%
2012–2013	1,083	14%	259	3%	3,150	41%	3,140	41%
2010–2011	1,079	15%	616	8%	4,115	56%	1,602	22%
2008–2009	835	11%	1,332	18%	4,551	62%	650	9%
2006–2007	859	10%	1,944	23%	5,089	60%	551	7%
2004–2005	412	6%	3,138	44%	3,461	48%	164	2%
2002–2003	475	9%	3,076	59%	1,587	30%	118	2%
2000–2001	193	4%	3,678	69%	1,424	27%	1	0%

Source: 2017 NSF Survey of Doctorate Recipients.

Appendix E. Immigration Statuses of Indian Nationals

Table E1. Immigration Statuses of Indian STEM PhD Graduates as of February 2017

	Left United States		Naturalized Citizens		Permanent Residents		Temporary Residents	
Graduation Cohort	N	% Total	N	% Total	N	% Total	N	% Total
2014–2015	211	6%	168	5%	432	13%	2,536	76%
2012–2013	717	14%	298	6%	1,657	33%	2,359	47%
2010–2011	700	14%	454	9%	2,450	49%	1,376	28%
2008–2009	638	16%	746	19%	1,827	47%	676	17%
2006–2007	872	18%	1,035	22%	2,192	46%	712	15%
2004–2005	204	8%	1,250	48%	953	36%	207	8%
2002–2003	202	14%	649	43%	545	37%	96	6%
2000–2001	172	12%	961	68%	251	18%	24	2%

Source: 2017 NSF Survey of Doctorate Recipients.

Endnotes

[1] "Survey of Doctorate Recipients: 2017 - Technical Notes," *National Science Foundation*, accessed January 2022, https://ncsesdata.nsf.gov/doctoratework/2017/sdr_2017_tech_notes.pdf#page=2. The sample of 124,580 individuals represents roughly 11 percent of the total population (1,103,200 individuals).

[2] Catherine Aiken, James Dunham, and Remco Zwetsloot, "Immigration Pathways and Plans of AI Talent" (Center for Security and Emerging Technology, September 2020), https://cset.georgetown.edu/publication/immigration-pathways-and-plans-of-ai-talent/.

[3] Remco Zwetsloot, Jack Corrigan, Emily Weinstein, Dahlia Peterson, Diana Gehlhaus, and Ryan Fedasiuk, "China is Fast Outpacing U.S. STEM PhD Growth" (Center for Security and Emerging Technology, August 2021), https://cset.georgetown.edu/publication/china-is-fast-outpacing-u-s-stem-phd-growth/.

[4] Tina Huang, Zachary Arnold, and Remco Zwetsloot, "Most of America's 'Most Promising' AI Startups Have Immigrant Founders" (Center for Security and Emerging Technology, October 2020), https://cset.georgetown.edu/publication/most-of-americas-most-promising-ai-startups-have-immigrant-founders/.

[5] We include five academic fields in our definition of STEM: biological, agricultural, and environmental life sciences; computer and information science; engineering; mathematics and statistics; and physical sciences, geosciences, and ocean sciences. Our analysis excludes PhD graduates with degrees in social sciences.

[6] Remco Zwetsloot, James Durham, Zachary Arnold, and Tina Huang, "Keeping Top AI Talent in the United States" (Center for Security and Emerging Technology, December 2019), https://cset.georgetown.edu/wp-content/uploads/Keeping-Top-AI-Talent-in-the-United-States.pdf#page=23; Aiken, Dunham, and Zwetsloot, "Immigration Pathways and Plans of AI Talent"; Catherine Aiken, James Dunham, and Remco Zwetsloot, "Career Preferences of AI Talent" (Center for Security and Emerging Technology, June 2020), https://cset.georgetown.edu/publication/career-preferences-of-ai-talent/.

[7] Zwetsloot et al., "Keeping Top AI Talent in the United States."

[8] H-1B visa holders with pending green card applications may continue renewing their visas in one-year increments after the initial three-year extension.

[9] Zachary Arnold, Roxanne Heston, Remco Zwetsloot, and Tina Huang, "Immigration Policy and the U.S. AI Sector" (Center for Security and Emerging Technology, September 2019), https://cset.georgetown.edu/publication/immigration-policy-and-the-u-s-ai-sector/; and Zwetsloot et al., "Keeping Top AI Talent in the United States."

[10] There are multiple categories under which people can apply for permanent residency, including EB-1 (for those with "extraordinary ability" or "outstanding professors and researchers"), EB-2 (for those with "exceptional ability," most commonly used by those with graduate degrees), and EB-3 (college graduates). Graduate students typically apply under the EB-2 category, though generally they are also eligible for EB-3 visas.

[11] Due to privacy considerations, NSF was only able to provide data on four-year cohorts.

[12] Julia Gelatt, "Explainer: How the U.S. Legal Immigration System Works" (Migration Policy Institute, April 2019), https://www.migrationpolicy.org/content/explainer-how-us-legal-immigration-system-works.

[13] David J. Bier, "Employment-Based Green Card Backlog Hits 1.2 Million in 2020," Cato at *Liberty*, November 20, 2020, https://www.cato.org/blog/employment-based-green-card-backlog-hits-12-million-2020.

[14] Kimberly Bennett, "Bill Passed by House Benefits Immigrants in STEM Fields, Entrepreneurs in Start-Ups," *JDSupra*, February 9, 2022, https://www.jdsupra.com/legalnews/bill-passed-by-house-benefits-8093761/; America COMPETES Act of 2022, H.R. 4521, 117th Congress (2021), https://docs.house.gov/billsthisweek/20220131/BILLS-117HR4521RH-RCP117-31.pdf.

[15] Remco Zwetsloot, Jacob Feldgoise, and James Durham, "Trends in U.S. Intention-to-Stay Rates of International PhD Graduates Across Nationality and STEM Fields" (Center for Security and Emerging Technology, April 2020), https://cset.georgetown.edu/publication/trends-in-u-s-intention-to-stay-rates-of-international-ph-d-graduates-across-nationality-and-stem-fields/.

[16] Chinese law does not permit dual citizenship, so Chinese nationals automatically lose their citizenship after completing the naturalization process in the United States. See: Embassy of the People's Republic of China in the United States of America, "Nationality Law of the People's Republic of China," accessed October 2021, http://www.china-embassy.org/eng/ywzn/lsyw/vpna/faq/t710012.htm.

[17] While our analysis shows stay rates among international STEM PhD graduates remain consistently high, we were unable to assess the United States' ability to attract and retain foreign nationals at the bachelor's and master's level, as neither the NSF nor any organization

we know of collects such data. Additional research into the post-graduation stay rates of international bachelor's and master's students would give us a more comprehensive understanding of the STEM talent pipeline in the United States.

[18] Remco Zwetsloot, "Sen. Tom Cotton suggested Chinese STEM students head home after studying in the U.S. The research shows otherwise," *The Washington Post*, April 28, 2020, https://www.washingtonpost.com/politics/2020/04/28/sen-tom-cotton-suggested-chinese-stem-students-head-home-after-studying-us-research-shows-otherwise/; and Remco Zwetsloot, "US-China STEM Talent 'Decoupling': Background, Policy, and Impact" (Johns Hopkins Applied Physics Laboratory, 2020), https://www.jhuapl.edu/assessing-us-china-technology-connections/dist/6f836fc5733036e578c346897c5f623a.pdf.

[19] Due to privacy considerations, NSF restricted data on the size of certain cohorts of Chinese and Indian nationals who graduated between 2000–2005 and held temporary residency in February 2017. We estimated these figures indirectly using other public SDR data.

[20] David J. Bier, "Backlog for Skilled Immigrants Tops 1 Million: Over 200,000 Indians Could Die of Old Age While Awaiting Green Cards" (Cato Institute, March 30, 2020), https://www.cato.org/publications/immigration-research-policy-brief/backlog-skilled-immigrants-tops-1-million-over#projection-future-wait-times.

[21] U.S. Customs and Immigration Services, "Form I-140, I-360, I-526 Approved Employment-Based Petitions Awaiting Visa Availability by Preference and Country of Birth," U.S. Department of Homeland Security, April 2021, https://www.uscis.gov/sites/default/files/document/reports/EB_I140_I360_I526_performancedata_fy2021_Q1_Q2.pdf.

[22] U.S. Department of State, "Visa Bulletin for April 2021," March 5, 2021, https://travel.state.gov/content/travel/en/legal/visa-law0/visa-bulletin/2021/visa-bulletin-for-april-2021.html.

[23] The United States is already seeing large numbers of Indian nationals, including those educated in the country, flock to other countries with less restrictive immigration systems, such as Canada. For more information, see: Zachary Arnold, "Canada's Skilled Immigration System Increasingly Draws Talent from the United States" (Center for Security and Emerging Technology, July 2020), https://cset.georgetown.edu/publication/canadas-immigration-system-increasingly-draws-talent-from-the-united-states/.

[24] Zwetsloot et al., "China is Fast Outpacing U.S. STEM PhD Growth."