



Career Pathways for International Students

ANNA ESAKI-SMITH

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American Council on Education
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ANNA ESAKI-SMITH
Co-Founder and Managing Director
Education Rethink

Introduction

International students seek study-abroad opportunities for many reasons. Most want to enroll in courses that are of a higher quality or offer alternative subject specialisms than those available at home. Traditionally, most international students have headed to Anglophone destinations, particularly the United States and the United Kingdom, where international recruitment trends have tracked the economic trends in recruits' respective source countries. Study-abroad students enroll at all levels, for credit-bearing and non-credit-bearing courses, for courses leading to qualifications at home (for example exchange students), and for qualifications from the host college or university. This paper focuses on study-abroad students enrolled at degree level, with a particular focus on doctoral graduates.

The rise of an increasingly integrated global economy means the connection between study and work has become more important. Work-related drivers have become higher priorities for recruits; in turn, this has increased pressure on colleges and universities to deliver and quantify employment outcomes and to forefront these in their recruitment activities (Berquist et al. 2019). Initially, many international students saw the potential to learn English as a way to gain a competitive edge in the job market.

But with today's technology-based workplace, possession of an array of so-called soft skills—such as adaptability, creativity, and problem solving—has also grown in importance in an evolving knowledge economy (World Economic Forum 2018). From the perspective of employers, these professional skills are a measure of individuals' employability alongside their academic transcripts, and the academic and extracurricular experiences of studying and living in a foreign country can help international students acquire these skills. As a result, the value of the study-abroad experience for international students has increased (Bowman 2019).

But little is known about how international graduates of U.S. institutions actually fare in the job market and how their career trajectories are altered as a result of their study-abroad experience. Colleges and universities bear some of the blame for this lack of data, as they have largely failed to track the career trajectories of their international graduates. According to a survey of 100 postsecondary institutions conducted by Academic Assembly and the marketing firm Intead (2017, 5), 65 percent of respondents said they did not dedicate any staff time to track their international alumni. Insufficient time and budgets and a lack of data management systems were among the reasons given, even though data on employment and contact details are routinely collected for domestic students. Even when data are collected from international graduates, they are often of limited value, representing only a portion of the cohort, lacking detail, and simply reflecting first destinations that may be summer jobs and bear little relation to long-term career paths.

The Current Situation

Prior to the COVID-19 pandemic, U.S. colleges and universities were already contending with challenges. After rising to over 1 million students in the 2015–16 academic year (IIE, n.d.), international student enrollments in the U.S. have declined across the board. Indeed, the latest Open Doors data collected by the Institute of International Education (IIE) (2020) indicated exactly that, with a 1.8 percent decrease in international students in the 2019–20 academic year. Further, a “snap” survey of institutions showed the dampening impact of the pandemic, with a 16 percent decline in total international student enrollment for the fall 2020 semester, dragged down by a 43 percent fall in new enrollments.

The reasons for the falling trend are numerous, among them the proliferation of study-abroad options in nontraditional host destinations, which offer more choices and are often less expensive, and the obstructive immigration policies of the Trump presidency.

As we know, China and India currently send the highest numbers of students overseas, and other Anglophone markets such as Canada and Australia fiercely compete with the U.S. for these students. Germany, the Netherlands, Japan, and China itself are among other nations aggressively, and successfully, recruiting international students, with many of these countries achieving international student enrollment goals years before their government-implemented deadlines (*ICEF Monitor* 2018). In many instances, lower fees, as well as industry-aligned internships and job opportunities, have cemented student interest. Meanwhile, regional leaders are emerging in places that can satisfy the aspirations of those with more limited financial means, such as Africa and Southeast Asia.

It is not only their academic offerings, however, but also the comparative ease of their study and post-study work visa processes that competitor countries are using to attract international recruits to their institutions. Canada, for example, is home to a number of high-ranking universities, is geographically well-placed to appeal to graduates who have been unsuccessful in gaining employment in the U.S., and has been proactive in easing the associated bureaucratic procedures.

Higher education is not the only beneficiary of international student enrollment. Optional Practical Training (OPT)—part of the U.S. F-1 visa employment regulation that allows students to work in a field directly related to their major for up to 12 months after completing their course of study¹—is one mechanism by which the U.S. can compete with other countries for top talent and benefit from its contribution. OPT is one of the few pathways international students have to work legally in the U.S.

SNAPSHOT FROM NATIONAL CENTER FOR SCIENCE AND ENGINEERING STATISTICS' 2019 SURVEY OF EARNED DOCTORATES

- Students from China, India, and South Korea account for 53 percent of the 158,996 doctorates awarded to temporary visa holders in the last 10 years.
- Thirty-eight percent of all U.S. doctorates were awarded to temporary visa holders in 2019.
- Between 70 percent and 95 percent of doctorate recipients from these countries earned a doctorate in a science and engineering field.

1 More information on OPT is available at the U.S. Citizenship and Immigration Services' website: <https://www.uscis.gov/working-in-the-united-states/students-and-exchange-visitors/optional-practical-training-opt-for-f-1-students>.

A Closer Look at OPT Data

F-1 students can engage in practical training in the U.S. upon graduation, which can help build upon the skills learned during college.² While there are two types of training—curricular practical training (CPT) and optional practical training (OPT)—the major difference is the time period in which a student is eligible for these programs and the type of work allowed in each program. CPT must be completed before graduation, as CPT employment must be part of a curriculum that allows students to work in a paid or unpaid internship, practicum, or cooperation education program, whereas OPT is not employer-specific and course credit is not required.

Under OPT, which began in 1992, international students can work for a year in a U.S.-based job related to their field of study (Miano 2017). In 2017, a representative of the Student and Exchange Visitor Program, a division within U.S. Immigration and Customs Enforcement that collects data on international students, described OPT as “an opportunity to apply knowledge gained from a program of study in a practical environment” (Ross and Moody 2019).

Between 2004 and 2016, nearly 1.5 million foreign graduates of American colleges and universities were authorized to stay and work in the U.S. through the OPT program (Ruiz and Budiman 2018b). However, in an indication of the declining trend of international student enrollments, even with a 9.6 percent gain in the OPT program (Redden 2019), growth in total numbers of international students studying and working in the U.S. during the 2018–19 academic year was slight, rising by an incremental 0.05 percent.

Research connecting international graduates and employment in the U.S. often focuses on OPT data and stay rates, and most tracks the pathways of graduate students studying science, technology, engineering, and mathematics (STEM) subjects. More than half of the foreign graduates approved for employment specialized in STEM fields, according to a Pew Research Center analysis of U.S. Immigration and Customs Enforcement data obtained via a Freedom of Information Act request (Ruiz and Budiman 2018b). Executive actions in 2008 and 2016 first doubled, then tripled the maximum length of employment for international students with STEM degrees (U.S. Immigration and Customs Enforcement, Department of Homeland Security 2008; Department of Homeland Security 2016).

Indeed, the number of international STEM graduates participating in OPT has expanded by 400 percent since the first employment extension was announced, according to Pew Center research (Ruiz and Budiman 2018b). These students come from across the globe, but the majority are from Asia, with 57 percent of all OPT participants between 2004 and 2016 from India, China, and South Korea. At the same time, the population eligible for OPT has been increasing—between 2008 and 2016, new college enrollments among international students on F-1 visas rose by 104 percent (Ruiz and Radford 2017).

According to a 2019 report from the Niskanen Center, a Washington, DC-based think tank, experiential learning opportunities for international students like OPT lead to increased innovation and higher average earnings while not costing U.S. workers their jobs (Neufeld 2019). The center obtained data on over 1.7 million OPT participants, including information on their degrees and employers, from the Student and Exchange Visitor Information System through a Freedom of Information Act request. Since 2004, the number of OPT participants working in the U.S. has increased more than three-fold, from over 77,000 to 250,000. The data indicate significant growth in OPT since the first STEM extension was established in 2008, and the biggest yearly increase was between 2015 and 2016 with the launch of the 24-month STEM extension.

2 See the “Student and Exchange Visitor Program” section of the U.S. Immigration and Customs Enforcement’s website for more detailed information: <https://www.ice.gov/sevis/practical-training>.

Furthermore, the Niskanen research found that the greater the number of OPT participants, the higher the levels of innovation, as measured by the number of patents and higher average earnings, especially among the higher skilled, while the effect of OPT participants on the labor force is marginal, suggesting that international graduate workers do not have adverse effects on aggregate labor market outcomes. This is addressed a bit later in this paper.

However, in recent years, OPT growth has slowed, with enrollment of STEM graduates in the program increasing by 13 percent in 2017 over the previous year, compared with 48 percent annual growth in 2016 (Ruiz and Budiman 2018a). The decrease was due partly to a smaller number of international graduates who studied STEM subjects, as well as the significant effect of proposed curtailments to the program by the Trump administration (Associated Press 2018). There have also been investigations into OPT by the Department of Homeland Security (Fischer 2020), as well as accusations of fraud in the program (Gutierrez and Gardella 2020). And according to the Migration Policy Institute (Israel and Batalova 2021), it is not employability that is the deciding factor in the success or failure of international graduates' search for work in the U.S., but rather barriers to work visas. The new Biden administration has pledged to increase the availability of highly skilled visas, exempt PhD graduates in STEM fields from employment-based visa caps, reduce visa backlogs, and speed up visa and citizenship application processing; Biden has even talked of offering doctoral graduates a green card with their degree.

A Closer Look at H1-B Data

The H1-B offers a three-year temporary work visa, with the possibility of a further three-year extension, and is capped at 65,000 visas per year; a further 20,000 visas are earmarked for workers with a U.S. master's degree or higher (some industries, including higher education, nonprofit, and government research are exempt from the annual cap). Applications are made by employers on behalf of candidates and hugely outnumber the visas granted. Successful H1-B visa applications are concentrated in a few U.S. metro areas and often won by recruits to the tech industries, global manufacturing companies, management consulting firms, and the finance industry, and include many well-known Fortune 500 companies (Ruiz, Wilson, and Choudhury 2012).

OPT approvals have outnumbered initial H1-B visa approvals in recent years, despite the fact that the H1-B visa program, which enables American companies to hire highly skilled foreign workers and is the country's largest temporary employment visa program, is more well known (Ruiz and Budiman 2018b). There is little research focusing on the conversion of OPT to H1-B visa status, nor to permanent residency, or on these workers' contributions to industry competitiveness.

A Glimpse of the Economic Implications

U.S. employers, especially in the technology field, are experiencing talent shortages that hinder their competitiveness, a gap that international graduates could help to close. Technology and science jobs in the U.S. outnumbered qualified workers by 3 million as of 2016 (da Costa 2019). By 2030, there is expected to be a global shortage of over 85 million tech workers, representing \$8.5 trillion in lost annual revenue.



Surveys by the American Physical Society (2019) of physics department chairs and international physics students reveal that the U.S. is losing its ability to attract the best students in the world, with an average two-year decline of 22 percent in international applications to physics departments not in the top tier. Considering that over 70 percent of all U.S. physics PhDs are awarded by institutions outside the top 15, the decline indicates a rising economic risk to the U.S., since a country's ability to attract the best students in the world is a key competitive advantage when it comes to innovation and a high-caliber STEM workforce. Further research is needed to contextualize this data, reflecting on international and domestic recruitment trends in physics internationally, and the quality of applicants, as well as placing the data in the context of rising or falling trends across a wide range of subject disciplines. The National Science Foundation echoes the call for more information on the labor force and demographic trends to inform policy that shapes the countries science and engineering landscape (National Science Board 2019).

Sentiment against the recruitment of foreign workers was fueled by the last administration by, for example, the “Buy American and Hire American” executive order of 2017 (U.S. Citizenship and Immigration Services, Department of Homeland Security 2021), but the shortage of highly qualified workers with specialist skills in the U.S. could be alleviated by an overhaul of the H1-B system. While the impact of foreign workers on the U.S. economy has been the subject of much research, most focuses on low-skilled labor. Further data on the impact of foreign high-skilled workers—specifically, U.S.-educated high-skilled workers—both on the economy as well as on the domestic labor force is needed. The failure to measure the professional and economic impact of international graduates after they leave U.S. campuses impedes the ability of U.S. colleges and universities to fully convey the benefits of their programs and services when they recruit overseas.

Other hurdles to the long-term employment prospects of international graduates in the U.S. include the length of time it can take to gain permanent residency and, recently, bars to applications for all workers

from certain countries. As a result, other countries that offer easier routes to employment for international personnel, such as Canada, have benefited from a talent pool that might otherwise have worked in the U.S. Moreover, recent research using bibliographic data reveals how growing numbers of researchers are mobile, working in different destinations or across borders and in collaboration with other researchers based in different destinations; traditional affiliations to one institution or one country are only one of many models in today's global work (Robinson-Garcia et al. 2018). Such insights offer us a glimpse into future norms, accelerated by the impact of COVID-19 and the new prevalence of remote working. Such flexibility in hiring and work practices can boost the ability of U.S. institutions to draw talent no matter the worker's nationality or geographic locale. The growing ease with which many occupations can operate across national boundaries poses new political and regulatory questions for policymakers in terms of visas for foreign workers. For returning international graduates, it offers an alternative mode of employment in the host country.

Declining international enrollment combined with the effects of the pandemic creates even more urgency to provide U.S. colleges and universities with data to support successful recruitment and enrollment yields. The last four years and the advent of the pandemic have starkly highlighted the fragility of U.S. "economic norms" and traditional workplace routines, revealing that not only political forces can disrupt global competition and its concomitant economic activities, but labor market conditions and workplace norms can change drastically without warning, demanding innovation and creative thinking as never before. The inauguration of Joe Biden signals the altered political direction of the next four years, and this time is crucial for advocacy for change, to enable greater openness and flexibility to realize the potential of the innovative and green economy of the future.

The Success of U.S. Competitors

The implementation of hurdles to international recruitment under the Trump administration contrasts with policies in competitor host countries that have strategically developed pathways for international recruitment and for international graduates to work after graduation and even gain citizenship.

Canada, for example—where international student mobility has increased 119 percent in roughly the last decade (Ortiz 2018)—wants to attract and retain international students in order to address the needs of its aging and shrinking labor supply. Steps to encourage international student mobility have been taken, even during the pandemic when the country announced in July that it would fast-track study visa processing and offered a temporary two-stage approval process for international students who could not yet submit a complete study visa application but wanted to begin their Canadian study program online (El-Assal 2020). Just two months later, the U.S. announced the September 25 proposal by the U.S. Department of Homeland Security (U.S. Immigration and Customs Enforcement, Department of Homeland Security 2020) to amend regulations by changing the admission period of F, J, and I aliens from duration of status (the period a student is pursuing a full course of study, plus any authorized practical training) to admission for a fixed time period.

The U.K., too, has acknowledged the value international students place on the ability to work after graduation, recently reinstating the two-year post-study work rights after rescinding them in 2012 resulted in a significant drop in international enrollments and a huge increase in Indian students heading to Canada (United Kingdom Government Digital Service 2019; Kennedy 2019). Before the impact of the pandemic, the U.K. was experiencing significant growth in international enrollments, particularly from China and India.

As highlighted above, the U.S. has recently been losing its market share of international students, which has a knock-on effect on its profile—propagated by a diminishing number of alumni—and is therefore suffering a reduction in the economic contribution of its smaller international graduate talent pool. Policies designed to increase visa hurdles for both international students and foreign workers in the U.S. have dampened the appeal and opportunity to study abroad in the country. These worries were intensified in the summer of 2020 when new U.S. immigration guidance barred new international students who were studying entirely online from entering the U.S. (Redden 2020). The order was quickly rescinded for international students already enrolled in the U.S., but it left many confused and put off. Indian students—who currently number 200,000 in the U.S.—were among those unnerved by the move to limit the activities of first-time international students who are studying exclusively online (Slater and Masih 2020).

The impact of COVID-19 has further exacerbated declines in international student enrollments in the U.S. The beginning of the fall 2020 academic semester saw a decrease of 16 percent in the total number of international students enrolled in U.S. schools, compared with 2019 (Israel and Batalova 2021). The total number of new international students fell by 43 percent, in part because some chose to defer their studies, and the recent worsening of the pandemic in terms of the emergence of new strains of the virus threatens to reduce international recruitment further. The race to roll out a successful vaccine program is key to when, how, and in what form study abroad will recover.

The international education organization NAFSA (2020, 12) characterized the third consecutive year of decreasing new international student enrollments as “alarming,” while noting many other countries are proactively establishing national policies and marketing strategies in order to attract talented international individuals. NAFSA is among several organizations that recommend a coordinated U.S. recruitment strategy to attract a diverse pool of talented individuals from across the globe and to allow visa applicants to express interest in remaining in the U.S. after graduation; current immigration law requires international students to show no intent to immigrate. Research that demonstrates how international graduates contribute to the U.S. economy could underscore NAFSA’s recommendations to welcome expressions of interest in remaining in the country. From a more macro perspective, linking a U.S. degree to improved job prospects could increase U.S. competitiveness in industries—in particular, in the field of technology—as we seek to attract young international talent, especially against a backdrop of recently heightened geo-political tensions with China. Fortunately, a shift in the U.S. administration indicates potential changes to policies across the board and augurs well for a recovery in international student recruitment, if fences can be mended (such a recovery may be tempered, of course, by the ongoing impact of the pandemic).

A Close Look at China

China’s own emergence as a major study-abroad destination as well as its ambition for dominance in technology—specifically, in the fields of artificial intelligence and machine learning—have solidified in recent years. While China is the largest source country of international students, it also draws foreign enrollments based on less expensive tuition, a curriculum taught in English, and potential jobs aligned with the Belt and Road Initiative,³ one of the world’s most ambitious infrastructure projects. The country’s mobility goals are to match inbound student numbers—currently 492,000—with outbound, which stand at 662,000 (Wang 2019; Zou

3 For an overview of the Belt and Road Initiative, see Andrew Chatzky and James McBride, “China’s Massive Belt and Road Initiative,” *Backgrounder*, Council on Foreign Relations, January 28, 2020, <https://www.cfr.org/backgrounder/chinas-massive-belt-and-road-initiative>.

2019). In addition, massive investment that is impossible to match by most countries in the West has enabled Chinese universities to climb steadily in the rankings, with Tsinghua University breaking into the top 20 in the most recent *Times Higher Education World University Rankings*; the number of mainland universities in the top 100 has also doubled from three to six (*ICEF Monitor 2020*). These factors not only make China an attractive destination for international students, but also provide more reasons for Chinese students to remain at home.

In 2008, China launched its Thousand Talents Plan to recruit leading international experts in scientific research, innovation, and entrepreneurship.⁴ The program has drawn the interest of lawmakers and others for its problematic contract provisions, lack of transparency, and some high-profile cases of U.S. researchers who have not disclosed their foreign support on federal grant disclosure forms (Green and Barry 2020). The FBI has characterized China's recruitment program as enticing scientists to covertly bring U.S. knowledge and innovation to China, even if that means "stealing proprietary information or violating our export controls and conflict-of-interest rules" (Wray 2020). Nevertheless, it exemplifies China's intention of dominating key industries.

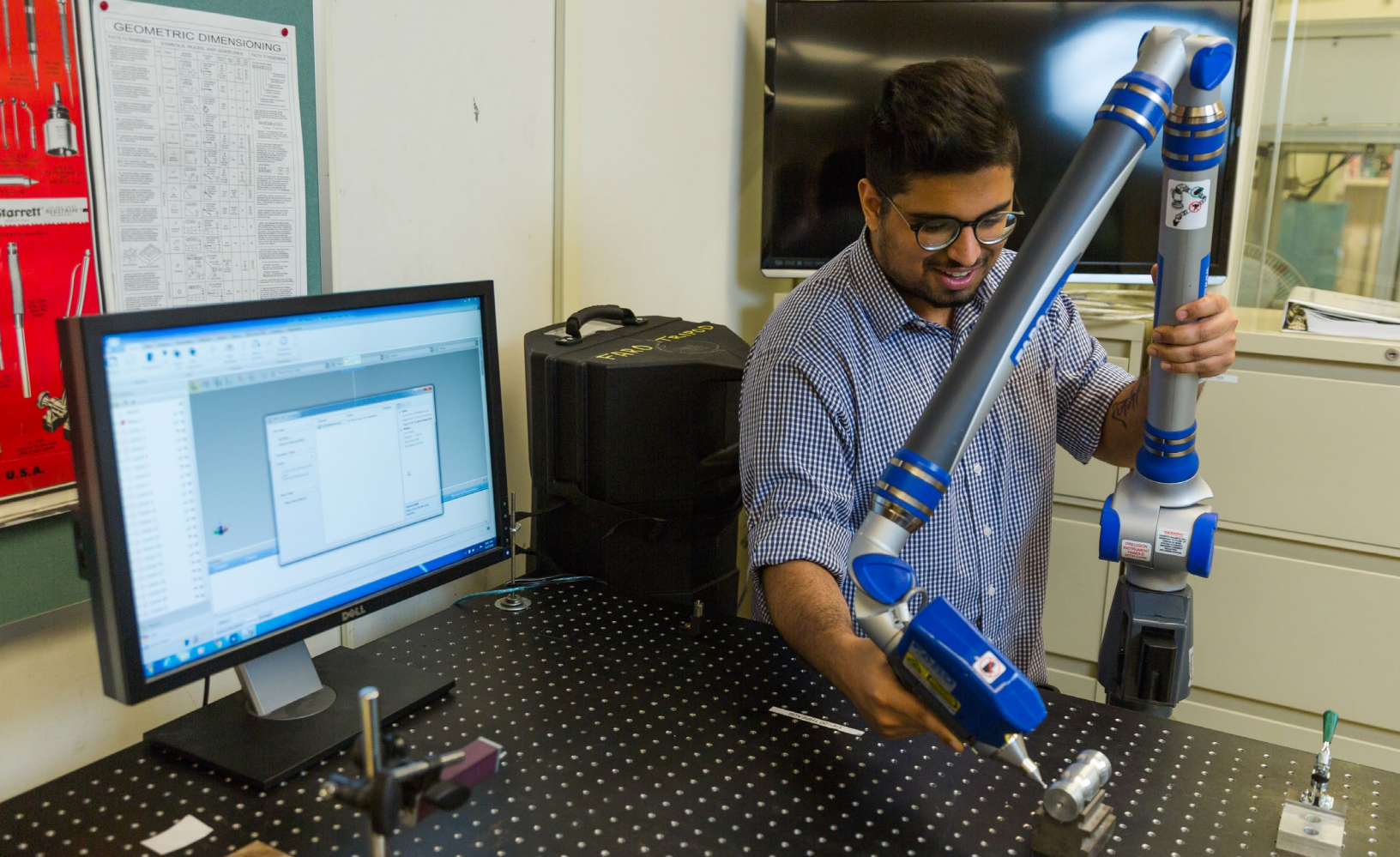
The mainland's rise as an education player coincided with a deterioration in diplomatic and economic relations between the U.S. and China under the Trump administration. In late May 2020, President Trump signed a proclamation banning Chinese graduate students and researchers with ties to Chinese institutions of higher education with links to the military from entering the country, due to fears of intellectual property and technology theft tied to "military civil fusion" efforts (Executive Office of the President 2020). Subsequently, by September 8, 2020, the U.S. had revoked over 1,000 visas of Chinese graduate students (Pamuk 2020). These actions were a clear escalation of measures implemented since 2018, when the U.S. restricted visas for Chinese citizens studying in certain high-tech sectors with potential national security applications (Feng 2019).

These developments exacerbated concerns among Chinese students that they will face tougher security if they major in STEM subjects, even to the point they would have their visas revoked abruptly during their studies. In fact, a recently surveyed group of Chinese students indicated a preference for the U.K. over the U.S. (New Oriental Education & Technology Group 2020). Despite the recent change in the U.S. administration, it will take time to rebuild the appeal of international study in the U.S. for those who have been presented with such obstacles, and it remains to be seen whether the U.S. can remain the top recipient of international students in today's geo-political environment, as well as post-COVID-19.

What We Know About International Graduates and Employment in the U.S.

One of the problems facing researchers in this field is the lack of consistent data across subject disciplines and graduation levels. Nevertheless, the National Center for Science and Engineering Statistics' data demonstrate that the vast majority of international students in the U.S. are concentrated in science and engineering subjects, and their experiences are therefore key to our understanding of the issue (Trapani and Hale 2019)

⁴ The official Chinese government website for the Thousand Talents Plan has been taken down. An archived version, dated March 17, 2020, is still available by using the Way Back Machine Internet Archive; see <https://web.archive.org/web/20200317203352/http://www.1000plan.org.cn/en/>.



According to the National Center for Science and Engineering Statistics' (NCSES) 2019 Survey of Earned Doctorates (2020), 55,703 people earned doctoral degrees from U.S. universities in 2019 (1 percent more than in 2018, but 3 percent below the average annual growth rate since the survey began in 1958). Over a third of these (38 percent) were awarded to student visa holders in 2019, up from 36 percent between 2010 and 2017 and 37 percent in 2018.

The survey has recorded massive growth in these numbers in the past two decades: a rise of 99 percent in the number of doctorates awarded to temporary visa holders since 2000 and 35 percent since 2010. The rate of increase peaked at 41 percent in 2007, before the global financial crisis, and it remained at about 36 percent between 2010 and 2017, rising to 38 percent in 2019.

In science and engineering fields, 15,801 doctorates were awarded to temporary visa holders in 2019, an increase of 3.76 percent from 2018. In comparison, the rate of growth in the number of science and engineering doctorates awarded to U.S. citizens and permanent residents is slower (42 percent since 2000 and 20 percent since 2010), and increased by 290 doctorates (1.14 percent) to 25,718 in 2019.

Unsurprisingly, new doctorate holders entering positions in industry are likely to command higher salaries than those taking postdoctoral positions or jobs in colleges and universities and, while the numbers of doctoral graduates with firm job offers have grown since 2017 in most fields, those with qualifications in humanities and arts have not fared so well, highlighting the need for further research outside science and engineering fields to support recruits and recruiters in these disciplines.

The notion of salaries leads us to consider how graduates themselves evaluate jobs. Top priorities are undoubtedly salary, benefits terms and conditions, company profile and reputation, prospects for progression, working environment, and location. But in an age of dynamically changing work practices and due to the impact of

COVID-19 on the traditional workplace, it is worth exploring further the criteria that dictate which applications graduates make and which offers they take.

This brings us to the decision to stay or return home. When they receive their doctorates, foreign-born students at U.S. universities are asked by NSF to report their intentions and whether they have a firm offer to work in the United States. According to NSF data provided on its “Immigration and the S&E Workforce” web page, most students indicate a desire to stay. In the 2014 to 2017 graduating cohorts, 77 percent of foreign-born noncitizen recipients of U.S. science and engineering doctorates indicated their intentions to stay in the U.S., and 46 percent had either accepted an offer of a postdoctoral position or other employment or were continuing employment in the U.S. (Burke 2019). Whether those noncitizen recipients include permanent residents is not specified. These data are indicative of a rising trend. In 2017, foreign-born individuals accounted for 30 percent of workers (with a bachelor’s or higher-level degree) in science and engineering occupations compared with less than one-fifth of the overall population (18 percent) and of all college graduates (17 percent).

This leads us to consider the longevity of international students’ careers in the U.S., something that is harder to gather details about and escapes most institutional surveys, which focus on first-destination statistics. Looking closer at NSF’s immigration and S&E workforce data, 71 percent of temporary visa holders who received their science and engineering doctoral degrees approximately five years before 2017 remained in the country, as did 72 percent of those who received their science and engineering doctoral degrees approximately 10 years before 2017 (Burke 2019, Section: “Stay Rates” of U.S. S&E Doctorate Recipients). These “stay rates” were high among graduates from China and India, and stay rates were higher among those with doctorates in broad science and engineering fields of study than those in the social sciences. Despite falling during the financial crisis between 2007 and 2009, the five- and 10-year stay rates have increased overall since 2001. However, stay rates of Chinese and Indian graduates with science and engineering doctorates fell from 93 percent and 90 percent, respectively, in 2003 to 84 percent and 85 percent in 2013, likely reflecting home country efforts to attract back graduates.

Georgetown University’s Center for Security and Emerging Technology (CSET) found in April 2020, based on data from the NCSES’s Survey of Earned Doctorates, that international students account for a significant proportion of U.S. STEM PhD graduates, with variation across fields, with international graduates most numerous in computer science and engineering (Zwetsloot, Feldgoise, and Dunham 2020). In nearly all STEM fields, the proportion of graduates who are international remained constant or fell slightly between 2010 and 2017, according to CSET.

Intention-to-stay rates among international PhD graduates were 70 percent or more in all STEM fields, and highest—between 85 and 90 percent—in computer science, biology, and engineering. The rates either held steady or rose slightly between 2000 and 2017 and were highest among students from Iran, India, and China, with lower rates of students intending to stay among those from wealthier countries in the European Union or from Canada.

CSET also surveyed recent PhD graduates—both U.S. citizens and noncitizens—from top-ranking artificial intelligence (AI) programs at U.S. universities (Aiken, Dunham, and Zwetsloot 2020b). AI is viewed as a key subject benchmark due to its disruptive and transformative impact on industries and economies (Marr 2020). These recent graduates find the U.S. an attractive place to study and work, and those working in this country plan on remaining. About a third of AI PhDs who departed the U.S. considered the difficulties of the immigration process to be a significant factor in their decision to leave, and a majority of noncitizen AI PhDs working in the U.S. reported experiencing heavy difficulties with the U.S. immigration system.

In another study, CSET found that 80 percent of U.S.-educated international PhD graduates in the field of AI remain in the U.S., with international students already making up two-thirds of the students in those programs (Zwetsloot et al. 2019). In a June 2020 study measuring the preferences of AI talent, CSET found that AI PhDs are drawn to careers that offer growth opportunities, professional culture, technical challenges, and research ownership—areas where public sector jobs do not score well (Aiken, Dunham, and Zwetsloot 2020a). The organization also noted marked differences between the career preferences of PhDs who are U.S. citizens and those who are not, the former prioritizing location, family and friends, colleagues, and the ability to have a positive social impact, while noncitizens focus on salary and immigration concerns.

Looking at another field, CSET research indicates that 40 percent of high-skill semiconductor workers in the U.S. today were born overseas, as were two-thirds of graduate students in semiconductor-related programs at U.S. universities. Intel, the leading chip manufacturer, estimates that without OPT, it would only be able to hire 30 percent of the highly skilled graduates it currently hires (Zwetsloot and Hunt 2020).

Mapping such data not only informs us about international graduate employability, but it also—of course—illustrates the global map of the development of cutting-edge technologies. There is a symbiotic link between the development of industries like IT or the medical sciences and the corresponding supply of educated talent at proximal institutions. As the global economy shifts in response to the development of cutting-edge technologies, we need to be alert to the corresponding geographic shift in its personnel. But by other indicators, there is some evidence that international graduate interest to remain in the U.S. to work is ebbing. In the early 2000s, only one or two of every 10 Chinese students studying abroad returned home after graduation (Pandey 2018). According to a National Center for Science and Engineering Statistics (2014) report, 86 percent of Chinese science and engineering doctoral students planned to stay in the U.S. upon completion of their degrees. However, by 2017, the Chinese government reported 82.3 percent of those who studied abroad returned to China that year (China Power Team 2017). How the Chinese government collected and analyzed the data is unclear; furthermore, the findings cover all Chinese students abroad, not those specifically in the U.S., and don't distinguish students by degree level or major (Zwetsloot 2020).

It is difficult to quantify exactly how many outbound students do return home. As we know, China and India are currently the highest-sending countries for international students in the U.S. Both have rapidly developing economies that are providing an unprecedented number and variety of employment opportunities for domestic and returning international graduates. According to a recent research paper, China has implemented a range of initiatives to attract outbound students to return home when they have completed their overseas training and work experience. There are good reasons for this policy, as illustrated, for example, by the fact that Chinese returnees are responsible for research publications with higher impact than their domestically educated counterparts and more likely to publish research undertaken in collaboration with researchers in their former host country (Cao et al. 2019).

Despite making up a large proportion of international students, many of whom choose to stay in the U.S. after graduation, China's rapid economic development means these portions will likely diminish over the coming years. According to the Center for China and Globalization and Zhaopin's *2019 Chinese Overseas Returnees Employment and Entrepreneurship Report*, 42 percent of surveyed returnees have a positive attitude toward China's future economic development, and 60 percent wished to reunite with their families (Cheng 2019). Meanwhile, they also cited work visa restrictions in their host countries and increased geo-political tension as influencing their decisions to return.



Employability—The Heart of the Matter

How can we measure and analyze graduate employability? Many attempts use survey-based methodologies. For example, in the U.K., the consulting firm iGraduate (2019) published *International Graduates Outcomes 2019*, a survey-based research report conducted on behalf of Universities UK International that tracked the career outcomes of a large number of international students who had studied in the U.K. Among the key findings were that 69 percent of international respondents said they progressed more quickly in their careers than peers who had studied elsewhere, 82 percent said the U.K. degree was worth the investment, and 83 percent said their degree helped get them their first job.

Earlier this year, Universities UK International (2020) collaborated with other U.K. education organizations and a university to produce a survey-based research report identifying how U.K. universities support the employability of their international students. One of the report's significant findings was that 86 percent of respondents—composed mostly of careers and employability professionals—rated the demand from international students for career and employability services as “very high” or “fairly high” (11). Conversely, only 28 percent felt they were able to meet that demand (14).

Other host countries have also delved into international employability outcomes, often on an institutional level. In 2019, Australia's Deakin University studied the impact of post-study work in a report titled *Temporary Graduatification* (Tran, Rahimi, and Tan 2019). While the researchers found the temporary graduate visa program helped draw international students to Australia and gave them the benefit of extra time in the country after completing their studies, the graduates were not always able to find work in their chosen profession. They also found that employers were reluctant to hire international graduates with temporary

work visas, especially if they had other candidates who were permanent residents. However, despite potential underemployment, the surveyed students felt the post-study work visa offered them a chance to gain valuable international work experience and to pay off student loans, develop social and professional networks, improve English proficiency, and potentially secure permanent residency. In 2017, the Australian International Directors' Forum conducted research that shows that only 4 percent of international graduates surveyed were unemployed three years after graduating from an Australian university, only slightly higher than domestic graduates (Howley 2017).

A report published by the Council of Graduate Schools in 2017 identified a number of key issues in terms of professional development of graduate students in STEM fields from an analysis of 857 survey responses from graduate deans, college deans, faculty directors of graduate study, and professional development program directors at 226 institutions (Denecke, Feaster, and Stone 2017). According to the survey responses, less than two-thirds of the institutions (62 percent) offered some type of formal professional development program for graduate students, apparently both domestic and international, in research degree programs to obtain skills beyond core academic research skills, while a third offered programs that focused exclusively on preparing graduate students with additional skills for academic careers, such as teaching and academic job search preparation, and only 44 percent of respondents representing 134 institutions (59 percent of the total) reported having formal programs for graduate students to develop skills for nonacademic careers (9). The study identified the main driving factor in the provision of professional development activities to be the identification of such as a strategic priority of the university or graduate school, followed by demand from the students themselves and then from the job market. As such, leaders of university graduate schools are key players in the promotion of these activities and their associated policy and funding infrastructure.

As pressure has increased on institutions to demonstrate employment outcomes, there has been a corresponding proliferation of departments with responsibilities, staff, and budgets for the provision of training for students' professional development, usually under the auspices of graduate schools. These have enhanced the usually more general offerings of the traditional careers' services. The study found that the most frequently reported general skills training included communication and presentation, writing, mentoring, and leadership skills (20). There is a growing trend in developing cultural competency and intercultural teamwork skills for a diverse workforce and in preparing graduate students to see career skills development as a lifelong process rather than as onetime preparation for job placement.

Meanwhile, subject-specific skills training has been added to the responsibilities of individual academic departments and the curricula of their courses. Common STEM-specific skills, where included, are research ethics, research development, technology commercialization, and entrepreneurship. Areas of training in demand by employers for which there was scant provision include data science and big data skills; science policy; governance, risk, and compliance; and time management and project management (20).

A survey undertaken by IIE found that most respondents believed the skills gained through their international student experience were useful throughout their careers, and as they acquired more senior positions with management responsibilities, their interpersonal and communication skills became more useful and could help to facilitate career progression (Farrugia and Sanger 2017). Interestingly, the study also found that graduates reported that their study-abroad experience gave them a broader understanding of the career possibilities open to them and the confidence to pursue these career paths (15).

In our search to account for the employability of graduates, we should not overlook factors that do not fit neatly into skills boxes. Despite the lack of a comprehensive approach to skills training by institutions, the IIE reports that "study abroad has an overall positive impact on the development of a wide range of 21st century job skills" (5). The skills most likely to have been developed were a range of soft skills including curiosity,

flexibility and adaptability, confidence, self-awareness, interpersonal skills, communication, problem-solving, language, tolerance for ambiguity, and course or major-related knowledge (12).

To a lesser degree, teamwork, leadership, and work ethic skills were developed or improved. The ability to develop and effectively use soft skills is related to students' "character traits, attitudes, and behaviors—rather than technical aptitudes or knowledge"; such skills involve the ability and willingness to cooperate with others, to be flexible, to show enthusiasm; reliability and commitment; to be able to plan, organize, prioritize and time manage; and to be questioning and problem-solving (Appleby 2017). It is likely that international students, who have broken from the normal route and from their peer group, are often imbued with these characteristics and have strong potential to further develop and apply such soft skills. By choosing to study abroad, they have already marked themselves out from the crowd.

TOWARD GREATER INCLUSION AND SUCCESS: A NEW COMPACT FOR INTERNATIONAL STUDENTS

ACE's recently published report *Toward Greater Inclusion and Success: A New Compact for International Students* proposes key strategies and practical approaches for institutions to establish lifelong relationships with international students and to ensure that they not only thrive academically and socially while on campus, but are also well prepared for careers and life upon graduation.

When it comes to career planning, the report emphasizes the need for international students to build well-integrated, multifaceted networks on campus and beyond and the critical roles of faculty and career advisors in students' professional development. Recognizing that "career planning is about more than finding a job," the report highlights the need to prepare international students for long-term careers that may span multiple geographic locations and fields.

What's Next?

Challenges to the appeal of international study in the U.S. have continued, including a September 2020 proposal by the Department of Homeland Security (2020) to require a fixed period of stay for international students "to encourage program compliance, reduce fraud, and enhance national security." The impact of an unwelcoming political environment has been augmented by significant moves by competitor countries to attract and retain international talent, as well as the impact of COVID-19 and travel restrictions.

Nevertheless, the potential to reverse current trends in the U.S. remains, both in terms of international student enrollments and employment incentives. Surveys conducted by the American Physical Society (2019) indicate that appropriate federal policies can reverse the downward trend, showing that making the F-1 visa "dual intent" and providing a clear path to a green card for international students who earn advanced STEM degrees from U.S. institutions will help restore the U.S. as a competitive host destination for global talent. Further research underscoring the benefits of the U.S. study-abroad experience would help the sector regain lost ground in terms of international enrollments.

Additional Questions and Possible Future Efforts

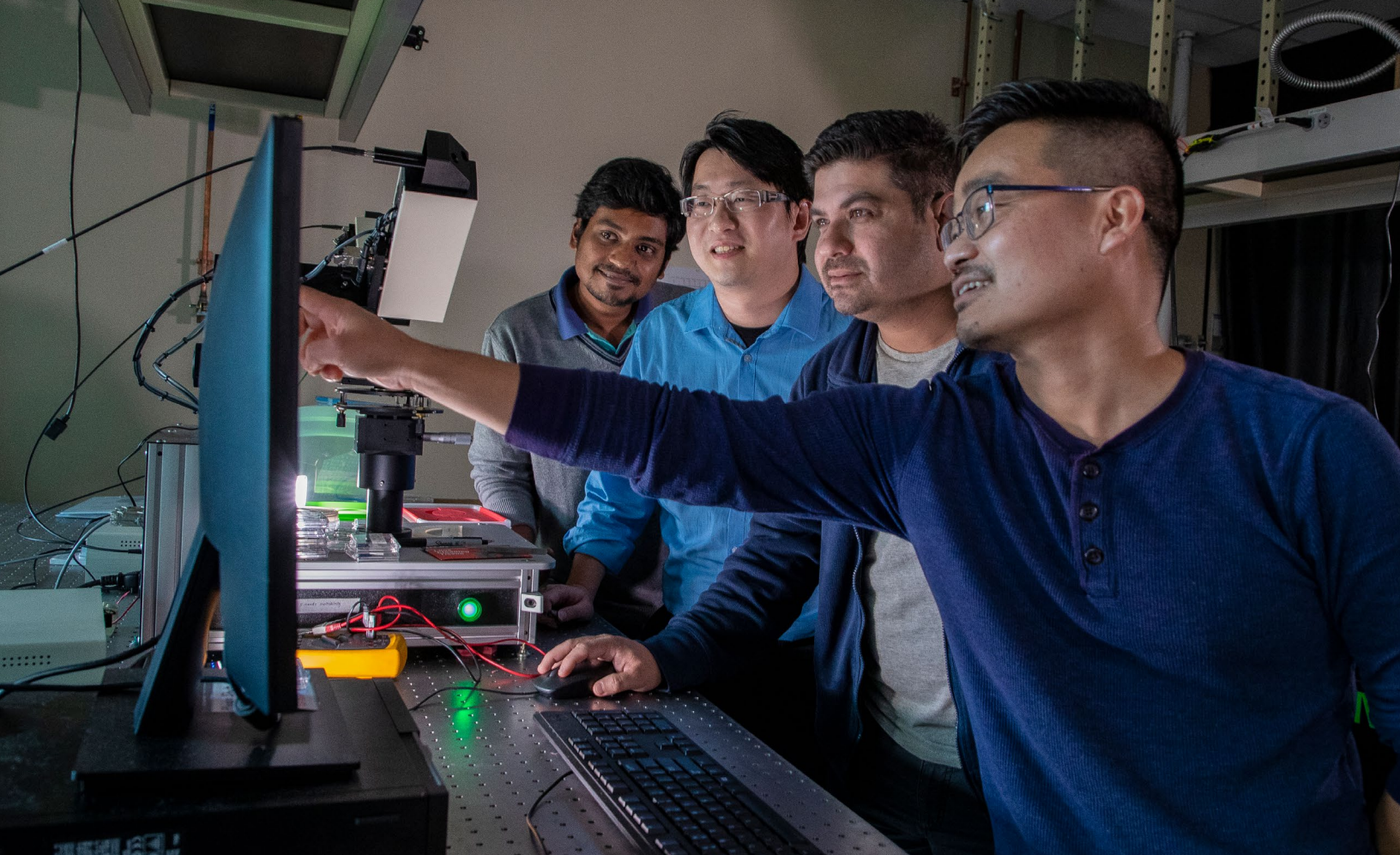
After reflecting on the research review above, it would be helpful for a U.S.-specific study to be undertaken to gather robust data from American colleges and universities, most likely through a survey of current international students and recent alumni, to identify and understand the connections between overseas study and employability. Throughout this paper, we have proposed research questions that would capture important employability data and potentially boost the revenue-generating potential of U.S. universities. The insights gained by such research will enable us to effectively integrate graduate employability into institutional internationalization strategies.

The economic and innovative impact of the professional contributions of international graduates may be more difficult to measure, but a snapshot could be achieved by sampling data from key industries by case studies of the careers of international graduates to understand how their career trajectories were achieved and the levels of influence they command or by surveying or interviewing key members of recruiting clusters. Interviews and survey data from employers could also highlight how employers view job candidates with overseas study experience.

The obstacles currently facing the international higher education sector are formidable. It is hoped that changes to the regulatory and legal environment under the new U.S. administration will alleviate some of the difficulties institutions face in attracting international candidates. However, reversing the measures of the Trump administration that were implemented to break the connection between study and work and severely limit opportunities for foreign nationals to gain work visas will take time, as will dealing with the backlog of applications and the legacy of Trump's policies (Anderson 2020). Research based on robust data can help to develop positive messaging to support such change-making.

The findings can be used to inform further research questions, such as:

- How can the U.S. maintain its competitiveness?
- How can institutions enhance their connections with international graduates?
- How do international graduates contribute to the economy? Can we estimate their economic contribution?
- How should we define employability and employment?
- How can we improve data collection and tracking of non-STEM graduates?



Research Questions

A survey, or surveys, should be devised that will provide data that has the potential to strengthen institutional policies, programs, and practices and to advocate for continuing reforms to government policy and legislation.

Focus groups can assist with the crafting of questions to gather useful data sets and the design of one or more surveys. Future workshop discussion, after the data is collected, can be organized to decide on ways it can be used to answer research questions.

To reveal the connections between international study in the U.S. and increased employability, questions addressing the topics below are suggested for inclusion in the data collection/surveys:

- First destination (and possibly later stage, e.g., three-, five-, and seven-year destination) data.
- What are the career outcomes of international and domestic alumni who have graduated from U.S. institutions?
- Comparisons between the career outcomes of students with the same nationality who either studied in the U.S. or in their home country, ideally disaggregated by discipline.
- Comparative studies of the value of international study and destinations in different disciplines.
- Interview and survey-based analysis of international students' views of the value of their overseas study, and comparison with the reasons for choosing to study abroad.
- Does study in the U.S. boost employability for international students? Against what control group?

- Are domestic students' experiences and/or job prospects improved by international students?
- Survey and interview-based analysis of employers in a range of key fields to compare the hard and soft skills of domestic and international employees at entry.
- If graduates cannot realize their career goals, what are the obstacles?
- What are the factors (personal and labor market) that determine whether international students will remain in the U.S. after they complete their studies or return home?
- How often does OPT lead to an H-1B visa? What was the conversion experience like for graduates?
- How does the international student experience with career services and related support services compare with domestic students on the same campus?
- What were the roles of career services and internships in the student experience?
- What are the most common pathways to reach permanent residency in the U.S. after graduation?
- Benchmarking against other countries, especially on pathways to citizenship/permanent residence. What is the impact of longer versions of OPT? Can we benchmark visa processing times and approval rates? What does this mean for knowledge creation and innovation?

Outlook and Conclusion

The international education sector is undergoing the stress of the global health crisis, and it will likely take years to recoup the decrease in international enrollments and the associated financial losses. Some departments and institutions may be closed permanently, and colleges and universities will need to be creative and innovative to survive and to maintain the provision of high-quality education programs. The new U.S. administration signals a sea change in government policy and legislation that offers some respite to the beleaguered higher education sector, but it will take time for perceptions to change. Competitor nations that have shown a friendlier face in recent years will continue to attract students who have been put off by recent insular policies. U.S. institutions will continue to attract international students, but it will take thoughtful and purposeful actions by colleges and universities, as well as policymakers, to restore the U.S. as the destination of choice.

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