

## INTERNATIONAL STUDENTS IN SCIENCE AND ENGINEERING

### EXECUTIVE SUMMARY

International students are a significant source of talent for U.S. employers and allow U.S. universities to offer high-quality academic programs in science and engineering for American students. Without international students the number of students in America pursuing graduate degrees (master's and Ph.D.'s) in fields such as computer and information sciences and electrical engineering would be small relative to the size of the U.S. economy. In 2019, at U.S. universities, there were only 9,083 full-time U.S. graduate students in electrical engineering, compared to 26,343 full-time international students. Similarly, in computer and information sciences, in 2019, there were only 17,334 full-time U.S. graduate students compared to 44,786 international graduate students at U.S. universities.<sup>1</sup> This report updates an October 2017 [study](#).

Among the key findings of the research:

- The number of full-time international students enrolled in graduate-level electrical engineering at U.S. universities dropped 19.5% between 2015 and 2019. The number of full-time international students enrolled in graduate-level computer and information sciences at U.S. universities declined 9.5% between 2016 and 2019. This decline in international graduate students was before the new restrictions imposed on Chinese students and the impact of Covid-19. A continuation of this trend would present serious issues for U.S. employers and universities.
- At U.S. universities, foreign nationals account for 82% of the full-time graduate students in petroleum engineering, 74% in electrical engineering, 72% in computer and information sciences, 71% in industrial and manufacturing engineering, 70% in statistics, 67% in economics, 61% in civil engineering, 58% in mechanical engineering and agricultural economics, 56% in mathematics, 54% in chemical engineering, 53% in metallurgical and materials engineering, 52% in materials sciences and 50% in pharmaceutical sciences.
- At many U.S. universities, the data show it would be difficult to maintain important graduate programs without international students. In electrical engineering, the majority of full-time graduate students (master's and Ph.D.'s) are international students at 88% of the U.S. graduate school programs with at least 30 students, or 149 U.S. universities total. In computer and information sciences, the majority of full-time graduate students are international students at 211 universities, representing 78% of the U.S. graduate school programs with at least 30 students.

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<sup>1</sup> Note the designation computer and information sciences includes what in the past was referred to only as computer sciences or computer sciences.

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- Over the past two decades, foreign-born scientists and engineers have played a critical role in filling the demand for high-level technical talent in the United States. Between 1998 and 2019, the annual number of full-time international graduate students in computer and information sciences *increased by 310%*, from 10,930 in 1998 to 44,786 in 2019. In comparison, over the same period, the annual number of full-time U.S. graduate students in computer and information sciences increased by 91%, from 9,042 in 1998 to 17,334 in 2019.
- A May 2020 Trump administration presidential proclamation (PP10043), continued by the Biden administration, contains overly broad criteria and is blocking visas for Chinese graduate students based on the universities they attended in China, not based on the individual risk of the students. After the resumption of consular activities in China, U.S. universities reported denials of J-1 visas for Chinese scholars and new and F-1 visas for graduate students in science and engineering. The implications of the denials have alarmed analysts and universities, given the significant role Chinese graduate students and scholars play in key technical fields in the United States.
- The policy is likely to block at least 3,000 to 5,000 Chinese graduate students a year. The policy is costly to the United States. Every 1,000 Ph.D. students blocked in a year from U.S. universities costs an estimated \$210 billion in the expected value of patents produced at universities over 10 years and nearly \$1 billion in lost tuition over a decade, according to an analysis from the National Foundation for American Policy. Other economic costs include the loss of highly productive scientists and engineers prevented from working in the U.S. economy or patents and innovations produced outside university settings.
- The annual number of full-time U.S. graduate students in electrical engineering increased by only 12% over the past 21 years, from 8,139 in 1998 to 9,083 in 2019. Over the same period, the annual number of full-time international graduate students in electrical engineering *increased by 130%*, from 11,469 in 1998 to 26,343 in 2019.
- The increase in both the size and number of graduate programs in science and engineering at U.S. universities indicates U.S. student enrollment has not been held down by the lack of available slots at U.S. graduate schools. Research by economist Kevin Shih found, “At the graduate level, international students do not crowd-out, but actually increase domestic enrollment.”<sup>2</sup>

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<sup>2</sup> Kevin Shih, *Do International Students Crowd Out or Cross-Subsidize Americans in Higher Education?* September 25, 2017.

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- In electrical engineering, international students account for 83% of the full-time graduate students at Auburn University, 81% at Duke University, 61% at the University of Kentucky, 88% at Texas A&M, 88% at SMU and 73% at the University of Texas at Austin.
- In computer and information sciences, international students account for 80% of the full-time graduate students at Rice University, 63% at Texas Tech, 67% at UCLA, 76% at North Carolina State, 70% at LSU, 77% at George Mason University, 61% at Vanderbilt, 56% at West Virginia University and 72% at Virginia Tech.
- A high level of international students allows U.S. universities to attract and retain faculty. “If we were not to place such a heavy emphasis on research, we wouldn’t be able to get faculty that teach the wide range of things we do, with the appropriate expertise, so our educational mission would suffer,” said Professor Christopher Raphael, who heads the Music Informatics program in the School of Informatics, Computing, and Engineering at Indiana University.
- “To get tenure and perform research, professors require a significant number of graduate students and there are not enough domestic students alone in certain fields,” said Stuart Cooper, a professor of chemical and biomolecular engineering at Ohio State University.
- Postdocs assist in critical research at U.S. universities after completing their doctorate. Fifty-six percent of postdocs at U.S. universities are foreign nationals who work on temporary visas, including 73% in electrical engineering (954 postdocs in 2019), 72% in metallurgical and materials engineering, 69% in mechanical engineering, 68% in chemical engineering, 66% in oncology and cancer research (1,202 postdocs), 66% in physics (1,785 postdocs), 64% in computer and information sciences, 63% in chemistry, 53% in neurobiology and neuroscience (1,179 postdocs) and 49% (1,951 postdocs) in clinical medicine.

Maintaining a welcoming policy on international students is essential to preserving America’s role as a center of technological innovation. Such a policy means reasonable visa policies for international students and making it easier for students to work after graduation, including preserving STEM OPT (Optional Practical Training) and improved policies on H-1B visas, per-country limits and employment-based green cards. Today, the global competition for international students and talented scientists and engineers is intense. Recent U.S. efforts to block many Chinese graduate students from U.S. universities might deal a significant blow to future innovation and scientific research in America.

## INTERNATIONAL STUDENTS: A KEY SOURCE OF TALENT AND INNOVATION

At U.S. universities, international students account for 82% of the full-time graduate students in petroleum engineering, 74% in electrical engineering and 72% in computer and information sciences, 71% in industrial and manufacturing engineering, 70% in statistics, 67% in economics, 61% in civil engineering, 58% in mechanical engineering and agricultural economics, 56% in mathematics and applied mathematics, 54% in chemical engineering, 53% in metallurgical and materials engineering, 52% in materials sciences and pharmaceutical sciences.<sup>3</sup> (Data for 2019.) The field computer and information sciences includes what a few years earlier encompassed computer sciences.

**Table 1**  
**Full-time Graduate Students and the Percent of International Students by Field (2019)**

Field	Percent of International Students	Number of Full-time Graduate Students – International Students	Number of Full-time Graduate Students – U.S. Students
<b>Petroleum Engineering</b>	82%	803	181
<b>Electrical Engineering</b>	74%	26,343	9,083
<b>Computer and Information Sciences</b>	72%	44,786	17,334
<b>Industrial and Manufact. Engineering</b>	71%	6,554	2,632
<b>Statistics</b>	70%	5,497	2,406
<b>Economics</b>	67%	8,023	4,049
<b>Civil Engineering</b>	61%	8,775	5,527
<b>Mechanical Engineering</b>	58%	11,215	8,130
<b>Agricultural Economics</b>	58%	766	564
<b>Mathematics and Applied Math</b>	56%	9,902	7,876
<b>Chemical Engineering</b>	54%	4,590	3,975
<b>Metallurgical/Materials Engineering</b>	53%	2,981	2,671
<b>Materials Sciences</b>	52%	713	660
<b>Pharmaceutical Sciences</b>	50%	1,790	1,827

Source: National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, Public Use Microdata files, National Foundation for American Policy. U.S. students include lawful permanent residents.

<sup>3</sup> National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, Public Use Microdata files, National Foundation for American Policy. Data for 2019.

## INCREASING IMPORTANCE OF INTERNATIONAL STUDENTS IN STEM FIELDS

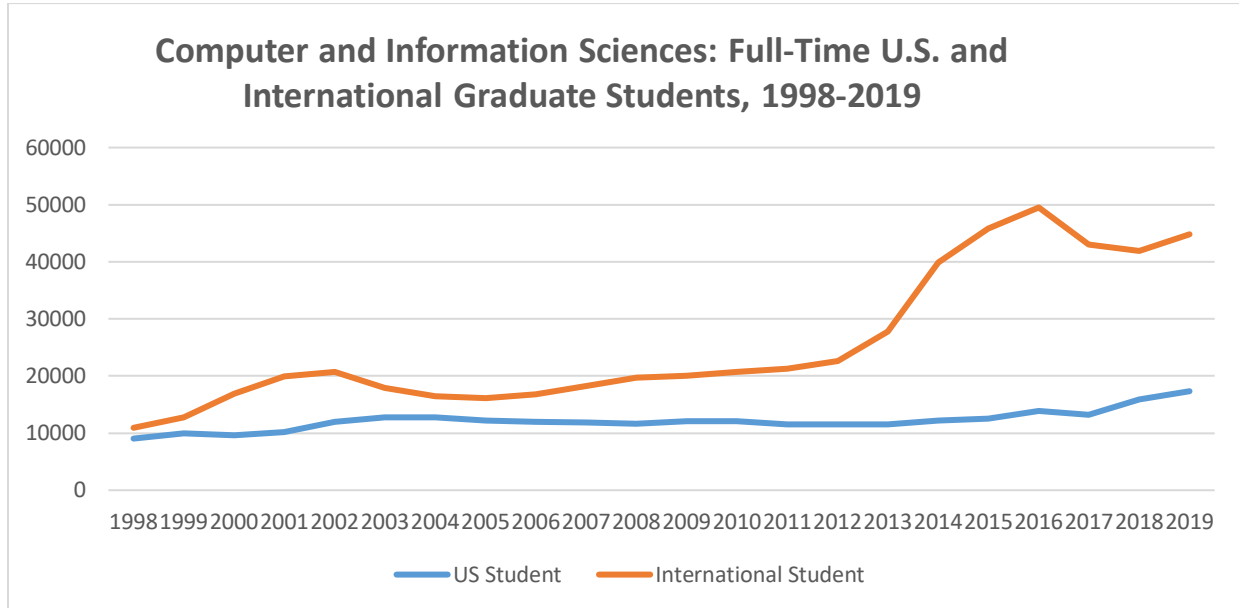
Over the past two decades, have helped fill the demand for high-level technical talent in the United States. Between 1998 and 2019, the annual number of full-time international graduate students in computer and information sciences *increased by 310%*, from 10,930 in 1998 to 44,786 in 2019. In comparison, over the same period, the annual number of full-time U.S. graduate students in computer and information sciences increased by 91%, from 9,042 in 1998 to 17,334 in 2019.

**Table 2**  
**Computer and Information Sciences: Full-time Graduate Students: 1998 to 2019**

<b>Year</b>	<b>U.S. Students</b>	<b>International Students</b>	<b>Percent International Students</b>
<b>1998</b>	9,042	10,930	54.7%
<b>1999</b>	9,939	12,748	56.2%
<b>2000</b>	9,630	16,928	63.7%
<b>2001</b>	10,164	19,923	66.2%
<b>2002</b>	11,919	20,660	63.4%
<b>2003</b>	12,744	17,964	58.5%
<b>2004</b>	12,719	16,443	56.4%
<b>2005</b>	12,226	16,091	56.8%
<b>2006</b>	11,959	16,801	58.4%
<b>2007</b>	11,814	18,268	60.7%
<b>2008</b>	11,684	19,654	62.7%
<b>2009</b>	12,113	20,085	62.4%
<b>2010</b>	12,072	20,710	63.2%
<b>2011</b>	11,579	21,282	64.8%
<b>2012</b>	11,534	22,574	66.2%
<b>2013</b>	11,481	27,787	70.8%
<b>2014</b>	12,232	39,837	76.5%
<b>2015</b>	12,539	45,790	78.5%
<b>2016</b>	13,854	49,507	78.1%
<b>2017</b>	13,224	42,982	76.5%
<b>2018</b>	15,904	41,885	72.5%
<b>2019</b>	17,334	44,786	72.1%

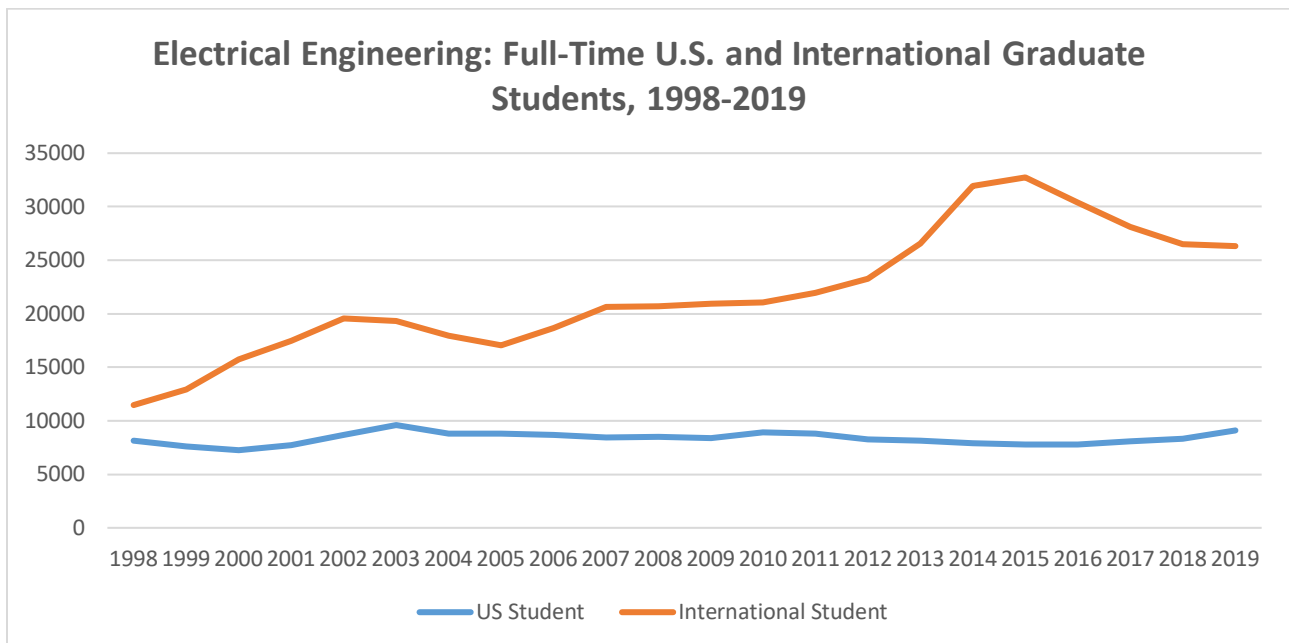
Source: National Science Foundation, Survey of Graduate Students and Postdoctorates, National Foundation for American Policy calculations. U.S. students include lawful permanent residents.

**Figure 1**



Source: National Science Foundation, Survey of Graduate Students and Postdoctorates, National Foundation for American Policy calculations. U.S. students include lawful permanent residents.

**Figure 2**



Source: National Science Foundation, Survey of Graduate Students and Postdoctorates, National Foundation for American Policy calculations. U.S. students include lawful permanent residents.

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The annual number of full-time U.S. graduate students in electrical engineering increased by only 12% over the past 21 years, from 8,139 in 1998 to 9,083 in 2019. Over the same period, the annual number of full-time international graduate students in electrical engineering *increased by 130%*, from 11,469 in 1998 to 26,343 in 2019.

**Table 3**  
**Electrical Engineering: Full-time Graduate Students: 1998 to 2019**

<b>Year</b>	<b>U.S. Students</b>	<b>International Students</b>	<b>Percent International Students</b>
<b>1998</b>	8,139	11,469	58.5%
<b>1999</b>	7,595	12,926	63.0%
<b>2000</b>	7,253	15,709	68.4%
<b>2001</b>	7,750	17,490	69.3%
<b>2002</b>	8,654	19,586	69.4%
<b>2003</b>	9,601	19,328	66.8%
<b>2004</b>	8,792	17,940	67.1%
<b>2005</b>	8,790	17,059	66.0%
<b>2006</b>	8,696	18,683	68.2%
<b>2007</b>	8,448	20,628	70.9%
<b>2008</b>	8,486	20,726	71.0%
<b>2009</b>	8,362	20,920	71.4%
<b>2010</b>	8,904	21,073	70.3%
<b>2011</b>	8,802	21,933	71.4%
<b>2012</b>	8,278	23,248	73.7%
<b>2013</b>	8,130	26,530	76.5%
<b>2014</b>	7,925	31,943	80.1%
<b>2015</b>	7,783	32,736	80.8%
<b>2016</b>	7,758	30,400	79.7%
<b>2017</b>	8,108	28,096	77.6%
<b>2018</b>	8,338	26,476	76.0%
<b>2019</b>	9,083	26,343	74.4%

Source: National Science Foundation, Survey of Graduate Students and Postdoctorates, National Foundation for American Policy calculations. U.S. students include lawful permanent residents. This includes full-time graduate students in electrical, electronic and communications engineering.

## **INTERNATIONAL STUDENTS KEEP TECH STUDIES AVAILABLE FOR U.S. STUDENTS AND HELP RETAIN TOP FACULTY**

At many U.S. universities, it would be difficult to maintain important graduate programs without international students. In electrical engineering, the majority of full-time graduate students (master's and Ph.D.'s) are international students at 88% of the U.S. graduate school programs with at least 30 students, or 149 U.S. universities total. In computer and information sciences, the majority of full-time graduate students are international students at 211 universities, representing 78% of the U.S. graduate school programs with at least 30 students.<sup>4</sup> The story is similar in other fields. In mechanical engineering, the majority of full-time graduate students are international students at 101 universities, representing 67% of the U.S. graduate school programs with at least 30 students.<sup>5</sup> The story is similar in other fields.

**Table 4**  
**U.S. University Graduate Programs with a Majority of International Students (2019)**

<b>Field</b>	<b>Number of U.S. Universities with More Than 50 Percent International Students in Graduate School Program (2019)</b>	<b>Percentage of U.S. Universities with a Majority of International Students in Graduate School Program (2019)</b>
<b>Electrical (and Electronics and Commercial) Engineering</b>	149	88%
<b>Industrial/Manufact. Engineering</b>	65	86%
<b>Economics</b>	86	80%
<b>Statistics</b>	60	79%
<b>Computer and Information Sciences</b>	211	78%
<b>Civil Engineering</b>	93	76%
<b>Mechanical Engineering</b>	101	67%
<b>Metallurgical and Materials Eng.</b>	36	63%
<b>Pharmaceutical Sciences</b>	29	63%
<b>Chemical Engineering</b>	55	61%
<b>Mathematics/Applied Math.</b>	83	54%

Source: National Science Foundation, Survey of Graduate Students and Postdoctorates, National Foundation for American Policy calculations. U.S. students include lawful permanent residents. Note: analysis limited to programs with at least 30 full-time students.

The high level of international students plays a role in universities being able to attract and retain faculty, which benefits U.S. students. "If we were not to place such a heavy emphasis on research, we wouldn't be able to get

<sup>4</sup> Ibid.

<sup>5</sup> Ibid.



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faculty that teach the wide range of things we do, with the appropriate expertise, so our educational mission would suffer,” said Professor Christopher Raphael, chair of the computer science department at Indiana University. “Really the most important part of the educational experience is to work closely with high quality faculty, as one does directly at the Ph.D. stage. So the research and the education are of a piece.”<sup>6</sup>

“We are a research university, and in computer science that means that much of the research is done by teams led by professors with experiments carried out by graduate students,” explains Professor Christopher Raphael, who heads the Music Informatics program in the School of Informatics, Computing, and Engineering at Indiana University. “This model only works if we can get high-quality Ph.D. students and we would be hard pressed to get the number we need solely from the United States.”<sup>7</sup>

A look at well-known universities in different parts of the country illustrates how critical international students are to maintaining graduate-level programs in computer science, electrical engineering and other fields. At Indiana University, approximately 329 of the 450 full-time graduate students in computer and information sciences, or 73%, are international students. One can see a similar pattern at other schools in the Midwest. The proportion of international students in computer and information sciences graduate programs is 73% at Purdue, 61% at Michigan State and 73% at Iowa State. At Carnegie Mellon University in Pittsburgh, 78%, or 1,444 of the approximately 1,850 full-time graduate students in computer and information sciences are international students, while 79% of the full-time graduate students at Carnegie Mellon in electrical engineering are international students.<sup>8</sup>

Stuart Cooper, a professor of chemical and biomolecular engineering at Ohio State University, also points to the connection between research and teaching at U.S. colleges. “There is a synergy. To get tenure and perform research, professors require a significant number of graduate students and there are not enough domestic students alone in certain fields,” said Professor Cooper. “The advances made by professors and graduate students, including international students and post-docs, provide new knowledge and benefits society.”<sup>9</sup>

Without the ability to perform high-level research at U.S. universities, many talented individuals would not take or seek faculty positions, leaving U.S. schools far weaker and unable to educate U.S. students in important fields. Graduate students also directly support the educational mission for undergraduates by serving as teaching

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<sup>6</sup> Interview, via email with, Christopher Raphael. See Stuart Anderson, *The Importance of International Students to America*, NFAP Policy Brief, National Foundation for American Policy, July 2013.

<sup>7</sup> Ibid.

<sup>8</sup> National Science Foundation, Survey of Graduate Students and Postdoctorates, NFAP calculations. Data for other universities in this report are derived from the same source.

<sup>9</sup> Interview with Stuart Cooper. Stuart Anderson, *The Importance of International Students to America*.

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assistants. Their duties include conducting study sessions and grading, which “takes some of the burden off the faculty” to focus on teaching, according to Professor Cooper.<sup>10</sup>

International students at the graduate level are key to supporting research at many U.S. universities. In electrical engineering, international students account for 83% of the full-time graduate students at Auburn University, 81% at Duke University, 61% at the University of Kentucky, 88% at Texas A&M, 88% at SMU and 73% at the University of Texas at Austin.

In computer and information sciences, international students account for 80% of the full-time graduate students at Rice University, 63% at Texas Tech, 67% at UCLA, 76% at North Carolina State, 70% at LSU, 77% at George Mason University, 61% at Vanderbilt, 56% at West Virginia University and 72% at Virginia Tech.

## **PROCLAMATION BLOCKS CHINESE GRADUATE STUDENTS**

In May 2020, the Trump administration issued [presidential proclamation 10043](#) (PP10043) on the “Suspension of Entry as Nonimmigrants of Certain Students and Researchers from the People’s Republic of China.” The proclamation resulted in the State Department revoking many existing visas and denying other visas. After the resumption of consular activities in China, U.S. universities reported denials of J-1 visas for Chinese scholars and new and F-1 visas for graduate students in science and engineering. The implications of the denials have alarmed analysts and universities given the significant role Chinese graduate students and scholars play in key technical fields in the United States.<sup>11</sup>

The policy is likely to block [at least 3,000 to 5,000 Chinese graduate students a year](#), according to the Center for Security and Emerging Technology at Georgetown University. This estimate may be low, depending how strictly the visa policy is enforced, and does not include individuals who choose to study in other countries in reaction to the proclamation.

For every 1,000 entering doctoral students blocked annually for 10 years, implies lost tuition for United States graduate programs of nearly \$1 billion using the National Center for Education Statistics average for 2018.<sup>12</sup> This assumes average completion rate of doctoral students at Stanford (83%) and the average time to degree for doctoral students reported by the National Science Foundation (5.8 years), implying around 50,000 fewer years of

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<sup>10</sup> Ibid.

<sup>11</sup> See Stuart Anderson, “Biden Keeps Costly Trump Visa Policy Denying Chinese Grad Students,” *Forbes*, August 10, 2021.

<sup>12</sup> NCES estimated an average graduate tuition of \$19,314 in 2018. <https://nces.ed.gov/programs/digest/d19/tables/xls/tabn330.50.xls>. When multiplied by the estimated lost enrollment of 49,840 this suggests \$962.6 million in lost tuition.

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attendance in U.S. graduate programs.<sup>13</sup> Most foreign students are not eligible for financial aid program and pay full tuition rates. Rather than displace U.S. students, foreign students provide crucial support for the survival of many graduate program, actually increase the educational options for Americans seeking graduate training.<sup>14</sup> When Ph.D. students earn tuition waivers in return for their labor as research assistants it is beneficial to both the student, who gains practical experience, and for universities and research funders.

The cost to the United States of losing the contributions of these graduate students to research is likely to dwarf lost tuition. While the economic gains to research are widely spread through the whole economy, one concrete measure is patenting by universities. AUTM (formerly known as the Association of University Technology Managers) estimates that the more than 117,000 patents issued since 1996 are associated with an additional \$865 billion in GDP—an average of \$7.4 million per patent.<sup>15</sup> A 2008 study (Chellaraj, et.al., 2008) found that each additional foreign student increased patents by 0.57. Taken together, this suggests an economic loss of \$210 billion for every 1,000 Ph.D. students blocked annually over a ten-year period.<sup>16</sup>

These numbers do not include nearly 7,000 fewer Ph.D. scientist and engineers working in the U.S. labor force and innovations and patents created outside the university setting.

## POSTDOCS

Postdoctoral research appointments, better known as “postdocs,” are temporary research positions for recent Ph.D. recipients, typically lasting two to five years, where they work under more senior scientists who have research funding. Postdocs are an important part of scientific research in the United States—over 100,000 workers that are already experienced in advanced research, they provide much of the labor, ideas, and innovation in many labs<sup>17</sup>

In the Fall of 2019, the National Science Foundation counted 36,795 temporary visa holders in postdoc positions within graduate science and engineering departments at American universities (56% of the total). Around two-

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<sup>13</sup> Even assuming all students not completing their doctorates dropped out of the program after their first year, these numbers imply a loss of 49,840 graduate student years. Stanford’s completion rate for doctorate students is reported at <https://irds.stanford.edu/data-findings/doctoral-degree-programs-completion-and-time-degree> and represents the completion rate of the 2012/2013 entering cohort. The National Science Foundation estimate of 5.8 year is the time since entering the doctoral program for recipients of new U.S. Ph.D.s in 2019 reported in National Center for Science and Engineering Statistics (NCSES). 2020. Doctorate Recipients from U.S. Universities: 2019. NSF 21-308. Alexandria, VA: National Science Foundation. Available at <https://nces.nsf.gov/pubs/nsf21308/>.

<sup>14</sup> Kevin Shih.

<sup>15</sup> <https://autm.net/AUTM/media/Surveys-Tools/Documents/FY20-Infographic.pdf>.

<sup>16</sup> Gnanaraj Chellaraj, Keith E. Maskus and Aaditya Mattoo, *The Contribution of International Graduate Students to U.S. Innovation*, Review of International Economics, 16(3), 444-462, 2008.

<sup>17</sup> There is no comprehensive source of data on postdocs working in the United States. In *Science and Engineering Indicators 2008*, NSF estimated that only around half of postdocs were in the graduate departments covered by its survey. Other postdocs are at academic research institutes, government labs, and private industry. Since that same survey reported more than 66,000 postdocs in academic departments in 2019, “somewhere over 100,000” is a conservative estimate.

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thirds of this total (22,349) were in the biological and medical sciences. There is also a large presence of foreign postdocs in engineering (5,577) and the physical sciences (4,520).

**Table 5**  
**Postdocs Working in U.S. Science and Engineering Graduate Departments by Field (2019)**

<b>Postdocs</b>	<b>Percent Temporary Visa</b>	<b>Number Working on Temporary Visa</b>	<b>U.S. Citizens and Permanent Residents</b>
<b>Total</b>	55.5%	36,795	29,452

Source: National Foundation for American Policy tabulation of National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, Public Use Microdata files

A separate NSF data source (the *Survey of Doctorate Recipients*) shows only 6,500 holders of Ph.D.'s from U.S. universities with temporary visas in academic postdoc positions, which means the vast majority of these 36,795 foreign postdocs have received their Ph.D.'s from universities outside the United States.<sup>18</sup> This provides the United States with direct connections to research recently performed at universities around the world. It also provides a gateway for foreign-trained scientists to enter the United States.

**Table 6**  
**Postdocs Working in U.S. Science and Engineering Graduate Departments by Field (2019)**

<b>Field</b>	<b>Percent Temporary Visa</b>	<b>Number Working on Temporary Visa</b>	<b>U.S. Citizens and Permanent Residents</b>
<b>Petroleum engineering</b>	81.9%	59	13
<b>Nanotechnology</b>	76.8%	116	35
<b>Engineering mechanics, physics, and science</b>	76.7%	138	42
<b>Aerospace, aeronautical, and astronautical engineering</b>	73.6%	167	60
<b>Electrical, electronics, and communications engineering</b>	73.1%	954	351
<b>Ophthalmology</b>	72.7%	380	143
<b>Metallurgical and materials engineering</b>	71.8%	461	181
<b>Biological and biosystems engineering</b>	71.3%	62	25
<b>Nuclear engineering</b>	71.3%	57	23
<b>Biotechnology</b>	70.1%	61	26

<sup>18</sup> NFAP calculation using the National Science Foundation 2019 Public Use File of the Survey of Doctorate Recipients. Some of these academic postdocs will be in research institutes not counted in NSF's GSS survey.

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<b>Mechanical engineering</b>	69.3%	791	351
<b>Materials sciences</b>	69.1%	179	80
<b>Endocrinology</b>	69.0%	238	107
<b>Industrial and manufacturing engineering</b>	68.9%	115	52
<b>Biophysics</b>	68.3%	112	52
<b>Chemical engineering</b>	68.1%	788	369
<b>Biomedical sciences</b>	67.8%	1317	625
<b>Computer science</b>	67.4%	328	159
<b>Statistics</b>	66.9%	119	59
<b>Agricultural engineering</b>	66.1%	74	38
<b>Oncology and cancer research</b>	65.7%	1202	628
<b>Physics</b>	65.6%	1785	936
<b>Civil engineering</b>	65.5%	567	298
<b>Radiological sciences</b>	65.4%	753	399
<b>Molecular biology</b>	64.7%	369	201
<b>Hematology</b>	64.3%	279	155
<b>Computer and information sciences, general</b>	64.3%	169	94
<b>Engineering</b>	64.1%	347	194
<b>Otorhinolaryngology</b>	64.0%	176	99
<b>Dental sciences</b>	63.3%	200	116
<b>Chemistry</b>	63.1%	2134	1249
<b>Mining engineering</b>	60.9%	14	9
<b>Biochemistry</b>	60.7%	1161	751
<b>Agricultural sciences</b>	59.3%	640	439
<b>Biostatistics and bioinformatics</b>	58.8%	424	297
<b>Pathology and experimental pathology</b>	58.6%	763	539
<b>Pharmacology and toxicology</b>	58.6%	598	423
<b>Cell, cellular biology, and anatomical sciences</b>	58.3%	1041	744
<b>Pharmaceutical sciences</b>	58.1%	634	457
<b>Bioengineering and biomedical engineering</b>	57.2%	867	648
<b>Microbiological sciences and immunology</b>	56.6%	1123	862
<b>Physiology</b>	56.5%	927	713
<b>Biological and biomedical sciences</b>	56.4%	487	376
<b>Cardiology</b>	55.7%	439	349
<b>Genetics</b>	55.6%	819	653
<b>Atmospheric sciences and meteorology</b>	54.6%	136	113
<b>Geological and earth sciences</b>	54.2%	458	387
<b>Economics (except agricultural)</b>	53.8%	71	61
<b>Anesthesiology</b>	53.6%	265	229

*International Students in Science and Engineering*

<b>Neurobiology and neuroscience</b>	53.2%	1179	1037
<b>Computer and information sciences</b>	53.1%	68	60
<b>Astronomy and astrophysics</b>	53.1%	303	268
<b>Physical sciences</b>	52.9%	119	106
<b>Mathematics and applied mathematics</b>	52.8%	471	421
<b>Gastroenterology</b>	52.6%	151	136
<b>Botany and plant biology</b>	51.9%	346	321
<b>Surgery</b>	51.5%	708	668
<b>Neurology</b>	50.5%	741	725
<b>Obstetrics and gynecology</b>	49.4%	154	158
<b>Clinical medicine</b>	49.0%	1951	2031
<b>Pediatrics</b>	48.7%	616	648
<b>History and philosophy of science</b>	47.6%	10	11
<b>Multidisciplinary and interdisciplinary studies</b>	47.3%	460	512
<b>Biology</b>	47.3%	1041	1162
<b>Geosciences, atmospheric sciences, and ocean sciences</b>	46.4%	135	156
<b>Nutrition science</b>	46.4%	89	103
<b>Zoology and animal biology</b>	46.1%	187	219
<b>Ocean and marine sciences</b>	45.3%	178	215
<b>Geography and cartography</b>	44.5%	57	71
<b>Environmental science and studies</b>	39.7%	110	167
<b>Agricultural economics</b>	38.5%	20	32
<b>Linguistics</b>	38.5%	15	24
<b>Epidemiology</b>	38.2%	109	176
<b>Other health</b>	38.2%	209	338
<b>Research and experimental psychology</b>	36.8%	92	158
<b>Public health</b>	36.7%	309	534
<b>Public policy analysis</b>	35.0%	77	143
<b>Forestry, natural resources, and conservation</b>	34.4%	182	347
<b>Veterinary biomedical and clinical sciences</b>	34.3%	233	446
<b>Ecology and population biology</b>	33.1%	137	277
<b>Communication disorders sciences</b>	32.0%	24	51
<b>Social sciences</b>	31.9%	139	297
<b>Pulmonary disease</b>	31.3%	86	189
<b>Political science and government</b>	31.2%	53	117
<b>Clinical psychology</b>	29.2%	21	51
<b>Psychiatry</b>	28.5%	286	718
<b>Psychology, general</b>	28.1%	186	477

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<b>Sociology</b>	25.8%	41	118
<b>Anthropology</b>	24.3%	36	112
<b>International relations and national security studies</b>	23.5%	20	65
<b>Nursing science</b>	20.8%	25	95
<b>Counseling and applied psychology</b>	19.8%	33	134
<b>Criminal justice and safety studies</b>	18.8%	3	13
<b>Human development</b>	13.5%	21	135

Source: National Foundation for American Policy tabulation of National Science Foundation Survey of Graduate Students and Postdoctorates in Science and Engineering, Public Use Microdata files

**CONCLUSION**

International students play an essential role preserving America's position as a center of scientific and technological innovation. For international students to continue playing that role, it is necessary for the United States to maintain reasonable visa policies for international students and to make it easier for students to work after graduation, including preserving STEM OPT and improved policies on H-1B visas, per-country limits and employment-based green cards. In the long term, continuing a U.S. visa policy that blocks many Chinese graduate students from attending U.S. universities might deal a significant blow to innovation and scientific research in America.

## **ABOUT THE NATIONAL FOUNDATION FOR AMERICAN POLICY**

Established in 2003, the National Foundation for American Policy (NFAP) is a 501(c)(3) nonprofit, nonpartisan public policy research organization based in Arlington, Virginia, focusing on trade, immigration and related issues. Advisory Board members include Columbia University economist Jagdish Bhagwati, Cornell Law School professor Stephen W. Yale-Loehr, Ohio University economist Richard Vedder and former INS Commissioner James Ziglar. Over the past 24 months, NFAP's research has been written about in the *Wall Street Journal*, the *New York Times*, the *Washington Post*, and other major media outlets. The organization's reports can be found at [www.nfap.com](http://www.nfap.com).  
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