Number of Foreign College Students Staying and Working in U.S. After Graduation Surges

Federal training program sees 400% increase in foreign students graduating and working in STEM fields from 2008 to 2016

BY *Neil G. Ruiz and Abby Budiman*

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Terminology

The term **OPT** is used in this report as a shorthand for Optional Practical Training, a type of work authorization provided by the U.S. government under the F-1 visa program that allows foreign students to be temporarily employed for up to 12 or 36 months in a field that is directly related to their area of study. The term "foreign student graduates" is used interchangeably throughout the report to refer to those who are authorized to work under the optional practical training program.

The **F-1 visa,** or the academic student visa, is a type of non-immigrant visa for foreign individuals who intend to study full-time in accredited academic institutions the United States, which includes colleges and universities, K-12 schools and language training programs.

Foreign students refer to individuals who were approved to study in the United States under the F-1 visa program by the U.S. government. The terms **foreign students** and **F-1 visa holders** are used interchangeably throughout this report. Students from outside the U.S (not including U.S. territories) wishing to study in the U.S. must go through a process to receive approval for their visas, which includes interviews with U.S. consulates or embassies in their home countries operated by the U.S. Department of State.

H-1B visa is the United States' largest temporary employment-based visa program. It allows U.S. employers to hire foreigners to work for up to six years in jobs that require highly specialized knowledge, and workers' employment may be extended if they have green card applications pending. For more details on the H-1B visa process, see our previous analysis.

Metro areas in this report refer to metropolitan statistical areas (MSAs) that are classified by the U.S. Office of Management and Budget. They consist of at least one large urban core with 50,000 people or more, as well as neighboring areas that are socially and economically linked to the core area. The terms **metro areas** and **cities** are used interchangeably throughout this report.

STEM extension refers to foreign students on F-1 visas working under OPT who qualify for an additional 24 months of OPT. To qualify, the foreign student must have received a bachelor's, master's or doctorate degree in science, technology, engineering or mathematics (STEM) degree in a field on the STEM designated degree program list from an accredited school that is certified by the Student and Exchange Visitor Program.

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Federal training program sees 400% increase in foreign students graduating and working in STEM fields, 2008-2016

Between 2004 and 2016, nearly 1.5 million foreign graduates of U.S. colleges and universities obtained authorization to remain and work in the U.S. through the federal government's Optional Practical Training program (OPT). More than half (53%) of the foreign graduates approved for employment specialized in science, technology, engineering and mathematics (STEM) fields, according to a Pew Research Center analysis of U.S. Immigration and Customs Enforcement (ICE) data received through a Freedom of Information Act request.[1]

Many foreign STEM graduates enrolled with OPT after executive actions in 2008 and 2016 initially doubled (29 months), then later tripled (36 months), the maximum length of employment for foreign students with STEM degrees. The number of foreign STEM graduates participating in OPT grew by 400% since the first employment extension was introduced in 2008.

Number of foreign students graduating American colleges and obtaining authorization to work in the U.S. grows, especially among those in STEM fields

Number of OPT approvals from 2004-2016, in thousands
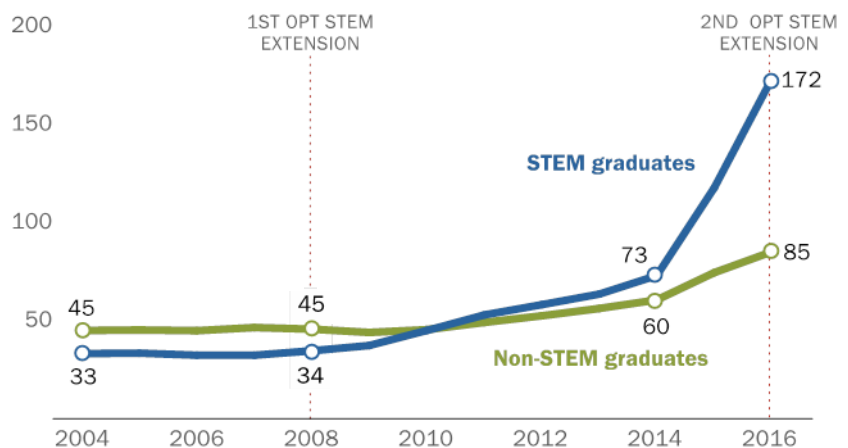
Note: Figures are students with an associate degree or higher. STEM categories are based on fields outlined by the U.S. Department of Homeland Security.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
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[1] Data received from Immigration and Customs Enforcement are from the U.S. government's Student and Exchange Visitor Information System (SEVIS) – an automated foreign student monitoring system. SEVIS is managed by the Student and Exchange Visitor Program within ICE.

OPT is one mechanism by which the U.S. can compete with other countries for top talent. It is less well-known than the H-1B visa program – which enables U.S. companies to hire highly skilled foreign workers and is the nation's largest temporary employment visa program – yet OPT approvals actually outnumbered initial H-1B visa approvals in recent years.[2] In addition, OPT's eligible population has been on the rise: Between 2008 and 2016, new college enrollments among foreign students on F-1 visas grew 104%.

Nearly three-quarters of the 1.5 million graduates on OPT came from Asia

Number and % of OPT approvals in the United States from 2004-2016, by country of citizenship

China
313,500
(21%)

Nepal
23,500
(2%)

South
Korea
90,800
(6%)

Canada
35,300
(2%)

Japan
39,400
(3%)

Turkey
19,500
(1%)

Mexico
17,900
(1%)

Taiwan
52,700
(4%)

Brazil
16,100
(1%)

India
441,400
(30%)

Note: Only top 10 countries shown. Figures are students with an associate degree or higher and are rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
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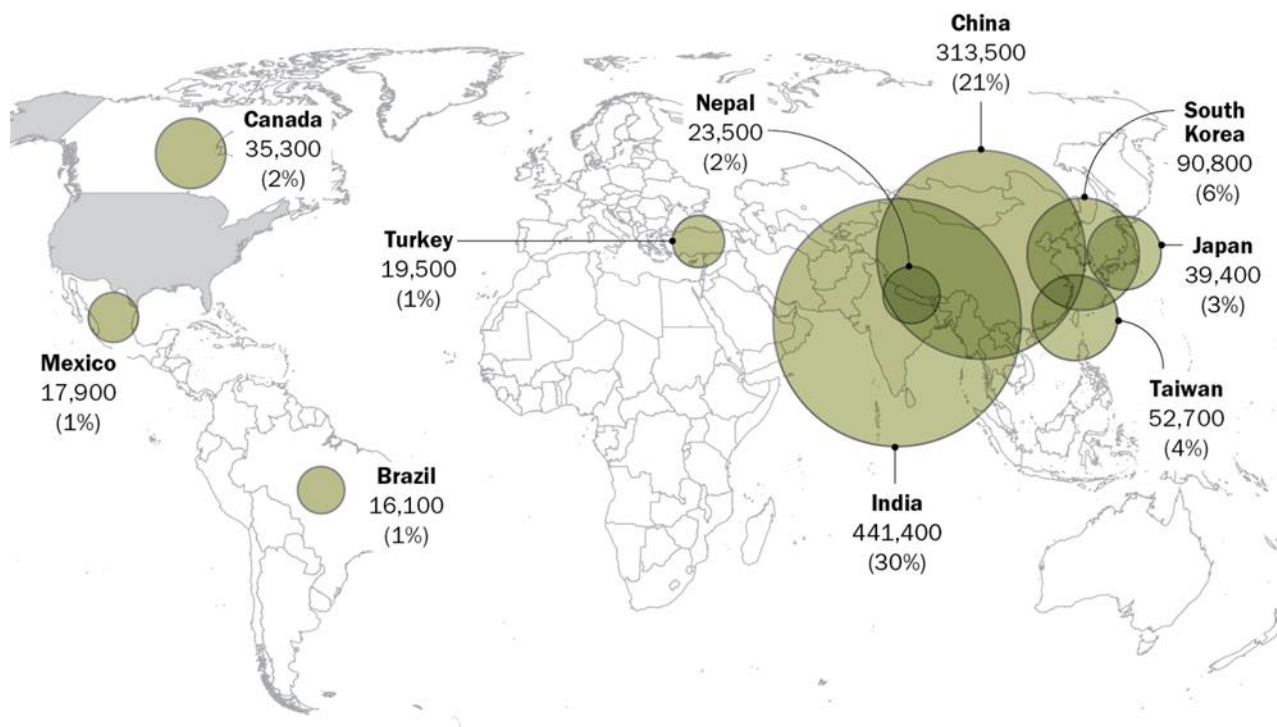
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[2] While this refers to initial approvals for the H-1B visa, both initial *and* continuing approvals for the H-1B visa still exceed the OPT program. See Appendix C for more details.

Foreign students obtaining authorization to remain and work in the U.S. after graduation come from all corners of the globe, but the majority of them hold citizenship in Asia. Students from India, China and South Korea made up 57% of all OPT participants between 2004 and 2016. Although the data referenced in this report cover F-1 visa holders approved for OPT participation between 2004 and 2016, only those who pursued degrees in higher education (associate, bachelor's, master's or doctorate) are included in the analysis.

This data made it possible to map where foreign college graduates came from and where they were going – both for their education and their OPT employment. Major metro areas in the U.S. tend to attract large numbers of foreign students and also keep a significant share as OPT enrollees. By contrast, smaller-sized metro areas often see local foreign graduates relocate elsewhere as part of OPT employment.

View our interactive *to see where foreign student graduates under OPT worked in the United States, by the top 61 metro areas with the largest number of graduates approved for OPT between 2004 and 2016.*

Newly enrolled foreign students surge at U.S. colleges and universities from 2008 to 2016

Only foreign students enrolled full-time at U.S. colleges and universities are eligible for OPT. The most common type of visa for foreign students is the F-1 academic student visa, which is typically given to those pursuing degrees in higher education. The number of newly enrolled foreign students with F-1 visas at U.S. colleges and universities has grown dramatically in recent years, increasing from 138,500 in 2004 to 364,000 in 2016. Much of this growth happened after the start of the Great Recession at the end of 2007. Between 2008 and 2016, new foreign student enrollment has increased by 104%, far outpacing overall college enrollment growth, which was 3.4% during the same period, according to U.S. Census Bureau data. This increase was greatest in public colleges and universities, which faced budget cuts during the recession and began to rely more heavily on tuition from foreign students.

For more in-depth analysis, see this Pew Research Center study *on foreign students in the U.S. and its related* fact sheet.

Foreign STEM graduates make up majority of OPT participants

More than half (53%) of students authorized to work under OPT during the 2004-2016 period graduated with a STEM degree from a U.S. college or university, according to the Center's analysis of ICE data.[3] STEM graduates with master's degrees made up roughly a third (34%) of all authorized OPT enrollees.

The overall surge in the number of foreign college graduates participating in OPT is largely attributable to a 400% increase in STEM graduates approved to temporarily work in the U.S. since 2008.

Among OPT participants with doctoral degrees, 78% studied in a STEM field, while among those with master's degrees the share was 60%. STEM graduates made up smaller shares of OPT participants with bachelor's (33%) and associate degrees (12%).

The top fields of study among OPT participants with doctorates were engineering (34%), physical sciences (16%) and biological and biomedical sciences (13%).[4] Foreign graduates with master's degrees concentrated in the areas of engineering (27%), computer and information sciences and support services (22%), and business, management, marketing, and support services (22%). OPT enrollees with bachelor's degrees most often completed majors in business, management, marketing, and support services (32%), engineering (12%), and the social sciences (9%).

Number of STEM graduates under OPT grew substantially after the 2008 program expansion

% increase between 2008 and 2016

STEM	400%
Non-STEM	49%
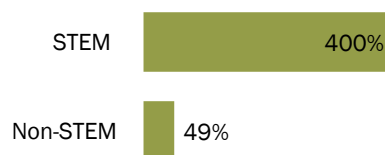
Note: STEM categories are based on fields outlined by the U.S. Department of Homeland Security. Figures are students with an associate degree or higher.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request. "Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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[3] This is based on the definition of which fields of study qualify for the OPT STEM extension according to the U.S. Department of Homeland Security as of May 10, 2016. The full list of fields of study qualifying as STEM is available here.
[4] See Appendix C for a breakdown of top 10 majors by degree level.

OPT approvals outpaced initial H-1B visa approvals in recent years

Between 2004 and 2016, the number of foreign student graduates who were approved for the OPT program rivaled the number of high-skilled workers initially approved for the nation's largest temporary employment visa program, also known as the H-1B visa, according to a Pew Research Center analysis of data from a Freedom of Information Act request received from Immigration and Customs Enforcement (ICE) and publicly available data from U.S. Citizenship and Immigration Services (USCIS).[5]

By the end of the 2004-2016 period, [6] there were a total of 1,474,000 OPT approvals and 1,473,000 initial H-1B visa approvals.[7]

Optional Practical Training approvals surpassed initial H-1B visa approvals in 2010, 2014, 2015 and 2016

Number of OPT and H-1B visa approvals, in thousands

Note: H-1B visa data are in U.S. federal fiscal years, which run from Oct. 1-Sept. 30. OPT data are in calendar years. H-1B data include both capped and uncapped approvals. H-1B visa applications require an equivalent to a U.S. bachelor's degree or higher. See Appendix B for OPT educational requirements.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request and publicly available H-1B visa data from U.S. Citizenship and Immigration Services.
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While both programs give foreign workers temporary employment authorization in the U.S., they are different in a number of ways. For instance, only foreign students on an F-1 visa with a higher education degree[8] from a U.S. college or university are eligible for the OPT program, whereas any foreign worker with a degree that is equivalent to a U.S. bachelor's degree or higher is permitted to apply for the H-1B visa. Also, unlike the H-1B visa program, which imposes an annual cap of

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[5] Data for OPT approvals were received on August 2017 from ICE. Data on annual H-1B visa approvals are publicly available from USCIS.
[6] OPT approvals are made during calendar years while H-1B visa approvals are made during the federal government's fiscal years, which run from Oct. 1 to Sept. 30. OPT and H-1B visa approval data cannot be harmonized into fiscal years since the OPT data that we received did not provide the month of approval.
[7] The total number of initial and continuing H-1B visa approvals between 2004 and 2016 is 3.5 million. H-1B visa holders can also be sponsored for a green card through their employer. See Appendix C for more details.
[8] See Appendix B for definitions of higher education under OPT.

65,000 visas to private companies sponsoring foreign workers[9], there is no cap on the number of approvals available under the OPT program; all F-1 visa holders are eligible to apply.[10] Furthermore, foreign students do not require employer sponsorship to apply for OPT, while the H-1B visa program requires employers to directly sponsor the foreign workers they intend to hire.[11]

Transitioning to the H-1B visa is one of the pathways that foreign graduates can pursue to stay in the U.S. once their OPT period expires.[12] However, there is no guarantee that H-1B visas will be available for employers who want to sponsor foreign graduates working under OPT. In recent years, the number of applications for this visa program has exceeded its annual cap, and a lottery system was put in place to award the visas.

However, those who hold advanced degrees (master's, professional or doctorate) in any subject from a U.S. higher educational institution have a greater chance of getting approved for an H-1B visa, since an additional 20,000 visas are set aside for this group every year. According to a Pew Research Center analysis of previously obtained H-1B visa data from a separate public records request from U.S. Citizenship and Immigration Services, nearly 14%, or 118,000, of all capped H-1B visas approved between fiscal 2010 and 2016 were given to advanced degree graduates of U.S. universities.[13]

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[9] Institution of higher education or its affiliated or related nonprofit entities, or a nonprofit research organization, or a government research organization are exempt from the cap.

[10] For pre-completion OPT, full-time foreign students on F-1 visas must be fully enrolled for at least nine months at a U.S. college or university.

[11] Those on OPT may be unemployed for up to 90 days before having to leave the country, while H-1B visa holders are given a 60-day "grace period" if they find themselves out of a job.

[12] Work authorization under OPT is also restricted to 12 months of work in an area related to the foreign student's field of study, and extendable only up to a maximum of 36 months for STEM degree holders (it cannot directly lead to a path of permanent residency). On the other hand, the H-1B visa does not require foreign employees to work in fields that they majored in, and it gives visa holders the opportunity to transition to permanent residency status (through a green card) with employer sponsorship.

[13] The data from U.S. Citizenship and Immigration Services do not include whether the H-1B visa holder received a U.S. bachelor's degree. Only numbers for those with a master's, professional or doctorate degree from a U.S. college or university are given.

As yearly H-1B visa applications surpass the annual cap, OPT is becoming a more popular pathway for foreign graduates of U.S. higher educational institutions to stay in the country

The Optional Practical Training program (OPT) was developed to allow F-1 visa holders to gain practical work experience after graduating from a U.S. college or university. In 2007 and 2013, Congress did not pass expansive reforms to the H-1B visa program as part of comprehensive immigration reform bills. At the time, there were proposals to increase the number of H-1B visas as well as legislation to add 55,000 green cards exclusively for foreign student graduates with a STEM degree. With no legislation passed on the H-1B visa program, the residency limit for OPT was extended an additional 24 months for those with a STEM degree.

In light of economic concerns and pressure raised by high-tech professionals, members of Congress and U.S. educational institutions, the George W. Bush and Obama administrations expanded the OPT program for those with STEM degrees in 2008 and 2016, respectively. This expansion was intended to prevent a "brain drain," addressing U.S. concerns of losing students unable to obtain an H-1B visa.

The federal government also established the "cap-gap extension," which extends the OPT period authorization for U.S. foreign student graduates whose work authorization has expired. This extension allows foreign graduates to continue residing in the U.S. if they are attempting to change status to an H-1B visa. Only those with pending or approved H-1B visa petitions are granted cap-gap extension, valid until the beginning of the government's fiscal year (Oct. 1).

With these policy developments, the OPT program has become a more popular pathway that foreign students on F-1 visas are taking to remain in the U.S. after graduation. Foreign students are now given multiple chances to adjust status to the H-1B visa program, which they can then use to potentially obtain a green card. H-1B visas for private companies are awarded to employers on a first-come, first-served basis, with applications accepted each year beginning in April. Employers that are institutions of higher education, nonprofits or government research institutions are exempted from the cap through the American Competitiveness in the 21st Century Act of 2000. Those OPT participants without STEM degrees have two opportunities to find employers to sponsor them under the H-1B visa program (one during the year of graduation and the other during their 12 month OPT period). OPT participants with STEM degrees could have four chances to get sponsored for an H-1B visa because of the additional 24 months that they receive.

More recently, a lawsuit filed against the Department of Homeland Security by the Washington Alliance of Technology Workers (WashTech) contested the validity of the STEM OPT extension program that started in 2008. It was dismissed after a new rule by the Obama administration was issued on May 10, 2016.

Majority of foreign student graduates working under OPT are from Asia

With regard to region of origin, the largest group of foreign students who studied in the U.S. and utilized the OPT program between 2004 and 2016 held citizenship in Asia. Asian foreign student graduates accounted for 74% of all OPT approvals during this period. Graduates of European citizenship were the second-largest group (8%) along with students from Latin America and the Caribbean (8%), followed by African students (5%).

In terms of country of citizenship, graduates from India made up the largest share of those authorized to work under the OPT program during this period, with 441,400 (30% of the total). Students from China came second at 313,500 (21%), followed by South Koreans at 90,800 (6%).

Students from Asia make up a large majority of graduates approved for OPT, 2004-2016

North America 35,800 (2%)
Middle East 55,100 (4%)
Africa 66,400 (5%)
Latin America and the Caribbean 113,000 (8%)
Europe 118,600 (8%)
Asia-Pacific 1,085,400 (74%)

Height of bar represents number of foreign students from each region.

Width of bar represents percent of foreign students from each region.
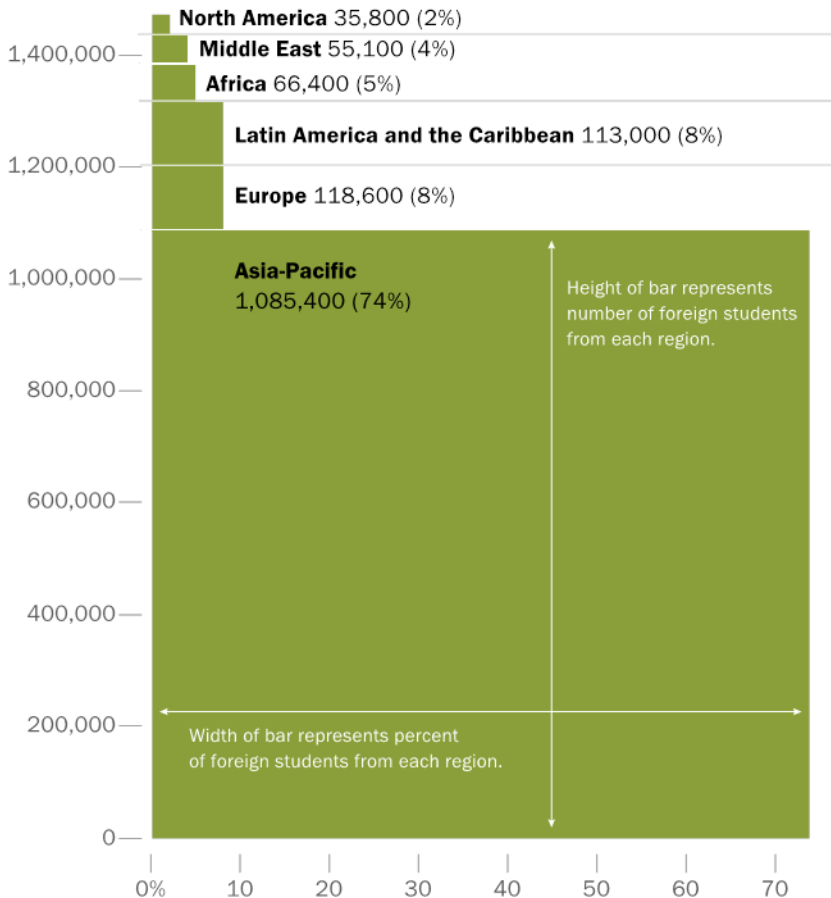
Note: See Appendix E for region categories. Figures are students with associate degree or higher degrees in higher education, rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
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Among citizens of India, STEM graduates made up the majority of OPT participants. Between 2004 and 2016, the number of students from India graduating with STEM degrees increased 658%, compared with a 93% increase for Indian students with non-STEM degrees.

Foreign graduates with master's degrees drive OPT's growth

Between 2004 and 2016, foreign graduates with master's degrees far outnumbered all other degree holders under OPT, making up 57% (840,800) of all graduates in the program. The number of master's degree holders also grew the most by far during the same time period, rising from 39,500 in 2004 to 172,900 in 2016 – a 337% increase. By comparison, the number of OPT approvals for doctorate degree holders grew by 187%, bachelor's by 115% and associate degree holders by just 21%.

This rapid increase in master's degree holders took place almost exclusively in the wake of a 2008 revision to OPT that enabled STEM graduates work an additional 17 months in the U.S. The contrast before and after the Bush-era revision is stark: Between 2004 and 2007, the number of master's degree OPT enrollees decreased by 7%, whereas between 2008 and 2016 it increased by 322%.

Largest growth of OPT approvals among foreign student graduates with master's degrees

% increase between 2004-2016

Degree	%
Master's	337%
Doctorate	187%
Bachelor's	115%
Associate	21%

Note: Those with degrees that fall under the "other" category not shown.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request. "Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"
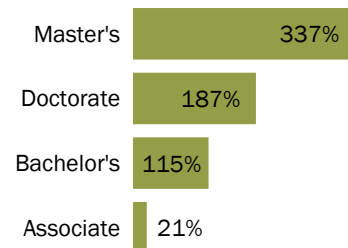
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Most foreign students enrolled in OPT attended public colleges

More than half (56%) of foreign graduates who participated in OPT between 2004 and 2016 obtained their degree from a public college or university. Four-in-ten (41%) came from private universities and colleges, of which 38% were not-for-profit schools and 3% were for-profit institutions. Fewer than 3% of OPT enrollees graduated from schools not classified under the Carnegie Classification of Institutions of Higher Education (CCIHE).
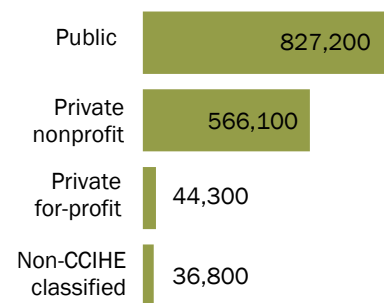
Despite these overall percentages, the three top sources of OPT enrollees between 2004 and 2016 are all private, nonprofit colleges: the University of Southern California (27,100), New York University (26,800) and Columbia University (22,600).

The top public college for OPT participants is City University of New York's Bernard M. Baruch College (18,500). Other public schools that graduated significant numbers of OPT enrollees include University of Michigan at Ann Arbor (13,700), University of California, Los Angeles (13,600), and University of Illinois at Urbana Champaign (13,600).

Among schools not under the CCIHE, Northwestern Polytechnic University stands out with 11,700 foreign graduates who went on to participate in OPT – more than double the second highest, Silicon Valley University (4,500). Three other schools stand out: University of Northern Virginia (2,400), Virginia International University (2,300) and Herguan University (1,000).[14]

Public college and university graduates made up largest group of OPT approvals, 2004-2016

Number of foreign graduates approved to work in the United States

Public	827,200
Private nonprofit	566,100
Private for-profit	44,300
Non-CCIHE classified	36,800

Note: School categories are defined by the Carnegie Classification of Institutions of Higher Education. Figures are students with associate degree or higher, rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request. "Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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[14] There have been some controversies over unaccredited colleges allegedly abusing the student visa program. Following these allegations at least four schools have closed: Tri-Valley University in the San Francisco metro area in 2011, University of Northern Virginia in the Washington, D.C., metropolitan area in 2013, Herguan University in the San Jose, CA metro area in 2016, and Silicon Valley University in the San Jose, CA metro area in 2018.

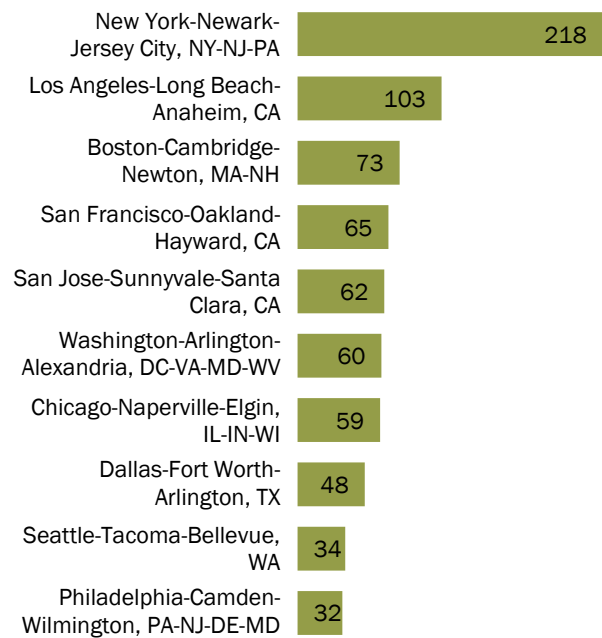## Where OPT participants work in the United States

Under the Optional Practical Training program, foreign students who stay to work in the United States can search for a job anywhere in the country. As a result, foreign student graduates in the OPT program can move from the metro area of their school and pursue work elsewhere. Overall, large metro areas retained many of the students who attended schools in the area. These same large metros were also top relocation destinations for many foreign graduates from other metros. Meanwhile, areas with smaller populations saw many of the foreign graduates who attended school there leave, and saw only a few foreign graduates from other areas move in to work.[15]

The New York-Newark-Jersey City metro area had the largest cumulative population of OPT participants (218,400).[16] That was followed by the Los Angeles-Long Beach-Anaheim (103,600) and Boston-Cambridge-Newton metro areas (73,000).

Top 10 metro areas with largest number of foreign graduates on OPT, 2004-2016

Number of OPT approvals, in thousands

Metro area	
New York-Newark-Jersey City, NY-NJ-PA	218
Los Angeles-Long Beach-Anaheim, CA	103
Boston-Cambridge-Newton, MA-NH	73
San Francisco-Oakland-Hayward, CA	65
San Jose-Sunnyvale-Santa Clara, CA	62
Washington-Arlington-Alexandria, DC-VA-MD-WV	60
Chicago-Naperville-Elgin, IL-IN-WI	59
Dallas-Fort Worth-Arlington, TX	48
Seattle-Tacoma-Bellevue, WA	34
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	32

Note: For more on the classification of Metropolitan Statistical Areas (MSAs), see Methodology. Figures are students with degrees in higher education, including an "other" category.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
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New York's dominance can be explained in part by its ability to retain foreign students graduating from local colleges: 85% of foreign students graduating from New York-area schools stayed in the metro region to work under OPT between 2004 and 2016. In the Los Angeles and Boston areas, the shares were 78% and 72%, respectively.

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[15] See Appendix D for metropolitan area population sizes.

[16] This analysis focused on 113 metropolitan statistical areas where at least 2,000 foreign student graduates went to school and were approved for OPT between 2004 and 2016. The sortable table accompanying this report includes this same set of metro areas (113).The metro area profiles in the interactive accompanying this report only includes 61 metro areas with 5,000 or more foreign student graduates. This shows percentages based on unrounded numbers.

The Seattle (84%) and Honolulu areas (83%) actually outperformed Los Angeles and Boston in terms of the share of local foreign students retained through OPT.

On the opposite end of the spectrum, the Springfield, Illinois, metro area retained the lowest share (7%) of foreign graduates who attended schools in its area. The Carbondale-Marion, Illinois, and Beaumont-Port Arthur, Texas, areas were next above it at 20% and 23%, respectively.

Across U.S. metro areas, OPT has resulted in both net "importers" and net "exporters" of foreign college graduates. New York topped the list for attracting the most foreign students who graduated from schools *outside* its metro area, with 74,000 students coming into the area for work between 2004 and 2016. Three California metro areas followed: San Jose (44,500), San Francisco (33,700) and Los Angeles (27,800). The San Jose metro, however, had the largest *share* (71%) of foreign graduates working in the area on OPT who graduated from other metros. This was followed by the Kansas City, Missouri (69%), and Peoria, Illinois (66%), areas.

Even though the New York metro area both attracted and retained the largest numbers of foreign students on OPT, the Seattle area retained and attracted the highest shares of graduates proportionate to its foreign graduate population. This is because the number of students who relocated to the Seattle area (20,500) is larger than the graduates who left (2,700). Overall, the net change in the Seattle metro's foreign graduate population was 52%, compared with 22% in the New York metro area.

To see a sortable table detailing the movement of foreign graduates on OPT by the top metro areas where they attended school, see Appendix D.

See Methodology for details on this section's calculations.

Acknowledgments

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Methodology

The demographic analysis for this report is based on participant records from three U.S. government programs – F-1 visa, the Optional Practical Training (OPT) program (which is part of the F-1 program) and H-1B visa. All were received through a Freedom of Information Act request submitted to Immigration and Customs Enforcement and U.S. Citizenship and Immigration Services and some H-1B data used are publicly available.[17] Information before 2004 was excluded from analysis because prior to that year the automated monitoring system did not include all foreign students.

The Sept. 11, 2001, terrorist attacks played a key role in shaping the U.S. government's current system for foreign student visas. In the years after Sept. 11, the federal government fully implemented the automated foreign student monitoring system, and student visa applications began receiving additional scrutiny.

Populations of analysis and data access

The OPT data for this study are from the federal government's automated foreign student monitoring system, the Student and Exchange Visitor Information System (SEVIS). Information added into SEVIS is self-recorded and contains information about F-1 visa holders that have been approved for the Optional Practical Training (OPT) program extension. The data in this analysis include information on graduates' country of citizenship, major, level of education, name and location of their educational institution, employer name and location, and approval start and end years. Only foreign individuals who pursued degrees in higher education (associate, bachelor's, master's and doctorate) were included in our analysis. Foreign graduates on OPT who attended schools in Puerto Rico are included in this analysis; however, those who graduated from or are currently working in other U.S. territories (such as Guam and the U.S. Virgin Islands) are not. These individuals accounted for less than 0.02% of the population.

Geographical classification of Metropolitan Statistical Areas

Respondents' city and state level data in the OPT dataset (school address and current address) were matched to their corresponding Metropolitan Statistical Areas (MSAs) as classified by the Office of Management and Budget.[18] Because the raw data contained numerous typographical and

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[17] H-1B visa data were received in November 2017 from U.S. Citizenship and Immigration Services; findings were published in a separate analysis. F-1 visa data were received in March 2017 from Immigration and Customs Enforcement (ICE) and were also published under a separate publication. OPT data were received from ICE on Aug. 28, 2017.

[18] Cross-referenced data of city and state for respondent address and school address had to match for a respondent to be counted in a corresponding MSA.

other contextual errors, the raw entries for city and state were preprocessed by standardizing prefixes common to cities and towns (such as "saint" or "heights") and by removing digits and punctuation. For each entry, we then looked up a list of all cities and towns in that state, found a matching city, and returned its corresponding MSA. In cases where errors in the raw data resulted in failure to return an exact match to the city, approximate string matching using the restricted Damerau-Levenshtein distance metric was used to find the closest matching city up to a maximum string distance of 3. Locations that are not categorized under any MSA were coded as "non-metropolitans" (these include Micropolitan Statistical Areas) and were not included in our analysis. About 3% of entries could not be programmatically matched in this way, and were therefore manually coded into their corresponding metro areas. Of this 3%, less than 0.5% could not be manually matched.[19]

This report's accompanying sortable table focuses on 113 MSAs that had at least 2,000 foreign student graduates approved for OPT during the 2004 to 2016 period.[20] The interactive associated with this report includes 61 metro areas with 5,000 or more foreign student graduates.[21]

Carnegie Classification of Institutions of Higher Education (CCIHE)

The Carnegie Classification of Institutions (specifically their "control" variable) was used to categorize schools into public, private nonprofit or private for-profit institutions. Colleges and universities that were not included in the classification encompassed less than 3% of the foreign graduate population on OPT.[22] These schools were coded as "non-CCIHE classified" in our analysis.

Major classifications

This report groups majors based on the taxonomic scheme from the U.S. Department of Education's Classification of Instructional Programs which supports the accurate tracking and reporting of fields of study.[23] The most recent delineation of majors that fall under the science, technology, engineering or mathematics (STEM) fields outlined by the Department of Homeland Security was used to determine the individuals who are eligible to apply for the additional 24 months OPT program expansion.

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[19] Those who were not matched were left out of the metropolitan analysis.
[20] Metro areas with at least 2,000 foreign student graduates approved for OPT are 87% of the total approved OPT population.
[21] Metro areas with at least 5,000 foreign student graduates approved for OPT are 75% of the total approved OPT population.
[22] Colleges and universities not included in the CCIHE made up 13% of schools in the data.
[23] Majors are based on the first major reported by the respondent. Less than 0.01% of respondents did not report a major.

Calculating retention, attraction and net change

By comparing individual-level locations of schools and current addresses, we were able to calculate the total number and breakdown of foreign graduates who *stayed* in (retention) or *left* (outflow) their school's metro area, as well as the total who were *attracted* to other metro areas and relocated (inflow) there. The variables and formulas below were used to define and calculate the numbers used in our analysis.

STAYED   =   Total who *attended* school in metro and *stayed* to work

LEFT   =   Total who *attended* school in metro and *left* for other metros to work

ATTRACT =   Total who *arrived* from other metros to work

$$\text{RETENTION RATE} = \left(\frac{\text{STAYED}}{\text{Total who } \textit{attended} \text{ school in metro}} \right) \%$$

$$\text{ATTRACTION RATE} = \left(\frac{\text{ATTRACT}}{\text{Total who } \textit{worked} \text{ in metro area}} \right) \%$$

$$\text{NET CHANGE} = \left(\frac{\text{ATTRACT} - \text{LEFT}}{\text{Total who } \textit{worked} \text{ in metro area}} \right) \%$$

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Appendix B: Additional note

The approval process for the U.S. Optional Practical Training (OPT) program

Optional Practical Training (OPT) is temporary work authorization for eligible F-1 visa holders that lasts up to 12 months. There are two types of OPT programs, *pre-completion* and *post-completion*. For pre-completion OPT eligibility, F-1 visa holders must have completed at least one full academic year on a full-time basis and apply up to 90 days before completing the full academic year. If a foreign student chooses to take part in pre-completion OPT, that amount of time will be taken out of the students' post-completion period. Many students take advantage of the post-completion program. For post-completion OPT, students may apply up to 90 days before completing their degree, but no later than 60 days after degree completion. While students are enrolled full-time they can also participate in the Curricular Practical Training (CPT) if it is part of their program of study, which can make them ineligible for OPT if they have 12 months or more of full-time CPT.

The OPT process starts with foreign students completing an application that involves filing several official forms and documents to U.S. Citizenship and Immigration Services (USCIS). If approved, USCIS issues an employment authorization document that allows the student to work in their area of study for up to 12 months. If students cannot find a job within 90 days they must leave the country.

OPT graduates can apply for a 24-month extension if their degree is a science, technology, engineering or mathematics (STEM) degree in a field approved by the U.S. Department of Homeland Security. They also must obtain a recommendation from their school, additional approval from USCIS after completing their initial 12-month OPT period, and sponsorship from an employer that is part of the E-Verify program, an internet-based system used to confirm employment eligibility.

Foreign graduates are eligible to receive OPT approvals for each successive higher education program they complete in the country. This means that a student who graduated with a degree in the U.S. may participate in OPT before *and* after receiving another degree within the country. However, if the student goes straight to another degree program after graduating, they do not receive extra time for their OPT.

Appendix C: Additional charts

Total approvals for both initial and continuing H-1B visas exceed OPT approvals, 2004-2016

Number of foreign temporary employees, in thousands

Among H-1B approvals

Initial	1,473
Continuing	2,073

OPT approvals

Total	1,474
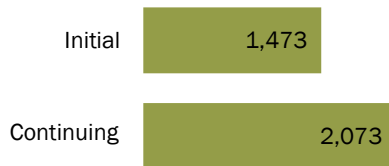
Note: Data for OPT approvals are based on calendar years, while data for H-1B approvals are based on fiscal years.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request and publicly available U.S. Citizenship and Immigration Services data.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Share of foreign grads on OPT who studied STEM, by degree level

% of STEM graduates by degree levels, 2004-2016

Doctorate **78%**

Master's **60%**

Bachelor's **33%**

Associate 12%
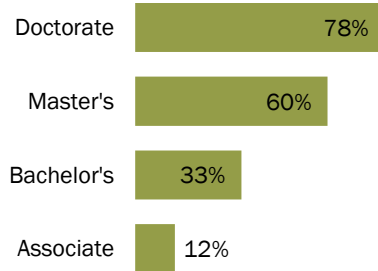
Note: Degree levels categorized under "Other degrees" are not included. STEM categories are based on fields outlined by the Department of Homeland Security.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request. "Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 10 fields of study among associate degree holders on OPT, 2004-2016

Total number of foreign graduates studying ...

		Share
Business, management, marketing, and related support services	18,500	31%
Health professions and related programs	9,700	16%
Visual and performing arts	8,200	14%
Liberal arts and sciences, general studies and humanities	6,800	11%
Computer and information sciences and support services	3,900	6%
Personal and culinary services	2,700	4%
Education	1,100	2%
Communication, journalism and related programs	1,000	2%
Engineering	1,000	2%
Engineering technologies and engineering-related fields	900	2%

Note: Majors are grouped based on the taxonomic scheme from the U.S. Department of Education's Classification of Instructional Programs. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

PEW RESEARCH CENTER

Top 10 fields of study among bachelor's degree holders on OPT, 2004-2016

Total number of foreign graduates studying ...

Field		Share
Business, management, marketing and related support services	108,700	32%
Engineering	40,800	12%
Social sciences	29,600	9%
Visual and performing arts	29,000	8%
Computer and information sciences and support services	27,900	8%
Biological and biomedical sciences	16,100	5%
Communication, journalism and related programs	12,900	4%
Health professions and related programs	12,300	4%
Mathematics and statistics	9,800	3%
Psychology	8,800	3%

Note: Majors are grouped based on the taxonomic scheme from the U.S. Department of Education's Classification of Instructional Programs. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 10 fields of study among master's degree holders on OPT, 2004-2016
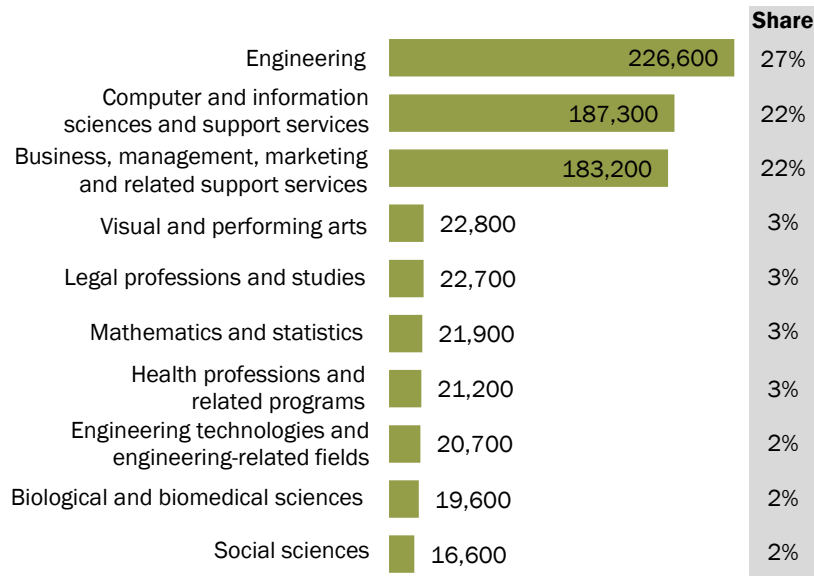
Total number of foreign graduates studying ...

Field	Total	Share
Engineering	226,600	27%
Computer and information sciences and support services	187,300	22%
Business, management, marketing and related support services	183,200	22%
Visual and performing arts	22,800	3%
Legal professions and studies	22,700	3%
Mathematics and statistics	21,900	3%
Health professions and related programs	21,200	3%
Engineering technologies and engineering-related fields	20,700	2%
Biological and biomedical sciences	19,600	2%
Social sciences	16,600	2%

Note: Majors are grouped based on the taxonomic scheme from the U.S. Department of Education's Classification of Instructional Programs. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

PEW RESEARCH CENTER

Top 10 fields of study among doctorate degree holders on OPT, 2004-2016
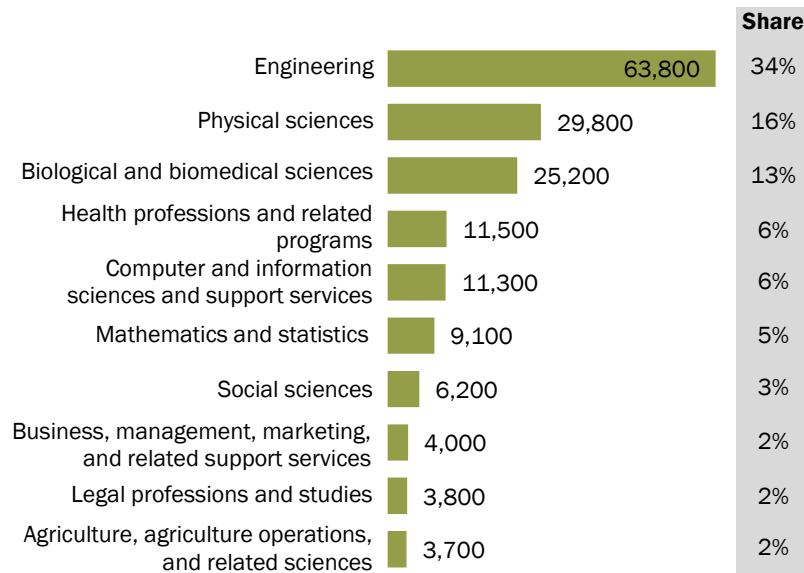
Total number of foreign graduates studying …

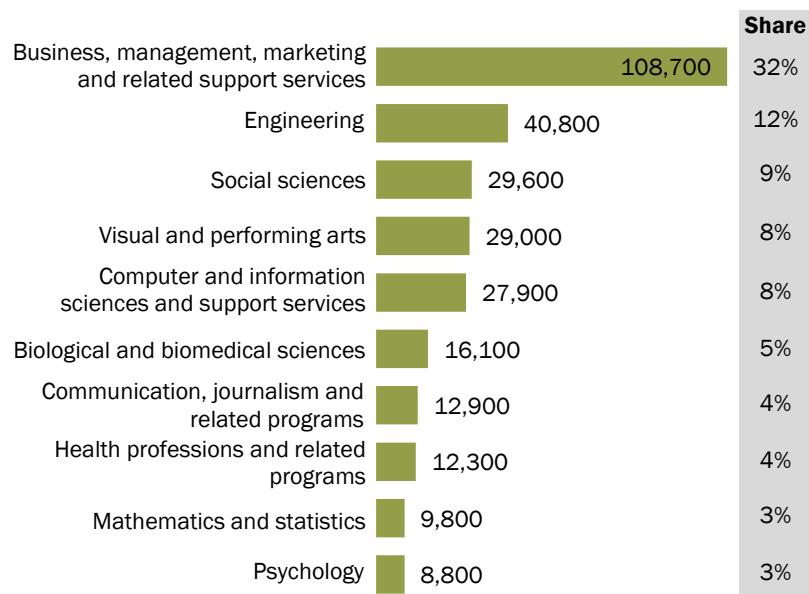| Field	Number	Share
Engineering	63,800	34%
Physical sciences	29,800	16%
Biological and biomedical sciences	25,200	13%
Health professions and related programs	11,500	6%
Computer and information sciences and support services	11,300	6%
Mathematics and statistics	9,100	5%
Social sciences	6,200	3%
Business, management, marketing, and related support services	4,000	2%
Legal professions and studies	3,800	2%
Agriculture, agriculture operations, and related sciences	3,700	2%

Note: Majors are grouped based on the taxonomic scheme from the U.S. Department of Education's Classification of Instructional Programs. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Appendix D: Additional tables

Top 10 public schools foreign student graduates on OPT attended, 2004-2016

Number of foreign graduates by school

School name

City University of New York, Baruch College	18,500
University of Michigan, Ann Arbor	13,700
University of California, Los Angeles	13,600
University of Illinois at Urbana-Champaign	13,600
University of Texas at Dallas	13,500
Purdue University	12,900
Arizona State University, Tempe	12,600
University of Texas at Arlington	12,500
State University of New York, University at Buffalo	12,300
University of Florida	12,300

Note: School classifications are defined by the Carnegie Classification of Institutions of Higher Educations. Only institutions of higher education are included in the classifications. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 10 private nonprofit schools foreign student graduates on OPT attended, 2004-2016

Number of foreign graduates by school

School name

University of Southern California	27,100
New York University	26,800
Columbia University	22,600
Carnegie Mellon University	14,100
Illinois Institute of Technology	12,900
Northeastern University	10,700
Boston University	10,800
University of Pennsylvania	10,500
Cornell University	10,400
Harvard University	9,500

Note: School classifications are defined by the Carnegie Classification of Institutions of Higher Educations. Only institutions of higher education are included in the classifications. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 10 non-CCIHE classified schools foreign students on OPT attended, 2004-2016

Number of foreign graduates by school

School name	
Northwestern Polytechnic University	11,700
Silicon Valley University*	4,500
University of Northern Virginia**	2,400
Virginia International University	2,300
Herguan University***	1,000
The Lee Strasberg Theatre and Film Institute	800
New York Institute of English and Business	700
San Diego University for Integrative Studies	700
Christ for the Nations Institute	600
Pensacola Christian College	500

* Silicon Valley University was officially closed in 2018.
** University of Northern Virginia was officially closed in 2013.
***Herguan University was officially closed in 2016.
Note: School classifications are defined by the Carnegie Classification of Institutions of Higher Educations. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 10 private for-profit schools foreign student graduates on OPT attended, 2004-2016

Number of foreign graduates by school

School name	
Academy of Art University	6,800
Stratford University	5,900
New York Film Academy	4,100
School of Visual Arts	3,000
Strayer University	2,700
DeVry University	2,100
Fashion Institute of Design and Merchandising	1,800
Monroe College	1,700
Full Sail University	1,300
Berkeley College	1,100

Note: School classifications are defined by the Carnegie Classification of Institutions of Higher Educations. Figures rounded to nearest hundred.
Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Foreign graduates who worked under OPT by metro area, 2004-2016

Number of foreign graduates with an associate degree or higher, by metro area

Metropolitan statistical area	Number who attended school in area	Number who left area for work	Number who entered area to work	Total number who worked in area following school	Net change in area's foreign graduate population
Akron, OH	5,200	2,600	600	3,100	-66%
Albany-Schenectady-Troy, NY	5,000	2,500	2,200	4,700	-8%
Allentown-Bethlehem-Easton, PA-NJ	2,500	1,300	1,000	2,200	-13%
Ames, IA	5,400	3,100	400	2,700	-102%
Ann Arbor, MI	16,000	10,000	2,300	8,300	-92%
Athens-Clarke County, GA	2,900	1,500	300	1,800	-65%
Atlanta-Sandy Springs-Roswell, GA	20,500	6,900	12,600	26,300	22%
Auburn-Opelika, AL	2,400	1,500	400	1,200	-96%
Austin-Round Rock, TX	10,700	4,700	7,800	13,800	22%
Baltimore-Columbia-Towson, MD	13,700	5,700	6,200	14,200	4%
Baton Rouge, LA	4,300	2,200	600	2,800	-57%
Beaumont-Port Arthur, TX	4,700	3,600	100	1,200	-286%
Binghamton, NY	4,400	3,000	100	1,500	-187%
Birmingham-Hoover, AL	2,200	800	700	2,000	-7%
Blacksburg-Christiansburg-Radford, VA	5,000	2,800	300	2,600	-93%
Bloomington, IN	7,600	4,200	500	4,000	-92%
Boston-Cambridge-Newton, MA-NH	69,700	19,400	22,600	73,000	4%
Boulder, CO	3,000	1,900	900	2,000	-52%
Bridgeport-Stamford-Norwalk, CT	8,900	6,200	2,900	5,600	-60%
Buffalo-Cheektowaga-Niagara Falls, NY	13,400	10,100	800	4,100	-225%
Carbondale-Marion, IL	3,800	3,000	100	800	-356%
Champaign-Urbana, IL	13,600	7,500	1,300	7,500	-83%
Charlotte-Concord-Gastonia, NC-SC	5,400	2,500	4,400	7,400	27%
Charlottesville, VA	4,100	2,300	500	2,300	-75%
Chicago-Naperville-Elgin, IL-IN-WI	54,300	17,200	21,800	59,000	8%
Cincinnati, OH-KY-IN	6,900	3,500	2,400	5,800	-19%
Cleveland-Elyria, OH	7,800	3,400	2,500	7,000	-12%
College Station-Bryan, TX	11,000	7,500	600	4,200	-164%
Columbia, MO	3,400	1,900	400	1,800	-85%
Columbia, SC	2,600	1,200	700	2,100	-27%
Columbus, OH	12,300	5,200	5,600	12,700	3%
Corvallis, OR	2,300	1,300	300	1,300	-75%
Dallas-Fort Worth-Arlington, TX	45,100	15,800	19,200	48,500	7%

Dayton, OH	5,300	3,100	700	3,000	-81%
Denver-Aurora-Lakewood, CO	5,800	1,700	3,600	7,700	25%
Detroit-Warren-Dearborn, MI	11,700	3,400	12,300	20,600	43%
Durham-Chapel Hill, NC	9,400	5,400	2,300	6,300	-49%
El Paso, TX	3,300	1000	300	2,600	-26%
Erie, PA	2,300	1,700	300	800	-179%
Eugene, OR	2,600	1,100	200	1,800	-48%
Fargo, ND-MN	2,900	1,400	300	1,800	-59%
Fayetteville-Springdale-Rogers, AR-MO	2,300	1,000	1,200	2,500	7%
Gainesville, FL	12,400	7,100	600	5,900	-110%
Greenville-Anderson-Mauldin, SC	4,500	2,900	600	2,200	-104%
Hartford-West Hartford-East Hartford, CT	5,500	3,300	2,400	4,600	-18%
Houston-The Woodlands-Sugar Land, TX	23,900	8,100	16,600	32,400	26%
Indianapolis-Carmel-Anderson, IN	3,900	1,500	2,900	5,300	26%
Iowa City, IA	3,600	2,100	500	2,000	-83%
Ithaca, NY	10,500	5,400	700	5,700	-82%
Kalamazoo-Portage, MI	2,900	1,400	400	1,900	-55%
Kansas City, MO-KS	6,100	3,800	5,100	7,400	18%
Knoxville, TN	2,200	1,200	1000	1,900	-15%
Lafayette-West Lafayette, IN	11,700	6,500	700	5,900	-99%
Lansing-East Lansing, MI	7,200	3,500	1,200	5,000	-46%
Las Vegas-Henderson-Paradise, NV	4,000	800	1,100	4,300	7%
Lawrence, KS	2,600	1,400	300	1,500	-71%
Lexington-Fayette, KY	3,000	1,400	700	2,300	-30%
Lincoln, NE	3,200	1,100	600	2,600	-22%
Los Angeles-Long Beach-Anaheim, CA	97,700	21,900	27,800	103,600	6%
Lubbock, TX	4,200	3,000	200	1,500	-185%
Madison, WI	6,800	3,400	2,900	6,400	-7%
Manchester-Nashua, NH	3,600	2,600	1,000	2,000	-79%
Manhattan, KS	2,200	1,200	200	1,100	-100%
Miami-Fort Lauderdale-West Palm Beach, FL	21,900	5,400	6,300	22,700	4%
Milwaukee-Waukesha-West Allis, WI	4,000	1,900	1,600	3,700	-8%
Minneapolis-St. Paul-Bloomington, MN-WI	12,900	5,100	6,500	14,300	10%
Mobile, AL	2,700	1,700	100	1,200	-136%
Morgantown, WV	2,800	1,800	300	1,200	-122%
Nashville-Davidson-Murfreesboro-Franklin, TN	3,700	1,500	2,100	4,300	16%
New Haven-Milford, CT	7,500	3,900	2,200	5,800	-30%
New Orleans-Metairie, LA	4,200	1,700	800	3,200	-30%

New York-Newark-Jersey City, NY-NJ-PA	170,700	26,300	74,000	218,400	22%
Oklahoma City, OK	7,800	2,900	1,000	5,900	-32%
Omaha-Council Bluffs, NE-IA	3,600	1,200	1,200	3,600	0%
Orlando-Kissimmee-Sanford, FL	6,100	1,900	3,000	7,300	16%
Palm Bay-Melbourne-Titusville, FL	3,000	1,800	800	2,100	-47%
Peoria, IL	2,100	1,300	1,500	2,300	9%
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	33,200	12,600	11,900	32,500	-2%
Phoenix-Mesa-Scottsdale, AZ	15,000	7,200	5,600	13,400	-12%
Pittsburgh, PA	20,400	11,100	3,900	13,300	-54%
Portland-Vancouver-Hillsboro, OR-WA	5,000	1,600	6,200	9,500	48%
Providence-Warwick, RI-MA	9,800	5,000	1,900	6,800	-45%
Provo-Orem, UT	3,300	1,200	500	2,600	-25%
Raleigh, NC	8,600	4,300	4,400	8,700	1%
Richmond, VA	2,600	900	2,300	4,100	36%
Riverside-San Bernardino-Ontario, CA	6,500	2,900	3,700	7,300	12%
Rochester, NY	8,900	5,500	1,100	4,400	-101%
Sacramento-Roseville-Arden-Arcade, CA	7,400	3,700	4,100	7,800	5%
Salt Lake City, UT	4,900	1,400	2,000	5,500	11%
San Antonio-New Braunfels, TX	4,500	2,100	1,800	4,300	-6%
San Diego-Carlsbad, CA	17,000	4,800	9,400	21,600	21%
San Francisco-Oakland-Hayward, CA	50,300	18,600	33,700	65,400	23%
San Jose-Sunnyvale-Santa Clara, CA	32,300	14,400	44,500	62,400	48%
Santa Maria-Santa Barbara, CA	3,100	1,600	900	2,400	-30%
Savannah, GA	3,100	1,300	300	2,100	-50%
Seattle-Tacoma-Bellevue, WA	16,700	2,700	20,500	34,500	52%
South Bend-Mishawaka, IN-MI	2,500	1,300	500	1,700	-47%
Springfield, IL	3,000	2,800	200	400	-596%
Springfield, MA	5,300	3,400	500	2,400	-122%
St. Cloud, MN	2,500	1,300	400	1,700	-51%
St. Louis, MO-IL	11,100	4,200	3,800	10,600	-5%
State College, PA	7,800	5,100	600	3,200	-141%
Syracuse, NY	8,600	5,300	600	3,900	-124%
Tallahassee, FL	3,500	1,800	700	2,500	-42%
Tampa-St. Petersburg-Clearwater, FL	7,500	2,800	3,100	7,800	4%
Toledo, OH	4,100	1,600	500	3,000	-40%
Trenton, NJ	3,000	1,700	2,400	3,800	19%
Tucson, AZ	5,100	2,700	700	3,000	-67%
Urban Honolulu, HI	5,700	1000	700	5,400	-6%

Virginia Beach-Norfolk-Newport News, VA-NC	3,500	1,500	1,100	3,100	-12%
Washington-Arlington-Alexandria, DC-VA-MD-WV	50,200	16,200	26,800	60,800	17%
Wichita, KS	5,100	2,900	300	2,600	-98%
Worcester, MA-CT	5,700	3,200	2,500	5,000	-14%

Note: For more information on the classification of metropolitan statistical areas (MSA) see Methodology. Only Metro areas with 2,000 or more foreign students approved for OPT are included. Figures rounded to nearest hundred.

Source: Pew Research Center analysis of U.S. Immigration and Customs Enforcement data received August 2017 through a Freedom of Information Act request.

"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Top 113 metro areas with over 2,000 foreign graduates approved for OPT, by population

2016 population estimates

Metropolitan statistical area	Population
New York-Newark-Jersey City, NY-NJ-PA	20,153,600
Los Angeles-Long Beach-Anaheim, CA	13,310,400
Chicago-Naperville-Elgin, IL-IN-WI	9,513,000
Dallas-Fort Worth-Arlington, TX	7,233,300
Houston-The Woodlands-Sugar Land, TX	6,772,500
Washington-Arlington-Alexandria, DC-VA-MD-WV	6,132,000
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	6,070,500
Miami-Fort Lauderdale-West Palm Beach, FL	6,066,400
Atlanta-Sandy Springs-Roswell, GA	5,789,700
Boston-Cambridge-Newton, MA-NH	4,794,400
San Francisco-Oakland-Hayward, CA	4,679,200
Phoenix-Mesa-Scottsdale, AZ	4,661,500
Riverside-San Bernardino-Ontario, CA	4,527,800
Detroit-Warren-Dearborn, MI	4,297,600
Seattle-Tacoma-Bellevue, WA	3,798,900
Minneapolis-St. Paul-Bloomington, MN-WI	3,551,000
San Diego-Carlsbad, CA	3,317,700
Tampa-St. Petersburg-Clearwater, FL	3,032,200
Denver-Aurora-Lakewood, CO	2,853,100
St. Louis, MO-IL	2,807,000
Baltimore-Columbia-Towson, MD	2,798,900
Charlotte-Concord-Gastonia, NC-SC	2,474,300
Orlando-Kissimmee-Sanford, FL	2,441,300
San Antonio-New Braunfels, TX	2,429,600
Portland-Vancouver-Hillsboro, OR-WA	2,425,000
Pittsburgh, PA	2,342,300
Sacramento-Roseville-Arden-Arcade, CA	2,296,400
Cincinnati, OH-KY-IN	2,165,100
Las Vegas-Henderson-Paradise, NV	2,155,700
Kansas City, MO-KS	2,104,500
Austin-Round Rock, TX	2,056,400
Cleveland-Elyria, OH	2,055,600
Columbus, OH	2,041,500
Indianapolis-Carmel-Anderson, IN	2,004,200
San Jose-Sunnyvale-Santa Clara, CA	1,978,800

Nashville-Davidson-Murfreesboro-Franklin, TN	1,865,300
Virginia Beach-Norfolk-Newport News, VA-NC	1,726,900
Providence-Warwick, RI-MA	1,614,800
Milwaukee-Waukesha-West Allis, WI	1,572,500
Oklahoma City, OK	1,373,200
Raleigh, NC	1,302,900
Richmond, VA	1,281,700
New Orleans-Metairie, LA	1,268,900
Hartford-West Hartford-East Hartford, CT	1,206,800
Salt Lake City, UT	1,186,200
Birmingham-Hoover, AL	1,147,400
Buffalo-Cheektowaga-Niagara Falls, NY	1,132,800
Rochester, NY	1,078,900
Tucson, AZ	1,016,200
Urban Honolulu, HI	992,600
Bridgeport-Stamford-Norwalk, CT	944,200
Worcester, MA-CT	935,800
Omaha-Council Bluffs, NE-IA	924,100
Greenville-Anderson-Mauldin, SC	885,000
Albany-Schenectady-Troy, NY	881,800
Knoxville, TN	868,500
New Haven-Milford, CT	856,900
El Paso, TX	842,000
Allentown-Bethlehem-Easton, PA-NJ	835,700
Baton Rouge, LA	835,200
Columbia, SC	817,500
Dayton, OH	800,700
Akron, OH	702,200
Syracuse, NY	656,500
Madison, WI	648,900
Wichita, KS	644,700
Springfield, MA	630,300
Toledo, OH	605,200
Provo-Orem, UT	603,300
Palm Bay-Melbourne-Titusville, FL	579,100
Durham-Chapel Hill, NC	559,500
Fayetteville-Springdale-Rogers, AR-MO	513,449
Lexington-Fayette, KY	506,800
Lansing-East Lansing, MI	475,100
Santa Maria-Santa Barbara, CA	446,200
Mobile, AL	414,800

Beaumont-Port Arthur, TX	410,000
Manchester-Nashua, NH	407,800
Savannah, GA	384,000
Tallahassee, FL	379,600
Peoria, IL	376,200
Trenton, NJ	371,000
Eugene, OR	369,500
Ann Arbor, MI	364,700
Kalamazoo-Portage, MI	336,900
Lincoln, NE	326,900
Boulder, CO	322,200
South Bend-Mishawaka, IN-MI	320,700
Lubbock, TX	314,800
Gainesville, FL	280,700
Erie, PA	276,200
College Station-Bryan, TX	254,900
Binghamton, NY	244,100
Champaign-Urbana, IL	238,600
Fargo, ND-MN	238,100
Charlottesville, VA	231,300
Lafayette-West Lafayette, IN	216,700
Springfield, IL	210,000
Athens-Clarke County, GA	205,300
St. Cloud, MN	195,600
Blacksburg-Christiansburg-Radford, VA	182,900
Columbia, MO	176,600
Iowa City, IA	168,800
Bloomington, IN	166,300
State College, PA	161,500
Auburn-Opelika, AL	159,000
Morgantown, WV	138,400
Carbondale-Marion, IL	126,400
Lawrence, KS	119,400
Ithaca, NY	104,900
Ames, IA	97,100
Manhattan, KS	97,000
Corvallis, OR	89,400

Note: Geographic boundary population estimates are based on the Office of Management and Budget's 2017 delineations of metropolitan areas. Rounded to the nearest hundred.
Source: U.S. Census Bureau's population estimates as of July 1 of 2016.
"Number of Foreign College Students Staying and Working in U.S. After Graduation Surges"

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Appendix E: Countries and territories by regional classification

Africa
Algeria
Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Comoros
Dem. Rep. of the Congo
Djibouti
Equatorial Guinea
Eritrea
Ethiopia
Gabon
Gambia
Ghana
Guinea
Guinea Bissau
Ivory Coast
Kenya
Lesotho
Liberia
Libya
Madagascar
Malawi
Mali
Mauritania
Mauritius
Mayotte
Morocco
Mozambique
Namibia

Niger
Nigeria
Republic of the Congo
Reunion
Rwanda
Sao Tome and Principe
Senegal
Seychelles
Sierra Leone
Somalia
South Africa
South Sudan
St. Helena
Sudan
Swaziland
Tanzania
Togo
Tunisia
Uganda
Western Sahara
Zambia
Zimbabwe

Asia-Pacific
Afghanistan
American Samoa
Ashmore and Cartier Islands
Australia
Azerbaijan
Bangladesh
Bhutan
British Indian Ocean Territory
Brunei
Burma (Myanmar)
Cambodia
China

Cook Islands
Christmas Islands
Federated States of Micronesia
Fiji
French Polynesia
Guam
Hong Kong
India
Indonesia
Japan
Kazakhstan
Kiribati
Kyrgyzstan
Laos
Macau
Malaysia
Maldives
Marshall Islands
Mongolia
Nauru
Nepal
New Caledonia
New Zealand
Niue
Norfolk Island
North Korea
Northern Mariana Islands
Pakistan
Palau
Papua New Guinea
Philippines
Samoa
Singapore
Solomon Islands
South Korea
Sri Lanka

Tajikistan
Thailand
Timor-Leste
Tokelau
Tonga
Tromelin Islands
Turkmenistan
Tuvalu
Uzbekistan
Vanuatu
Vietnam
Wallis and Futuna

Europe[24]
Albania
Andorra
Armenia
Austria
Belarus
Belgium
Bosnia-Herzegovina
Bulgaria
Channel Islands
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Faeroe Islands
Finland
France
Georgia
Germany
Gibraltar
Greece
Hungary

[24] USSR and Czechoslovakia were included as countries of citizenship in the dataset in 2004; they accounted for less than 1% of the population. Serbia prior to 2001 was also included.

Iceland	Argentina	Puerto Rico	St. Pierre and Miquelon
Ireland	Aruba	Saint Martin	United States
Isle of Man	Bahamas	Sint Maarten	
Italy	Barbados	St. Kitts and Nevis	
Kosovo	Belize	St. Lucia	
Latvia	Bolivia	St. Vincent and the Grenadines	
Liechtenstein	Brazil	Suriname	
Lithuania	British Virgin Islands	Trinidad and Tobago	
Luxembourg	Caribbean Netherlands	Turks and Caicos Islands	
Malta	Cayman Islands	U.S. Virgin Islands	
Moldova	Chile	Uruguay	
Monaco	Colombia	Venezuela	
Montenegro	Costa Rica		
Netherlands	Cuba	**Middle East**	
Norway	Curacao	Bahrain	
Poland	Dominica	Egypt	
Portugal	Dominican Republic	Iran	
Republic of Macedonia	Ecuador	Iraq	
Romania	El Salvador	Israel	
Russia	Falkland Islands (Malvinas)	Jordan	
San Marino	French Guiana	Kuwait	
Serbia	Grenada	Lebanon	
Serbia and Montenegro	Guadeloupe	Oman	
Slovakia	Guatemala	Palestinian territories[25]	
Slovenia	Guyana	Qatar	
Spain	Haiti	Saudi Arabia	
Sweden	Honduras	Syria	
Switzerland	Jamaica	Turkey	
Ukraine	Martinique	United Arab Emirates	
United Kingdom	Mexico	Yemen	
Vatican City	Montserrat		
	Nicaragua	**North America[26]**	
Latin America and the Caribbean	Panama	Bermuda	
Anguilla	Paraguay	Canada	
Antigua and Barbuda	Peru	Greenland	

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[25] Palestinian territories include the West Bank and the Gaza Strip.

[26] Individuals who are stateless, from the Neutral Zone and whose citizenship is unknown are also included but do not fall under any region classification. They accounted for less than 1% of the whole population.