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IN FOCUS

November 1, 2019

Foreign STEM Students in the United States

The number of foreign students in the United States pursuing postsecondary degrees in science, technology, engineering, and mathematics (STEM) disciplines has increased steadily in recent years. This increase has drawn attention from lawmakers interested in potential effects on institutions of higher education (IHEs), the U.S. workforce, economic competitiveness, immigration, and national security.

The global economy increasingly relies on the skills learned in the STEM disciplines. U.S. IHEs play an important role in training U.S. citizens and foreign nationals in these disciplines. Foreign students are attracted to U.S. IHEs for their quality of education and the prestige that comes with a U.S. degree. American colleges and universities strive to attract top international students to pursue and obtain STEM degrees at the undergraduate and graduate levels in order to remain globally competitive and draw additional tuition revenue, as foreign students typically pay full cost of tuition and do not receive financial aid.

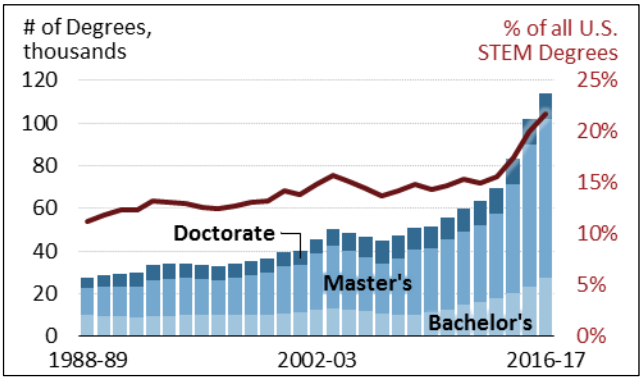
This In Focus provides an overview of the trends in foreign student enrollment in STEM programs at U.S. IHEs, as well as the pathways that students may take to remain in the United States legally after graduation. There is no single definition of "STEM" used by the federal government. For the purposes of this In Focus, STEM disciplines include mathematics and computer science, physical and life sciences, and engineering. For more information on STEM education, see CRS Report R45223, *Science, Technology, Engineering, and Mathematics (STEM) Education: An Overview*.

Number of Foreign STEM Students in the United States

More than 1 million foreign students in the United States on student visas (see box on p. 2) were enrolled in U.S. IHEs in the 2017-2018 school year (SY), accounting for 5.3% of total U.S. IHE enrollment. Of these, almost half (497,413) were studying STEM disciplines. After more than a decade of continuous growth, the number of new enrollments of foreign students in U.S. IHEs has dropped in each of the two most recent school years, falling by 9.6% in that time.

Of particular interest to Congress is the number of postsecondary STEM degrees attained by foreign students. As shown in **Figure 1**, this number has steadily grown over the past few decades, increasing by 315% (from 27,470 to 114,092) from SY1988-1989 (the earliest year for which annual data are available) to SY2016-2017 (the most recent year for which data are available). Graduate degrees, particularly master's degrees, account for the largest share of STEM degrees awarded to foreign students, and have also experienced the fastest growth in recent years.

Figure 1. STEM Degrees Earned by Foreign Students



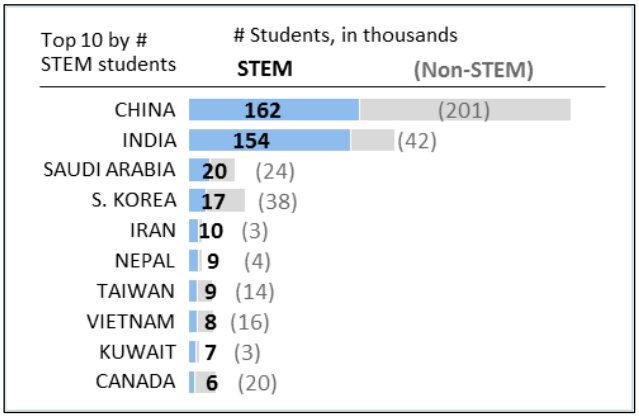
Source: CRS display of data from U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System.

Foreign STEM students also make up an increasing share of total students receiving STEM degrees at U.S. IHEs, doubling from 11% in SY1988-1989 to 22% in SY2016-2017. This percentage is even higher for graduate degrees, as foreign students accounted for 54% of master's degrees and 44% of doctorate degrees issued in STEM fields in the United States in SY2016-2017.

Countries of Origin

According to data from the Institute of International Education's Open Doors report, China (162,050) and India (153,876) were the leading sources of STEM students enrolled in U.S. IHEs in SY2017-2018 (see **Figure 2**), accounting for 70% of all foreign STEM students in the United States.

Figure 2. Top 10 Countries of Origin for Foreign STEM Students in the United States, SY2017-2018



Source: CRS display of data from the Institute of International Education, Open Doors Report, 2018.

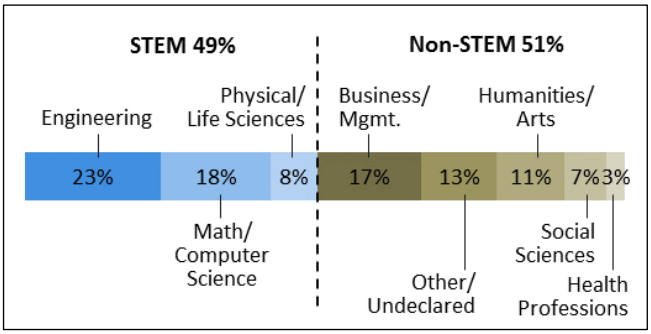
Notes: Data include undergraduate, graduate, non-degree, and Optional Practical Training (OPT; see box on p. 2) enrollments.

The number of students from India and, especially, China studying STEM disciplines in the United States has increased in recent years. For example, in SY2009-2010 (the first year for which detailed data are available) there were approximately 72,000 students from India and 56,000 students from China pursuing STEM degrees at U.S. IHEs. In SY2016-2017, a greater share of Indian (78%) than Chinese (45%) students in the United States were studying STEM disciplines.

STEM Fields of Study

Figure 3 illustrates the breakdown of foreign students by field of study at U.S. IHEs in SY2017-2018. Engineering was the most popular field, accounting for 23% of all foreign students, followed by mathematics/computer science with 18%.

Figure 3. Foreign Students in U.S. IHEs by Field of Study, SY2017-2018



Source: CRS display of data from the Institute of International Education, Open Doors Report, 2018.

Notes: Data include undergraduate, graduate, non-degree, and OPT enrollments.

Staying in the United States after Graduation

According to the National Science Foundation's 2017 survey of STEM doctorate recipients from U.S. IHEs, 72% of foreign doctorate recipients were still in the United States 10 years after receiving their degrees. This percentage varied by country of origin; for example, STEM graduates from China (90%) and India (83%) stayed at higher rates than European students (69%).

There are several avenues—both temporary and permanent—by which foreign students may remain in the United States after graduation (see "Selected Options" in the text box), but some categories have annual numerical limits ("caps"). Practical training programs that give U.S. work authorization to students to be employed in their field while enrolled in school or after graduation do not have caps and have seen a steady increase (see **Figure 4**). These programs also allow foreign students to remain in the United States legally while they pursue longer-term options, such as H-1B or LPR status. For more information on pathways for staying in the United States, see CRS Report R43735, *Temporary Professional, Managerial, and Skilled Foreign Workers: Policy and Trends*.

Permission to Enter the United States to Study

F-1 visa: for full-time study at an academic or language training institution

M-1 visa: for vocational or other non-academic training (other than language training)

J-1 visa: for participation in the Exchange Visitor program, which includes students and scholars among its 14 programs

Permission for Students to Work

Curricular Practical Training (CPT): up to 12 months' employment that is an integral part of a student's curriculum

Optional Practical Training (OPT): up to 12 months' employment directly related to a student's major field of study

STEM OPT Extension: up to 24 months after initial 12-month OPT, post-completion employment directly related to a student's STEM degree

Selected Options for Remaining in the United States After Graduation

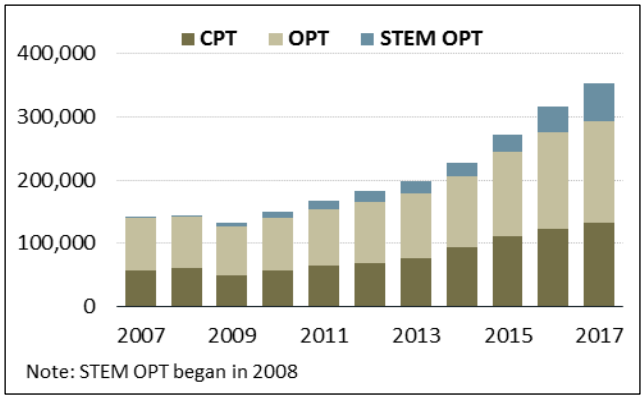
OPT and STEM OPT: see above; no numerical cap

Continue education: begin a new program of study on a student visa; no numerical cap for student visas

H-1B visa: temporary visa for workers in specialty occupations typically requiring a bachelor's degree or higher. Employer must petition for the H-1B worker; visas are issued for three years and may be renewed for another three years. Employer demand for H-1B workers routinely surpasses numerical caps, including the set-aside for those with U.S. STEM advanced degrees, and petition approval rates have dropped recently.

Lawful permanent residence (LPR): also known as "green card"; typically sponsored by employer or family member; some categories are subject to years-long wait times due to annual and per-country numerical caps.

Figure 4. Approved Employment Authorizations for OPT, STEM OPT, and CPT, CY2007-2017



Source: DHS/ICE, https://www.ice.gov/doclib/sevis/pdf/data-ApprovedEmploymentAuthorizations2007-2017.pdf

Notes: Approved authorizations with employment start dates in indicated calendar year.

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