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# STEM Workers Data Sources

BY **MARLENE LEE** AND **NADWA MOSSAAD**

**Science, Technology, Engineering, and Mathematics**

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AUGUST 2010

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BY **MARLENE LEE** AND  
**NADWA MOSSAAD**

### ABOUT THE AUTHORS

**MARLENE LEE** is a senior research associate in Domestic Programs at PRB. **NADWA MOSSAAD** is a research associate at PRB.

### ACKNOWLEDGMENTS

The authors wish to thank: Ellen Carnevale, PRB's vice president of Communications and Marketing for her assistance with design, and Tyjen Tsai, PRB writer/editor, Lisa Aronson, PRB program assistant, and Jonathan Stall, PRB intern for their assistance. We also wish to acknowledge Jeanne Batalova, Michelle Mittelstadt, and Mark Mather, co-authors of *Immigration: Data Matters*, after which this guide has been modeled.

This project is underwritten through the generosity of the Alfred P. Sloan Foundation.

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# INTRODUCTION

Businesses, governments, and individuals are trying to understand and plan for shifts in the demand for highly skilled workers, particularly those workers with advanced degrees and experience in science, technology, engineering, and mathematics. Global shifts in production, consumption, education, and training are affecting regional, national, and local economies and their labor markets. To understand and respond to shifts in the demand for and supply of skilled labor, it is critical to have access to authoritative and high-quality data about skilled workers—both those currently in the labor force and those in the education pipeline.

We hope that *Stem Workers: Data Sources* will provide useful information about where to find credible and accessible data on Canada's skilled labor force. We include information from Canadian government sources and international organizations. This guide is by no means a comprehensive list of all sources for data related to the skilled workforce in Canada. Instead, we are sharing resources identified in our search for comparable indicators with which to assess the stock of skilled workers in Canada relative to other countries, the flow of skilled workers into Canada from other countries, and the production of future workers.

Key Topics (Canada Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>GLOBAL MOBILITY</b>			
<b>Immigration/Visa Status</b>	The Citizenship and Immigration Canada (CIC) provides select pregenerated online tables on permanent and temporary visa holders based on immigration status at the point of entry.		
	Permanent immigrants: Online tables and charts provide information on immigrants admitted to Canada in a given calendar year (flow data) by class of admission, source country, intended destination in Canada, age at landing, level of education, marital status, language ability, occupational skill level, and intention to work. Data are available for the last 10 calendar years.	Citizenship and Immigration Canada (CIC), <i>Facts and Figures: Immigration Overview—Permanent and Temporary Residents</i> , <a href="http://www.cic.gc.ca/english/resources/statistics/menu-fact.asp">www.cic.gc.ca/english/resources/statistics/menu-fact.asp</a>	Annually
	Temporary residents: Tables provide data on the number of temporary residents who arrived during a given calendar year (flow data) and who were present as of Dec. 1 of the same calendar year (stock data). Information is organized by source country, intended destination in Canada (provinces or territories and urban area), occupation skill level for foreign workers, level of study for foreign students, and age for refugee claimants.	Citizenship and Immigration Canada (CIC), <i>Facts and Figures: Immigration Overview—Permanent and Temporary Residents</i> , <a href="http://www.cic.gc.ca/english/resources/statistics/menu-fact.asp">www.cic.gc.ca/english/resources/statistics/menu-fact.asp</a>	Annually
<b>International Students</b>	Flow and stock data on foreign students over time for Canada, the provinces and territories, and selected urban areas. Also includes information on foreign students' source country, gender, and level of study.	CIC, <i>Facts and Figures</i> (see above)	Annually
	Enrollment and graduation data for students by immigrant status (Canadian citizens, landed immigrants, foreign students). Also includes information on students' age, mother tongue, gender, country of citizenship, and highest level of education.	Statistics Canada, Postsecondary Student Information System (PSIS), <a href="http://www.statcan.gc.ca/concepts/psis-siep/index-eng.htm">www.statcan.gc.ca/concepts/psis-siep/index-eng.htm</a> . PSIS results are available as online pregenerated tables or as published reports ( <a href="http://www.statcan.gc.ca/concepts/psis-siep/prodserv-eng.htm">www.statcan.gc.ca/concepts/psis-siep/prodserv-eng.htm</a> ). Custom-built tables/data are available for a fee from Statistics Canada.	Annually
<b>Multinational Companies</b>	Data for latest available year includes number of parent corporations and number of foreign affiliates in country economy. R&D expenditures of foreign affiliates in host economy.	UNCTAD, <i>Annexes in World Investment Reports</i> (1991-2009), <a href="http://www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1</a> . Online information on multinationals (transnational corporations) by country may also be accessed at <a href="http://www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1</a>	Annually

Key Topics (Canada Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Multinational Companies (continued)</b>	Data on the performance of foreign affiliates in OECD countries particularly in the areas of production, employment, and international trade and research. Coverage is provided for the manufacturing sector from 1983 onward and for the services sector from 1990 onward, based on ISIC categories. Data are provided in national currency values.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> , or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>  See also OECD Measuring Globalisation database 2009, <a href="http://www.oecdbookshop.org">www.oecdbookshop.org</a>	Every 2 years
<b>Research Collaborations</b>	Data on international cooperation in R&D, patents, and scientific publications among countries; technological balance of payments; international flows in inventions and doctoral students.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> , or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
<b>EDUCATION</b>			
<b>STEM Graduates</b>	Characteristics of graduates with doctoral degree: data on the size, postsecondary academic path, funding sources, field of study, and immediate postgraduate plans of individuals receiving research doctoral degrees from Canadian institutions that grant doctoral degrees. Includes information on foreign graduate students.	Statistics Canada, Survey of Earned Doctorates (SED), <a href="http://www.statcan.gc.ca">www.statcan.gc.ca</a> . Users need to request data from Statistics Canada. See the most recent report that used SED data: <i>Doctoral Graduates in Canada: Findings from the Survey of Earned Doctorates, 2004/2005</i> , <a href="http://www.statcan.gc.ca/pub/81-595-m/81-595-m2008065-eng.pdf">www.statcan.gc.ca/pub/81-595-m/81-595-m2008065-eng.pdf</a>	Annually
<b>Postsecondary Education</b>	See also <i>International Students</i>  “World’s Best Universities” ranks the top 400 universities worldwide by school subject, including engineering and the IT, natural and physical sciences, and life sciences and biomedicine. The rankings are based on five criteria: academic peer review, employer review, student-to-faculty ratio, citations, and international faculty and students.  Canadian investment into education compared to other countries: annual expenditure on educational institutions by broad level of education: total, as a percentage of GDP, per student, and public vs. private.	<i>U.S. News &amp; World Report’s</i> “World’s Best Universities,” <a href="http://www.usnews.com/sections/education/worlds-best-universities/index.html">www.usnews.com/sections/education/worlds-best-universities/index.html</a>  OECD, <i>Education at a Glance</i> , Chapter B “Financial and Human Resources Invested In Education,” <a href="http://www.oecd.org/dataoecd/41/25/43636332.pdf">www.oecd.org/dataoecd/41/25/43636332.pdf</a>	Annually  Annually
<b>Lifelong Learning (formal learning)</b>	Information on participation in education and training among Canadians ages 18 to 64, the proportion of Canadians ages 18 to 64 who had unmet training needs, the costs associated with education and training, and the sources of funding used to finance education programs.	Statistics Canada, <i>Lifelong Learning Among Canadians Ages 18 to 64 Years: First Results from the 2008 Access and Support to Education and Training Survey</i> , <a href="http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=81-595-MWE2009079&amp;lang=eng">www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=81-595-MWE2009079&amp;lang=eng</a>	Irregular

Key Topics (Canada Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
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## LABOR FORCE CHARACTERISTICS

<b>STEM Workers</b>	Canadian government collects detailed social, demographic, educational, and economic data on Canadian population, distinguishing between Canadian citizens, permanent immigrants, and temporary residents. In terms of occupations that can be used to identify STEM workers, Canada uses National Occupational Classification; STEM workers can be captured in the Census of Population, Labour Force Survey (LFS), and Survey of Labour and Income Dynamics (SLID).	Statistics Canada, Census of Population, <a href="http://www.statcan.gc.ca">www.statcan.gc.ca</a> . Users can access a number of pregenerated tables online ( <a href="http://census2006.ca/census-recensement/2006/dp-pd/index-eng.cfm">http://census2006.ca/census-recensement/2006/dp-pd/index-eng.cfm</a> ). Select “Topic-based tabulations.” For a more detailed analysis, researchers need to request 2006 microdata from Statistics Canada for a fee, <a href="http://www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=95M0028X&amp;lang=eng">www.statcan.gc.ca/bsolc/olc-cel/olc-cel?catno=95M0028X&amp;lang=eng</a> . The earlier censuses can be accessed through Minnesota Population Center’s IPUMS International ( <a href="https://international.ipums.org/international/sample_designs/sample_designs_ca.shtml">https://international.ipums.org/international/sample_designs/sample_designs_ca.shtml</a> ); Statistics Canada, LFS, <a href="http://www.statcan.gc.ca">www.statcan.gc.ca</a> ; Statistics Canada, SLID, <a href="http://www.statcan.gc.ca/pub/75f0011x/75f0011x2010001-eng.htm">www.statcan.gc.ca/pub/75f0011x/75f0011x2010001-eng.htm</a>	Census (every five years); LFS and SLID annually
<b>Foreign-Born Workers</b>	Researchers can analyze Canadian Census and Labour Force Survey data to estimate the number and share of foreign- and Canadian-born workers among overall and STEM workforce for the nation and individual provinces; generate data on employment by industry; calculate average age and salary. The Longitudinal Immigration Database (IMDB) includes information on class of admission, year of landing, countries of birth, citizenship and last permanent residence, education and knowledge of French or English, intended occupation at landing, employment and earnings in Canada, use of social assistance, and domestic migration.	See above; suggested reading: <i>Foreign Nationals Working Temporarily in Canada</i> , <a href="http://www.statcan.gc.ca/pub/11-008-x/2010002/article/11166-eng.htm">www.statcan.gc.ca/pub/11-008-x/2010002/article/11166-eng.htm</a> ; Statistics Canada, IMDB, <a href="http://www.statcan.gc.ca">www.statcan.gc.ca</a> . Access is restricted to approved users.	Census (every five years); LFS, SLID, and IMDB annually
<b>Highly Skilled Workers (those with at least a bachelor’s degree)</b>	Researchers can analyze Canadian Census and Labour Force Survey data to estimate the number and share of foreign- and Canadian-born workers among overall and Canadian college-educated workforce for the nation and individual provinces; generate data on employment by industry; calculate average age and salary. See also about IMDB above.	Same as above.	Census (every five years); LFS, SLID, and IMDB annually

## R&D INVESTMENT

<b>Expenditures</b>	Gross domestic expenditures on R&D: total amount, percent GDP, per capita, by source of funding (government, private, foreign, etc.)	UNESCO Institute for Statistics, Data Centre, Science & Technology Tables, <a href="http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx">http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx</a>	Annually
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Key Topics (Canada Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Expenditures (continued)</b>	R&D spending, venture capital, patents and trademarks, and employment.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> , or directly from the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
<b>Employment</b>	R&D workers in science and technology fields: total, by gender, by degree level, by field of science.	UNESCO Institute for Statistics, Data Centre Science & Technology Tables, <a href="http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx">http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx</a>	Annually
<b>Patents</b>	Information on the nationality and current residence of the inventors of applied and granted patents.	World Intellectual Property Organization, <a href="http://www.wipo.int/ipstats/en/statistics/patents/">www.wipo.int/ipstats/en/statistics/patents/</a> ; OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> ; OECD Patent Database, <a href="http://www.oecd.org">www.oecd.org</a>	Annually

**CANADIAN GOVERNMENT SOURCES****Statistics Canada****Census of Population**

The Census of Population provides data on both the foreign-born (permanent residents and temporary residents) and Canadian-born workforce: their share of the overall workforce and the STEM workforce, their distribution by occupation and industry, and their average wages. The Census also provides information on the distribution of the STEM workforce by occupation and industry. However, confidentiality may require suppression of more detailed occupations. Statistics Canada conducts the Census every five years, with the latest being done in 2006, [www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3901&lang=en&db=imdb&adm=8&dis=2](http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3901&lang=en&db=imdb&adm=8&dis=2). In terms of occupations that can be used to identify STEM workers, Canada uses the National Occupational classification system. It is possible to map this classification into the broad categories of the International Labour Organisation (ILO) International Standard Classification of Occupations (ISCO), [www.ilo.org/public/english/bureau/stat/isco/intro.htm](http://www.ilo.org/public/english/bureau/stat/isco/intro.htm)

**Labour Force Survey (LFS)**

LFS is a monthly household survey of civilian, noninstitutionalized population 15 years of age or older. The survey excludes about 2 percent of the population 15 and older: people living on reserves and other Aboriginal settlements in the provinces, full-time members of the Canadian Armed Forces, and the institutionalized population. In Jan. 2006, the LFS added questions to identify the country of birth of the respondent, whether or not the respondent was a "landed immigrant," the month and year he/she became a landed immigrant, and the country where the respondent received his/her highest level of education, making the data on immigrants comparable to those in the Census. The LFS also provides employment estimates by industry, occupation, hours worked, and other labor market outcomes. Information on industry and occupation, and reason for leaving last job is also available for people currently unemployed or not in the labor market but having recent labor market involvement. The LFS follows a rotating panel sample design, in which households remain in the sample for six consecutive months. Data collection for the LFS is carried out each month during the week following the LFS reference week. The reference week is normally the week of the 15th of the month. See [www.statcan.gc.ca/imdb-bmd/indexL-eng.htm](http://www.statcan.gc.ca/imdb-bmd/indexL-eng.htm).

**Survey of Labour and Income Dynamics (SLID)**

SLID, as a longitudinal survey, interviews the same people from one year to the next for a period of six years. SLID provides information on a broad selection of human capital variables, occupations, earnings, employment, unemployment, and economic inactivity, as well as demographic characteristics such as family relationships and household composition. The data are collected annually by Statistics Canada, [www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3889&lang=en&db=imdb&adm=8&dis=2](http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=3889&lang=en&db=imdb&adm=8&dis=2)

**Longitudinal Immigrant Database (IMDB)**

IMDB is a database that links immigration and taxation records and is a comprehensive source of data on the economic integration of the taxfiling immigrant population in Canada. A person is included in the database only if he or she obtained their landed immigrant status since 1980 and filed at least one tax return after becoming a landed immigrant. IMDB allows users to analyze relative labor market behavior of different categories of immigrants. The database includes information on class of admission, year of landing, countries of birth, citizenship, last permanent residence, education and knowledge of French or English, intended occupation at landing, as well as earnings, employment, use of social assistance, and domestic migration in Canada. The data are collected annually but access is restricted to approved users. Contact Statistics Canada for further information, [www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5057&lang=en&db=imdb&adm=8&dis=2#a2](http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5057&lang=en&db=imdb&adm=8&dis=2#a2)

**Survey of Earned Doctorates (SED)**

SED is an annual census of doctorate recipients in Canada that was conducted for the first time on a national basis during the 2003-2004 academic year. The survey collects data about the graduate's postsecondary academic path, funding sources, field of study, and his/her immediate postgraduate

plans. In addition, information on educational history and socioeconomic background is collected. Request data from Statistics Canada, <http://www.statcan.gc.ca/dli-ild/data-donnees/ftp/sed-etd-eng.htm>. Note: Many of the questions in the Canadian SED have been modeled on the U.S. Survey of Earned Doctorates, which allows cross-country comparisons.

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**National Graduates Survey (NGS)**

NGS examines the labor market experiences of graduates from Canadian public universities, community colleges, and trade/vocational programs. Provides information on the labor market experiences of graduates entering Canadian labor market, focusing on employment, occupations, and the relationship between jobs and education. The NGS interviews graduates two and five years after graduation. To date, six graduating classes have been surveyed: 1982, 1986, 1990, 1995, 2000, and 2005.

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**Postsecondary Student Information System (PSIS)**

PSIS is a national survey aimed to provide detailed information on enrollments and graduates of Canadian postsecondary education institutions ([www.statcan.gc.ca/concepts/psis-siep/index-eng.htm](http://www.statcan.gc.ca/concepts/psis-siep/index-eng.htm)). It creates a unique longitudinal record for each postsecondary student in Canada and allows tracking of students' progress through the education system (fields of study, levels of education, and full-/part-time status). Includes information on students' age, mother tongue, gender, country of citizenship, immigrant status, highest level of education, etc. ([www.statcan.gc.ca/imdb-bmdi/document/5017\\_D2\\_T3\\_V7-eng.pdf](http://www.statcan.gc.ca/imdb-bmdi/document/5017_D2_T3_V7-eng.pdf)). This survey is a census with a cross-sectional design and a longitudinal follow-up. Linked to information included in other databases containing student education and labor market outcome data such as the National Graduates Survey (NGS), the PSIS database provides data on student mobility, pathways, and their relationship to education and labor market outcomes. PSIS also collects data on the postsecondary institutions and the programs offered by these institutions in Canada.

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**Adult Education and Training Survey (AETS)**

AETS is Canada's most comprehensive source of data on individual participation in formal adult education and training. It has been administered intermittently as a supplement to the Labour Force Survey in 1992, 1994, 1998, and 2003. The survey collects detailed information about the skill development efforts of the entire adult Canadian population for the calendar year prior to the survey year. It provides information about the main subject of training activities, their provider, duration, and the sources and types of support for training. In addition, the AETS includes socioeconomic and demographic profiles of both training participants and nonparticipants. [www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5151&lang=en&db=imdb&adm=8&dis=2](http://www.statcan.gc.ca/cgi-bin/imdb/p2SV.pl?Function=getSurvey&SDDS=5151&lang=en&db=imdb&adm=8&dis=2)

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**Research and Development in Canadian Industry (RDCI)**

RDCI includes data collected directly from survey respondents and extracted from administrative files. An annual mail survey is administered to all companies in Canadian industries known to be performing or funding more than \$1.5 million in research and development. The data for the small performers and funders is taken directly from the Canada Revenue Agency (CRA). Although a complete enumeration is carried out of known and suspected R&D performers and funders, records received from the administrative data do not provide as much information as do records from those completing the long form. Certain data are imputed for records from the administrative file based on the patterns of long-form respondents in the same industry. A listing of all Canadian R&D surveys may be found at [www.statcan.gc.ca/imdb-bmdi/document/SIEID\\_D1\\_T9\\_V1-eng.pdf](http://www.statcan.gc.ca/imdb-bmdi/document/SIEID_D1_T9_V1-eng.pdf)

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**CANSIM**

CANSIM is Statistics Canada's key socioeconomic database. Updated daily, CANSIM provides fast and easy access to a large range of the latest statistics available in Canada. A directory provides a table listing of the content of the CANSIM database. A user guide walks through each CANSIM screen and option. <http://cansim2.statcan.gc.ca/cgi-win/CNSMCGI.PGM?Lang=Eng&Dir-Rep=CII/&CNSM-Fi=Documentation/CANSIM-Guide-eng.htm>

**Citizenship and  
Immigration Canada*****Facts and Figures:  
Immigration Overview—  
Permanent and Temporary  
Residents***

An annual statistical publication that provides information about new permanent residents to Canada as well as temporary residents entering Canada to work, study, or for humanitarian reasons, [www.cic.gc.ca/english/resources/statistics/menu-fact.asp](http://www.cic.gc.ca/english/resources/statistics/menu-fact.asp). Provides data on annual flow of permanent residents by category of immigration (family class, economic immigrants, and refugees) and of temporary residents (temporary foreign workers, foreign students, humanitarian, and other temporary residents) by yearly status within the last decade. It also shows the number of temporary residents present (stock) on Dec. 1 of each year for the same period. All statistical information provided in this publication is derived from CIC's administrative data files and presented on the individual level rather than on the number of visas or permits issued.

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**INTERNATIONAL DATA SOURCES****World Intellectual Property  
Organization (WIPO)**

WIPO, a specialized agency of the United Nations, maintains an international intellectual property (IP) system, [www.wipo.int/portal/index.html.en](http://www.wipo.int/portal/index.html.en). Its online database allows users to search more than 1.7 million international patent applications, <http://www.wipo.int/pctdb/en/>. However, users might need to obtain access to detailed data records for their analysis. Note: The WIPO database records an inventor's nationality at the time of filing; therefore, the data do not capture the contributions of immigrants who became Canadian citizens before filing patent applications.

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**OECD Education Indicators**

The OECD provides a comparable set of indicators on the performance of education systems in OECD countries. Indicators look at who participates in education, what is spent on it, how education systems operate, and the results achieved. The latter includes indicators on a wide range of outcomes, from comparisons of students' performance in key subject areas to the impact of education on earnings and on adults' chances of employment. See information on tables available: [www.esds.ac.uk/international/support/user\\_guides/oecd/educ.asp](http://www.esds.ac.uk/international/support/user_guides/oecd/educ.asp)

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**OECD Measuring  
Globalisation**

The OECD Measuring Globalisation database provides data on production, employment, international trade, and research of foreign affiliates' in OECD countries. Coverage is provided for the manufacturing sector from 1983 onward and for the services sector from 1990 onward, based on ISIC categories. Data are provided in national currency values.

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**OECD Science and  
Technology Scoreboard**

The OECD Science and Technology Scoreboard brings together indicators that reflect the level and structure of the efforts undertaken by OECD member countries and selected nonmember economies in the field of science and technology with R&D investment data in a time series. Not all countries provide data with the same frequency or of similar reliability.

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**UNESCO Institute for  
Statistics (UIS)**

UIS, [www.uis.unesco.org](http://www.uis.unesco.org), is a source of international data on education and science and technology. Users may access data and build statistical tables. The Data Centre contains over 1,000 types of indicators and raw data on education, literacy, science and technology, and culture and communication, collected for over 200 countries.

**Citizenship.** A person's formal legal status that links them to their country of birth or naturalization, and conveys a set of legal rights, protections, and responsibilities.

**Economic immigrants.** Permanent residents selected for their skills and ability to contribute to Canada's economy. The economic immigrant category includes skilled workers, business immigrants, provincial or territorial nominees, and live-in caregivers.

**Family class.** Permanent residents sponsored by a Canadian citizen or a permanent resident living in Canada who is 18 years of age or older. Family class immigrants include spouses and partners (spouse, common-law partner, or conjugal partner); parents and grandparents; and others (dependent children and siblings).

**Flow.** Cross-border migration that involves the movements of foreigners and citizens alike.

**Foreign students.** Temporary residents who are in Canada principally to study in a given calendar year. Foreign students have been issued a study permit (with or without other types of permits), which authorizes foreign nationals to enter and study in Canada on a temporary basis. The study permit identifies the level of study and the length of time the individual may study in Canada. Students do not need a study permit for courses shorter than six months. Foreign students exclude temporary residents who have been issued a study permit but who entered Canada principally for reasons other than study.

**Generation.** Statistics Canada uses the following definitions: First generation: Individuals born outside Canada, includes permanent residents, temporary residents, and a small number of people born outside Canada to parents who are Canadian citizens by birth; Second generation: Individuals born inside Canada with at least one parent born outside Canada; Third generation: Individuals born inside Canada with both parents born inside Canada (these individuals may have grandparents born inside or outside Canada as well).

**Highly skilled.** No consistent definition is available. One common definition refers to individuals who possess a bachelor's degree or higher.

**Landed immigrants.** Same as permanent residents.

**Microdata files.** Files that contain information on individuals who took part in a survey. To protect identity and ensure confidentiality of collected information, the individual-level records do not include sensitive information such as respondent's name.

**Patent.** "A patent is a document which describes an invention which can be manufactured, used and sold with the authorization of the owner of the patent. An invention is a solution to a specific technical problem. A patent document normally contains at least one claim, the full text of the description of the invention, and bibliographic information such as the applicant's name. The protection given by a patent is limited in time (generally 15 to 20 years from filing or grant). It is also limited territorially to the country or countries concerned." (World Intellectual Property Organization, Glossary)

**Permanent residents.** Foreign nationals who have been granted permanent resident status in Canada (landed immigrants). Permanent residents have all the rights guaranteed under the Canadian Charter of Rights and Freedoms such as equality rights, legal rights, mobility rights, freedom of religion, freedom of expression, and freedom of association. They do not, however, have the right to vote in elections. There are three main classes of permanent residents in Canada: economic immigrants, family class, and refugees.

**Refugee.** A person who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group, or political opinion, lives outside the country of his or her nationality or residence and is unable or unwilling to return.

**Refugees (immigration class).** Permanent residents in the refugee category include government-assisted refugees, privately sponsored refugees, refugees landed in Canada, and refugee dependents (dependents of refugees landed in Canada, including spouses and partners living abroad or in Canada).

**Source country.** The principal country of last permanent residence for all permanent residents and temporary residents (relevant to data provided by CIC).

**STEM.** Science, Technology, Engineering, and Mathematics. There is no consistent definition of STEM occupations, industries, or workers. In this publication, we consider STEM-related occupations as architecture and engineering occupations; computer and mathematical occupations; life, physical, and social science occupations; and health care practitioner and technical occupations. STEM industries may

be defined in relation to the concentration of STEM-related occupations in the industry group. STEM-educated workers are those with advanced (postsecondary) degrees in fields relevant to the STEM occupations.

**Stock.** Represents snapshots of a population at a single point in time by counting (as in a census) or estimating (as in a survey) the distribution of that population according to some characteristic, such as place of birth, citizenship, age, income, or gender.

**Temporary residents.** Foreign nationals who are lawfully in Canada on a temporary basis under the authority of a valid document (a work permit, study permit, temporary resident permit, or a visitor record) issued for the purpose of entering Canada and individuals who seek asylum upon or after their arrival in Canada and remain in the country pending the outcome of processes relative to their claim. Temporary residents include: foreign workers, foreign students, the humanitarian population, and other temporary residents.

**Unauthorized migrant.** A person who arrives or resides in a country without valid authorization from the country's government. Also known as illegal, clandestine, undocumented, or irregular migrant.

**Visible minorities.** Canada's Employment Equity Act defines visible minorities as "people, other than Aboriginal people, who are non-Caucasian in race or nonwhite in color."

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## Links To Useful Research and Other Resources

Darren King, *Doctoral Graduates in Canada: Findings from the Survey of Earned Doctorates, 2004/2005* (Ottawa, Canada: Statistics Canada, 2008), [www.statcan.gc.ca/pub/81-595-m/81-595-m2008065-eng.pdf](http://www.statcan.gc.ca/pub/81-595-m/81-595-m2008065-eng.pdf).

Derrick Thomas, "Foreign Nationals Working Temporarily in Canada," *Canadian Social Trends* no. 90 (2010): 34-48, accessed at [www.statcan.gc.ca/pub/11-008-x/2010002/article/11166-eng.htm](http://www.statcan.gc.ca/pub/11-008-x/2010002/article/11166-eng.htm).

Institute for Research on Public Policy  
[www.irpp.org/indexe.htm](http://www.irpp.org/indexe.htm)

Lesleyanne Hawthorne, *Labor Market Outcomes for Migrant Professionals: Canada and Australia Compared* (Victoria, Australia: University of Melbourne, 2006), accessed at [www.cic.gc.ca/english/resources/research/2006-can-ada-australia.asp](http://www.cic.gc.ca/english/resources/research/2006-can-ada-australia.asp).

UNESCO Institute for Statistics, [www.uis.unesco.org/ev.php?ID=2867\\_201&ID2=DO\\_TOPIC](http://www.uis.unesco.org/ev.php?ID=2867_201&ID2=DO_TOPIC)

UNESCO Institute for Statistics, *Global Education Digest 2009* (Montreal: UNESCO Institute for Statistics, 2009), accessed at [www.uis.unesco.org/template/pdf/ged/2009/GED\\_2009\\_EN.pdf](http://www.uis.unesco.org/template/pdf/ged/2009/GED_2009_EN.pdf).

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BY **MARLENE LEE** AND **NADWA MOSSAAD**

**Science, Technology, Engineering, and Mathematics**

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AUGUST 2010

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# UNITED KINGDOM STEM WORKERS DATA SOURCES

BY **MARLENE LEE** AND  
**NADWA MOSSAAD**

## ABOUT THE AUTHORS

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## ACKNOWLEDGMENTS

The authors wish to thank: Ellen Carnevale, PRB's vice president of Communications and Marketing for her assistance with design, and Tyjen Tsai, PRB writer/editor, Lisa Aronson, PRB program assistant, and Jonathan Stall, PRB intern for their assistance. We also wish to acknowledge Jeanne Batalova, Michelle Mittelstadt, and Mark Mather, co-authors of *Immigration: Data Matters*, after which this guide has been modeled.

This project is underwritten through the generosity of the Alfred P. Sloan Foundation.

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# INTRODUCTION

Businesses, governments, and individuals are trying to understand and plan for shifts in the demand for highly skilled workers, particularly those workers with advanced degrees and experience in science, technology, engineering, and mathematics. Global shifts in production, consumption, education, and training are affecting regional, national, and local economies and their labor markets. To understand and respond to shifts in the demand for and supply of skilled labor, it is critical to have access to authoritative and high-quality data about skilled workers—both those currently in the labor force and those in the education pipeline.

We hope that *STEM Workers: Data Sources* will provide useful information about where to find credible and accessible data on the United Kingdom's skilled labor force. We include information from United Kingdom government sources and international organizations. This guide is by no means a comprehensive list of all sources for data related to the skilled workforce in the United Kingdom. Instead, we are sharing resources identified in our search for comparable indicators with which to assess the stock of skilled workers in the United Kingdom relative to other countries, the flow of skilled workers into the United Kingdom from other countries, and the production of future workers.

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
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## GLOBAL MOBILITY

### Immigration/ Visa Status

The U.K. data provide limited information on migrants based on immigration status at the point of entry. The data are collected by ongoing survey and administrative sources; they are not available in census or population-based survey data.

Data are available for individuals who change their country of usual residence for at least a year, so that the country of destination effectively becomes the country of usual residence. Tables provide information on reason for migration and usual occupation prior to migration. Access to individual-level (micro) data is also available for more expert data users.

The U.K. Home Office publishes statistics on U.K. long-term migration as well as data on global applications for entry into the United Kingdom, Commonwealth countries, overseas territories, and U.K. crown dependency destinations. These data apply to people subject to immigration control. British citizens, those Commonwealth citizens who also have the right of abode, other European Economic Area (EEA) nationals, and Swiss nationals are not subject to immigration control and may freely enter and leave the United Kingdom.

Permanent immigrants (settlement): Online reports and supplementary tables provide data on the number of applicants and approval of “grants of settlement” (flow data) within a given calendar year or quarter. Information is provided by type of entry visa (work, family, etc.) and by nationality.

Temporary immigrants (nonsettlement): Online reports provide data on the number of visas (flow data) issued for the U.K. region in a given financial year (April 1 to March 31). Figures and tables show information on the number of visas issued by type of visa endorsement, including settlement visas and other types of visas (nonsettlement visas).

Long-Term International Migration (LTIM) based on International Passenger Survey (IPS), Office of National Statistics (ONS), [www.statistics.gov.uk/statbase/Product.asp?vlnk=15053](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15053), links to calendar year and midyear tables as well as historical data.

Annually

Control of Immigration Statistics: United Kingdom, Home Office, Research and Development Statistics, <http://rds.homeoffice.gov.uk/rds/immigration-asylum-stats.html>

Quarterly and  
Annually

Entry Clearance (Visa) Statistics 2008-2009, The U.K. Border Agency-International Group, Home Office, [www.ukvisas.gov.uk/en/aboutus/statistics/](http://www.ukvisas.gov.uk/en/aboutus/statistics/)

Annually

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
International Students	The United Kingdom collects data on students enrolled at all publicly funded higher education institutions during the academic year.		
	Published tables cross-tabulate student qualifications and programs of study by usual country of residence (domicile). Data are also available on the number of students from top sending countries. These tables usually categorize country of residence as United Kingdom, other European Union, and non-European Union. Requests may be made for special tabulations.	Higher Education Statistics Agency (HESA), <a href="http://www.hesa.ac.uk/index.php?option=com_content&amp;task=view&amp;id=1197&amp;Itemid=266">www.hesa.ac.uk/index.php?option=com_content&amp;task=view&amp;id=1197&amp;Itemid=266</a> ; U.K. Council for International Affairs (UKCISA) provides copies of some HESA tables, <a href="http://www.ukcisa.org.uk/about/statistics_he.php">www.ukcisa.org.uk/about/statistics_he.php</a> and links to other resources.	Annually
	Published tables include data on the number of international students by region of usual domicile, gender, qualifications, and location of U.K. institution.	<i>Higher Education Statistics for the U.K.</i> , Higher Education Statistics Agency (HESA), <a href="http://www.hesa.ac.uk/index.php/component?option=com_pubs/Itemid,286/task,show_year/publd,1/versionId,4/yearId,184/">www.hesa.ac.uk/index.php/component?option=com_pubs/Itemid,286/task,show_year/publd,1/versionId,4/yearId,184/</a>	Annually
Multinational Companies	Data on businesses within the United Kingdom are available from the Annual Business Inquiry Division, Office for National Statistics. However, indicators relevant to investment in development of science, engineering, and technology resources are sometimes easily accessed in international databases.	ABI, <a href="http://www.statistics.gov.uk/statbase/Product.asp?vlnk=7381">www.statistics.gov.uk/statbase/Product.asp?vlnk=7381</a>	
	Tables for the latest available year include data on the number of parent corporations and number of foreign affiliates in the country economy. R&D expenditures by foreign affiliates in host economy.	UNCTAD, <i>Annexes in World Investment Reports (1991-2009)</i> , <a href="http://www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1</a> ; Online information on multinationals (transnational corporations) by country may also be accessed at <a href="http://www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1</a>	Annually
	This database is available separately and as part of other OECD products. It includes data on the performance of foreign affiliates in OECD countries particularly in the areas of production, employment, international trade, and research. Coverage is provided for the manufacturing sector from 1983 onward and for the services sector from 1990 onward, based on ISIC categories. Data are provided in national currency values.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> or directly to the online tables: <a href="http://www.oecdlibrary.org/content/book/sti_scoreboard-2009-en">www.oecdlibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
		OECD Measuring Globalisation database 2009, <a href="http://www.oecdbookshop.org">www.oecdbookshop.org</a>	Annually

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Research Collaborations</b>	Data on international cooperation in R&D, patents, and scientific publications among countries; technological balance of payments; international flows in inventions and doctoral students.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> , or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
<b>EDUCATION</b>			
<b>STEM Graduates</b>	Published tables report on the path of students after completion of part-time or full-time programs at higher education institutions. They provide information about employment and further study or training at a point about six months after completion. Tables include data on type of industry sector and occupation, geographical distribution of leavers, and analysis of destinations by students' attributes such as gender, subject of study, and qualification obtained. Data is based on a survey of those who completed their programs during the academic year (Aug. 1 to July 31).	<i>Destinations of Leavers from Higher Education</i> , Higher Education Statistics Agency (HESA), <a href="http://www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1708&amp;Itemid=286">www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1708&amp;Itemid=286</a>	Annually
	Published tables report on a sample of students up to three and a half years after they have received their qualifications. Tables provide information on the distribution of graduates in broad occupation and industry categories. The sample is intentionally skewed toward foundation degree leavers, those who completed a master's or doctoral degree and nonwhite leavers.	<i>Destinations of Leavers from Higher Education Longitudinal Survey</i> , <a href="http://www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1714&amp;Itemid=286">www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1714&amp;Itemid=286</a>	Annually
<b>Postsecondary Education</b>	See also <i>International Students</i>		
	"World's Best Universities" ranks the top 400 universities worldwide by school subject, including engineering and the IT, natural and physical sciences, and life sciences and biomedicine. The rankings are based on five criteria: academic peer review, employer review, student-to-faculty ratio, citations, and international faculty and students.	<i>U.S. News &amp; World Report's "World's Best Universities,"</i> <a href="http://www.usnews.com/sections/education/worlds-best-universities/index.html">www.usnews.com/sections/education/worlds-best-universities/index.html</a>	Annually
	Published and online tables provide information about students in higher education institutions during the academic year (Aug. 1 to July 31). The data on which published and online tables are based includes detailed information on students' distribution across programs of studies in 19 subject areas and in four subjects that lie within or cut across the main subjects.	<i>Students in Higher Education Institutions</i> , Higher Education Statistics Agency (HESA), <a href="http://www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1&amp;Itemid=286">www.hesa.ac.uk/index.php?option=com_pubs&amp;task=show_pub_detail&amp;pubid=1&amp;Itemid=286</a> ; HESA statistics online <a href="http://www.hesa.ac.uk/index.php/component?option=com_datatables/Itemid,121/">www.hesa.ac.uk/index.php/component?option=com_datatables/Itemid,121/</a>	Annually

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Postsecondary Education (continued)</b>	U.K. investment in education compared to other countries: annual expenditure on educational institutions by broad level of education: total, as a percentage of GDP, per student, and public vs. private.	OECD, <i>Education at a Glance</i> , Chapter B “Financial and Human Resources Invested In Education,” <a href="http://www.oecd.org/dataoecd/41/25/43636332.pdf">www.oecd.org/dataoecd/41/25/43636332.pdf</a>	Annually
<b>Lifelong Learning (formal learning)</b>	Recent lifelong learning statistics for the United Kingdom have been collected as part of European Union (EU) efforts, on the basis of data collected by the Labour Force Survey (LFS) and supplemented by two other surveys: the Continuing Vocational Training Survey (CVTS) and the Adult Education Survey (AES).		
	Data on percent of economically active (employed or seeking employment) adults with professional qualifications by age group and qualification level. Tabulations are based on the Labour Force Survey.	National Learning Targets, Office of National Statistics, <a href="http://www.statistics.gov.uk/">www.statistics.gov.uk/</a>	Annually
	Numbers and characteristics of those participating in formal and informal training, including age, gender, educational attainment, and occupation.	Education and Training Database, Eurostat, <a href="http://epp.eurostat.ec.europa.eu">http://epp.eurostat.ec.europa.eu</a>	Irregular

## LABOR FORCE CHARACTERISTICS

### STEM Workers

The governments of the United Kingdom collect detailed social, demographic, educational, and economic data on the populations of England, Wales, Scotland, and Northern Ireland. These data may be used to identify STEM workers. STEM workers may be captured in the Census of Population, Labour Force Survey, and the Annual Population Survey.

Published tables provide information on the number of employee jobs classified by industry for Great Britain in detail and for the United Kingdom in less detail.

*Annual Statistical Abstract of Statistics*, Office of National Statistics, [www.statistics.gov.uk/StatBase/Product.asp?vlnk=94](http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=94)

Annually

Customized tables may be created using an online tool for accessing official labor market statistics. Number and characteristics for occupations by major subgroup. Industry and occupation may be cross-tabulated with characteristics such as age, ethnicity, gender, and

Nomis, Office of National Statistics, [www.nomisweb.co.uk/Default.asp](http://www.nomisweb.co.uk/Default.asp)

Annually

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
	average earnings.		
<b>STEM Workers (continued)</b>	Researchers may analyze data on individuals to obtain customized tabulations of the number and characteristics of workers by industry and occupation.	Census 2001 Microdata, Office of National Statistics, <a href="http://www.statistics.gov.uk/census2001/sar_update.asp">www.statistics.gov.uk/census2001/sar_update.asp</a>	Every 10 years
	Researchers may analyze data on individuals to obtain customized tabulations on the number and characteristics of workers by industry and occupation. An online analysis tool (Nesstar) also allows some analysis of these data.	Labour Force Survey and Annual Population Survey, U.K. Data Archive, Economics and Social Data Service, Government Data; Access data at ESDS Nesstar Catalog <a href="http://nesstar.esds.ac.uk/webview/">http://nesstar.esds.ac.uk/webview/</a> , and microdata available for download.	Quarterly and Annually
<b>Foreign-Born Workers</b>	Household surveys and census data provide estimates of the stock (or number) of non-U.K.-born or non-British nationality people living in the United Kingdom and a wide range of information on their characteristics.		
	Researchers may analyze individual data to obtain the numbers and characteristics of foreign-born workers, including country of birth and ethnicity, employment, unemployment, main occupation, qualifications (education), and industry.	Census 2001 Microdata, Office of National Statistics, <a href="http://www.statistics.gov.uk/census2001/sar_update.asp">www.statistics.gov.uk/census2001/sar_update.asp</a>	Every 10 years
	Researchers may analyze data on individuals to obtain customized tabulations on the number and characteristics of foreign-born workers, including country of birth, date arrived in the United Kingdom, ethnicity, employment, unemployment, main occupation, qualifications (education), and industry. An online analysis tool (Nesstar) also allows some analysis of these data.	Labour Force Survey and Annual Population Survey, U.K. Data Archive, Economic and Social Data Service, Government Data, <a href="http://www.esds.ac.uk/government/aps/">www.esds.ac.uk/government/aps/</a> ; Access data at ESDS Nesstar Catalog, <a href="http://nesstar.esds.ac.uk/webview/">http://nesstar.esds.ac.uk/webview/</a>	Quarterly and Annually
<b>Highly Skilled Workers (those with at least a bachelor's degree)</b>	Researchers may analyze data on individuals or use an online analysis tool (Nesstar) to obtain information on the working-age population by level of qualifications (education), including numbers with higher (postsecondary) degrees, where degree was obtained, and main subject in which degree was	Labour Force Survey and Annual Population Survey, U.K. Data Archive, Economics and Social Data Service, Government Data; Access data at ESDS Nesstar Catalog, <a href="http://nesstar.esds.ac.uk/webview/">http://nesstar.esds.ac.uk/webview/</a>	Quarterly and Annually

Key Topics (U.K. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>R&amp;D INVESTMENT</b>			
	obtained.		
<b>Expenditures</b>	Gross domestic expenditures on R&D: total amount, percent GDP, per capita, by source of funding (government, private, foreign, etc.).	UNESCO Institute for Statistics, Data Centre, Science & Technology Tables, <a href="http://stats.uis.unesco.org/">http://stats.uis.unesco.org/</a>	Annually
	R&D spending, venture capital, patents and trademarks, and employment.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> , or directly from the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
<b>Employment</b>	R&D workers in sciences and technology fields: total, by gender, by degree level, by field of science.	UNESCO Institute for Statistics, Data Center, Science & Technology Tables, <a href="http://stats.uis.unesco.org/">http://stats.uis.unesco.org/</a>	Annually
<b>Patents</b>	Information on the nationality and current residence of the inventors of applied and granted patents.	World Intellectual Property Organization, <a href="http://www.wipo.int/ipstats/en/statistics/patents/">www.wipo.int/ipstats/en/statistics/patents/</a> ; OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> ; OECD Patent Database, <a href="http://www.oecd.org/">/www.oecd.org/</a>	Annually

**Note:** Though international “migrant” is the term used across many data sources in the United Kingdom, the definition varies depending on the source. Most commonly, when speaking of migrants already in the country, migrant is defined as someone whose country of birth is not the United Kingdom. or whose nationality is non-British. With respect to discussion of flows of migrants into the United Kingdom, the definition often adopted is the UN definition: a person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months), so that the country of destination effectively becomes his or her new country of usual residence.



## U.K. GOVERNMENT SOURCES

### Office for National Statistics Annual Population Survey

The Annual Population Survey (APS) is a combined survey of households in Great Britain. Its purpose is to provide information on key social and socioeconomic variables between the 10 yearly censuses, with particular emphasis on providing information relating to small geographical areas. The APS includes the Quarterly Labour Force Survey (LFS) (waves one and five for the United Kingdom funded by the Office for National Statistics), plus data from the Annual Local (Area) Labour Force Survey (LLFS) Boosts for England, Scotland, and Wales. Since July 2005, APS data have been published on a quarterly basis, with each publication spanning data for the past 12 months. Tables available at [www.statistics.gov.uk](http://www.statistics.gov.uk). Online data analysis (see Nesstar) and microdata available at [www.esds.ac.uk](http://www.esds.ac.uk)

### Annual Business Inquiry

The Annual Business Inquiry (ABI) is conducted in two parts: employment and financial information. The financial inquiry covers about two-thirds of the U.K. economy; that is, production; construction; motor trades; wholesale; retail; catering and allied trades; property; service trades; agriculture (part); and hunting, forestry, and fishing. Employment inquiry coverage is wider. The major strengths of the ABI are its comprehensive coverage of U.K. businesses and the level of industrial detail available. The two-part form of the ABI enables employment and financial data to be linked. In terms of measuring employment, the ABI is the best source for measuring jobs, rather than people in employment, which is better measured by the Labour Force Survey (LFS). The disadvantages of the ABI are that it does not cover the agricultural sector, nor does it include jobs in private households, jobs in organizations not held on the Interdepartmental Business Register (IDBR), homeworkers, jobs in non-U.K. businesses, or the self-employed. ABI home page ([www.statistics.gov.uk/abi/](http://www.statistics.gov.uk/abi/)). Special tabulations or data extracts may be requested, but there may be a fee charged.

### Business Monitor MA4: Foreign Direct Investment

This publication provides a detailed breakdown of U.K. foreign direct investment (FDI) activity by component, country, and industry.

The data are principally from the Office for National Statistics' comprehensive annual surveys into foreign direct investment. It includes both investment overseas by a U.K. company and investment in the United Kingdom by a foreign company. Summary results from the annual surveys are released online prior to publication ([www.statistics.gov.uk/StatBase/Product.asp?vlnk=9614&Pos=1&ColRank=1&Rank=272](http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=9614&Pos=1&ColRank=1&Rank=272)). Data from quarterly surveys are published in *Balance of Payments* ([www.statistics.gov.uk/StatBase/Product.asp?vlnk=1140](http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=1140)). Key changes are being made to the current FDI questionnaire. The amended questionnaire will be used for the annual FDI questionnaire from April 2010.

### Census

The Census collects information every 10 years about the characteristics of people and households in the country. It is used by central and local governments, health authorities, and many other organizations to allocate resources and plan services for everyone. In the United Kingdom, England and Wales will administer a common census in 2011, Scotland will also administer its own in 2011, as will Northern Ireland. The last census for each of these countries was in 2001. Microdata allow cross-tabulation by occupation and industry and relatively small levels of geography.

### International Passenger Survey (IPS)

The International Passenger Survey (IPS) collects data on both credits and debits for the travel account of the *Balance of Payments*, provides detailed visit information on overseas visitors to the United Kingdom for tourism policy, and collects data on international migration. IPS surveys a random sample of passengers entering and leaving the United Kingdom by air, sea, or the Channel Tunnel. Data include: passenger's country of residence (for overseas residents), citizenship, reason for migration, and country of birth. From Jan. 1, 2009, changes to the sample design, weighting, and imputation methodology have produced a break in the series, making some comparisons to previous years inadvisable. Only expert users who are very familiar with the coding and weighting structures should use the individual-level data. Care must be taken when performing time series operations as there are year-to-year changes in variables and codes. Individual-level (microdata) files available for download after approved application at [www.esds.ac.uk](http://www.esds.ac.uk). Data are also available in published tables. See [www.statistics.gov.uk/ssd/surveys/international\\_passenger\\_survey.asp](http://www.statistics.gov.uk/ssd/surveys/international_passenger_survey.asp)

<b>Labour Force Survey (LFS)</b>	The Labour Force Survey (LFS) uses a quarterly sample survey of households living at private addresses in Great Britain. Its purpose is to provide information on the U.K. labor market. The survey provides information on personal circumstances and labor market status during a specific reference period, normally a period of one week or four weeks (depending on the topic) immediately prior to the interview. The LFS is carried out under a European Union Directive and uses internationally agreed concepts and definitions. Seasonally adjusted data are only available at the national level. Those who do not live in private households are usually not represented in this survey. Because of sample size, data available for the subnational level are limited, particularly for local authority district level. See user guides, <a href="http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1537">www.statistics.gov.uk/statbase/Product.asp?vlnk=1537</a> . Tables available at <a href="http://www.statistics.gov.uk">www.statistics.gov.uk</a> . Online data analysis (see Nesstar) and microdata available at <a href="http://www.esds.ac.uk">www.esds.ac.uk</a>
<b>Long-Term International Migration (LTIM)</b>	Long-Term International Migration (LTIM) combines information from several sources, providing a more comprehensive estimate of flows of international migration. The MN series tables present statistics on flows of international long-term migrants to and from the United Kingdom and England and Wales. LTIM time series data contain estimates derived from the International Passenger Survey (IPS); Home Office data; estimates of flows between the United Kingdom and the Irish Republic from Central Statistics Office, Dublin (up to 2007); and estimates of flows to and from Northern Ireland from the Northern Ireland Research and Statistics Agency (2008 onward). Adjustments are also made for people whose intentions change with respect to their length of stay such as asylum seekers and their dependents. <a href="http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15053">www.statistics.gov.uk/statbase/Product.asp?vlnk=15053</a>
<b>Nesstar</b>	The ESDS Nesstar Catalog ( <a href="http://nesstar.esds.ac.uk/webview/">http://nesstar.esds.ac.uk/webview/</a> ) is a virtual library that allows the user to search for, browse and download key indicators from raw data. Frequencies and tables generally need to be weighted, so users need to be comfortable using technical documentation to determine weights to be applied.
<b>Nomis</b>	Nomis, a web-based database of labor market statistics run on behalf of the Office for National Statistics by the University of Durham, contains the following key datasets: Labour Force Survey; Claimant Count; Annual Business Inquiry/Annual Employment Survey/Census of Employment; Vacancies Handled by Job Centres; Population Estimates; 1991 and 2001 Censuses of Population; New Earnings Survey/Annual Survey of Hours and Earnings. Nomis is a free service provided by National Statistics but registration is required for access.

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## Higher Education Statistics Agency

### *Students in Higher Education*

The Higher Education Statistics Agency collects data from publicly funded higher education institutions (HEIs) in the United Kingdom on behalf of funding bodies and government departments. Annual data collected on students include: subject of study, level of study, mode of study, age, gender, ethnicity, and disability. Information on overseas student numbers may also be tabulated based on data identifying the usual country of residence. Data are available in online tables and in publications (some also available online). Some data are also available to registered institutional users through an online data tool (Heidi). [www.hesa.ac.uk/index.php?option=com\\_content&task=view&id=1197&Itemid=266](http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=1197&Itemid=266)

### *Destination of Leavers for Higher Education (Cross-sectional and Longitudinal)*

*Destinations of Leavers from Higher Education (DLHE)* includes all students who usually reside in the United Kingdom; EU-domiciled students; and those who are reported to HESA as obtaining relevant qualifications, in addition to studying full-time or part-time between Aug. 1 and July 31. Relevant qualifications include: doctorate and master's degrees, and other postgraduate qualifications obtained primarily through supervised research. The longitudinal survey is a follow-up of a sample of those captured in the census of leavers described above. The sample is intentionally skewed toward foundation degree leavers, those who completed a master's or doctoral degree, and nonwhite leavers. [www.hesa.ac.uk/index.php?option=com\\_content&task=view&id=1197&Itemid=266](http://www.hesa.ac.uk/index.php?option=com_content&task=view&id=1197&Itemid=266)

**Heidi**

Heidi is a web-based management information service that provides easy access to quantitative data about higher education. Heidi enables the creation of reports by field of study. Information is also available on age group, ethnicity, gender, level of study, region of usual residence, and year of enrollment in program. Institutions must register to use Heidi. Use may be limited to participating U.K. higher education institutions. [www.heidi.ac.uk/](http://www.heidi.ac.uk/)

**Home Office****Research Development  
Statistics (RDS) Directorate**

The RDS website provides a range of research and statistics relating to crime, policing, immigration, drugs, and other areas of Home Office responsibility. RDS statistics on immigration, asylum, and nationality include passenger arrivals, applications for settlement, number of asylum seekers, applications, and decisions relating to British citizenship. Most of the data are taken from administrative records. Annual and quarterly immigration control reports available online provide numbers of people applying for temporary and settlement visas. Annual reports include extensive explanatory notes. Supplementary tables include information by country of nationality. Trends on citizenship and settlement are reported on a 12 month comparison period. <http://rds.homeoffice.gov.uk/rds/immigration-asylum-stats.html>

**U.K. Border Agency-  
International Group  
(UKBAIG)**

The U.K. Border Agency, an agency of the Home Office, protects the U.K. border and is a law enforcement agency in the United Kingdom. The agency's Entry Clearance Statistics are published annually and provide details of all visa applications, issuances, refusals, and appeals worldwide for the UKBA's financial year (April 1 to March 31). All data provided in the annual reports relate to global applications made for entry to the United Kingdom, Commonwealth countries, overseas territories, and U.K. crown dependency destinations, which include Alderney, Isle of Man, Jersey, and Guernsey. [www.ukvisas.gov.uk/en/](http://www.ukvisas.gov.uk/en/)

**NON-U.K. GOVERNMENT SOURCES****U.K. Council for  
International Student  
Affairs**

U.K. Council for International Student Affairs (UKCISA) does not hold or process any official international student statistics. UKCISA publishes a range of materials including education statistics from HESA and surveys of international students. These are intended to help international students and those who work with them. Some are available only to members. Others are available to all, either free or for a fee. [www.ukcisa.org.uk/about/stats\\_and\\_research.php](http://www.ukcisa.org.uk/about/stats_and_research.php)

**Council for Education in  
the Commonwealth (CEC)**

CEC is a parliament-based NGO whose purpose is to inform public opinion on the salient issues concerning education and training in the Commonwealth and to identify appropriate ways in which Britain and the European Union can best contribute to their development. CEC produces periodic updates on international student flows. [www.cecomm.org.uk/pages/Publications](http://www.cecomm.org.uk/pages/Publications)

**U.K. Data Archive**

The U.K. Data Archive (UKDA) is curator of the largest collection of digital data of the social sciences and humanities in the United Kingdom. It is a designated place of deposit by the National Archives, allowing it to ingest and preserve public records. Data are available via the web-based download system and the Economic and Social Data Service (ESDS) Nesstar system for online browsing and visualization of the data. UKDA is based at the University of Essex in Colchester. [www.data-archive.ac.uk/](http://www.data-archive.ac.uk/)

**INTERNATIONAL SOURCES****World Intellectual Property  
Organization (WIPO)**

WIPO, a specialized agency of the United Nations, maintains an international intellectual property (IP) system, [www.wipo.int/portal/index.html.en](http://www.wipo.int/portal/index.html.en). Its online database allows users to search more than 1.7 million international patent applications, [www.wipo.int/pctdb/en/](http://www.wipo.int/pctdb/en/). However, users may need to obtain access to detailed data records for their analysis. Note: The WIPO database records an inventor's nationality at the time of filing; therefore, the data do not capture the contributions of immigrants who became U.K. citizens before filing patent applications.

<b>Eurostat</b>	Eurostat, the statistical office of the European Union situated in Luxembourg, provides the European Union with statistics at European-level that enable comparisons between countries and regions. Themes covered in the databases include education and training, labor market, industry and trade, science, technology, and innovation. In addition to annual publications ( <i>Eurostat Yearbook</i> , <i>Regional Yearbook</i> , and others), there is a searchable online database, <a href="http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database">http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database</a> . Eurostat grants access to anonymized microdata for scientific purposes. Existing microdata include: ECHP (European Community Household Panel), LFS (Labour Force Survey), CIS (Community Innovation Survey), AES (Adult Education Survey), EU-SILC (European Union Statistics on Income and Living Conditions), SES (Structure of Earnings Survey).
<b>OECD Education Indicators</b>	The OECD provides a comparable set of indicators on the performance of education systems in OECD countries. Indicators look at who participates in education, what is spent, how education systems operate, and the results achieved. The latter includes indicators on a wide range of outcomes, from comparisons of students' performance in key subject areas to the impact of education on earnings and on adults' chances of employment. See information on tables available: <a href="http://www.esds.ac.uk/international/support/user_guides/oecd/educ.asp">www.esds.ac.uk/international/support/user_guides/oecd/educ.asp</a>
<b>OECD Measuring Globalisation</b>	The OECD Measuring Globalisation database provides data on production, employment, and international trade and research of foreign affiliates in OECD countries. Coverage is provided for the manufacturing sector from 1983 onward and for the services sector from 1990 onward, based on ISIC categories. Data are provided in national currency values.
<b>OECD Science and Technology Scoreboard</b>	The OECD Science and Technology Scoreboard brings together indicators that reflect the level and structure of the efforts undertaken by OECD member countries and selected nonmember economies in the field of science and technology with R&D investment data in a time series. Not all countries provide data with the same frequency or of similar reliability.
<b>UNESCO Institute for Statistics (UIS)</b>	UIS, <a href="http://www.uis.unesco.org">www.uis.unesco.org</a> , is a source of international data on education and science and technology. Users may access data and build statistical tables. The Data Centre contains over 1,000 types of indicators and raw data on education, literacy, science and technology, and culture and communication, collected for over 200 countries.

**EEA family permit.** A document similar to an entry clearance. The name "EEA family permit" distinguishes it from a visa or entry clearance issued under the Immigration Rules. Instead, EEA family permits are issued under the Immigration (European Economic Area) Regulations 2006 and not the Immigration Rules. This permit is issued for six months in all cases and is free of charge.

**Ethnic minority.** There is no coding structure for ethnicity that is applicable throughout the United Kingdom. U.K. data tables often report on white and other (nonwhite, including those of mixed origin). Some tables include classifications such as black, Pakistani, Bangladeshi, Indian, and other Asian.

**First degree.** Bachelor's degree. First degrees in HESA tables may also include first degrees with eligibility for registering to practice (doctor/dentist/veterinary surgeon), first degrees with qualified teacher status (QTS)/registration with the General Teaching Council (GTC), enhanced first degrees, and first degrees obtained concurrently with diplomas.

**Flow.** Cross-border migration that involves the movements of foreigners and citizens alike.

**Foreign student/international student.** Higher education captures data on students who are not U.K. nationals, including students who are nationals of countries in the European Economic Area (EEA). U.K. border control data capture information only on students from non-EEA countries. Students who plan to stay in the United Kingdom for less than six months and do not intend to work or extend their stay may enter as student visitors. Whether a student requires a student visa depends on nationality, age, and intended duration of stay.

**Foundation degree.** Provides vocational higher education qualifications (FdA, FdSc).

**GCE.** General Certificate of Education. The O (Ordinary)-level has been replaced by GCSE (General Certificate of Secondary Education) in U.K. schools. An O-level is standard U.K. qualification usually taken at the age of 15 or 16. An O-level provides a foundation for further study or employment. They are available in a wide range of subjects covering the whole curriculum. An A-level is an Advanced-level GCE qualification taken after the O-level. This exam is normally taken after two years of A-level study and is available in a broad range of subjects covering the whole curriculum.

**GCSE.** General Certificate of Secondary Education. GCSE exams and coursework are the main qualification taken by 14-to-16-year-olds, but are available to anyone. Many students take AS- and A-level qualifications in years 12 and 13, after completing their GCSEs. However, adults can take them too. AS- and A-level qualifications are highly valued by schools, colleges, and employers.

**Grants of settlement.** The main available measure of long-term immigration of individuals subject to immigration control; individuals granted settlement on arrival at ports; and individuals initially admitted to the country subject to a time limit that was subsequently removed.

**Great Britain.** United Kingdom excluding Northern Ireland.

**Highly skilled workers.** There is no established international definition. This publication uses education to define these workers and considers those with at least a bachelor's degree as highly skilled.

**Lifelong learning.** All purposeful learning activity, whether formal, nonformal, or informal, undertaken on an ongoing basis with the aim of improving knowledge, skills, and competence. Within the domain of lifelong learning statistics, formal education corresponds to education and training in the regular system of schools, universities, and colleges. Nonformal education and training includes all types of taught learning activities that are not part of a formal education program.

**Microdata files.** Files that contain information on individuals who took part in a survey. To protect identity and ensure confidentiality of collected information, the individual-level records do not include sensitive information such as respondent's name.

**Migrant.** This definition varies by data source. Two definitions used in U.K. data referenced here are: (1) someone whose country of birth is not the United Kingdom, or whose nationality is non-British. With respect to discussion of flows of migrants into the United Kingdom, (2) a person who moves to a country other than that of his or her usual residence for a period of at least a year (12 months), so that the country of destination effectively becomes his or her new country of usual residence.

**NVQ.** National Vocational Qualification is an alternative to the more traditional and academic GCE A-levels (or equivalent). It is a "competence-based" qualification, which means students learn practical, work-related tasks designed to help develop the skills and knowledge to

do a particular job effectively. See framework comparing qualifications at [www.direct.gov.uk/en/EducationAndLearning/QualificationsExplained/DG\\_10039017](http://www.direct.gov.uk/en/EducationAndLearning/QualificationsExplained/DG_10039017)

**Patent.** “A patent is a document which describes an invention which can be manufactured, used and sold with the authorization of the owner of the patent. An invention is a solution to a specific technical problem. A patent document normally contains at least one claim, the full text of the description of the invention, and bibliographic information such as the applicant’s name. The protection given by a patent is limited in time (generally 15 to 20 years from filing or grant). It is also limited territorially to the country or countries concerned.” (World Intellectual Property Organization, Glossary)

**Postgraduate qualifications.** Doctorate degrees, master’s degrees, higher bachelor’s degrees, postgraduate diplomas and certificates, and postgraduate certificate in education (PGCE).

**Right of abode.** The right to live permanently in the United Kingdom without any immigration restrictions. Persons with this right do not need an immigration officer’s permission to enter the United Kingdom and may live and work there without restriction. All British citizens and some Commonwealth citizens have this right.

**STEM.** Science, Technology, Engineering, and Mathematics. There is no consistent definition of STEM occupations, industries, or workers. In this publication, we consider STEM-related occupations as architecture and engineering occupations; computer and mathematical occupations; life, physical, and social science occupations; and health care practitioner and technical occupations. STEM industries may be defined in relation to the concentration of STEM-related occupations in the industry group. STEM-educated workers are those with advanced (postsecondary) degrees in fields relevant to the STEM occupations.

**Stock.** Represents snapshots of a population at a single point in time by counting (as in a census) or estimating (as in a survey) the distribution of that population according to some characteristic, such as place of birth, citizenship, age, income, or gender.

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## Links To Useful Research and Other Resources

Atlas of International Student Mobility  
<http://atlas.iienetwork.org/>

Ben Marriott, "Scientists, Engineers, and Technologists in Great Britain," *Labour Market Trends* 114, no. 4 (2006): 109-16, accessed at [www.statistics.gov.uk/CCI/article.asp?ID=1474&Pos=&ColRank=1&Rank=224](http://www.statistics.gov.uk/CCI/article.asp?ID=1474&Pos=&ColRank=1&Rank=224).

Office for National Statistics, "Estimating International Migration: An Exploration of the Definitional Differences Between the Labour Force Survey, Annual Population Survey, International Passenger Survey and Long-Term International Migration," accessed at [www.statistics.gov.uk/downloads/theme\\_population/International\\_migration\\_data\\_differences.pdf](http://www.statistics.gov.uk/downloads/theme_population/International_migration_data_differences.pdf).

Office for National Statistics, *Migration Statistics Quarterly Report Statistical Bulletin*, accessed at [www.statistics.gov.uk/statbase/Product.asp?vlnk=15230](http://www.statistics.gov.uk/statbase/Product.asp?vlnk=15230).

Nicolas Perrin, Michel Poulain, and Ann Singleton, eds., *THESIM: Towards Harmonised European Statistics on International Migration* (Louvain-la-Neuve, Belgium: Presses Universitaires de Louvain, 2008), accessed at [www.uclouvain.be/en-12321.html](http://www.uclouvain.be/en-12321.html).

Parliamentary Office of Science and Technology, "International Migration of Scientists and Engineers," *PostNote* no. 309 (June 2008): 1-4, accessed at [www.parliament.uk/documents/post/postpn309.pdf](http://www.parliament.uk/documents/post/postpn309.pdf).

UNESCO Institute for Statistics, *Global Education Digest 2009* (Montreal: UNESCO Institute for Statistics, 2009), accessed at [www.uis.unesco.org/template/pdf/ged/2009/GED\\_2009\\_EN.pdf](http://www.uis.unesco.org/template/pdf/ged/2009/GED_2009_EN.pdf).

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INFORM  
EMPOWER  
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United States  
**STEM Workers**  
**Data Sources**

BY **MARLENE LEE** AND **NADWA MOSSAAD**

**Science, Technology, Engineering, and Mathematics**

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AUGUST 2010

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# UNITED STATES STEM WORKERS DATA SOURCES

BY **MARLENE LEE** AND  
**NADWA MOSSAAD**

## ABOUT THE AUTHORS

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## ACKNOWLEDGMENTS

The authors wish to thank: Ellen Carnevale, PRB's vice president of Communications and Marketing for her assistance with design, and Tyjen Tsai, PRB writer/editor, Lisa Aronson, PRB program assistant, and Jonathan Stall, PRB intern for their assistance. We also wish to acknowledge Jeanne Batalova, Michelle Mittelstadt, and Mark Mather, co-authors of *Immigration: Data Matters*, after which this guide has been modeled.

This project is underwritten through the generosity of the Alfred P. Sloan Foundation.

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# INTRODUCTION

Businesses, governments, and individuals are trying to understand and plan for shifts in the demand for highly skilled workers, particularly those workers with advanced degrees and experience in science, technology, engineering, and mathematics. Global shifts in production, consumption, education, and training are affecting regional, national, and local economies and their labor markets. To understand and respond to shifts in the demand for and supply of skilled labor, it is critical to have access to authoritative and high-quality data about skilled workers—both those currently in the labor force and those in the education pipeline.

We hope that *STEM Workers: Data Sources* will provide useful information about where to find credible and accessible data on the skilled labor force in the United States. We include information from U.S. government sources, nongovernment sources, and international organizations. This guide is by no means a comprehensive list of all sources for data related to the skilled workforce in the United States. Instead, we are sharing resources identified in our search for comparable indicators with which to assess the stock of skilled workers in the United States relative to other countries, the flow of skilled workers into the United States from other countries, and the production of future workers.

Key Topics (U.S. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
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## GLOBAL MOBILITY

### Immigration/ Visa Status

The U.S. data provide limited information on permanent and temporary visa holders based on immigration status at the point of entry. The data are from the Department of Homeland Security's (DHS) U.S. Citizenship and Immigration Services (USCIS) administrative sources; they are not available in census or population-based survey data.

Permanent immigrants: information on the number of immigrants admitted for legal permanent residence ("green card" holders) over time and by detailed class of admission. Country of birth information is available only by broad class of admission (e.g., employment-based immigrants). No relevant information by occupation prior to migration is available.

Office of Immigration Statistics (OIS), *Yearbook of Immigration Statistics*, tables on legal permanent residents, [www.dhs.gov/files/statistics/publications/yearbook.shtm](http://www.dhs.gov/files/statistics/publications/yearbook.shtm)

Annually

Temporary immigrants: information on the number of admissions (entries, not people) by visa type, including temporary workers and foreign students. No information is available by prior occupation/profession. Also, *Characteristics of Specialty Occupation Workers (H-1B)* report provides data on the main countries of origin, educational attainment, industry, occupation, and median salary of temporary workers who were issued/extended H-1B visas during the previous fiscal year.

OIS, *Yearbook of Immigration Statistics*, tables on nonimmigrant admissions, [www.dhs.gov/files/statistics/publications/yearbook.shtm](http://www.dhs.gov/files/statistics/publications/yearbook.shtm); USCIS, *Report on H-1B workers*, [www.uscis.gov/USCIS/Resources/Reports%20and%20Studies/H-1B/h1b-fy-09-characteristics.pdf](http://www.uscis.gov/USCIS/Resources/Reports%20and%20Studies/H-1B/h1b-fy-09-characteristics.pdf)

Annually

Foreign students: information on the number of visas issued to foreign students over time by country of origin.

Department of State *Report of the Visa Office*, [www.travel.state.gov/visa/statistics/statistics\\_1476.html](http://www.travel.state.gov/visa/statistics/statistics_1476.html)

Annually

### International Students

Number and characteristics: U.S. total number of students by country of citizenship, visa status, level of education, and course of study. Based on surveys of U.S. postsecondary institutions.

Institute of International Education, *Open Doors* annual report, <http://opendoors.iienetwork.org/>

Annually  
(usually in  
November)

Information for individual U.S. colleges/universities: online tables with data on foreign students' number, share of total enrollment, graduation rates, degree level by U.S. individual institutions of postsecondary education. Note: 1. Foreign students are reported as "nonresident aliens."  
2. Not all data might be available for all institutions.

National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), IPEDS Data Center, <http://nces.ed.gov/ipeds/>

Annually

Key Topics (U.S. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>International Students (continued)</b>	Student and Exchange Visitor Information System (SEVIS) has quarterly administrative data on the number, country of origin, degree level, and majors of foreign students and exchange visitors. Also includes data on the institutions in which these students are enrolled such as geographic location and number of foreign students.	DHS, U.S. Immigration and Customs Enforcement (ICE) report <i>SEVIS By the Numbers</i> , <a href="http://www.ice.gov/sevis/">www.ice.gov/sevis/</a>	Quarterly
<b>Multinational Companies</b>	U.S. data on multinational corporations is available from the Bureau of Economic Analysis. However, indicators relevant to investment in development of science, engineering, and technology resources are sometimes easily accessed in international databases.	BEA, <a href="http://www.bea.gov/international/">www.bea.gov/international/</a>	
	Data for latest available year includes number of parent corporations and number of foreign affiliates in country economy.	UNCTAD, Annexes in World Investment Reports (1991-2009), <a href="http://www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=1485&amp;lang=1</a> ; Online information on multinationals (transnational corporations) by country may also be accessed at <a href="http://www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1">www.unctad.org/Templates/Page.asp?intItemID=3198&amp;lang=1</a>	Annually
	R&D expenditures of foreign affiliates in host economy.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years
<b>Research Collaborations</b>	Data on international cooperation in R&D, patents and scientific publications among countries; technological balance of payments; international flows in inventions and doctoral students.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years

## EDUCATION

<b>STEM Graduates</b>	Characteristics of graduates with doctoral degree: data on the size, educational characteristics, and postgraduation plans of individuals receiving research doctoral degrees from all accredited U.S. institutions. Includes information on field of degree, country of birth, citizenship status at graduation, race and ethnicity, gender, educational debt, and postgraduate plans (work, postdoc).	Survey of Earned Doctorates, National Science Foundation, <a href="http://www.nsf.gov/statistics/srvy/doctorates/">www.nsf.gov/statistics/srvy/doctorates/</a> . Results are available in the form of online reports, custom-built online tables ( <a href="https://webcaspar.nsf.gov/">https://webcaspar.nsf.gov/</a> ), and a restricted-license dataset for further analysis. Easy to view tables from this survey are also available: <a href="http://www.nsf.gov/statistics/doctorates/">www.nsf.gov/statistics/doctorates/</a>	Annually
	Foreign science and engineering students: report on the foreign students enrolled in U.S. Sciences and Engineering programs plus tables showing the size, degree level, country of origin, and estimates of cross-country mobility.	NSF report, <i>Foreign Science and Engineering Students in the United States</i> , <a href="http://www.nsf.gov/statistics/infbrief/nsf10324/?org=NSF">www.nsf.gov/statistics/infbrief/nsf10324/?org=NSF</a>	Periodic

Key Topics (U.S. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Postsecondary Education</b>	Student and institutional-level characteristics of U.S. primary providers of postsecondary education: survey-based data about students in individual higher education institutions. Custom-built online tables provide information on student enrollment, graduation rates, awards given by race and ethnicity, gender, degree level, field of study. Tables also include institution-level data such as enrollments, program completions, faculty, staff, finances, student financial aid, and academic libraries.	National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), IPEDS Data Center, <a href="http://nces.ed.gov/ipeds/">http://nces.ed.gov/ipeds/</a>	Annually
	University rankings: “America’s Best Colleges” is a ranking of 1,400-plus accredited colleges/universities in the United States. Also available are the rankings of the top 400 universities worldwide by school subject, including engineering and the IT, natural and physical sciences, and life sciences and biomedicine. The rankings are based on five criteria: academic peer review, employer review, student-to-faculty ratio, citations, and international faculty and students.	<i>U.S. News &amp; World Report’s “America’s Best Colleges”</i> ( <a href="http://colleges.usnews.rankingsandreviews.com/best-colleges">http://colleges.usnews.rankingsandreviews.com/best-colleges</a> ) and “World’s Best Universities” ( <a href="http://www.usnews.com/sections/education/worlds-best-universities/index.html">www.usnews.com/sections/education/worlds-best-universities/index.html</a> )	Annually
	U.S. investment into education compared to other countries: annual expenditure on educational institutions by broad level of education: total, as a percentage of GDP, per student, and public vs. private.	OECD, <i>Education at a Glance</i> , Chapter B “Financial and Human Resources Invested In Education,” <a href="http://www.oecd.org/dataoecd/41/25/43636332.pdf">www.oecd.org/dataoecd/41/25/43636332.pdf</a>	Annually
<b>Lifelong Learning (formal learning)</b>	<p>1. Number, share, and select characteristics (educational degree, broad occupation, nativity) of adults who are enrolled in work-related courses.</p> <p>2. ACS data on percent of adults already with professional qualifications (by degree or occupation) who are currently enrolled in college/university.</p>	<p>1. National Center for Education Statistics (NCES), 2005 Adult Education Survey. Suggested reading: <i>Career and Technical Education in the United States: 1990 to 2005</i>, <a href="http://nces.ed.gov/pubs2008/2008035.pdf">http://nces.ed.gov/pubs2008/2008035.pdf</a>. A number of pregenerated tables are available online (<a href="http://nces.ed.gov/pubs2006/adulted/tables.asp">http://nces.ed.gov/pubs2006/adulted/tables.asp</a>). Users can also use the Education Data Analysis Tool (EDET) to create online tables based on select variables, <a href="http://nces.ed.gov/nhes/dataproducts.asp">http://nces.ed.gov/nhes/dataproducts.asp</a>. Users also might request and analyze restricted-data microdata from NCES, <a href="http://nces.ed.gov/nhes/surveytopics_adult.asp">http://nces.ed.gov/nhes/surveytopics_adult.asp</a>;</p> <p>2. U.S. Census Bureau, American Community Survey (ACS), <a href="http://www.census.gov/acs/www/">www.census.gov/acs/www/</a>. Researchers can download microdata for further analysis either through American Fact-Finder (<a href="http://factfinder.census.gov/home/saff/main.html?_lang=en">http://factfinder.census.gov/home/saff/main.html?_lang=en</a>) or through Minnesota Population Center’s IPUMS USA (<a href="http://usa.ipums.org/usa/">http://usa.ipums.org/usa/</a>)</p>	

Key Topics (U.S. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>LABOR FORCE CHARACTERISTICS</b>			
<b>STEM Workers</b>	U.S. government collects detailed social, demographic, educational, and economic data on the U.S. population, including the foreign-born. In terms of occupations that can be used to identify STEM workers, the United States uses the Standard Occupation Classification System ( <a href="http://www.bls.gov/soc/">www.bls.gov/soc/</a> ) and releases crosswalks between this classification system and systems used by other international agencies; New Immigrant Survey (NIS) provides premigration and postmigration information on occupations, salary, English ability, education, etc., for immigrants granted legal permanent resident (LPR) status from 2003-2004. NIS is expected to track the economic and social outcomes of this cohort of LPRs over time.	U.S. Census Bureau, American Community Survey (ACS), <a href="http://www.census.gov/acs/www/">www.census.gov/acs/www/</a> . Researchers can download microdata for further analysis either through American FactFinder ( <a href="http://factfinder.census.gov/home/saff/main.html?_lang=en">http://factfinder.census.gov/home/saff/main.html?_lang=en</a> ) or through Minnesota Population Center's IPUMS USA ( <a href="http://usa.ipums.org/usa/">http://usa.ipums.org/usa/</a> ); Princeton University, New Immigrant Survey (NIS). Researchers can download microdata for further analysis from <a href="http://nis.princeton.edu/index.html">http://nis.princeton.edu/index.html</a>	Annually
<b>Foreign-Born Workers</b>	Researchers can analyze ACS data to estimate the number and share of foreign- and U.S.-born workers among overall and STEM workforce for the nation and individual states; generate data on employment by industry; calculate mean and median age, salary, years of education. See also about NIS above.	Same as above.	Same as above
<b>Highly Skilled Workers (those with at least a bachelor's degree)</b>	Researchers can analyze ACS data to estimate the number and share of foreign- and U.S.-born workers among U.S. college-educated workers for the nation and individual states; generate data on employment by industry; calculate mean and median age, salary, years of education. See also about NIS above.	Same as above.	Same as above
<b>R&amp;D INVESTMENT</b>			
<b>Expenditures</b>	Gross domestic expenditures on R&D: total amount, percent GDP, per capita, by source of funding (government, private, foreign, etc.)	UNESCO Institute for Statistics, Data Centre, Science & Technology Tables, <a href="http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx">http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx</a>	Annually
	R&D spending, venture capital, patents and trademarks, and employment.	OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> or directly to the online tables: <a href="http://www.oecdilibrary.org/content/book/sti_scoreboard-2009-en">www.oecdilibrary.org/content/book/sti_scoreboard-2009-en</a>	Every 2 years

Key Topics (U.S. Data)	What Is Available	Where Can it Be Found	How Often Is it Updated
<b>Employment</b>	R&D workers in sciences and technology fields: total, by gender, by degree level, by field of science.	UNESCO Institute for Statistics, Data Centre, Science & Technology Tables, <a href="http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx">http://stats.uis.unesco.org/unesco/ReportFolders/ReportFolders.aspx</a>	Annually
<b>Patents</b>	Information on the nationality and current residence of the inventors of applied and granted patents.	World Intellectual Property Organization, <a href="http://www.wipo.int/ipstats/en/statistics/patents/">www.wipo.int/ipstats/en/statistics/patents/</a> ; OECD <i>Science, Technology and Industry Scoreboard 2009</i> , <a href="http://www.oecd.org/sti/scoreboard">www.oecd.org/sti/scoreboard</a> ; OECD Patent Database, <a href="http://www.oecd.org/">www.oecd.org/</a>	Annually

**Note:** Though many people routinely use the words “immigrant,” “foreign-born,” and “foreigner” interchangeably, the terms have different meanings and definitions for individual government agencies and data providers. The Department of Homeland Security (DHS) and Department of State (DOS) use the term “immigrants” for foreign nationals who have been admitted for legal permanent residence in the United States. The U.S. Census Bureau classifies people by whether they had U.S. citizenship at birth. Thus, the bureau uses the term “foreign-born” to include naturalized citizens, legal permanent residents (“green card” holders), refugees and asylees, legal temporary migrants (those on work, student, and some other temporary visas), and undocumented migrants.

## U.S. GOVERNMENT SOURCES

### Census Bureau

#### American Community Survey (ACS)

Provides annual estimates of the foreign-born population with detailed sociodemographic, educational, economic, and housing characteristics. About 3 million households are surveyed each year, from every U.S. county. From 2005 on, one-year ACS estimates are available for geographic areas with a population of 65,000 or more. In 2008, the Census Bureau released its first multiyear estimates based on 2005 to 2007 ACS. The three-year estimates are available for geographic areas with a population of 20,000 or more. Many pregenerated tables (from one- and three-year files) are available through U.S. Census Bureau's American FactFinder. To create customized tables, users need statistical software and training. The microdata may be downloaded free of charge from the Minnesota Population Center's IPUMS, <http://usa.ipums.org/usa/>. Note: The IPUMS website allows users to create simple online tables through its "Analyze Data Online" feature. Another important advantage of using the IPUMS data is that most of the variables are harmonized (made as similar as possible) across survey years.

#### Current Population Survey (CPS)

CPS is a monthly survey of about 50,000 households conducted by the Census Bureau and the Bureau of Labor Statistics. The CPS is the primary source of information on the labor force characteristics of the U.S. civilian population. Immigration variables (citizenship status and place of birth of respondents and their parents) are available from 1994 on. The survey is designed for national-level analysis and users seeking state-level data should combine years to obtain a more precise estimate. It is not recommended for use at the metropolitan or submetropolitan level. Users may use microdata (individual records) to perform customized research. The microdata may be downloaded free of charge from the Minnesota Population Center's IPUMS, <http://cps.ipums.org/cps/>. Note: The IPUMS website allows users to create simple online tables through its "Analyze Data Online" feature. Another important advantage of using the IPUMS data is that most of the variables are harmonized (made as similar as possible) across survey years.

### Department of Education

#### National Center on Education Statistics, Integrated Postsecondary Education Data System (IPEDS)

IPEDS is a system of interrelated surveys conducted annually by the National Center for Education Statistics (NCES), <http://nces.ed.gov/ipeds/about/>. IPEDS gathers information on enrollments, program completions, graduation rates, faculty and staff, finances, institutional prices, and student financial aid from every college, university, and technical and vocational institution that participates in the federal student financial aid programs. IPEDS provides basic data needed to describe and analyze trends in postsecondary education in the United States, in terms of the numbers of students enrolled, staff employed, dollars expended, and degrees earned. More than 6,700 institutions complete IPEDS surveys each year. These include research universities, state colleges and universities, private religious and liberal arts colleges, for-profit institutions, community and technical colleges, nondegree-granting institutions such as beauty colleges, and others. Note: Postsecondary institutions that do not participate in the federal student financial aid programs are not required to respond to IPEDS surveys although some chose to do so.

#### National Center on Education Statistics, Adult Education Survey

The survey includes data on adults' participation in educational activities in the United States (<http://nces.ed.gov/pubs2006/adulted/index.asp>). Full-time only participation in postsecondary programs have not been considered adult education so were excluded. The survey collected information on both formal adult educational activities and on informal learning activities pursued for personal interest. Interviews were conducted with a nationally representative sample of the civilian, noninstitutionalized population age 16 or older who were not enrolled in grade 12 or below. Data were collected from early Jan. through April 2005. A total of 8,904 telephone interviews were completed with adults representing a weighted total of about 212 million people.



**Department of  
Homeland Security  
*Yearbook of Immigration  
Statistics***

This publication from the Department of Homeland Security's Office of Immigration Statistics provides annual inflow data on the number and select characteristics of foreigners who, during a fiscal year, were granted lawful permanent residence (became legal permanent residents or "green card" holders), were admitted into the United States on a temporary basis (tourists, students, or temporary workers), applied for asylum or refugee status, or became U.S. citizens through naturalization. The *Yearbook* also includes data on apprehensions, removals, and prosecutions of unauthorized migrants, [www.dhs.gov/files/statistics/publications/yearbook.shtm](http://www.dhs.gov/files/statistics/publications/yearbook.shtm). Users cannot customize tables online. Microdata are not available.

**Student and Exchange  
Visitor Information  
System (SEVIS)**

This web-based system collects real-time information on foreign students, exchange visitors and their dependents, as well as schools in which the students and visitors are enrolled. SEVIS' main goal is to track and monitor these foreign nationals throughout the duration of approved participation within the U.S. education system. Users cannot customize tables online. Microdata are not available.

**Department of State  
*Report of the Visa Office***

This set of statistical tables, published annually, provides information on the number of immigrant and nonimmigrant visas issued by U.S. consular offices around the world. It also provides information on the use of visa numbers in each of the admission categories for lawful permanent residence. Users cannot customize tables online. Microdata are not available.

**National Science  
Foundation (NSF)  
Survey of Earned  
Doctorates (SED)**

The SED gathers information annually from 45,000 new U.S. research doctorate graduates about their educational histories, funding sources, and postdoctoral plans, [www.nsf.gov/statistics/srvydoctorates/](http://www.nsf.gov/statistics/srvydoctorates/). Each year the SED data are added to a larger historical record of doctorate degree graduates, the Doctorate Records File (DRF). Begun in 1920, the DRF contains annual information used to track the number of graduates in various fields; the educational paths of scientists, engineers, and humanists; movement of graduates into the labor market; etc. A related study to the SED is the NSF Survey of Doctorate Recipients (SDR), which tracks the employment history and research productivity of members of the labor force as they move through their careers in research and practice, [www.nsf.gov/statistics/srvydoctoratework/](http://www.nsf.gov/statistics/srvydoctoratework/). Note: Many of the questions in the Canadian SED have been modeled on the U.S. Survey of Earned Doctorates, allowing for cross-country comparisons.

**Master's- and  
Baccalaureate-Origins of  
U.S. Research Doctorate  
Recipients**

Users can purchase Master's- and Baccalaureate-Origins of U.S. Research Doctorate Recipients: 1999-2008 tables that provide counts of doctorate recipients from each master's-origin institution and are broken down by broad field of doctorate study, gender, citizenship status, and race/ethnicity for 2008, [www.norc.org/projects/survey+of+earned+doctorates.htm](http://www.norc.org/projects/survey+of+earned+doctorates.htm)

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**NON-U.S. GOVERNMENT SOURCES****Institute for International  
Education (IIE)  
*Open Doors***

This annual report, <http://opendoors.iienetwork.org/>, provides information on U.S. students studying abroad and on international students in the United States. It is available in print and as online tables and contains data on place of origin, sources of financial support, fields of study, host institutions, academic level, and rates of growth of the international student population in the United States, as well as on the economic impact of international students to the host state and national economies. The data are obtained each year through surveys sent to about 2,800 accredited U.S. institutions, who report on the international students enrolled at their colleges and universities. Statistics on international students in high school or youth exchange programs are not included in this report. An international student is defined as anyone who is enrolled at an institution of higher education in the United States who is not a U.S. citizen; an immigrant (permanent resident); or a refugee. International students include holders of F (foreign student) visas, J (exchange visitor) visas, and M (vocational training) visas.

**New Immigrant Survey  
(NIS)**

NIS is a longitudinal study of legal permanent immigrants admitted for permanent residence in the U.S. from 2003-2004, conducted by Princeton University. The survey provides information on a wide range of premigration and postmigration experiences, including employment, occupation, salary, English ability, educational attainment, place of the highest degree received, and category of admission such as family, employment, and refugee. The survey sample included 8,753 adults. The first wave of microdata were collected in 2004 and released in Sept. 2007. The next round of microdata (collected in 2007) are expected to be released later in 2010. To create customized tables, users need statistical software and training. The microdata may be downloaded free of charge from the NIS project page (<http://nis.princeton.edu/index.html>). Note: Given its limited scope, NIS does not collect information on legal permanent residents admitted every year. Neither does it collect data on those who are in the United States on temporary visas. The main drawbacks of the survey are that it is not easy to use and that it has been released behind schedule.

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**INTERNATIONAL DATA SOURCES****World Intellectual Property  
Organization (WIPO)**

WIPO, a specialized agency of the United Nations, maintains an international intellectual property (IP) system, [www.wipo.int/portal/index.html.en](http://www.wipo.int/portal/index.html.en). Its online database allows users to search more than 1.7 million international patent applications, [www.wipo.int/pctdb/en/](http://www.wipo.int/pctdb/en/). However, users might need to obtain access to detailed data records for their analysis. Note: The WIPO database records an inventor's nationality at the time of filing; therefore, the data do not capture the contributions of immigrants who became U.S. citizens before filing patent applications.

**Organisation for Economic  
Co-operation and  
Development (OECD)**

The OECD Science and Technology Scoreboard brings together indicators that reflect the level and structure of the efforts undertaken by OECD member countries and selected nonmember economies in the field of science and technology with R&D investment data in a time series. Not all countries provide data with the same frequency or of similar reliability.

**UNESCO Institute for  
Statistics (UIS)**

UIS, [www.uis.unesco.org](http://www.uis.unesco.org), a source of international data on education, science, and technology. Users may access data and build statistical tables. The Data Centre contains over 1,000 types of indicators and raw data on education, literacy, science and technology, culture and communication, collected for over 200 countries.

**Citizenship.** A person's formal legal status that links them to their country of birth or naturalization, and conveys a set of legal rights, protections, and responsibilities.

**Flow.** Cross-border migration that involves the movements of foreigners and citizens alike.

**Foreign-born population.** People who reside long-term in one country, whether in legal or unauthorized status, but were born somewhere else.

**Foreign students.** Foreign nationals who are enrolled at U.S. institutions of higher education who are not U.S. citizens, legal permanent residents, or refugees. Foreign students are typically in the United States on F (foreign student) visas, J (temporary educational exchange-visitor) visas, and M (vocational training) visas.

**Highly skilled.** No consistent definition is available. One of them refers to individuals who possess a bachelor's degree or higher.

**Immigrant.** "Immigrant" and "foreign-born" are often used interchangeably although the terms have different meanings and definitions for individual government agencies and data providers. The Department of Homeland Security (DHS) and Department of State (DOS) use the term "immigrants" for foreign nationals who have been admitted for legal permanent residence in the United States. The U.S. Census Bureau classifies people by whether they had U.S. citizenship at birth. Thus, the bureau uses the term "foreign-born" to include naturalized citizens, legal permanent residents ("green card" holders), refugees and asylees, legal temporary migrants (those on work, student, and some other temporary visas), and undocumented migrants.

**Immigrant visa number.** U.S. immigration law limits the number of immigrant permanent resident visas (green cards) that can be issued each year for various categories of immigrants. As a result, the U.S. Department of State regulates the flow of visas to ensure that the annual statutory limit is not exceeded.

**Legal permanent residents (LPRs).** Foreign nationals who have been granted lawful permanent residence in the United States. They are also known as "green card" recipients. They have permission to reside and work in the United States and may travel abroad and return if they do not abandon their U.S. residence. They may apply for U.S. citizenship after living in the United States, in most cases, for at least five years.

**Microdata files.** Files that contain information on individuals who took part in a survey. To protect identity and ensure confidentiality of collected information, the individual-level records do not include sensitive information such as respondent's name.

**Patent.** "A patent is a document which describes an invention which can be manufactured, used and sold with the authorization of the owner of the patent. An invention is a solution to a specific technical problem. A patent document normally contains at least one claim, the full text of the description of the invention, and bibliographic information such as the applicant's name. The protection given by a patent is limited in time (generally 15 to 20 years from filing or grant). It is also limited territorially to the country or countries concerned." (World Intellectual Property Organization, Glossary)

**Refugee.** A person who, owing to a well-founded fear of persecution for reasons of race, religion, nationality, membership of a particular social group, or political opinion, lives outside the country of his or her nationality or residence and is unable or unwilling to return.

**STEM.** Science, Technology, Engineering, and Mathematics. There is no consistent definition of STEM occupations, industries, or workers. In this publication, we consider STEM-related occupations as architecture and engineering occupations; computer and mathematical occupations; life, physical, and social science occupations; and health care practitioner and technical occupations. STEM industries may be defined in relation to the concentration of STEM-related occupations in the industry group. STEM-educated workers are those with advanced (postsecondary) degrees in fields relevant to the STEM occupations.

**Stock.** Represents snapshots of a population at a single point in time by counting (as in a census) or estimating (as in a survey) the distribution of that population according to some characteristic, such as place of birth, citizenship, age, income, or gender.

**Unauthorized migrant.** A person who arrives or resides in a country without valid authorization from the country's government. Also known as illegal, clandestine, undocumented, or irregular migrant.

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## Links To Useful Research and Other Resources

Atlas of International Student Mobility  
<http://atlas.iienetwork.org>

Bertelsmann Stiftung and Migration Policy Institute, eds., *Talent, Competitiveness and Migration* (Gütersloh, Germany: Bertelsmann Stiftung, 2009).

Jeanne Batalova, and Michael Fix, *Uneven Progress: The Employment Pathways of Skilled Immigrants in the United States* (Washington, DC: Migration Policy Institute, 2008), accessed at [www.migrationpolicy.org/pubs/BrainWasteOct08.pdf](http://www.migrationpolicy.org/pubs/BrainWasteOct08.pdf).

Migration Policy Institute  
[www.migrationpolicy.org](http://www.migrationpolicy.org)

National Science Foundation  
(about Doctoral scientists and engineers)  
[www.nsf.gov/statistics/doctoratework](http://www.nsf.gov/statistics/doctoratework)

Vivek Wadhwa et al., *Intellectual Property, the Immigration Backlog, and a Reverse Brain-Drain* (Durnham, NC: Center on Globalization, Governance & Competitiveness, 2007), accessed at [www.cggc.duke.edu/documents/IntellectualProperty\\_theImmigrationBacklog\\_andaReverseBrainDrain\\_003.pdf](http://www.cggc.duke.edu/documents/IntellectualProperty_theImmigrationBacklog_andaReverseBrainDrain_003.pdf).

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