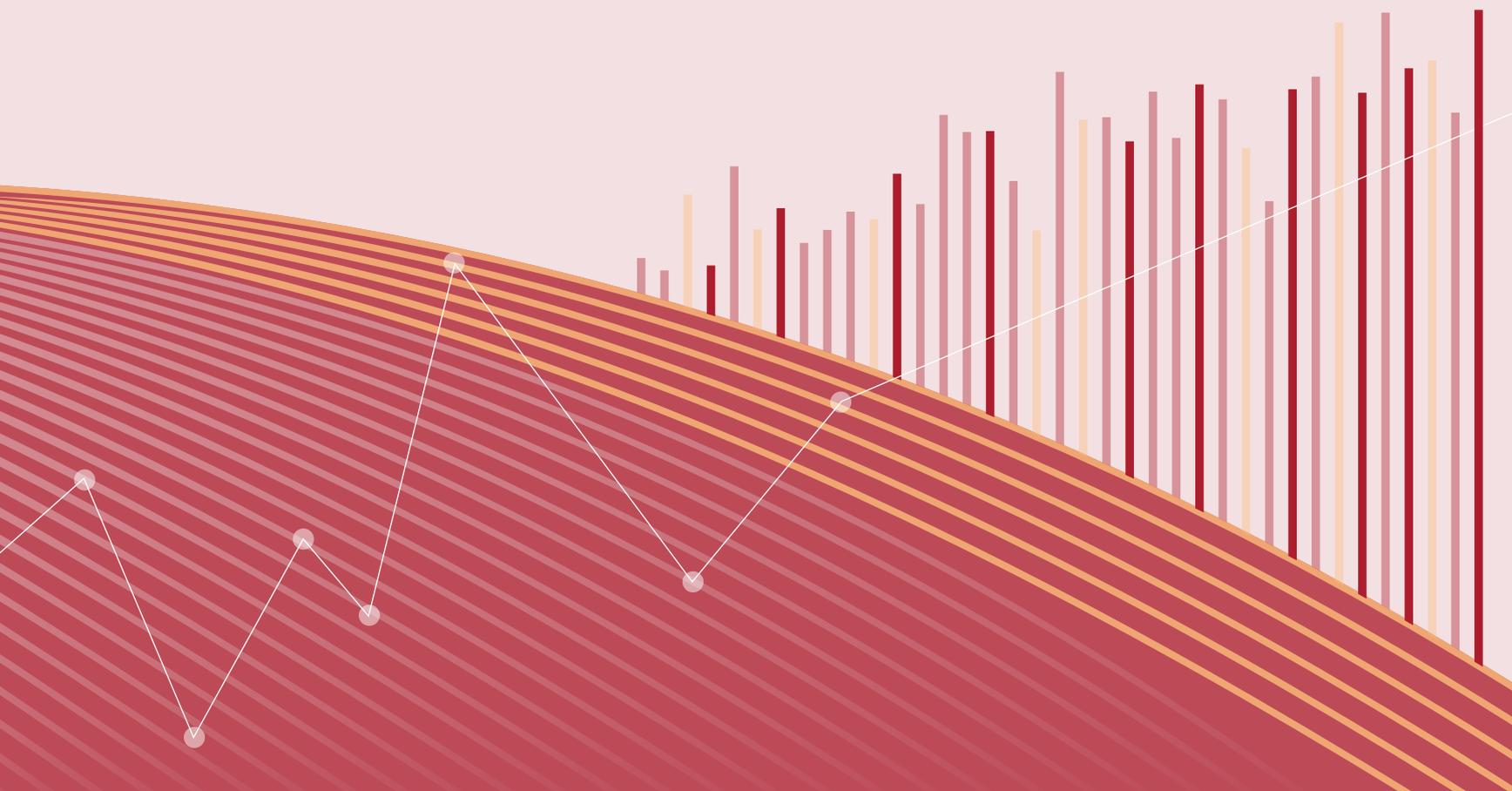


2015

DOCTORATE RECIPIENTS FROM U.S. UNIVERSITIES

NATIONAL CENTER FOR SCIENCE AND ENGINEERING STATISTICS
DIRECTORATE FOR SOCIAL, BEHAVIORAL AND ECONOMIC SCIENCES



ABOUT THIS REPORT

The Survey of Earned Doctorates, the data source for this report, is an annual census of individuals who receive research doctoral degrees from accredited U.S. academic institutions. The survey is sponsored by six federal agencies: the National Aeronautics and Space Administration, National Endowment for the Humanities, National Institutes of Health, National Science Foundation (NSF), Department of Agriculture, and Department of Education. These data are reported in several publications from NSF's National Center for Science and Engineering Statistics. The most comprehensive and widely cited publication is this report, *Doctorate Recipients from U.S. Universities*.

This report calls attention to major trends in doctoral education, organized into themes highlighting important questions about doctorate recipients. Online, the reader is invited to explore trends in greater depth through detailed data tables and interactive graphics (<https://www.nsf.gov/statistics/sed/>). Technical notes and other online resources are provided to aid in interpreting the data. The data tables are available in HTML, PDF, and Excel formats for easy viewing, printing, and downloading.

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FOR THE
HUMANITIES



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WHY IS THIS IMPORTANT?

The American system of doctoral education is widely considered to be among the world's best, as evidenced by the large and growing number of international students each year—many of them among the top students in their countries—who choose to pursue the doctoral degree at U.S. universities. But the continued preeminence of U.S. doctoral education is not assured. Other nations, recognizing the contributions doctorate recipients make to economies and cultures, are investing heavily in doctoral education. Unless doctoral education in the United States continues to improve, the world's brightest students, including U.S. citizens, may go elsewhere for the doctoral degree, and they may begin careers elsewhere as well.

Annual counts of doctorate recipients are measures of the incremental investment in human resources devoted to science, engineering, research, and scholarship, and they can serve as leading indicators of the capacity for knowledge-creation and innovation in various domains. The changing characteristics of this population over time—including the increased representation of women, minorities, and foreign nationals; emergence of new fields of study; time it takes to complete doctoral study; expansion of the postdoctoral pool; and reduced academic employment opportunities after graduation—reflect political, economic, social, technological, and demographic trends and events. Understanding the connections between these larger forces and the number and characteristics of doctorate recipients is necessary to make informed improvements in this country's doctoral education system.

Doctorate recipients begin careers in large and small organizations, teach in universities, and start new businesses. Doctoral education develops human resources that are critical to a nation's progress—scientists, engineers, researchers, and scholars who create and share new knowledge and new ways of thinking that lead, directly and indirectly, to innovative products, services, and works of art. In doing so, they contribute to a nation's economic growth, cultural development, and rising standard of living.

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WHO EARNS A U.S. DOCTORATE?

Each new cohort of doctorate recipients augments the supply of prospective scientists, engineers, researchers, and scholars. Data on the demographic composition of these cohorts reveal changes in the presence of underused groups.

OVERALL TRENDS

The 55,006 research doctorate degrees awarded by U.S. institutions in 2015 represent the highest number ever reported by the Survey of Earned Doctorates (SED). The number of doctorates awarded over time shows a strong upward trend—average annual growth of 3.3%—punctuated by periods of slow growth and even decline.

In every year of the SED, the number of doctorates awarded in science and engineering (S&E) fields has exceeded the number of non-S&E doctorates, and the gap is widening. From 1975 to 2015, the number of S&E doctorate recipients has more than doubled, reflecting an average annual growth rate of 1.9%, whereas the number of non-S&E doctorates awarded in 2015 is virtually identical to the 1975 count. As a result of these different growth rates, the proportion of S&E doctorates climbed from 58% in 1975 to 75% in 2015 (figure A).

CITIZENSHIP

Overview

The number of doctorates in S&E fields awarded to temporary visa holders grew to 14,037 in 2015, up 30% since 2005 but up only 2% since 2014. In comparison, the number of S&E doctorates awarded to U.S. citizens and permanent residents grew 43% since 2005 and 3% since 2014.

In 1995, 27% of all S&E doctorates were awarded to temporary visa holders. The proportion of S&E doctorate recipients with temporary visas increased to a peak of 41% in 2007 and has held steady at 36% since 2011 (figure B).

Over the 5-year period 2011 to 2015, 86% of the doctorates earned by temporary visa holders were in S&E fields, compared with 70% of the doctorates earned by U.S. citizens and permanent residents.

Countries or economies of foreign citizenship

Ten countries accounted for 71% of the doctorates awarded to temporary visa holders from 2005 to 2015, and the top three—China, India, and South Korea—accounted for more than half (figure C).

SEX

Citizenship

Women earned a majority of all doctorates awarded to U.S. citizens and permanent residents each year since 2002, and they earned more than one-third of all doctorates awarded to temporary visa holders over that period. From 1995 to 2006, the share of female doctorate recipients grew from 44% to 51% among U.S. citizens and permanent residents and from 22% to 34% among temporary visa holders. Since 2006, the shares of female doctorates in both citizenship categories have changed little. Overall, 46% of all doctorates in 2015 were awarded to women (figure D).

Field of study

Most of the growth in the number of doctorates earned by both men and women has been in S&E fields. From 1995 to 2015, the number of female doctorate recipients in S&E fields increased by 93%, far faster than the 29% growth in the number of male S&E doctorates. The numbers of male doctorate recipients and female doctorate recipients in S&E fields both grew by 2% from 2014 to 2015. Although women's share of S&E doctorates awarded increased from 33% in 1995 to 42% in 2009, it has remained stable since then.

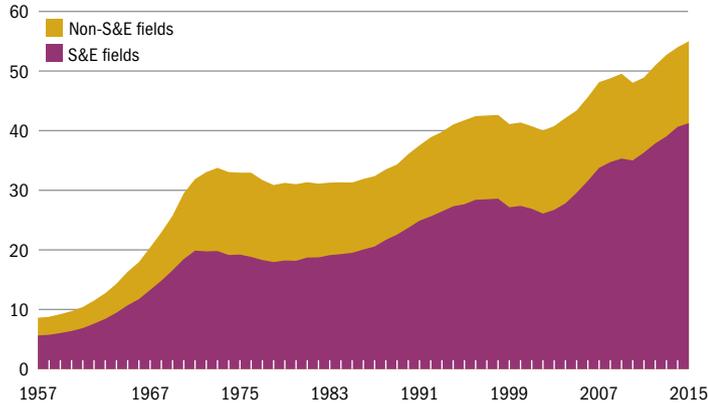
The number of female doctorate recipients in non-S&E fields has grown at a slower pace (7%) over the past 20 years, whereas the number of male doctorates in those fields has declined by 13%. In 2015, 57% of doctorates in non-S&E fields were awarded to women, a share that has changed little since 2002 (figure E).

RACE AND ETHNICITY

Participation in doctoral education by underrepresented minorities who are U.S. citizens or permanent residents is increasing, as evidenced by a 31% increase in the number of doctorates awarded to blacks or African Americans over the past 10 years and a 71% increase in the number of Hispanic or Latino doctorate recipients. Owing to these growth rates, the proportion of doctorates earned by blacks or African Americans has risen from 6.2% in 2005 to 6.5% in 2015, and the proportion awarded to Hispanics or Latinos has grown from 5.1% to 7.0%. The number of American Indian or Alaska Native doctorate recipients increased from 2014 to 2015 (figure F).

Doctorates awarded by U.S. colleges and universities: 1957–2015

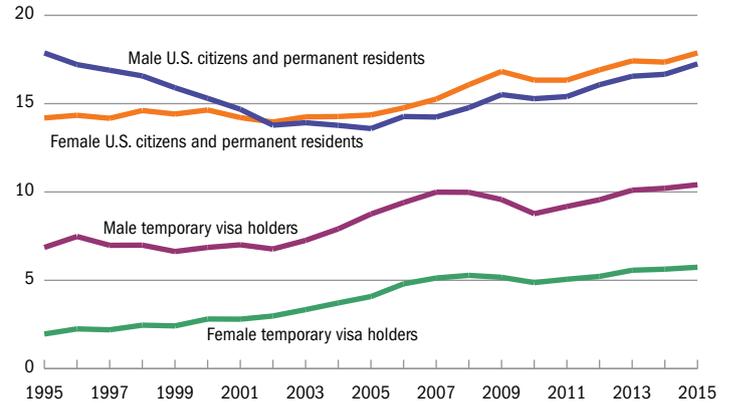
Doctorate recipients (thousands)



A

Sex and citizenship of U.S. doctorate recipients: 1995–2015

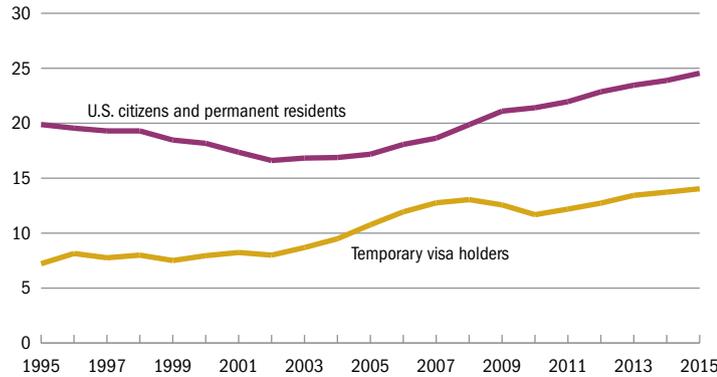
Doctorate recipients (thousands)



D

Doctorates awarded in science and engineering fields, by citizenship: 1995–2015

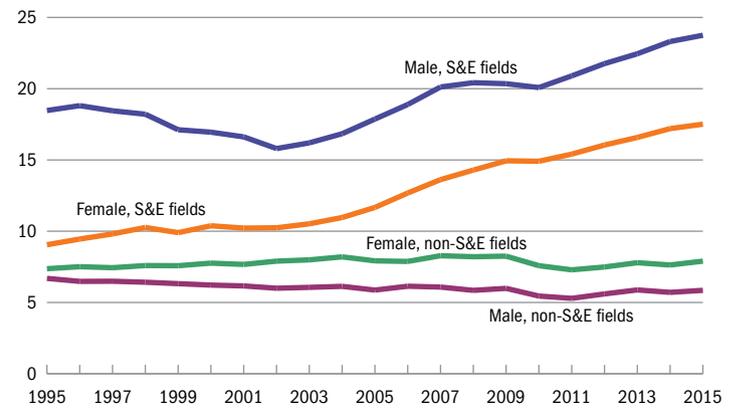
S&E doctorate recipients (thousands)



B

Sex and field of study of U.S. doctorate recipients: 1995–2015

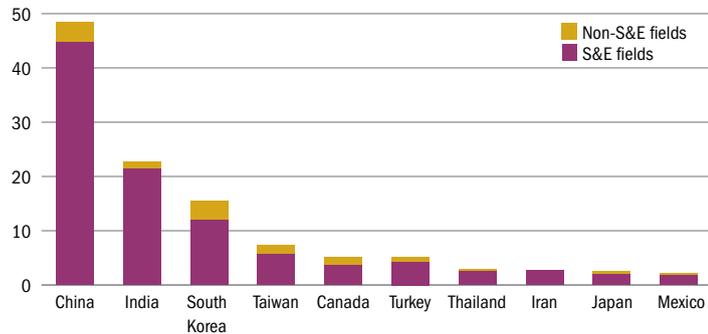
Doctorate recipients (thousands)



E

Top 10 countries or economies of foreign citizenship for U.S. doctorate recipients with temporary visas: 2005–15

Doctorate recipients (thousands)

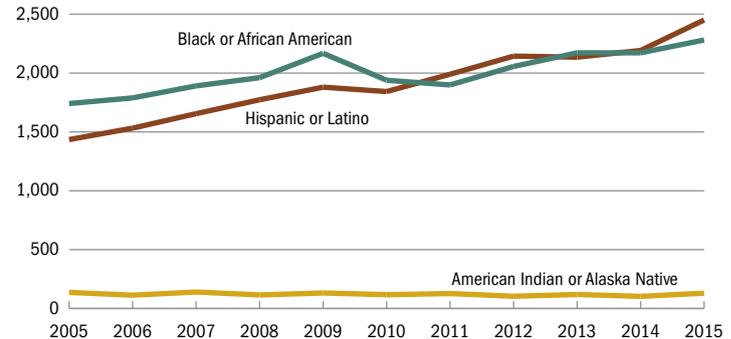


NOTE: China includes Hong Kong.

C

Doctorates earned by underrepresented minority U.S. citizens and permanent residents: 2005–15

Doctorate recipients



NOTE: Hispanic may be any race.

F

WHICH FIELDS ATTRACT STUDENTS?

As researchers expand their understanding of the world, new fields of study emerge and existing fields change. Observing which fields of study are attracting growing proportions of students can provide early insight into where future research breakthroughs may occur.

FIELD TRENDS

Science and engineering

Doctorates in science and engineering (S&E) fields, particularly in life sciences, are a growing share of all doctorates awarded. Overall, S&E doctorates accounted for 75% of all doctorates awarded in 2015, a substantially larger share than 10 years earlier (68%). With the exception of psychology and social sciences, the relative share of doctorates awarded in every broad S&E field increased over the past decade. Although the number of doctorates in psychology and social sciences was 27% larger in 2015 than it was in 2005, the relative share of doctorates awarded in this field showed no upward trend (figure A).

Non-science and engineering

The number of doctorates awarded in education has declined over the past decade, leading to a large, steady drop in the relative share of doctorates in that field from 14% in 2005 to 9% in 2015. Despite an increase in the number of humanities and arts doctorates, the relative share of doctorates awarded in this field fell 2 percentage points from 2005 to 2015. The share of doctorates in other non-S&E fields has remained fairly stable over the past decade (figure B).

TEMPORARY VISA HOLDERS

In every broad field of study, the share of doctorates awarded to temporary visa holders is larger in 2015 than it was 20 years earlier. In 2015, temporary visa holders earned the majority of doctorates awarded in engineering and in mathematics and computer sciences (figure C).

MINORITY U.S. CITIZENS AND PERMANENT RESIDENTS

Among minority U.S. citizens and permanent residents, doctorate recipients of different racial or ethnic backgrounds are more heavily represented

in some fields of study than in others. In 2015, Asians earned more doctorates than other racial and ethnic minority groups in life sciences, physical and earth sciences, mathematics and computer sciences, and engineering. Blacks or African Americans were the largest U.S. minority population in psychology and social sciences and in education. Hispanics or Latinos earned more doctorates in humanities and arts than did any other minority group. In 2015, Asians and blacks or African Americans earned relatively similar numbers of doctorates in other non-S&E fields (figure D).

WOMEN

Field of study

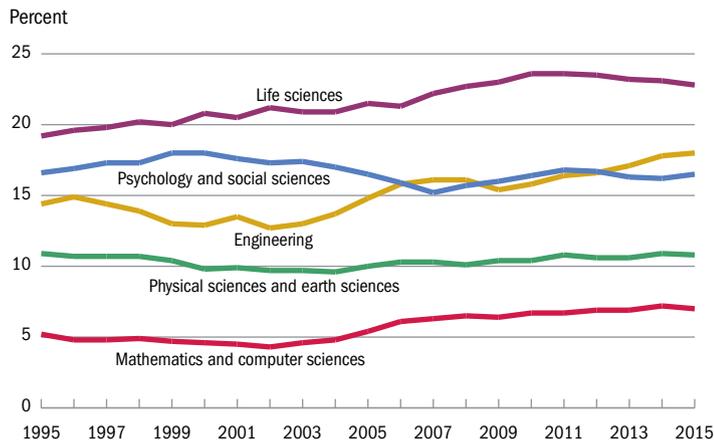
Women's share of doctorates awarded has grown over the past 2 decades in all broad fields of study. In 2015, women earned the majority of doctorates awarded in every broad field of study except physical and earth sciences, mathematics and computer sciences, and engineering.

Although women earned only about one-third of the 2015 doctorates awarded in physical and earth sciences and less than one-fourth of the doctorates in engineering, their relative shares of doctorates awarded in those fields has been growing rapidly. From 2005 to 2015, the proportion of doctorates in physical and earth sciences awarded to women increased by 6 percentage points, and the share of women in engineering grew by 5 percentage points. The proportion of female doctorate recipients in mathematics and computer sciences has grown more modestly, by 1 percentage point from 2005 to 2015 (figure E).

Growing subfields

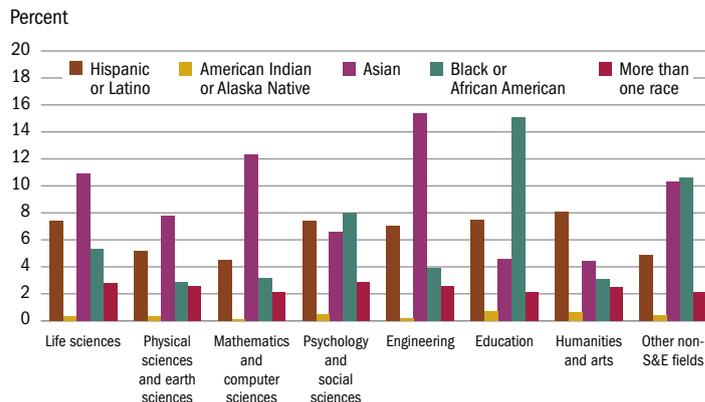
The subfields of doctoral study showing the largest relative growth in numbers of female doctorate recipients over the past decade have been within engineering, led by bioengineering and biomedical engineering (figure F).

Doctorates awarded in science and engineering fields of study: 1995–2015



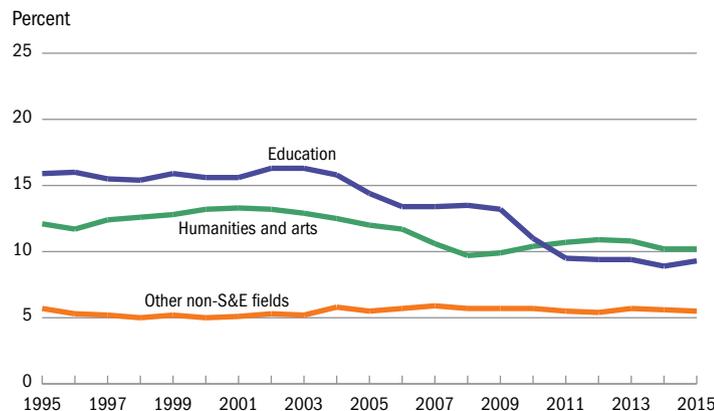
A

Doctorates awarded to minority U.S. citizens and permanent residents, by ethnicity, race, and broad field of study: 2015



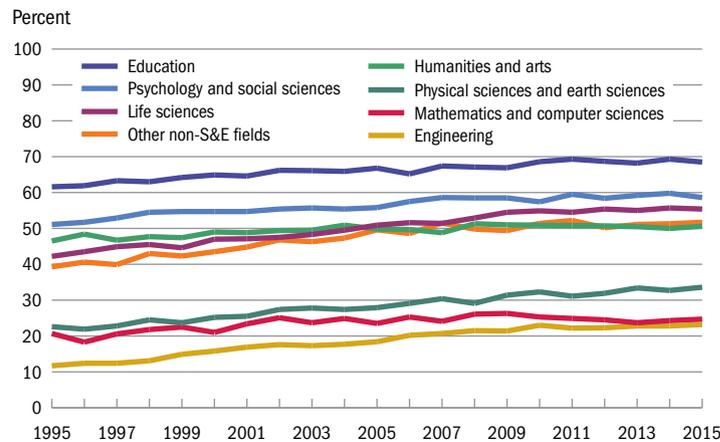
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Doctorates awarded in non-science and engineering fields of study: 1995–2015



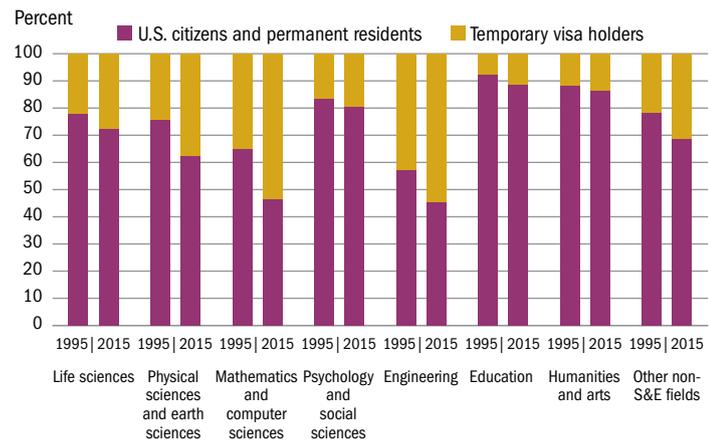
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Doctorates awarded to women, by broad field of study: 1995–2015



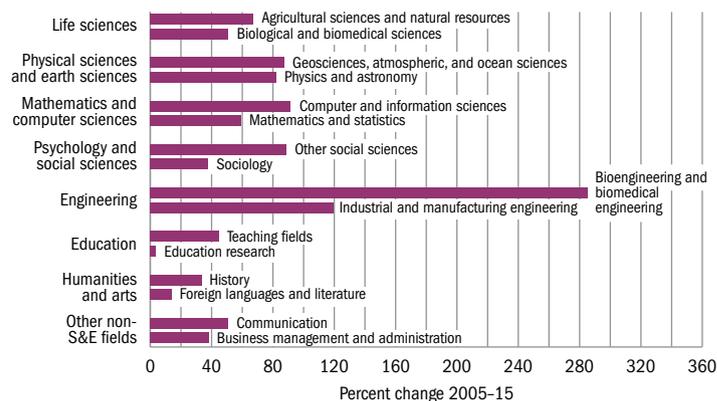
E

Doctorates awarded, by citizenship and broad field of study: 1995 and 2015



C

Fastest growing subfields of study for female U.S. doctorate recipients, by broad field of study: 2005–15



F

WHAT INFLUENCES THE PATH TO THE DOCTORATE?

Some paths to the doctoral degree are less traveled and some are more difficult to navigate, owing to a variety of influences that shape doctoral study. These paths may lead to different postgraduate destinations.

PARENTAL EDUCATION

Overview

The parents of recent doctorate recipients are better educated than the parents of earlier cohorts of doctorate recipients. The share of doctorate recipients from families in which neither parent has earned more than a high school diploma is declining, and the share from families in which at least one parent has earned a bachelor's degree or higher continues to climb, rising from 56% of doctorate recipients in 1995 to 69% in 2015 (figure A).

By race and ethnicity

The pattern of rising parental educational attainment is visible among all races and ethnicities for U.S. citizen and permanent resident doctorate recipients. Nonetheless, doctorate recipients from underrepresented minority groups are less likely to have at least one parent with a bachelor's degree than are Asian or white doctorate recipients.

As of 2015, approximately half of American Indian or Alaska Native and black or African American doctorate recipients and more than 40% of Hispanic or Latino doctorate recipients belonged to families in which neither parent had been awarded a college degree. In comparison, fewer than 30% of Asian and white doctorate recipients came from families in which neither parent had been awarded a college degree (figure B).

SOURCES OF FINANCIAL SUPPORT

Overview

A steadily declining share of doctoral students rely primarily on their own resources—loans, personal savings, personal earnings, and the earnings or savings of their spouse, partner, or family—to finance their doctoral studies. In turn, a growing proportion of students over the past 10 years has relied on research assistantships and teaching assistantships for their financial support during graduate school. The share of doctoral students reporting fellowships or grants as their most important source of financial support has remained relatively stable since 2005 (figure C).

By field of study

In 2015, fellowships or grants were the most common primary source of support for doctoral students in life sciences. Research assistantships were

the leading source of support in physical and earth sciences, mathematics and computer sciences, and engineering. Teaching assistantships were the most common source for doctoral students in humanities and arts. In other non-science and engineering (non-S&E) fields and in psychology and social sciences, similar proportions of doctorate recipients reported fellowships or grants, teaching assistantships, and their own resources as their primary source of financial support. Doctoral students in education fields were the most likely to rely on their own resources, with nearly half reporting this as their primary source of support (figure D).

EDUCATION-RELATED DEBT

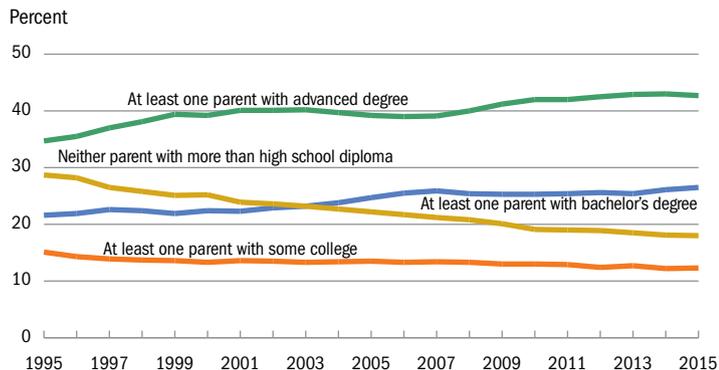
The amount of education-related debt incurred by doctorate recipients during graduate school is an indicator of the availability of financial support. In 2015, more than two-thirds of doctorate recipients in life sciences and more than three-quarters of those in physical and earth sciences, mathematics and computer sciences, and engineering reported holding no debt related to their graduate education when they were awarded the doctorate. In psychology and social sciences, humanities and arts, and other non-S&E fields, that proportion dropped to approximately one-half.

Within each broad field of study, roughly 7% to 11% of doctorate recipients had incurred low levels (\$10,000 or less) of education-related debt by the time they graduated. The shares of doctoral graduates with education-related debt burdens over \$30,000 were greatest in psychology and social sciences (33%), education (36%), humanities and arts (27%), and other non-S&E fields (30%) (figure E).

TIME TO DEGREE

The time between entering graduate school and earning the doctorate has fallen in all fields of study over the past 20 years, particularly in education. Since 2005, the declines in the duration of study of doctorate recipients in non-S&E fields have exceeded the declines in the duration of study of S&E doctorates. Despite these trends, it still takes years longer to earn a doctorate in non-S&E fields than it does to complete doctoral training in S&E fields (figure F).

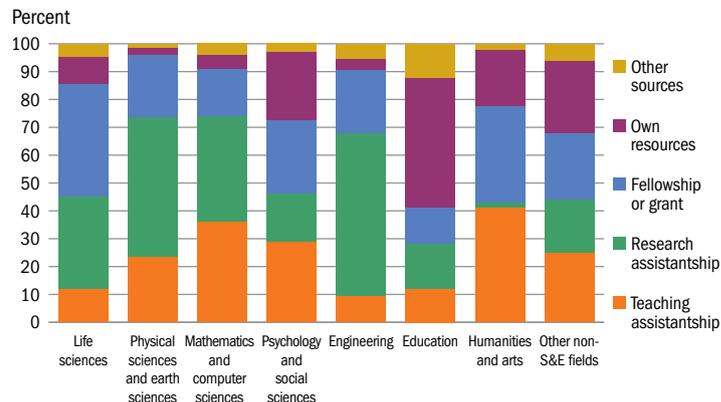
Doctorates awarded, by highest parental educational attainment: 1995–2015



NOTE: Percentages may not sum to 100% because of rounding and because of doctorate recipients who reported "not applicable" for both father's and mother's education beginning in 2004.

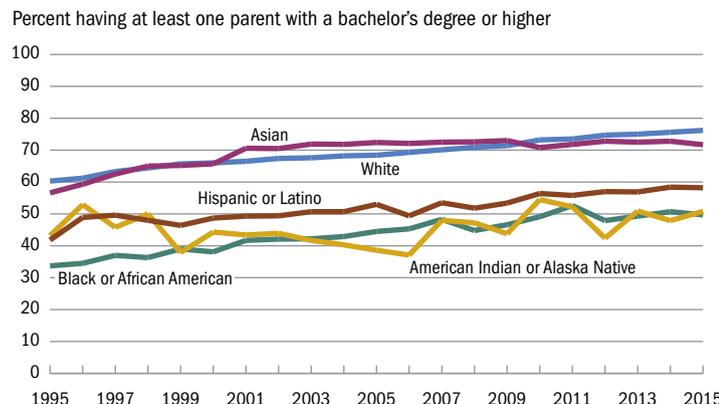
A

Primary source of financial support for U.S. doctorate recipients, by broad field of study: 2015



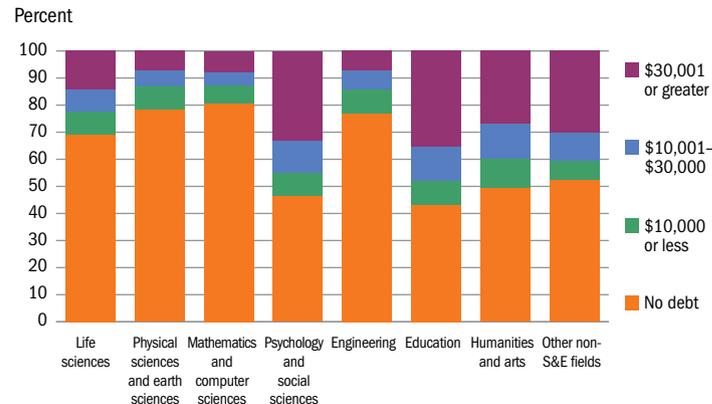
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Parental educational attainment of U.S. citizen and permanent resident doctorate recipients, by ethnicity and race: 1995–2015



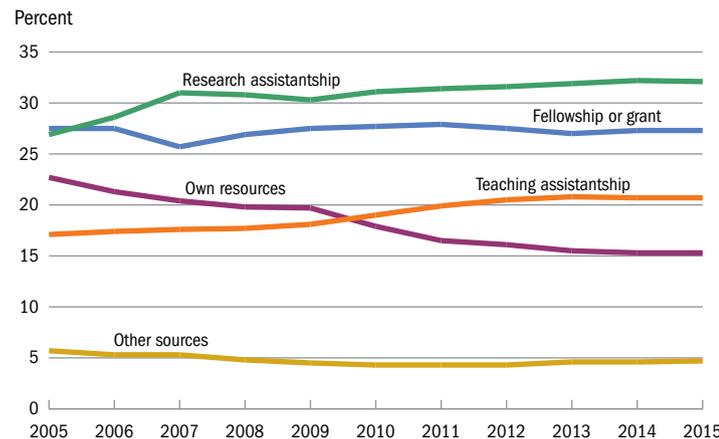
B

Graduate education-related debt of U.S. doctorate recipients, by broad field of study: 2015



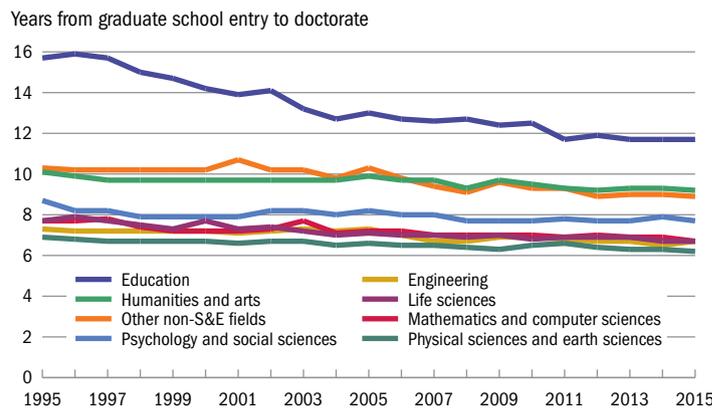
E

Primary source of financial support for U.S. doctorate recipients: 2005–15



C

Median time to degree of U.S. doctorate recipients, by broad field of study: 1995–2015



F

WHAT ARE THE POSTGRADUATION TRENDS?

A graduate's first position after earning the doctoral degree may reflect broad economic conditions and can shape later career opportunities and choices. Over the longer term, the early career patterns of doctorate recipients may influence the decisions of future generations of students considering careers as scientists, engineers, scholars, and researchers.

JOB MARKET

Science and engineering

At any given time, the job market will be better for new doctorate recipients in some fields of study than in others, although all fields tend to follow a similar cyclical pattern that generally reflects overall trends in economic conditions.

In every broad science and engineering (S&E) field, the proportion of 2015 doctorate recipients who reported definite commitments for employment or postdoctoral (postdoc) study was at or near the lowest level of the past 15 years, and it was 4 to 13 percentage points below the proportion reported in 2006, the most recent high point in definite commitments for S&E fields (figure A).

Non-science and engineering

The proportion of doctorate recipients with definite commitments for employment or postdoc study increased between 2014 and 2015 for doctorates in other non-S&E fields, but it changed little for doctorates in education and humanities and arts. The share of doctorate recipients with definite commitments remained at or near the 20-year low points in each of these three non-S&E fields (figure B).

FIRST POSTGRADUATE POSITION

Academic employment

In 2015, nearly half of all doctorate recipients with definite commitments for employment in the United States (excludes those with commitments for postdoc positions) reported that their principal job would be in academe.

The highest rates of academic employment commitments are reported by doctorate recipients in humanities and arts and in other non-S&E fields; the lowest rates are reported in engineering and in physical and earth sciences. Over the past 10 years, the rate of academic employment commitments by doctorate recipients in S&E fields has declined by 8 percentage points, whereas the academic employment rate of doctorates in non-S&E fields has increased by 5 percentage points (figure C).

Postdoc positions

Historically, postdoc positions have been a customary part of the early career paths of doctoral scientists in life sciences and in physical and earth sciences, and they have also become increasingly prevalent among recent doctoral

graduates in mathematics and computer sciences, psychology and social sciences, and engineering. However, since 2010, the proportion of doctorate recipients taking postdoc positions in the United States has declined in every S&E field but psychology and social sciences. Still, nearly two-thirds of 2015 doctoral graduates in life sciences took postdoc positions immediately after graduation, as did nearly half of all S&E doctorate recipients (figure D).

MEDIAN SALARIES

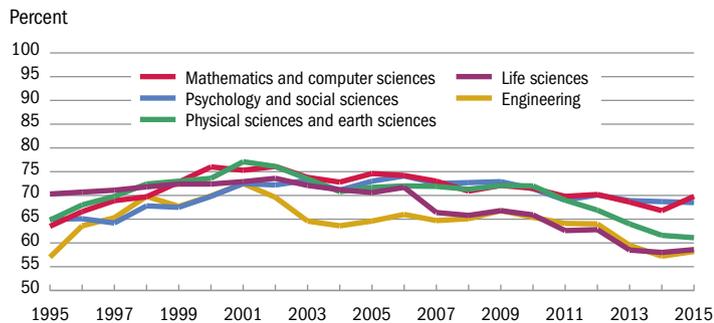
In 2015, doctorate recipients who had definite commitments for a postdoc or other employed position in the United States in the coming year reported annual salaries that varied by their field of study and the type of position to which they committed.

The median postdoc salaries in all broad fields except mathematics and computer sciences were relatively similar, ranging between \$42,000 and \$50,000. In every broad field, reported postdoc salaries were lower than salaries reported by doctorate recipients entering non-postdoc employment in industry or academe. Reported academic salaries lagged behind industry salaries in all broad fields except humanities and arts. Doctorate recipients in other non-S&E fields and in engineering reported the highest median academic salaries, and doctorate recipients in mathematics and computer sciences and in other non-S&E fields reported the highest median salaries in industry positions (figure E).

POSTGRADUATION LOCATION

Over the past 20 years, temporary visa holders earning doctorates have been increasingly likely to accept postdoc positions or other employment in the United States immediately following graduation. In 1995, more than half of temporary visa holder doctorate recipients with definite commitments for a postdoc or other employment reported that the location of their postgraduation position was in the United States. By 2015, that proportion had risen to greater than three-fourths. The share of temporary visa holder doctorates whose definite commitments are in the United States is greatest in fields where temporary visa holders are most prevalent: life sciences, physical and earth sciences, mathematics and computer sciences, and engineering (figure F).

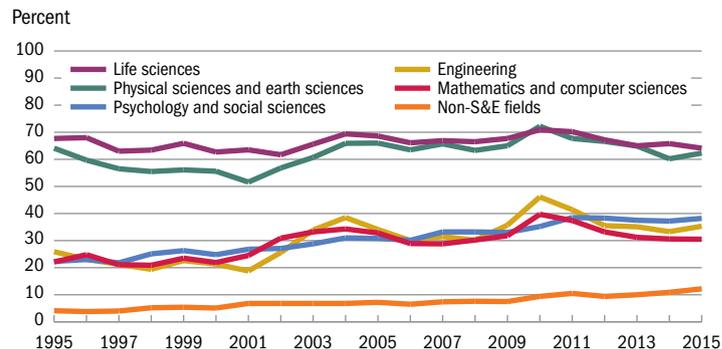
Definite commitments at doctorate award of U.S. doctorate recipients, by science and engineering field of study: 1995–2015



NOTE: Definite commitment refers to a doctorate recipient who is either returning to pre-doctoral employment or has signed a contract (or otherwise made a definite commitment) for employment or a postdoc position in the coming year.

A

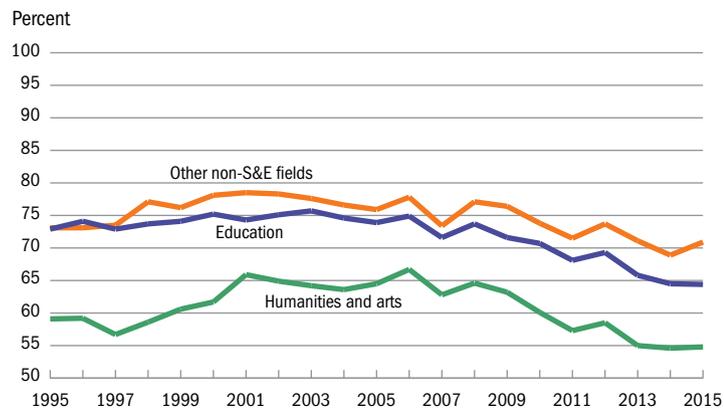
U.S. postdoc rate for U.S. doctorate recipients, by broad field of study: 1995–2015



NOTE: Percentages are based on the number of doctorate recipients who reported definite postgraduation commitments for a postdoc or other employment in the coming year and plans to stay in the United States.

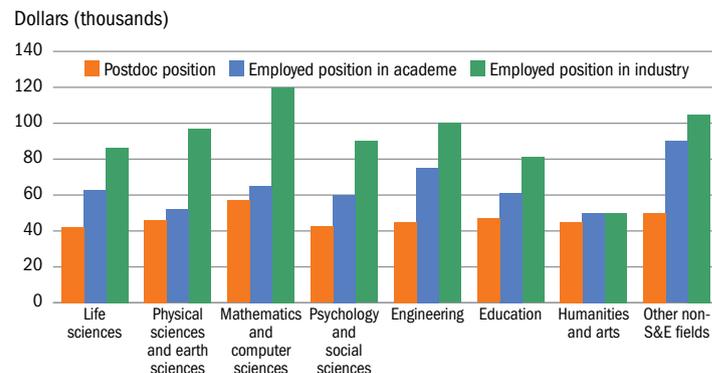
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Definite commitments at doctorate award of U.S. doctorate recipients, by non-science and engineering field of study: 1995–2015



B

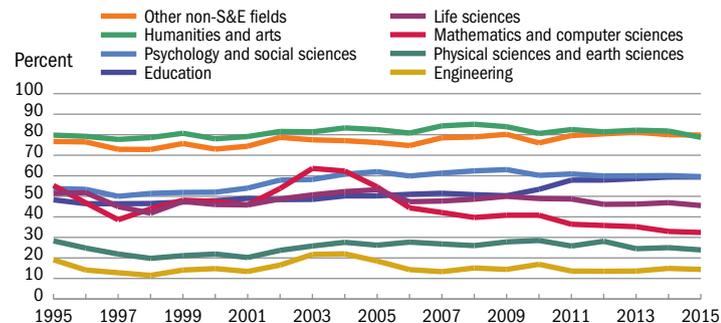
Median basic salary of U.S. doctorate recipients with definite commitments in the United States, by position type and broad field of study: 2015



NOTE: Other non-S&E fields includes business management and administration.

E

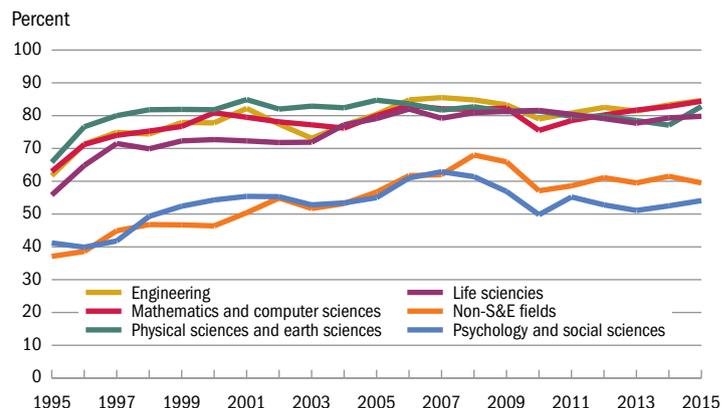
Definite commitments for academic employment in the United States, by broad field of study: 1995–2015



NOTE: Percentages are based on the number of doctorate recipients who reported definite commitments for employment in the coming year (including those missing employer type) and plans to stay in the United States.

C

Temporary visa holder U.S. doctorate recipients with definite commitments in the United States, by broad field of study: 1995–2015



F

INTERNATIONAL STUDENTS WHO INTEND TO STAY IN THE UNITED STATES: WHAT ARE THE OVERALL TRENDS?

The proportion of doctorate recipients with temporary visas who intend to stay in the United States within the year following graduation—also referred to as the “stay rate”—varies according to the characteristics of these international students.

OVERALL

From 1963 through 1979, the counts and the upward trend were similar among temporary visa holders intending to stay in the United States after earning a doctorate and among those intending to leave after graduation. From 1980 onward, the number of temporary visa holders intending to stay in the United States after earning a doctorate increased at an average annual rate of 5.4%, whereas the growth in number of temporary visa holders intending to leave the United States after graduation has been more modest (2.8% average annual increase). As a result, in 2015, the number of temporary visa holders intending to stay in the United States was nearly three times as great as the number intending to leave (11,508 versus 3,885) (figure A).

DESTINATION WHEN LEAVING THE UNITED STATES

Each year, between 93% and 98% of temporary visa holder doctorate recipients indicate in the Survey of Earned Doctorates where they intend to live after graduation. The stay rate for this group increased from 55% in 1995 to 75% in 2015. The proportion who intend to return to their country of origin after graduation has declined over time, whereas a relatively stable share of all temporary visa holder doctorates, between 6% and 9% each year, plan to move to a non-U.S. location other than their home country (figure B).

STAY RATES BY CHARACTERISTICS

Country of origin

From 2005 to 2015, among the top 10 countries or economies of foreign citizenship for U.S. doctorate recipients with temporary visas, there were substantial differences in the percentage intending to stay in the United States. Approximately 9 in 10 doctorates from Iran (92%), India (88%), and China (87%), planned to remain in the United States after graduation. With the exception of Thailand (28%), the remaining top countries had stay rates ranging from 50% to 65%, and the overall stay rate for all countries other than these top 10 was 64% (figure C).

Sex

In each field of study, female temporary visa holder doctorate recipients are more likely than their male counterparts to indicate that they intend to stay in the United States after being awarded a doctorate. The magnitude of the female-male difference in stay rates is greatest (8 percentage points or more) in fields where the stay rates are lowest: psychology and social sciences, education, and humanities and arts. The stay rates for all S&E fields except for psychology and social sciences exceed 75% for both men and women (figure D).

Age at doctorate

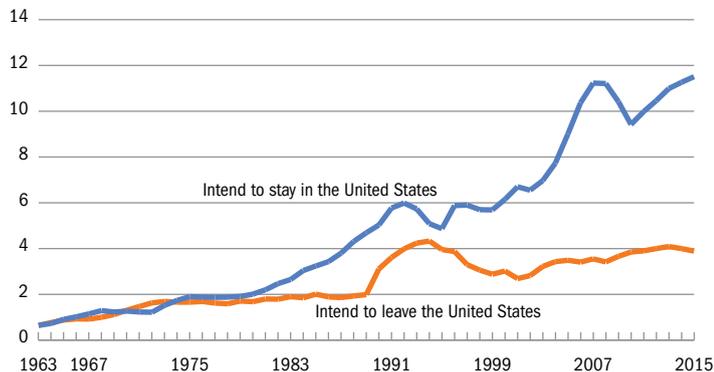
The proportion of temporary visa holders who plan to remain in the United States after graduation steadily declines with increasing age at doctorate award. Between 2011 and 2015, the stay rate exceeded 80% among temporary visa holders who earned a doctorate by age 30. In comparison, the stay rate was 59% for those awarded a doctorate between the ages of 36 and 40 and it was 40% for those who were awarded a doctorate after age 45 (figure E).

Doctoral institution

Temporary visa holders earning a doctorate from high and very high research universities are more likely to stay in the United States than are temporary visa holders graduating from doctoral/research institutions. The magnitude and pattern of the stay rates of temporary visa holder doctorates graduating from very high and high research universities have been quite similar over the past 20 years, rising steadily from 1995 to 2005 with smaller increases since 2006. The stay rates of temporary visa holder doctorate recipients from doctoral/research universities exhibited more year-to-year variability and remained at a level consistently below that of the other two institution types (figure F).

Doctorates awarded to temporary visa holders, by intent to stay in the United States after earning a doctorate: 1963–2015

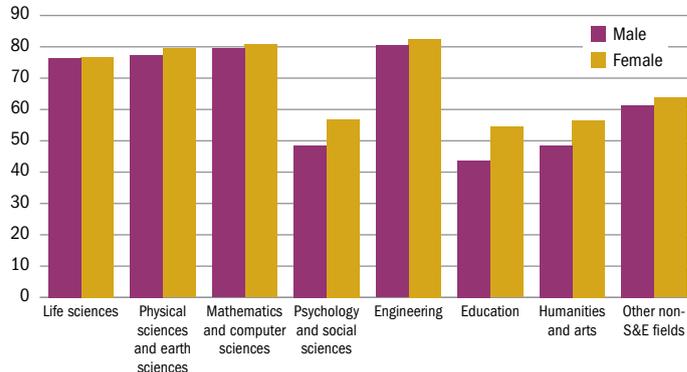
Doctorate recipients (thousands)



A

Stay rates of temporary visa holder U.S. doctorate recipients, by sex and broad field of study: 2011–15

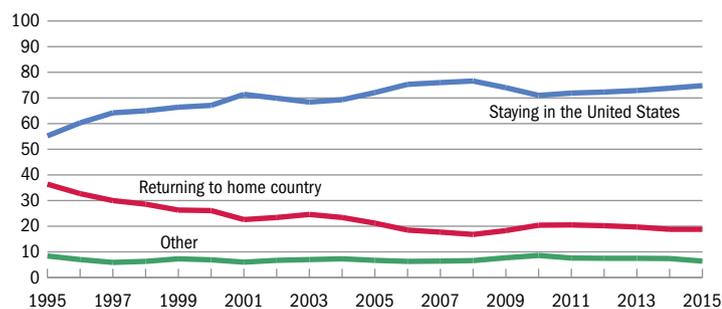
Percent



D

Rates of staying and leaving among temporary visa holder U.S. doctorate recipients: 1995–2015

Percent

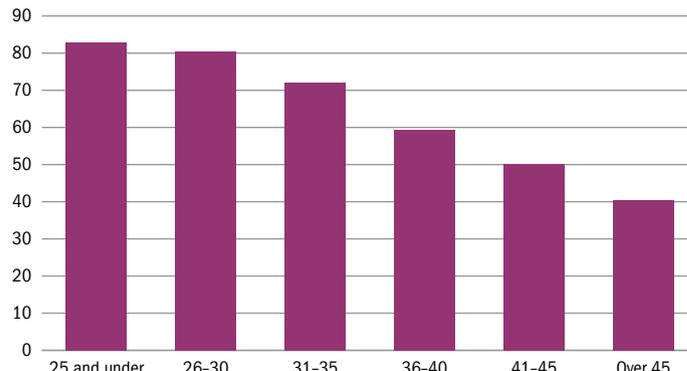


NOTE: Other includes temporary visa holders going to a foreign country other than their home country after earning a doctorate and those going to (or born in) an unspecified foreign county.

B

Stay rates of temporary visa holder U.S. doctorate recipients, by age: 2011–15

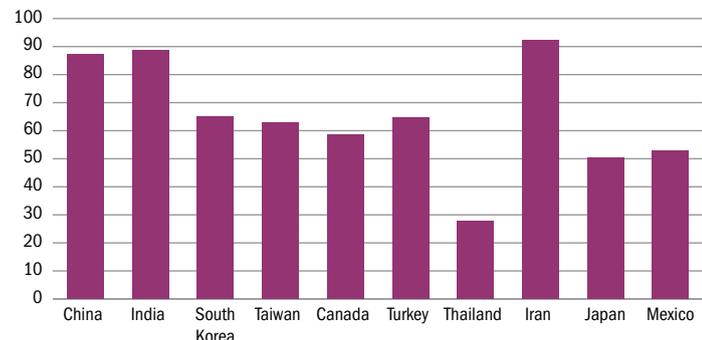
Percent



E

Stay rates of temporary visa holder U.S. doctorate recipients from top 10 countries of origin: 2005–15

Percent

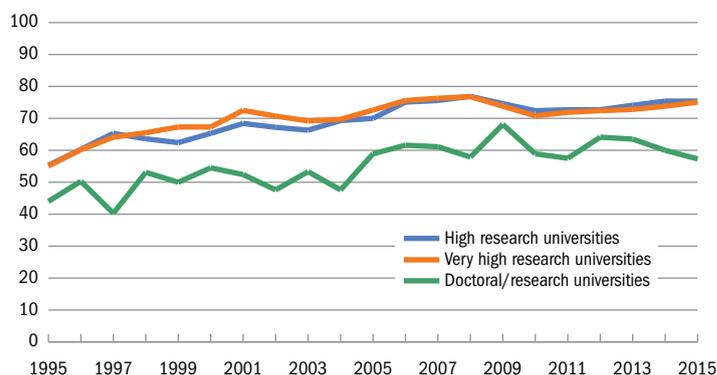


NOTE: China includes Hong Kong.

C

Stay rates of temporary visa holder U.S. doctorate recipients, by type of academic institution: 1995–2015

Percent



F

INTERNATIONAL STUDENTS WHO INTEND TO STAY IN THE UNITED STATES: WHAT ARE THE EDUCATIONAL AND EXPECTED EMPLOYMENT OUTCOMES?

Temporary visa holder doctorates who intend to stay in the United States within the year following graduation differ from other doctorate recipients with respect to their field of study choice, time to degree, primary source of financial support, existence of graduate debt, and initial postgraduation employment outcomes.

FIELDS OF STUDY

From 2011 to 2015, temporary visa holders intending to stay in the United States after earning a doctorate were more likely to study engineering than were temporary visa holders intending to leave (34% versus 22%). They were less likely to graduate with a degree in a non-S&E field (10% versus 22%) or in psychology and social sciences (7% versus 18%). U.S. citizens and permanent residents who earned a doctorate were more likely to graduate with a degree in life sciences or in a non-S&E field (figure A).

TIME TO DEGREE

From 2011 to 2015, temporary visa holders intending to stay in the United States after earning a doctorate took less time to complete their degrees than did those intending to leave. This result held in every broad field of study except physical and earth sciences, where both types of temporary visa holders took equally long to graduate. U.S. citizens and permanent residents took less time to complete an S&E doctorate, but they took longer to complete a doctorate in a non-S&E field (figure B).

FINANCIAL SUPPORT AND GRADUATE DEBT

Primary source of financial support

From 2011 to 2015, a research assistantship was the primary source of financial support for over one-half of the temporary visa holders intending to stay in the United States after earning a doctorate, for about one-third of those intending to leave, and for about one-quarter of U.S. citizen and permanent resident doctorate recipients. Foreign government support was the primary financial support for 11% of temporary visa holders who intended to leave, but it was the primary source for relatively few (1%) temporary visa holders who intended to stay in the United States after graduation. Over 21% of U.S. citizen and permanent resident doctorate recipients cited their own resources as their primary source of support. Only 6% of temporary visa holders intending to leave and 2% of those intending to stay relied primarily on their own resources to finance their doctorate (figure C).

Graduate education debt

Since 2005, temporary visa holders intending to leave the United States after earning a doctorate have been more likely than those intending to stay to have graduate education-related debt at the time of degree. Between 2005 and 2015, graduate debt was reported by nearly 20% of temporary visa holders intending to stay. However, among temporary visa holders intending to leave, the share declined slowly from 30% in 2005 to 25% in 2015. The percentage of U.S. citizens and permanent residents holding graduate debt at the time of degree has remained above 40% since 2007 (figure D).

FIRST POSTGRADUATE POSITION

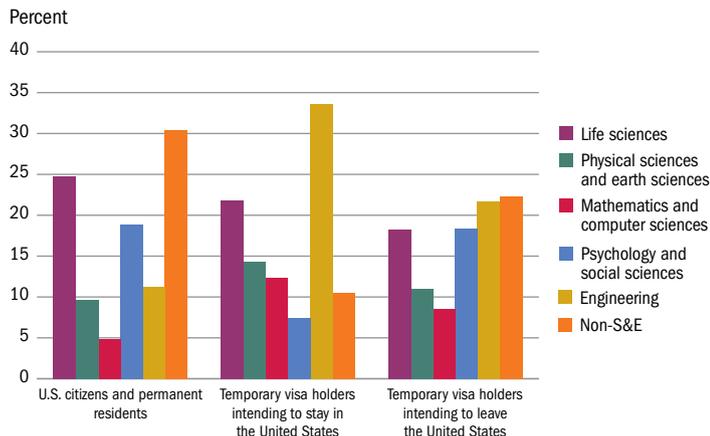
Postdocs

From 2005 to 2015, temporary visa holders intending to stay in the United States after earning a doctorate were more likely to take a postdoc position within the year following graduation than were temporary visa holders intending to leave and U.S. citizen and permanent resident doctorate recipients. Among temporary visa holders intending to stay and reporting definite postgraduation commitments for either a postdoc or employed position, the proportion of these graduates committing to a postdoc fluctuated around 50%, reaching a high of 59% in 2010. Among temporary visa holders intending to leave, the share committing to a postdoc position outside the United States increased over the 10 years but never exceeded 40%, and the same is true for the postdoc commitment rate of U.S. citizens and permanent residents (figure E).

Employment sector

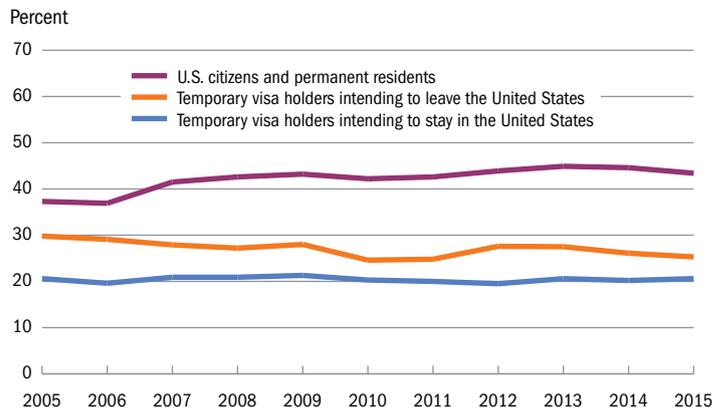
Among doctorate recipients reporting a definite postgraduation commitment for non-postdoc employment in 2011 to 2015, temporary visa holders intending to stay in the United States after graduation were about three times as likely to work in the industry or business sector (60%) as those intending to leave the United States (19%) or U.S. citizens and permanent residents (22%). These latter two types of doctorates were far more likely to take non-postdoc positions in the academic and government sectors (figure F).

Doctorates awarded, by resident type and broad field of study: 2011-15



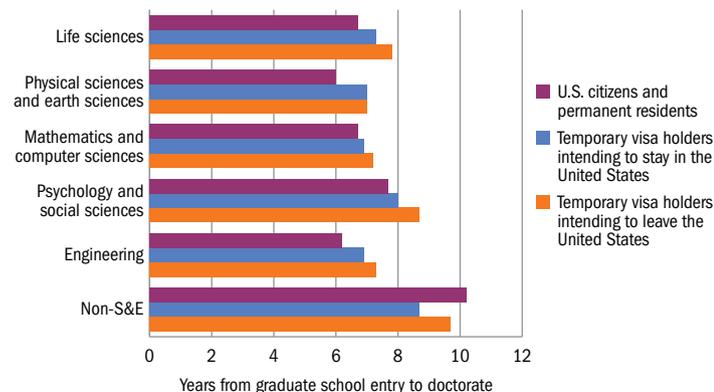
A

U.S. doctorate recipients with graduate education-related debt, by resident type: 2005-15



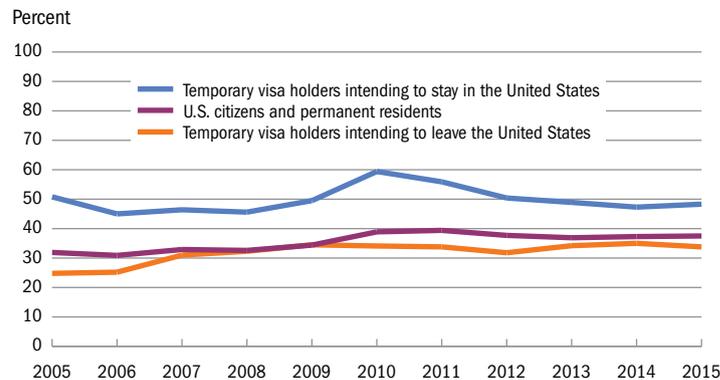
D

Median time to degree of U.S. doctorate recipients, by resident type and broad field of study: 2011-15



B

Postdoc rate of U.S. doctorate recipients, by resident type: 2005-15



E

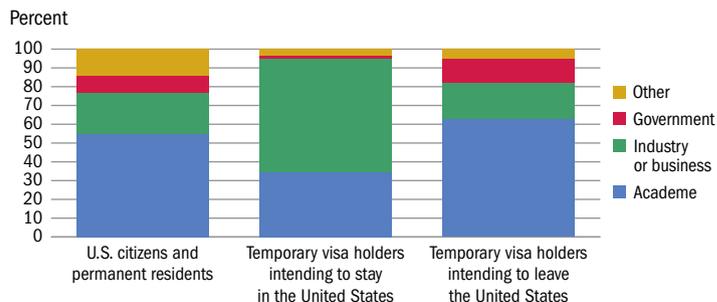
NOTE: Percentages are based on the number of doctorate recipients who reported definite postgraduation commitments for a postdoc or other employment in the coming year.

Primary source of financial support, by resident type: 2011-15



C

Employment sector of U.S. doctorate recipients with definite commitments for employed position, by resident type: 2011-15



F

NOTES: Industry or business includes doctorate recipients who indicated self-employment. Other includes non-profits and unknown, and otherwise is mainly composed of elementary and secondary schools. Percentages are based on the number of doctorate recipients who reported definite commitments for an employed (non-postdoc) position in the coming year (including those missing employer type).

GLOSSARY

Basic annual salary. Annual salary to be earned from the doctorate recipient's principal job in the next year, not including bonuses or additional compensation for summertime teaching or research.

Definite commitment. A commitment, through a contract or other method, by doctorate recipients to accept employment or a postdoc position in the coming year or to return to predoctoral employment.

Definite employment commitment. A definite commitment by doctorate recipients for employment in a non-postdoc position in the coming year.

Field of study. The Survey of Earned Doctorates (SED) collects data on 324 fields of doctoral study. For reporting purposes, these fields are grouped into 35 major fields and are further aggregated into eight broad fields: life sciences, physical sciences and earth sciences, mathematics and computer sciences, psychology and social sciences, engineering, education, humanities and arts, and other non-science and engineering fields. See technical table A-6 in the online resources of this report for a listing of the major fields within each broad field category. See the survey questionnaire for a full listing of the fine fields of study in 2015 (<https://www.nsf.gov/statistics/sed/>).

Graduate education-related debt. The amount of debt owed by a doctorate recipient at the time the doctorate is awarded that is directly related to graduate education.

Non-S&E. Non-science and engineering: A grouping of broad fields of study that includes education, humanities and arts, and other fields.

Parental educational attainment. The highest level of education attained by either parent of a doctorate recipient.

Postdoc position. As defined on the questionnaire form, a temporary position primarily for gaining additional education and training in research, usually awarded in academe, industry, government, or a non-profit organization.

Postdoc rate. The proportion of doctorate recipients who have definite commitments for a postdoc position among all doctorate recipients with definite commitments.

Race and ethnicity. Doctorate recipients who report Hispanic or Latino heritage, regardless of racial designation, are counted as Hispanic or Latino, and as of 2013, those who do not answer the Hispanic or Latino ethnicity question are counted as "ethnicity not reported." Respondents who indicate that they are not Hispanic or Latino and indicate a single race are reported in their respective racial groups, except for those indicating Native Hawaiian or other Pacific Islander, who are included in "other race or race not reported." Beginning in 2001, respondents who are not Hispanic or Latino and who indicate more than one race are reported in the category "two or more races." Data for this category were not collected before 2001. Before 2001, respondents who are not Hispanic or Latino and who indicate more than one race were categorized as "other or unknown." For 2001 and later data, the "other or unknown" category includes

doctorate recipients who indicated that they were not Hispanic or Latino and either did not respond to the race item or reported their race as Native Hawaiian and other Pacific Islander. For 2000 and earlier data, Native Hawaiians and other Pacific Islanders are counted in the Asian group.

Research doctorate. A doctoral degree that is oriented toward preparing students to make original intellectual contributions in a field of study and that is not primarily intended for the practice of a profession. Research doctorates require the completion of a dissertation or equivalent project. In this report, the terms “doctorate” and “doctoral degree” are used to represent any of the research doctoral degrees covered by the survey. Professional doctorates, such as the MD, DDS, JD, and PsyD, are not covered by the SED.

S&E. Science and engineering: A grouping of broad fields of study that includes science (life sciences, physical sciences and earth sciences, mathematics and computer sciences, psychology and social sciences) and engineering fields.

Self-support rate. The proportion of doctorate recipients who report “own resources” as the primary source of financial support during their doctoral education.

Sources of financial support. Sources of financial support are grouped into the following five categories:

fellowships (includes scholarships and grants), teaching assistantships, research assistantships (includes traineeships, internships, clinical residencies, and other assistantships), own resources (includes loans, personal savings, personal earnings, and earnings or savings of spouse, partner, or family), and other (includes employer reimbursements and support from non-U.S. sources).

Stay rate. Doctorate recipients with temporary visas who report an intent to live in the United States after graduation as a proportion of all temporary visa holder doctorates who indicated where they intended to stay.

Time to degree. The median time elapsed from the start of any graduate school program to completion of the doctoral degree. In addition to this measure, two other measures of time to degree are also reported in the data tables: median time elapsed from completion of the bachelor’s degree to completion of the doctorate, and median time elapsed from the start of the doctoral program.

Underrepresented minority. The following groups are underrepresented in science and engineering, relative to their numbers in the U.S. population: American Indian or Alaska Native, black or African American, and Hispanic or Latino groups.

DATA SOURCE

The Survey of Earned Doctorates (SED) is the sole data source for *Doctorate Recipients from U.S. Universities: 2015*. The principal elements of the 2015 SED data collection are described in the sections that follow. More detailed information and related technical tables are available at www.nsf.gov/statistics/sed/.

Survey eligibility. The SED collects information on research doctorate recipients only. Research doctorates require the completion of a dissertation or equivalent project, are oriented toward preparing students to make original intellectual contributions in a field of study, and are not primarily intended for the practice of a profession. The 2015 SED recognized 18 distinct types of research doctorates. In 2015, 98% of research doctorate recipients earned the PhD.

Survey universe. The population eligible for the 2015 survey consisted of all individuals who received a research doctorate from a U.S. academic institution in the 12-month period from 1 July 2014 to 30 June 2015. The total universe consisted of 55,006 persons in 432 institutions that conferred research doctorates in academic year 2015.

Data collection. Survey instruments were mailed to institutional coordinators at each doctorate awarding institution. The institutional coordinators distributed the survey forms to individuals receiving a research doctorate, collected the forms, and returned them to the survey contractor for editing and processing. Data were also collected using Web and telephone versions of the survey. Respondents who did not complete critical

survey items were contacted by mail to request response to those items. NORC at the University of Chicago conducted the 2015 SED under contract to NCSES.

Survey response rates. In 2015, 90% of research doctorate recipients completed the survey instrument. Limited records (field of study, doctoral institution, and sex) are constructed for nonrespondents from administrative records of the university—commencement programs, graduation lists, and other public records—and are included in the reported total of doctorate recipients. Response rates for 2005–15 are provided in the technical tables.

Time series data changes. After a multiyear review of Doctor of Education (EdD) degree programs participating in the SED, 143 programs were reclassified from research doctorate to professional doctorate over the 2010–11 period. No additional reclassifications of EdD degree programs are planned. SED data are no longer being collected from graduates earning degrees from the reclassified EdD programs, and this has affected the reporting of the number of doctorates awarded by sex, citizenship, race, and ethnicity. Several figures in this report show a decline in number of degrees awarded from 2009 to 2011 (in particular, see figures 1D and 1F in the “Who earns a U.S. doctorate?” section and figure 2B in the “Which fields attract students?” section). Readers should note that the declines from 2009 to 2010 and from 2010 to 2011 are at least partly attributable to the EdD reclassification.

FURTHER READING

For an overarching view of long-term trends in U.S. doctoral education, as reflected in the data from the Survey of Earned Doctorates (SED), please see *U.S. Doctorates in the 20th Century* (NSF 06-319, October 2006, <https://www.nsf.gov/statistics/nsf06319/>). Additional context is provided in summary reports for previous years (*Doctorate Recipients from U.S. Universities*), available at <https://www.nsf.gov/statistics/doctorates/>.

Other publications from NCSES use SED data to report on focused topics. Publications that relate to the topics covered in *Doctorate Recipients from U.S. Universities: 2015* are listed below, by relevant section.

Who earns a U.S. doctorate? and Which fields attract students?

Women, Minorities, and Persons with Disabilities in Science and Engineering: 2017 (NSF 17-310, January 2017, <https://www.nsf.gov/statistics/2017/nsf17310/>).

Numbers of Doctorates Awarded in the United States Declined in 2010 (NSF 12-303, November 2011, <https://www.nsf.gov/statistics/infbrief/nsf12303/>).

Numbers of Doctorates Awarded Continue to Grow in 2009; Indicators of Employment Outcomes Mixed (NSF 11-305, November 2010, <https://www.nsf.gov/statistics/infbrief/nsf11305/>).

Interdisciplinary Dissertation Research (NSF 10-316, March 2010, <https://www.nsf.gov/statistics/infbrief/nsf10316/>).

Numbers of U.S. Doctorates Awarded Rise for Sixth Year, but Growth Slower (NSF 10-308, November 2009, <https://www.nsf.gov/statistics/infbrief/nsf10308/>).

What influences the path to the doctorate?

Baccalaureate Origins of U.S.-trained S&E Doctorate Recipients (NSF 13-323, April 2013, <https://www.nsf.gov/statistics/infbrief/nsf13323/>).

Role of HBCUs as Baccalaureate-Origin Institutions of Black S&E Doctorate Recipients (NSF 08-319, August 2008, <https://www.nsf.gov/statistics/infbrief/nsf08319/>).

Baccalaureate Origins of S&E Doctorate Recipients (NSF 08-311, July 2008, <https://www.nsf.gov/statistics/infbrief/nsf08311/>).

Time to Degree of U.S. Research Doctorate Recipients (NSF 06-312, March 2006, <https://www.nsf.gov/statistics/infbrief/nsf06312/>).

What are the postgraduation trends?

Unemployment among Doctoral Scientists and Engineers Remained Below the National Average in 2013 (NSF 14-317, September 2014, <https://www.nsf.gov/statistics/infbrief/nsf14317/>).

Unemployment among Doctoral Scientists and Engineers Increased but Remained below the National Average (NSF 14-310, April 2014, <https://www.nsf.gov/statistics/infbrief/nsf14310/>).

International Mobility and Employment Characteristics among Recent Recipients of U.S. Doctorates (NSF 13-300, October 2012, <https://www.nsf.gov/statistics/infbrief/nsf13300/>).

Emigration of U.S.-Born S&E Doctorate Recipients (NSF 04-327, June 2004, <https://www.nsf.gov/statistics/infbrief/nsf04327/>).

Plans for Postdoctoral Research Appointments among Recent U.S. Doctorate Recipients (NSF 04-308, March 2004, <https://www.nsf.gov/statistics/infbrief/nsf04308/>).

Interstate Migration Patterns of Recent Science and Engineering Doctorate Recipients (NSF 02-311, February 2002, <https://www.nsf.gov/statistics/nsf02311/>).

ONLINE RESOURCES

An interactive version of the printed report and its related resources, described below, are available at <https://www.nsf.gov/statistics/sed/>.

Data tables. Data on the full range of survey items collected by the 2015 Survey of Earned Doctorates (SED) are presented in 72 detailed statistical tables. The full set of tables is available for download, either as PDF or Excel files.

Figures. The figures illustrating each theme are presented as interactive graphics and available for download as image files, accompanied by the supporting source data in Excel format.

Survey questionnaire. A link to the questionnaire for the 2015 SED appears in the “How Do I...” section of the online report.

Technical notes and tables. The technical notes provide more detail on how the SED collects data about recipients of research doctorates. The technical tables provide such information as the types of research doctoral degrees included in the SED, survey response rates over time, and details on field aggregations.

ACKNOWLEDGMENTS

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www.nsf.gov/statistics/sed/



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