Trends in Graduate Education

Wednesday, February 26, 2020

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National Center for Science and Engineering Statistics at the National Science Foundation

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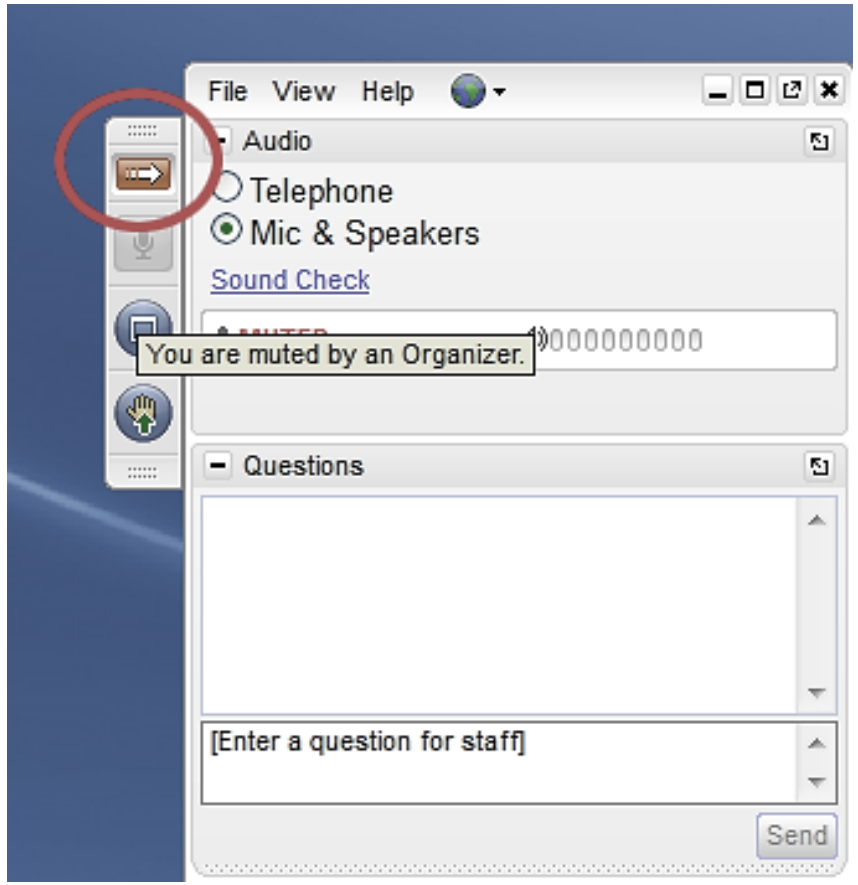
Plan for today

- **Three speakers** will speak for approximately **45 minutes** total, followed by Q & A
  - **Hironao Okahana** of the Council of Graduate Schools will speak for approximately 5 minutes introducing the speakers and discussing CGS data initiatives.
  - **Jaqui Falkenheim** and **Josh Trapani** will speak for 40 minutes on recent data on graduate students from the Survey of Earned Doctorates and the Science and Engineering Indicators. They will include trends in the humanities and other non-STEM fields, as well as U.S. graduate education in a global context, when available.

Technical Support

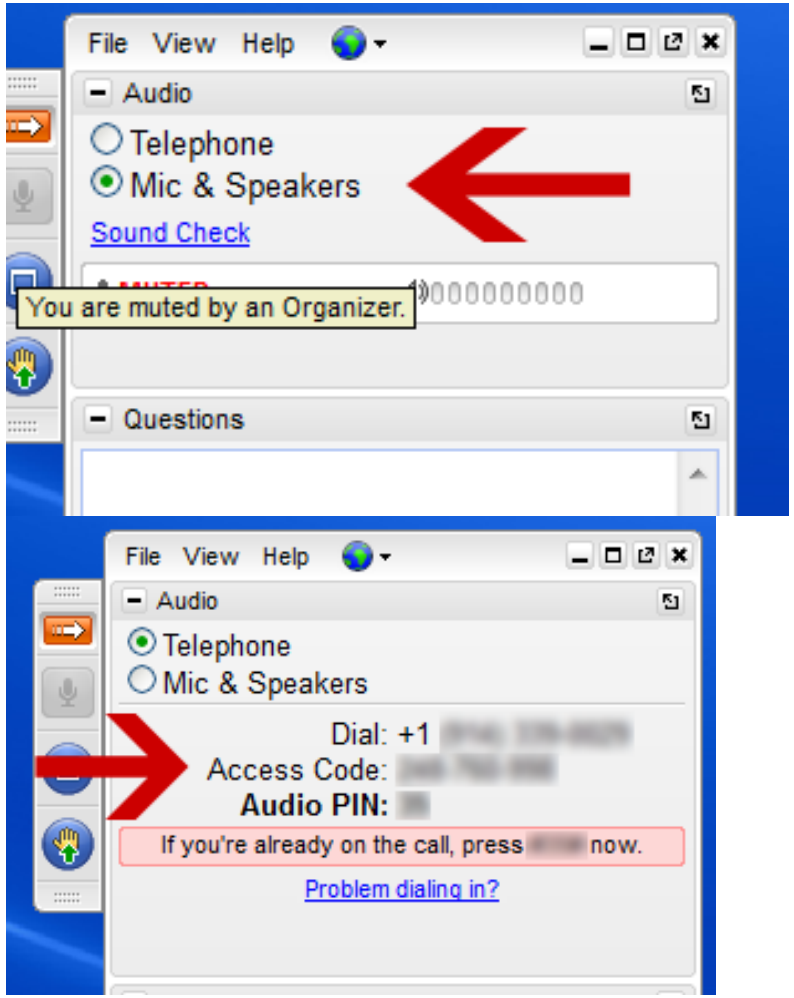
- Webinar **recording and slides** will be **emailed** to participants and **posted** on the CGS website
- Please **submit questions** through the GoToWebinar **control panel**
- **Technical issues**? Troubleshooting help available: http://support.citrixonline.com/en_US/webinar



Audio Troubleshooting

- Having trouble hearing us? Try switching to a different audio connection. You can change from Telephone to Mic & Speakers or vice versa without leaving the session.

- If you experience trouble with a telephone connection, click “Problem dialing in?” for an alternate phone number to dial.



Introduction:
Hironao Okahana

Many thanks to all the institutions who contribute data to our two enrollment surveys!

The Fall 2019 Data Collection Cycle for CGS/GRE Survey of Graduate Enrollment & Degrees is **still open**. If your institution has not completed the survey, please contact **surveys@cgs.nche.edu.**

Trends in Graduate Education

Dr. Jaqui Falkenheim and Dr. Josh Trapani

February 26, 2020

CGS Webinar

National Center for Science and Engineering Statistics

Social, Behavioral and Economic Sciences

National Science Foundation

Presentation Outline

- About NCSES
- Trends in master's degrees
- Trends in doctoral degrees
- International graduate student enrollment and doctoral degrees
- Financial support of graduate students
- Debt levels, postgraduation employment commitments, and salary of doctoral recipients
- Take-home messages
- Data availability and how to access our data

NCSES is NSF's statistical agency, one of thirteen principal federal statistical agencies in the United States

BEA Bureau of Economic Analysis U.S. Department of Commerce

BJS Celebrating 35 years

BLS Bureau of Labor Statistics U.S. Department of Labor

U.S. Department of Transportation Bureau of Transportation Statistics

United States Census Bureau

USDA ERS

eia

Agriculture Counts

ies National Center for Education Statistics Institute of Education Sciences

NCHS National Center for Health Statistics

NCSES

ORES

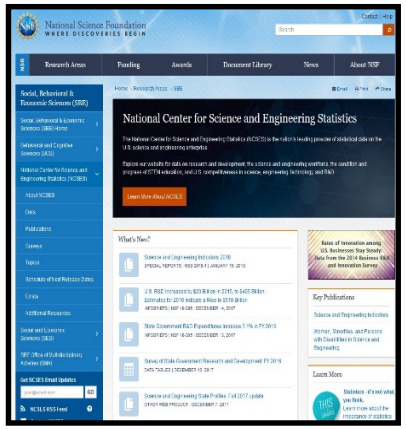
IRS

NCSES's mission is to be the federal clearinghouse for data that provides key insights on the American economy

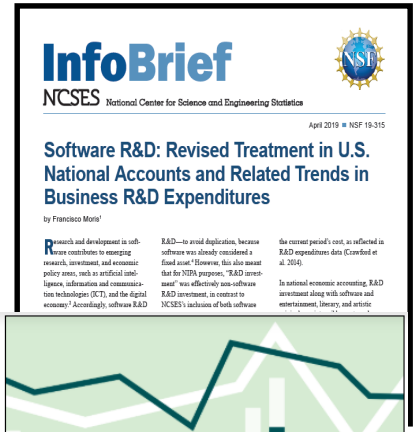
- **Science and engineering education**: S&E graduate school enrollment; post-graduation plans of U.S. S&E doctorates.
- **The science and engineering workforce**: Counts and fields of postdoctoral appointees, characteristics of U.S. college graduates.
- **Research and development**: Microbusiness R&D expenditures; federal R&D obligations.
- **U.S. competitiveness in science and engineering**: S&E research outputs (i.e. publications, citations, patents); regional share of R&D expenditures.

NCSES Data Products

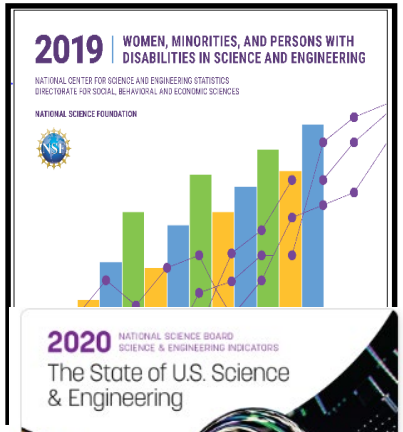
NCSES Website and Data Tools

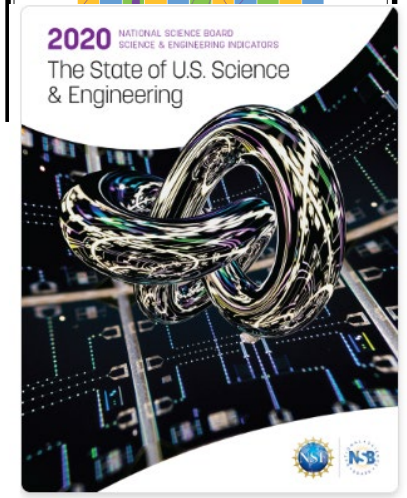


InfoBriefs and Special Reports

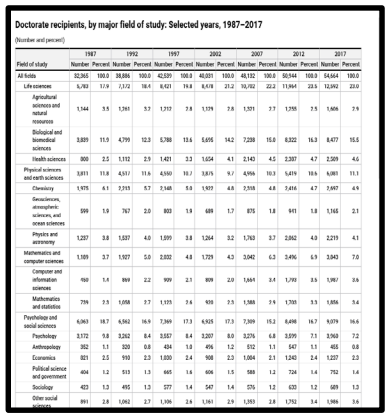


Congressionally Mandated Reports

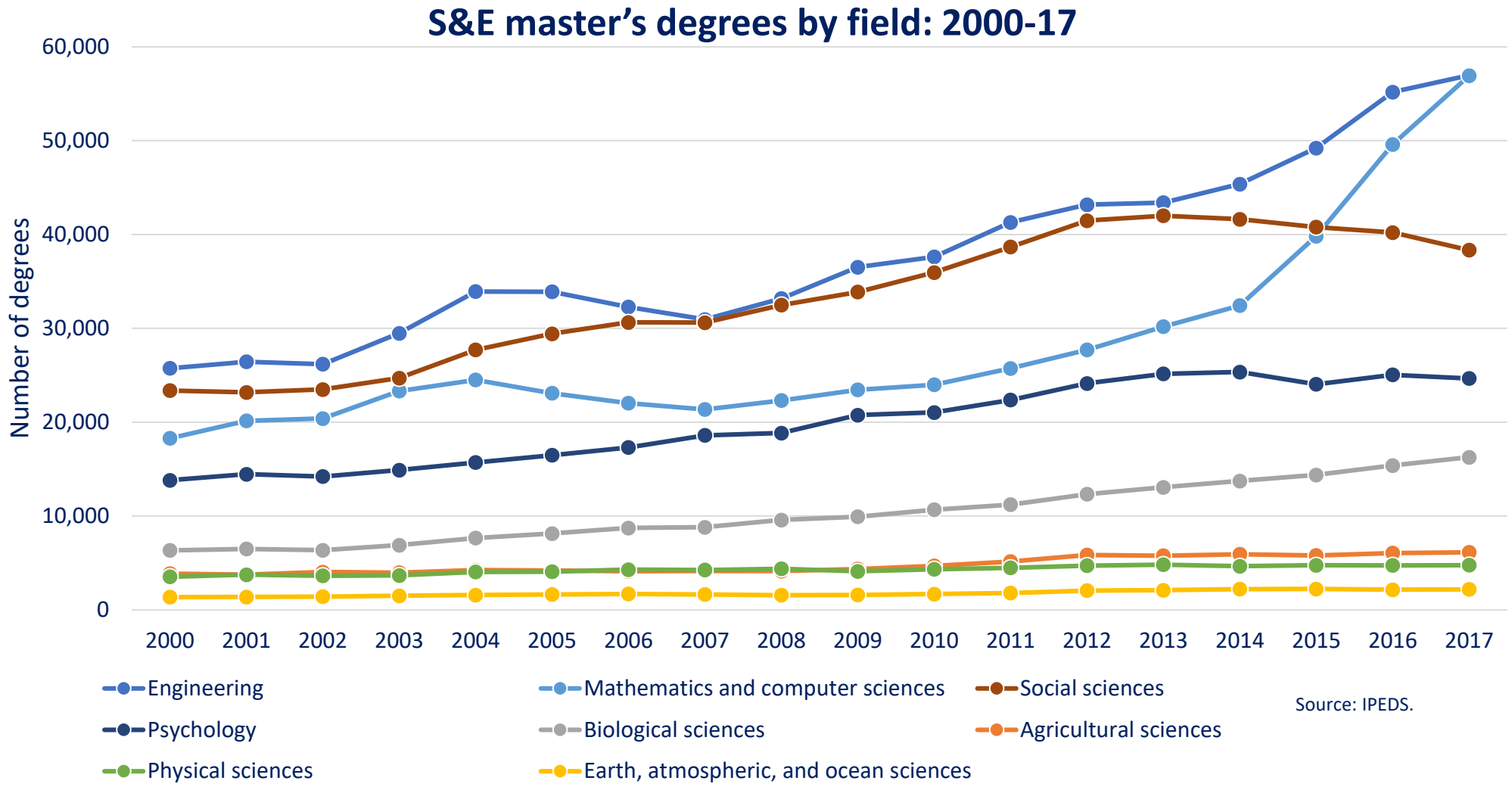




Data Tables

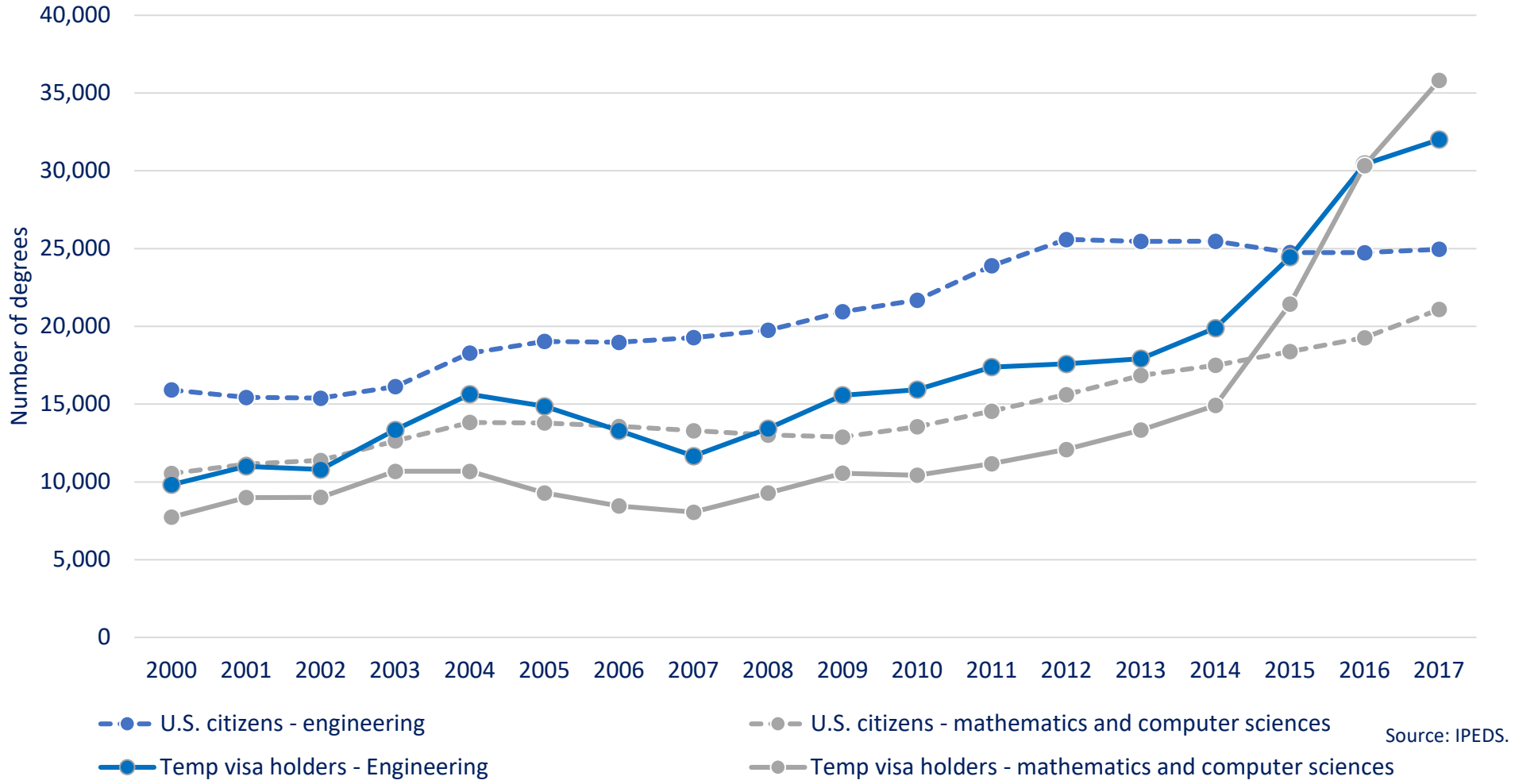


Numbers of master's degrees awarded have grown rapidly in engineering and mathematics and computer sciences.



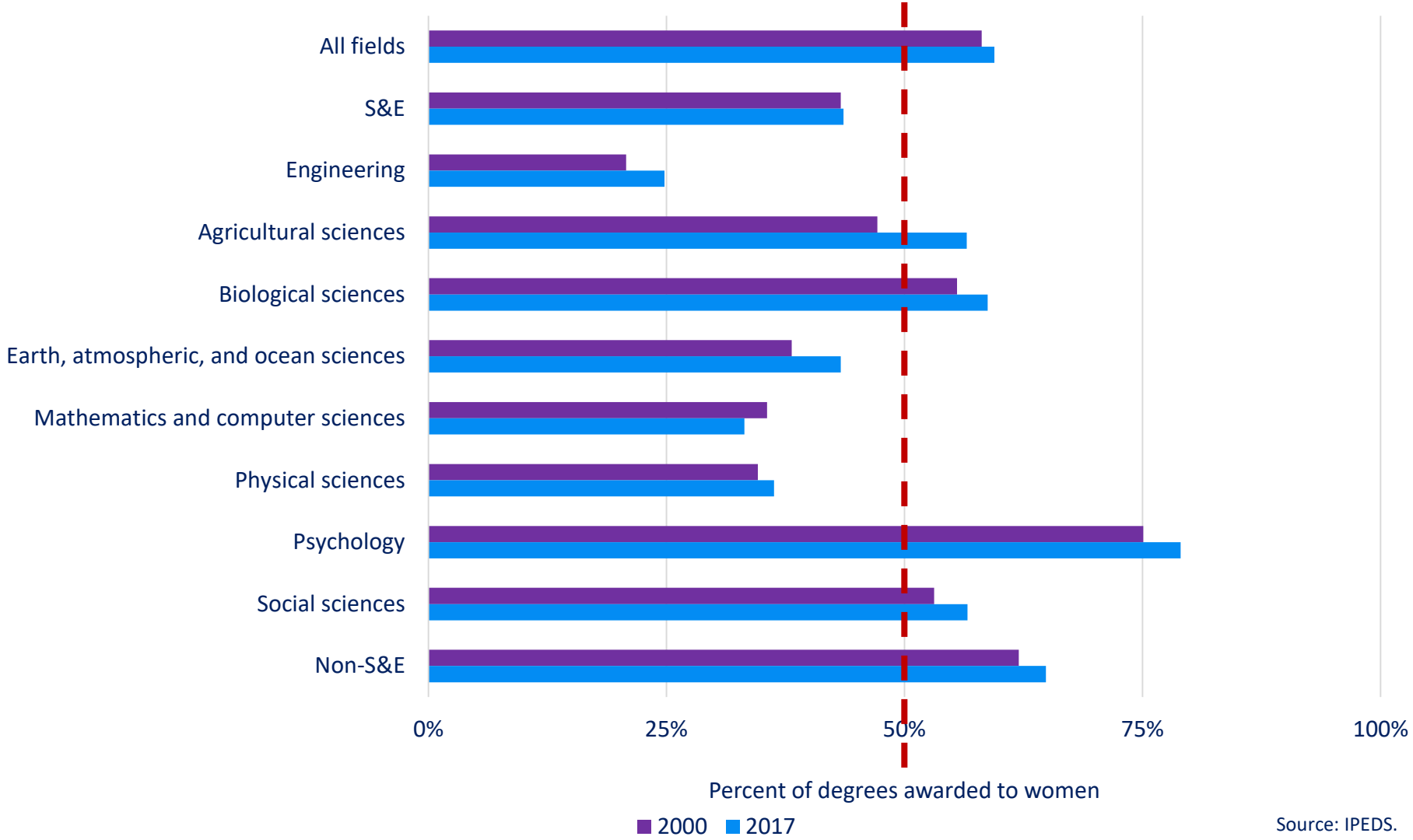
Much of the growth in those fields is attributable to increasing numbers of students on temporary visas earning master's degrees.

Master's degrees in engineering and math and computer sciences, by citizenship: 2000-17



Source: IPEDS.

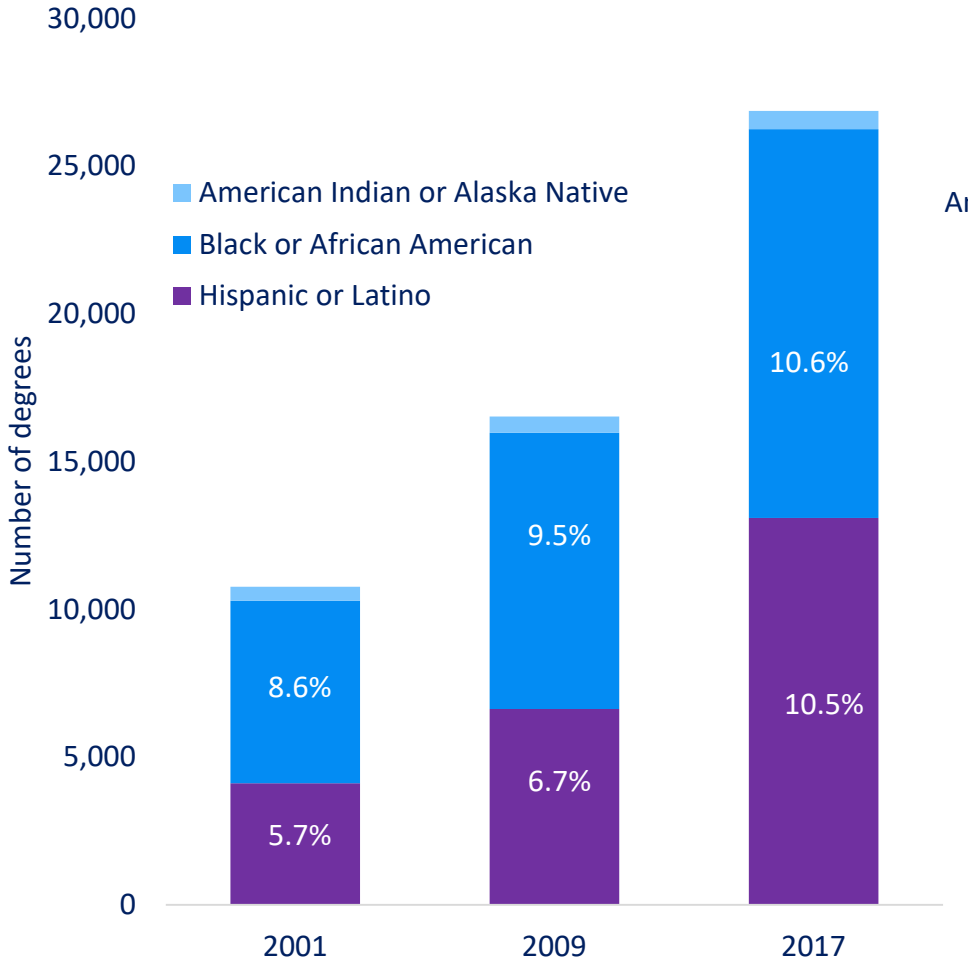
The share of S&E master's degrees earned by women is highly field-dependent, which is a long-standing pattern.



Source: IPEDS.

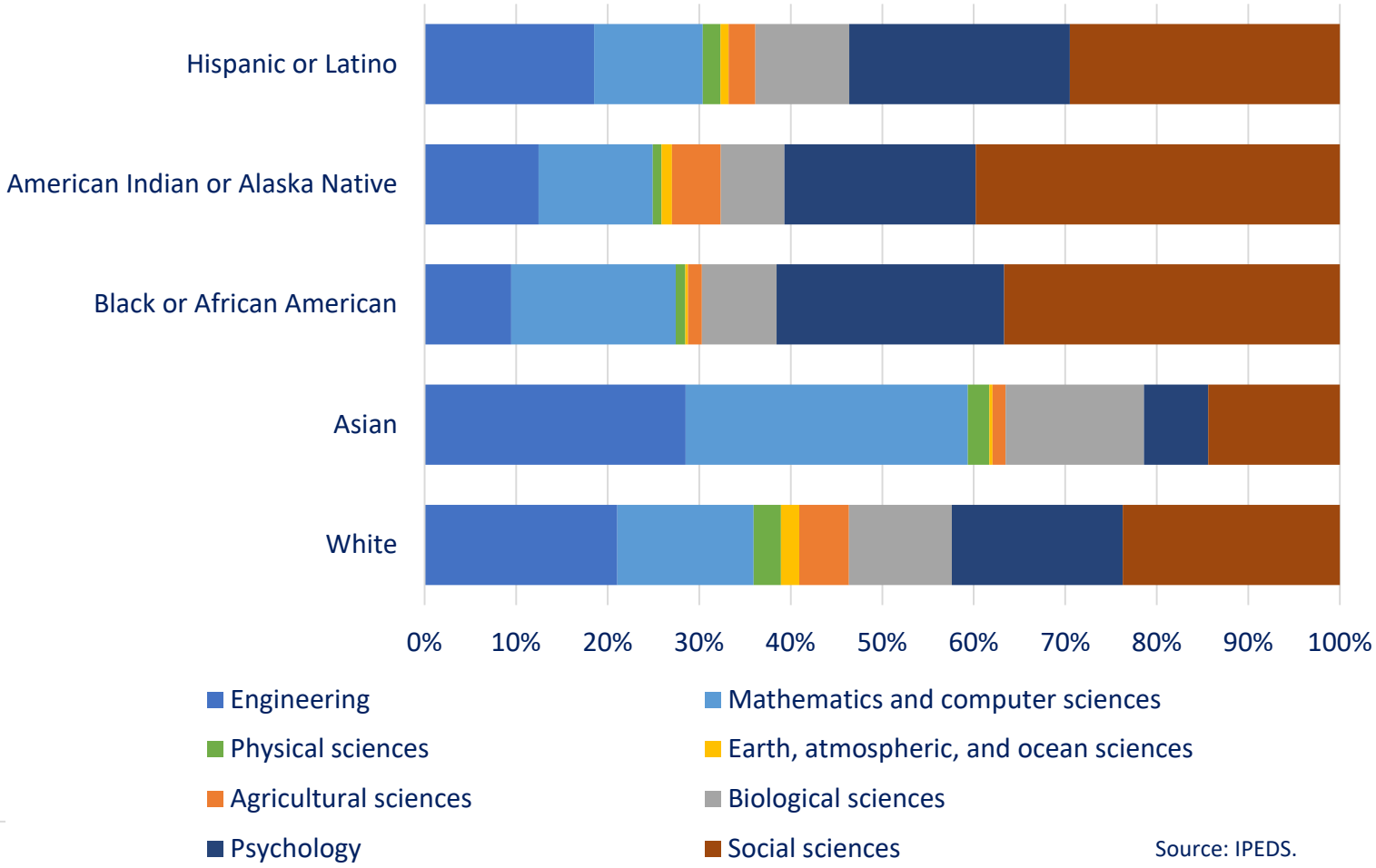
Numbers and percentages of underrepresented minority students earning master's degrees have increased. But these groups remain underrepresented, particularly in certain fields.

S&E master's degrees earned by URMs



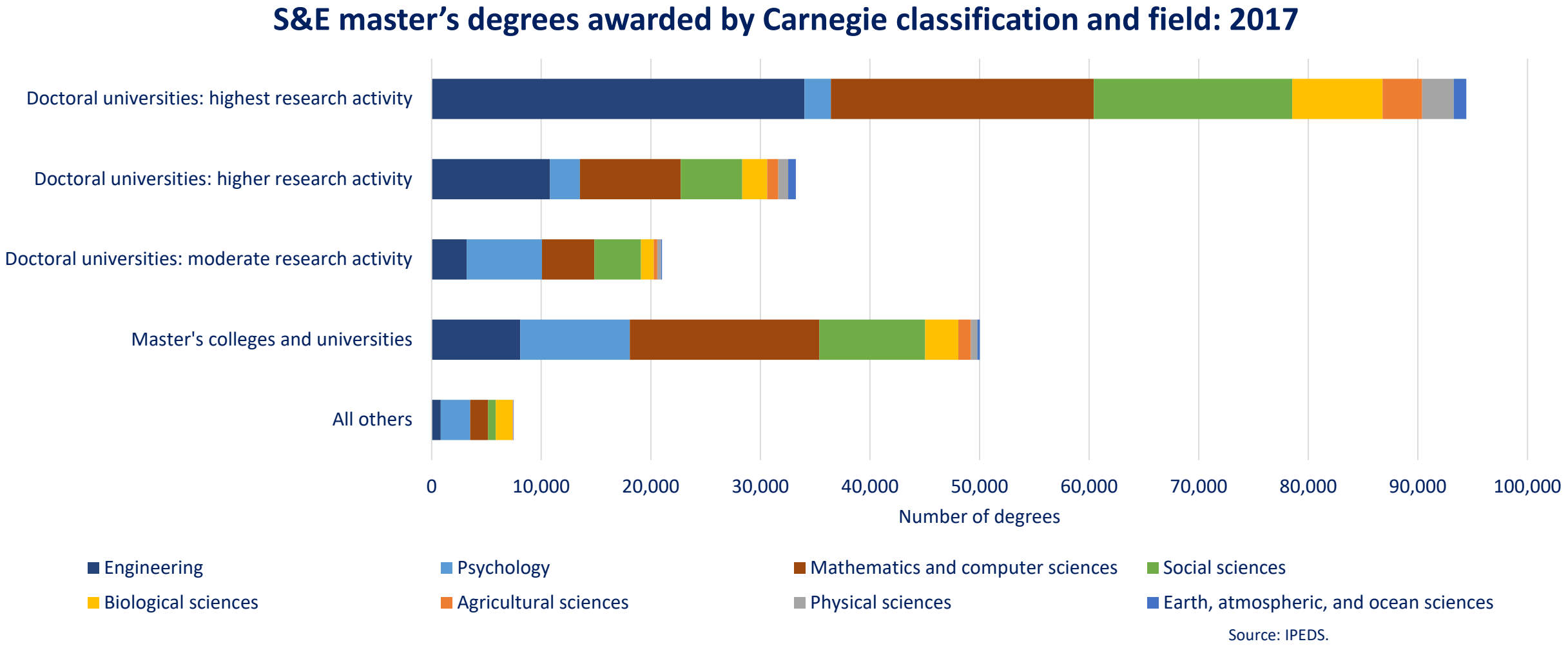
Source: IPEDS.

S&E master's degrees by field and race and ethnicity: 2017



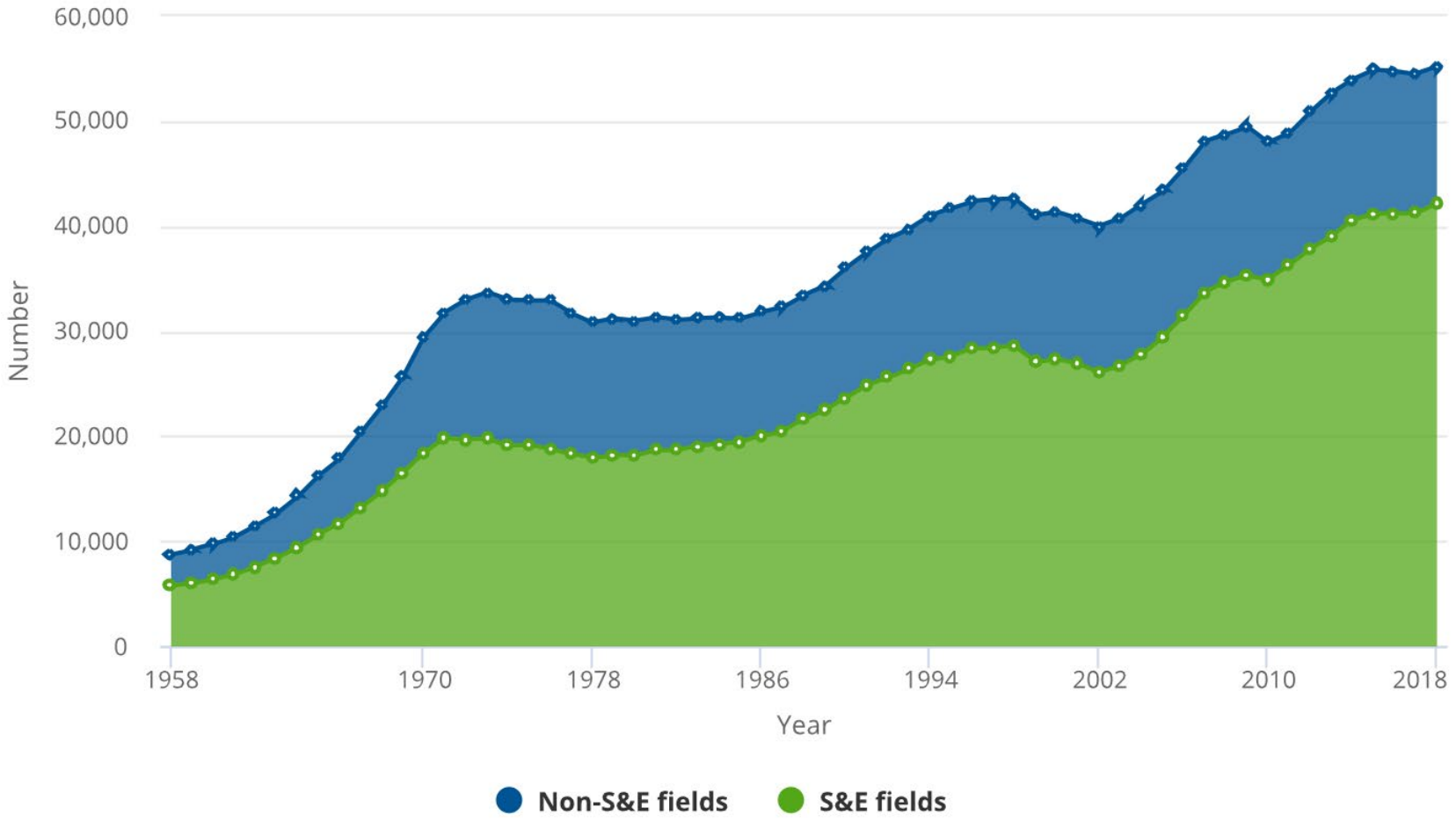
Source: IPEDS.

Most S&E master's degrees are awarded by doctoral and master's institutions. Different types of institutions focus on specific fields.



Source: IPEDS.

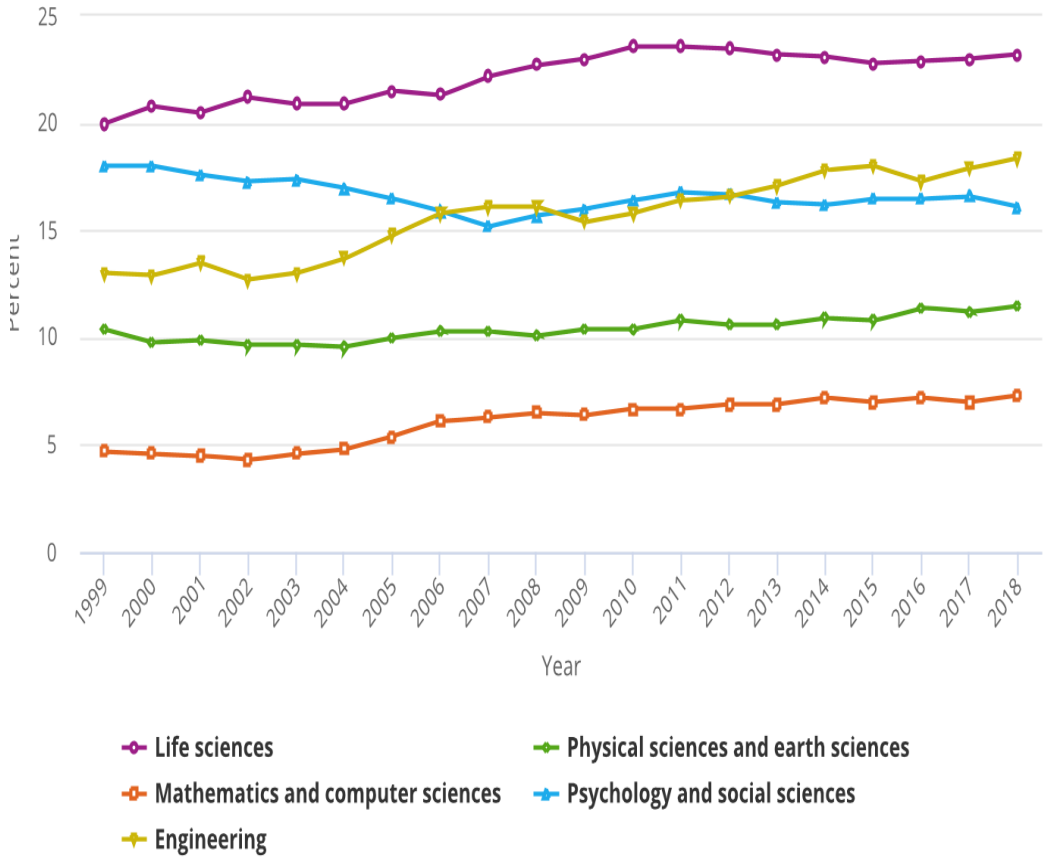
The number of doctorates awarded shows a strong upward trend over time



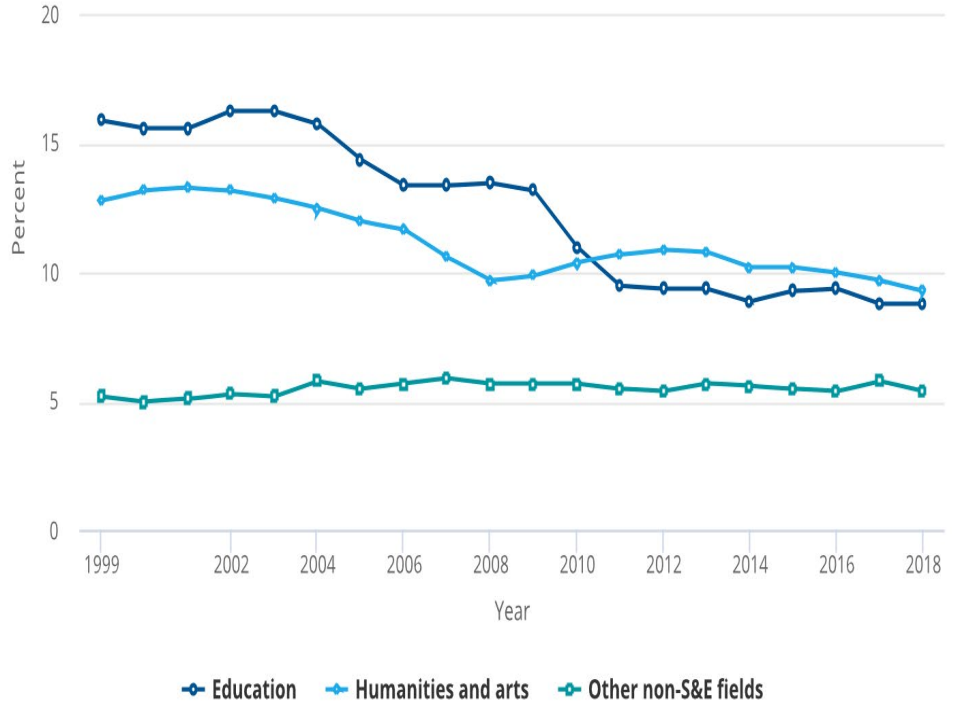
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Doctorates in S&E are a growing share of all doctorates awarded

S&E broad field of study

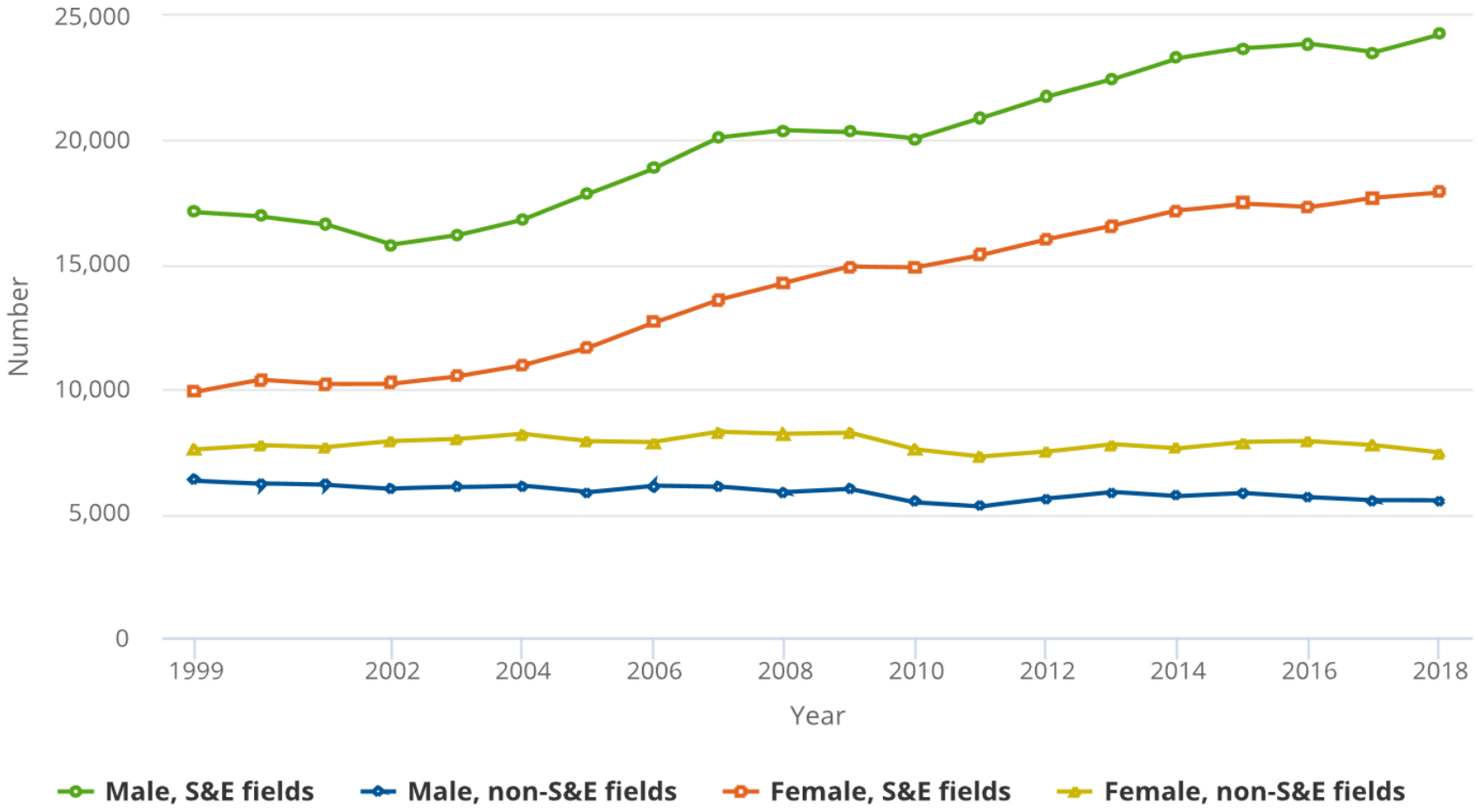


Non-S&E broad field of study



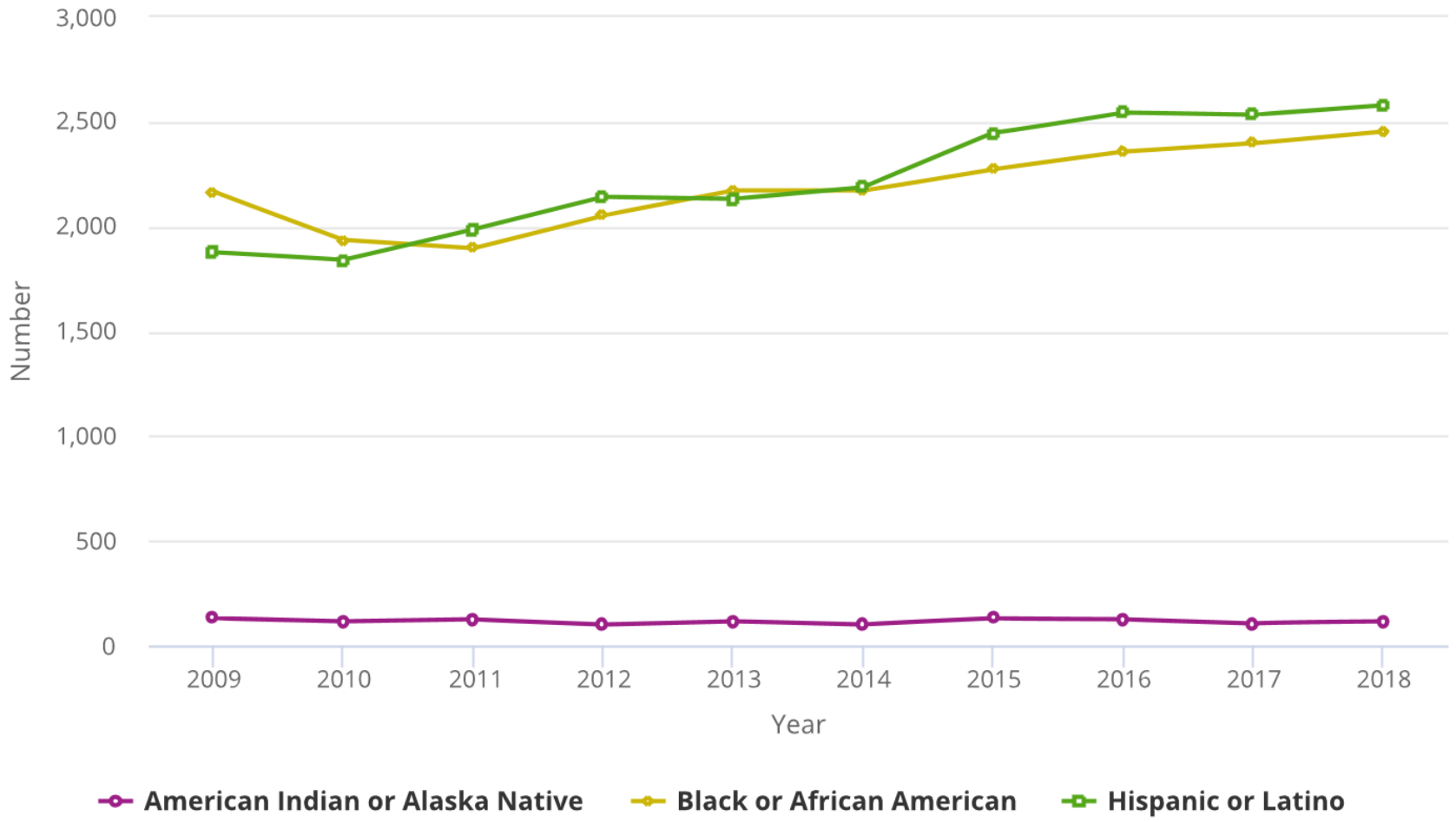
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Since 1999, most of the growth in the number of doctorates earned by both men and women has been in S&E fields



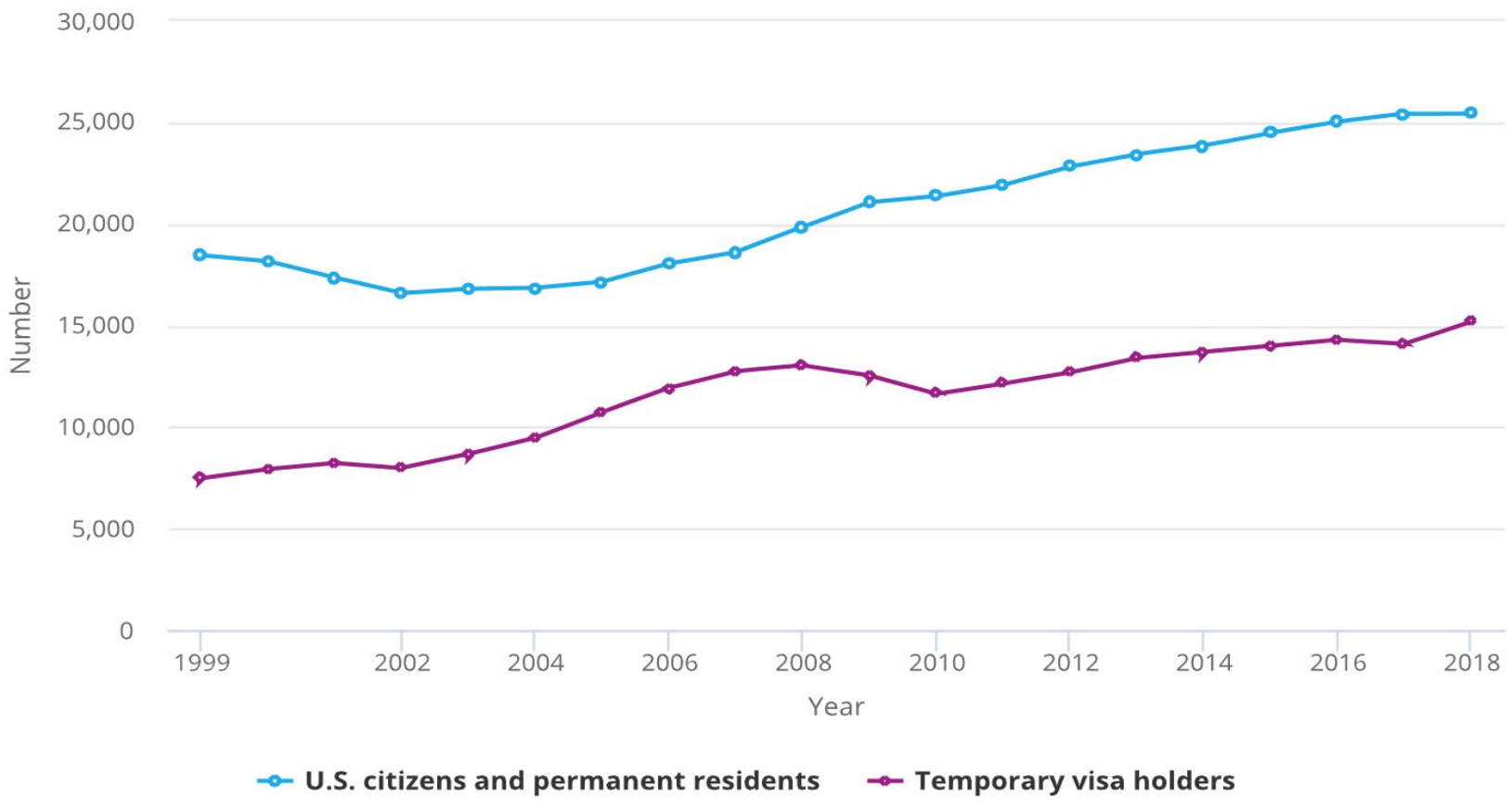
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Participation in doctoral education by underrepresented minorities who are U.S. citizens or permanent residents has increased, but remain a small number overall



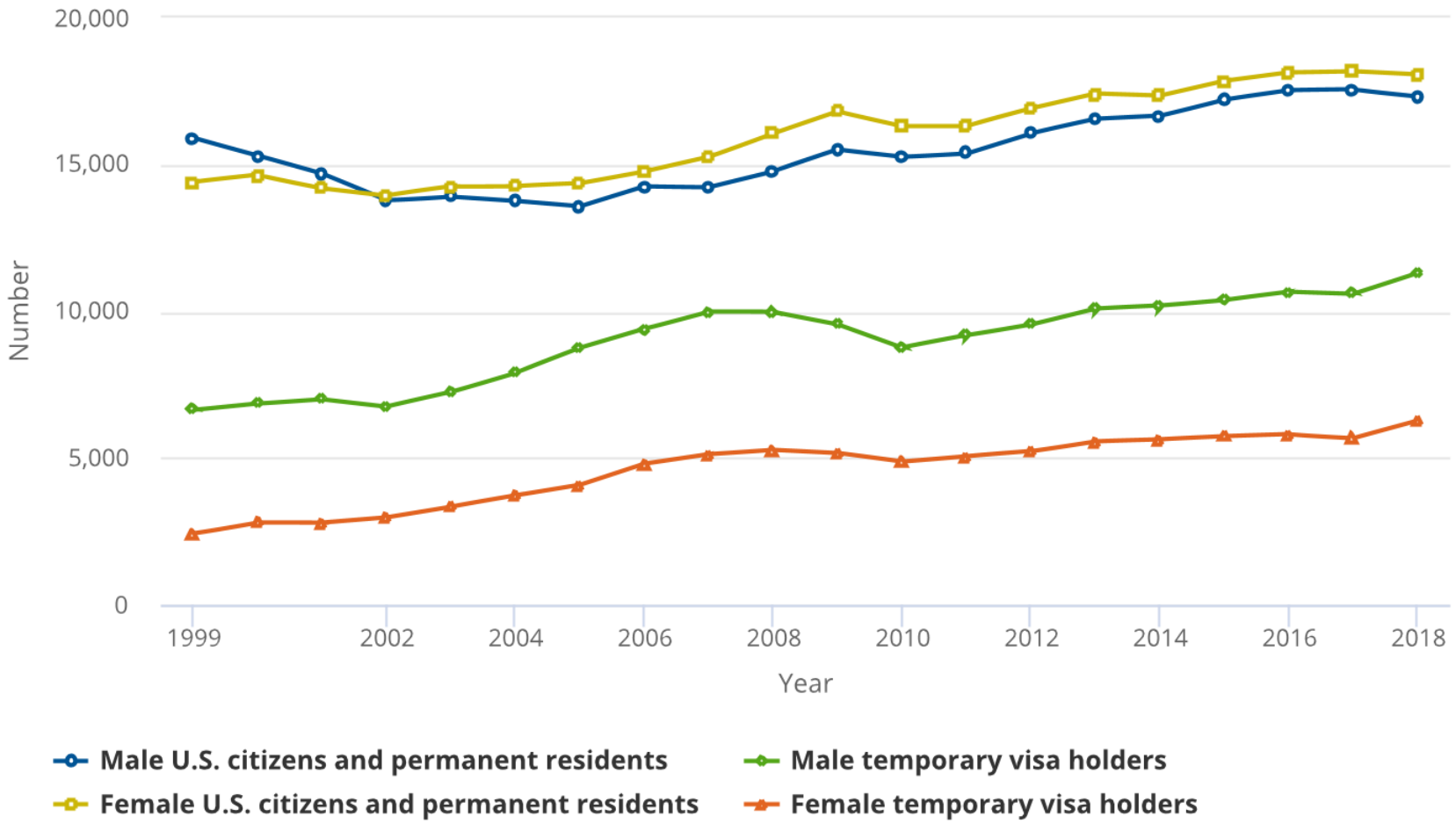
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Doctoral awards to temporary visa holders increased faster than those to U.S. citizens and permanent residents, though from a smaller base



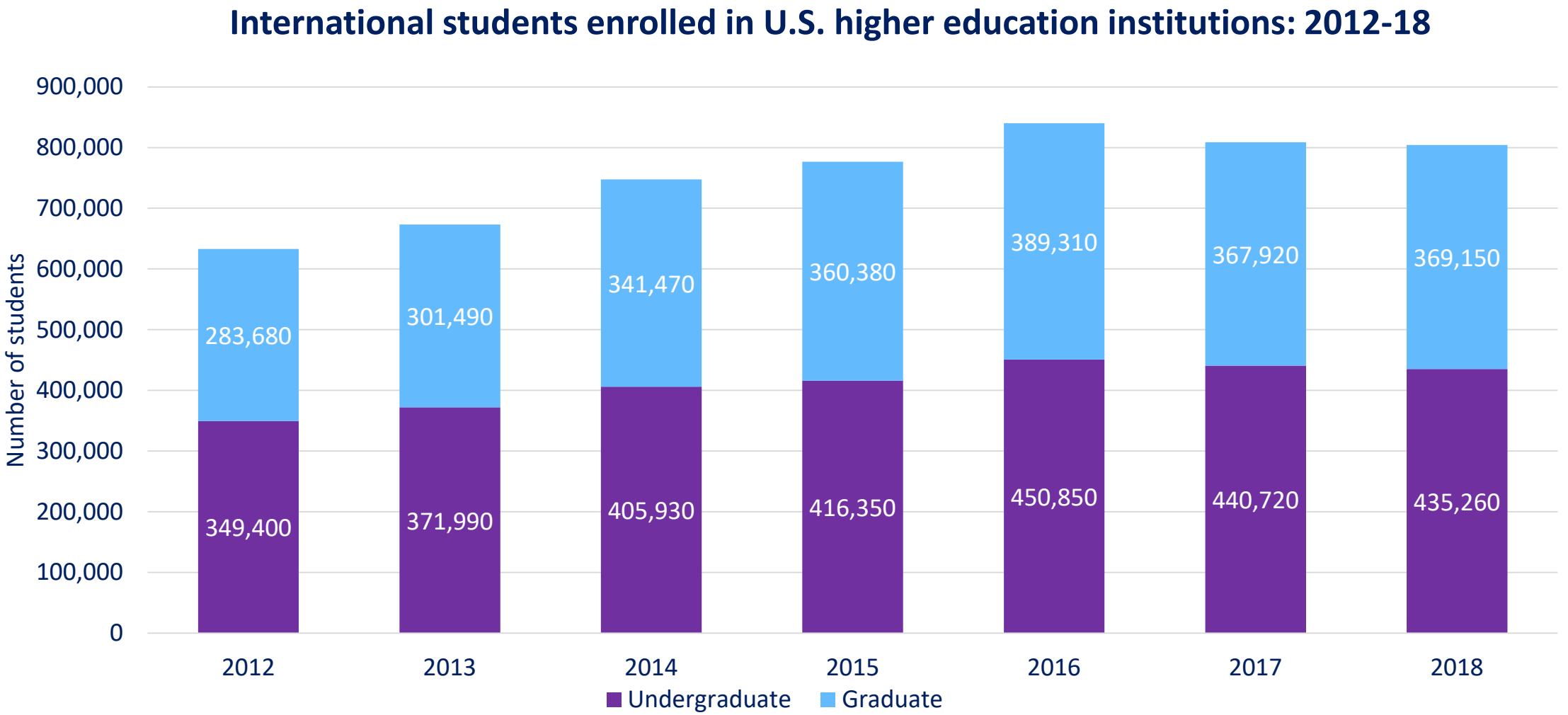
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Since 2002, women have earned a slim majority of doctorates awarded to U.S. citizens and permanent residents



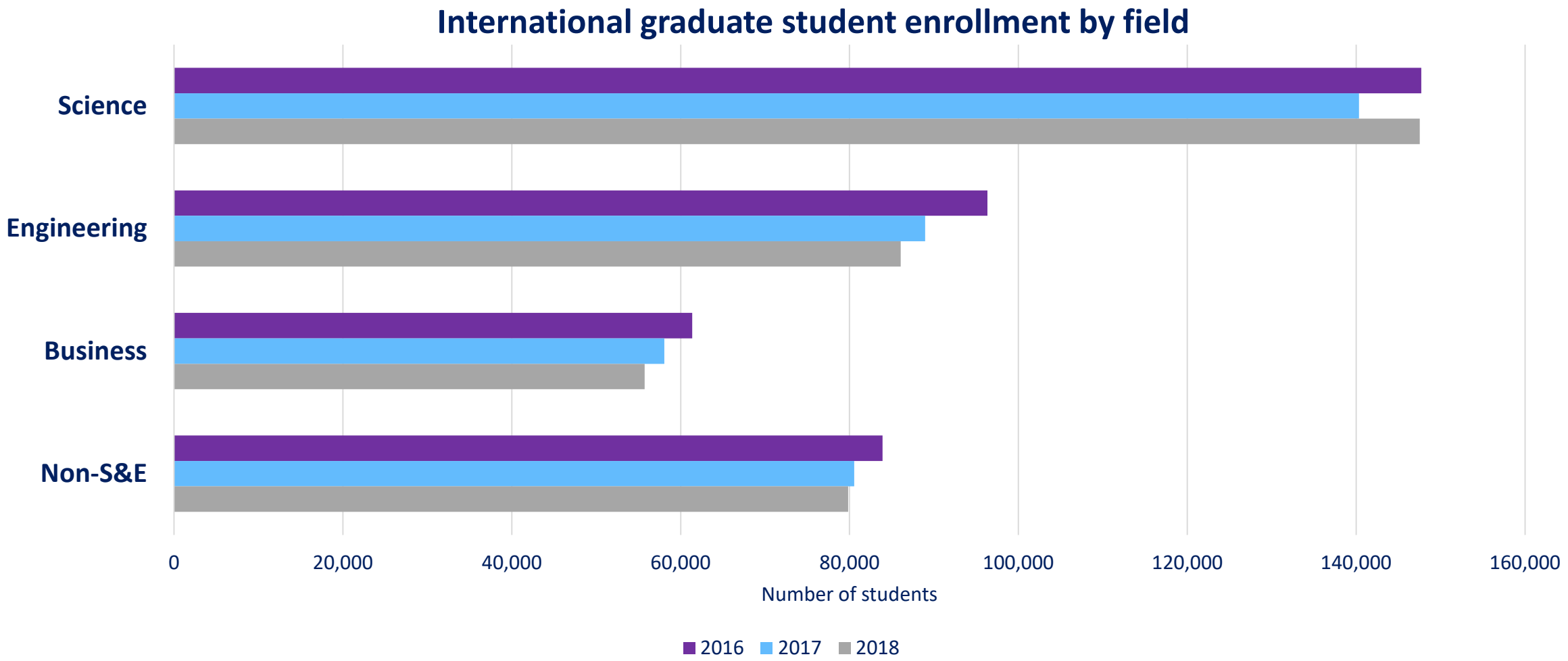
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

U.S. international student enrollment has declined since 2016.



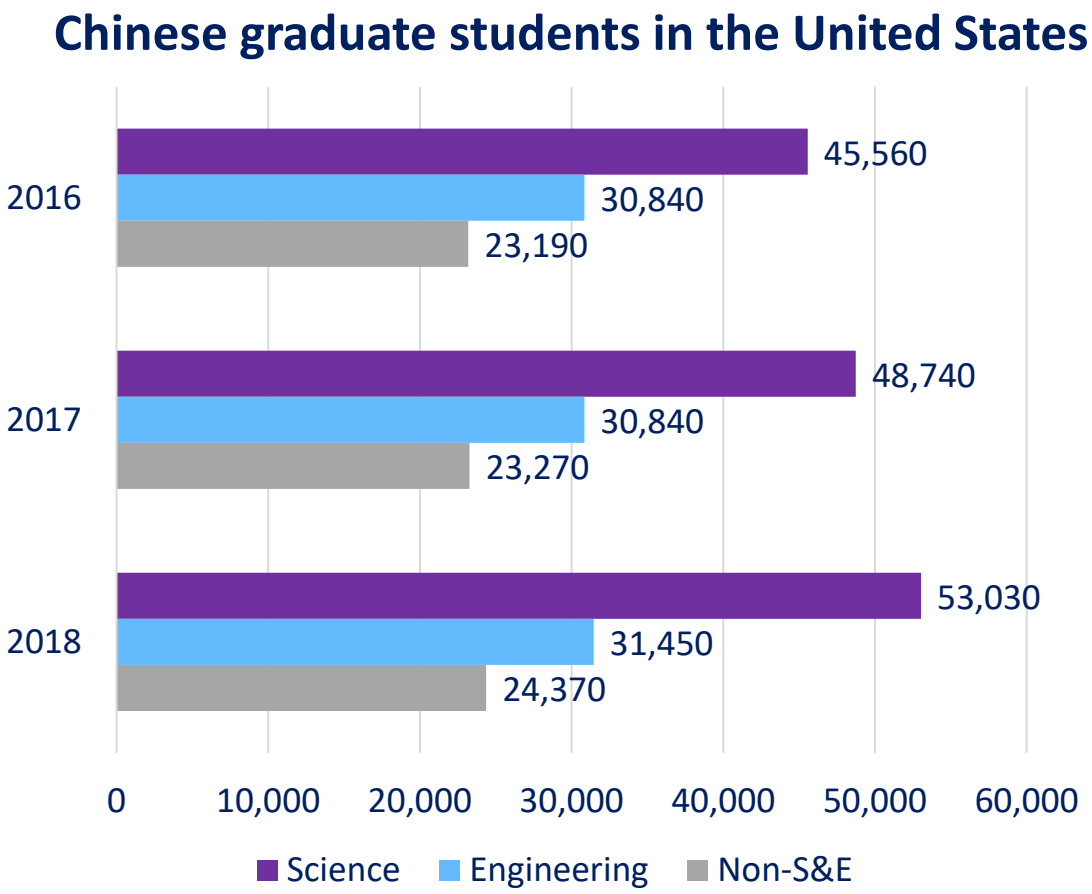
Source: U.S. Department of Homeland Security, U.S. Immigration and Customs Enforcement, special tabulations (2018) of the Student and Exchange Visitor Information System (SEVIS) database.

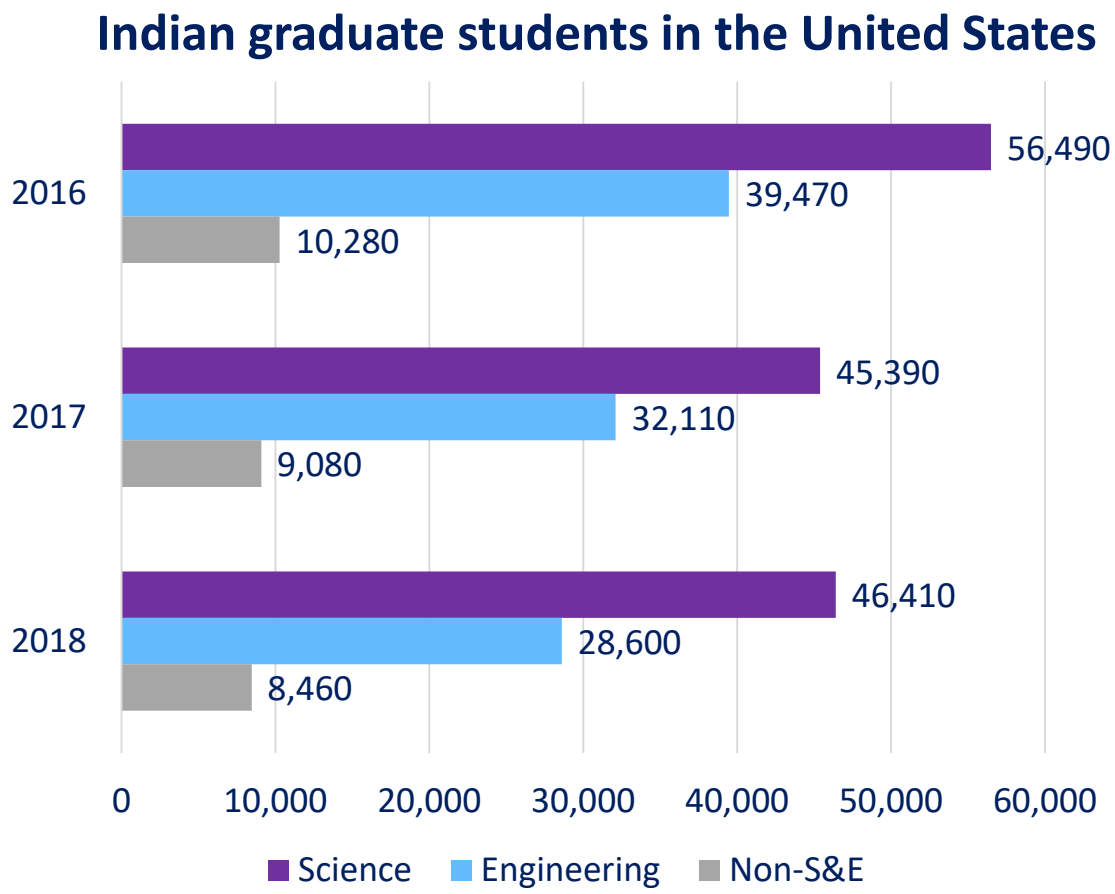
U.S. graduate student enrollment in science increased between 2017 and 2018. In other fields, the decline from 2016 continued.



Source: U.S. Department of Homeland Security, U.S. Immigration and Customs Enforcement, special tabulations (2018) of the Student and Exchange Visitor Information System (SEVIS) database.

Graduate students from China studying in the U.S. increased across fields. Numbers of students from India declined.

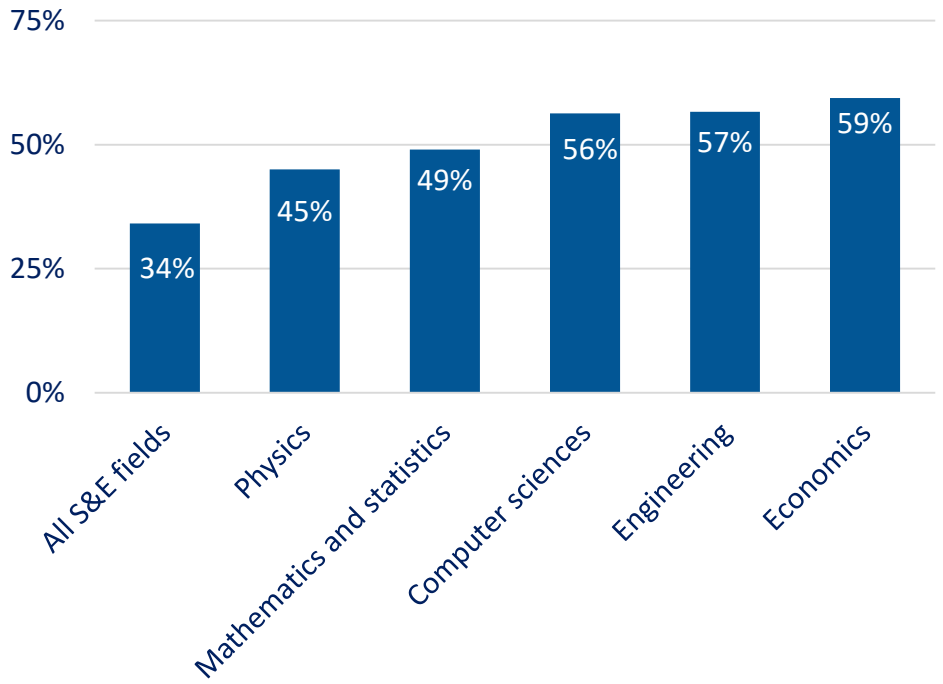




Source: U.S. Department of Homeland Security, U.S. Immigration and Customs Enforcement, special tabulations (2018) of the Student and Exchange Visitor Information System (SEVIS) database.

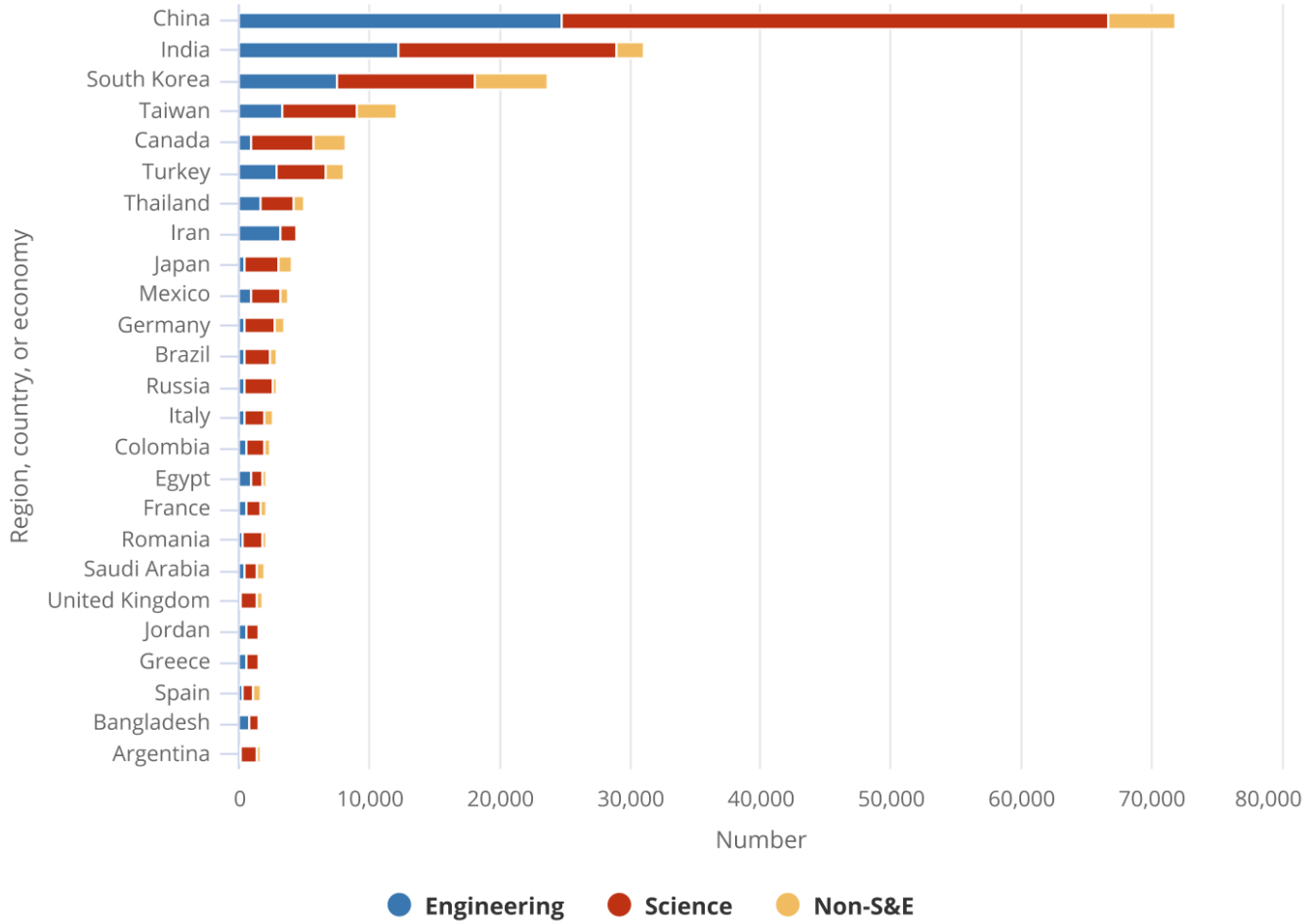
Students from China, India, and South Korea account for more than half of U.S. doctorates awarded to students on temporary visas since 2000

Percentage of doctoral degree recipients on temporary visas for selected fields: 2017



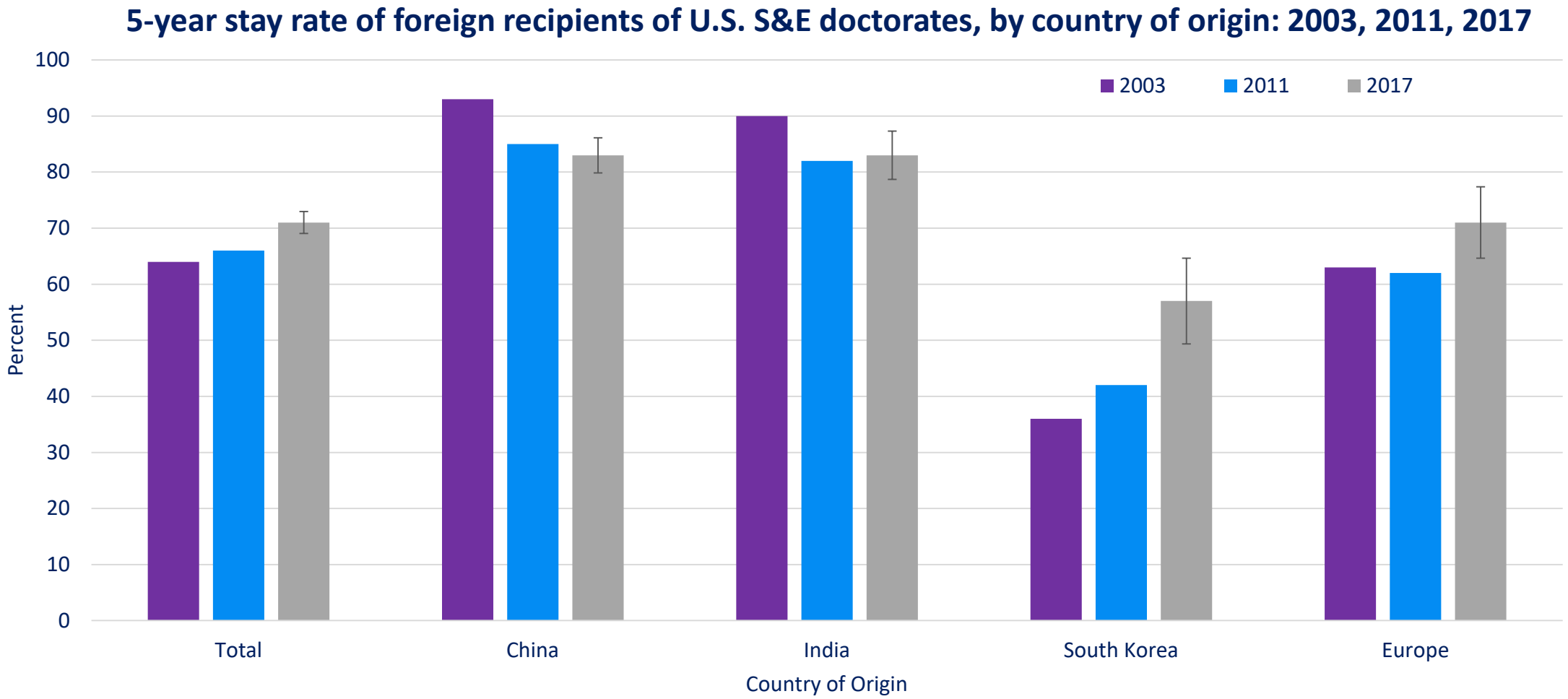
Sources: NCES IPEDS; NCSES IDS.

Top 25 regions, countries, or economies of origin of U.S. doctorate recipients on temporary visas, by broad field: 2000–17



Source: NCSES Survey of Earned Doctorates.

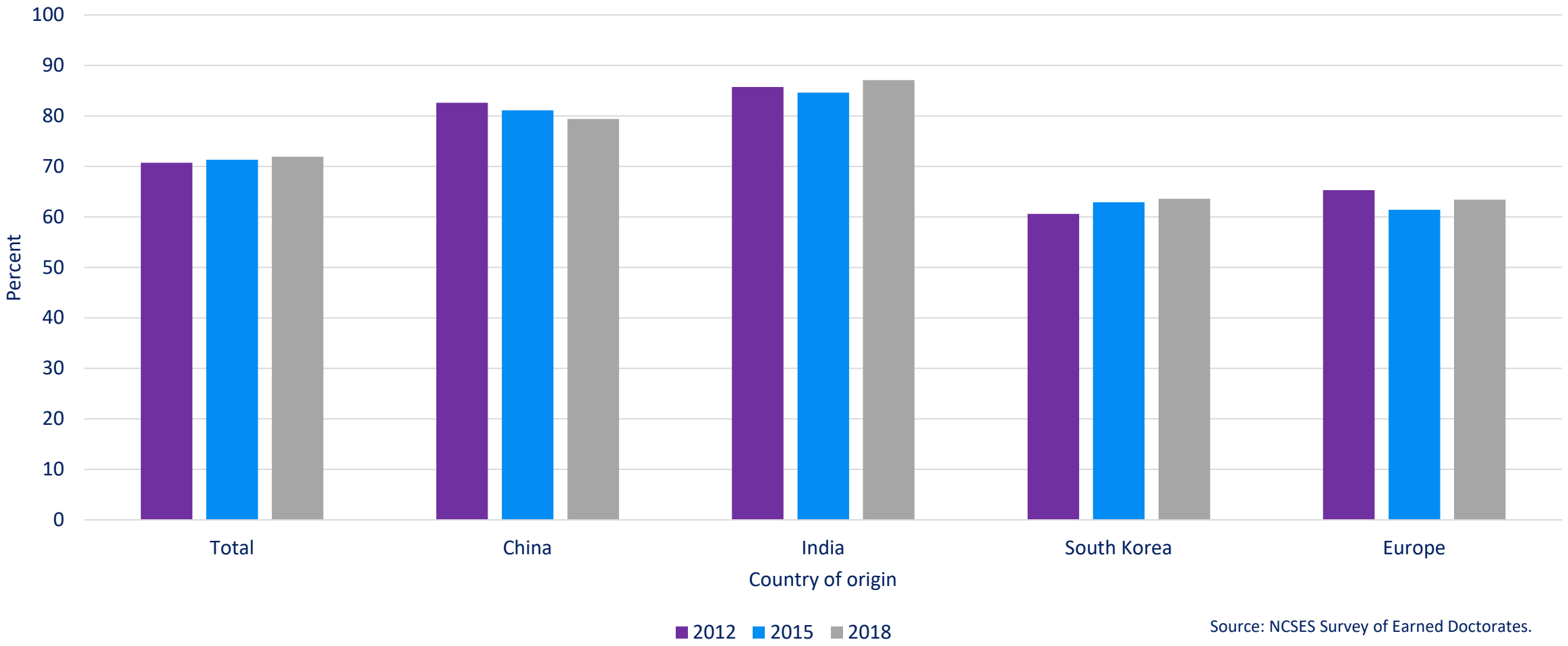
5-year stay rates overall have increased since 2011, and have not changed significantly for China or India.



Sources: NCSES, SDR and SED, and SSA. Note: The data source changed after 2011. Margin of error is shown for the 2017 estimates which are from a sample survey.

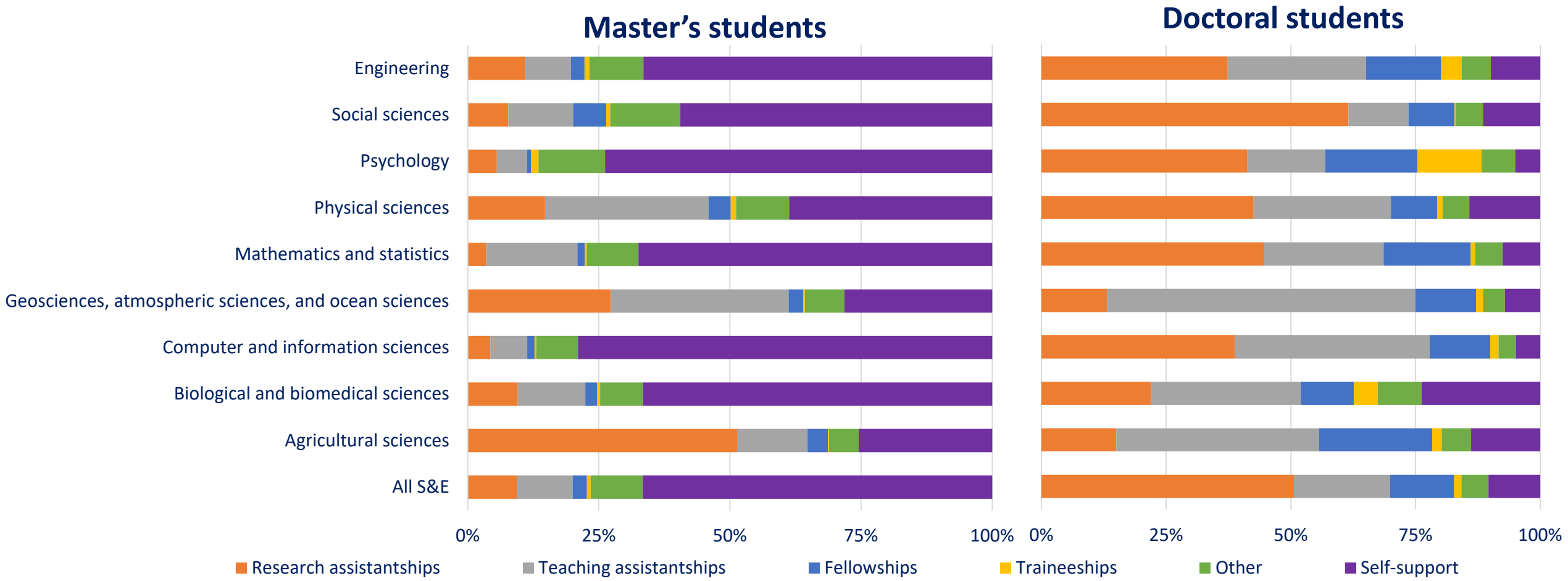
Intentions of doctoral recipients with temporary visas to stay in the U.S. changed little between 2012 to 2018.

Doctorate recipients with temporary visas intending to stay in the U.S.: 2012, 2015, 2018



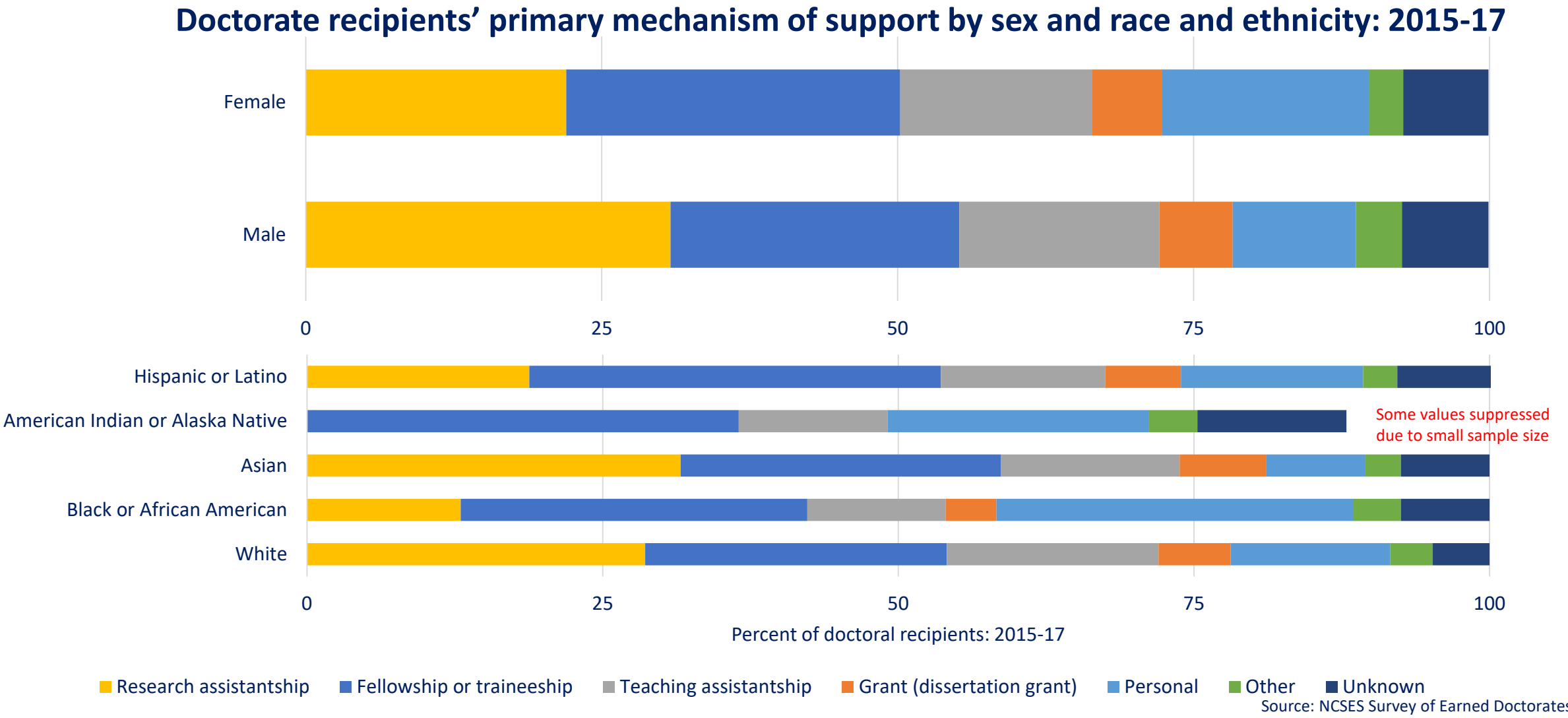
Source: NCSES Survey of Earned Doctorates.

Master's students are far more likely to self-support. For doctoral students, support patterns vary between fields.



Source: NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering,

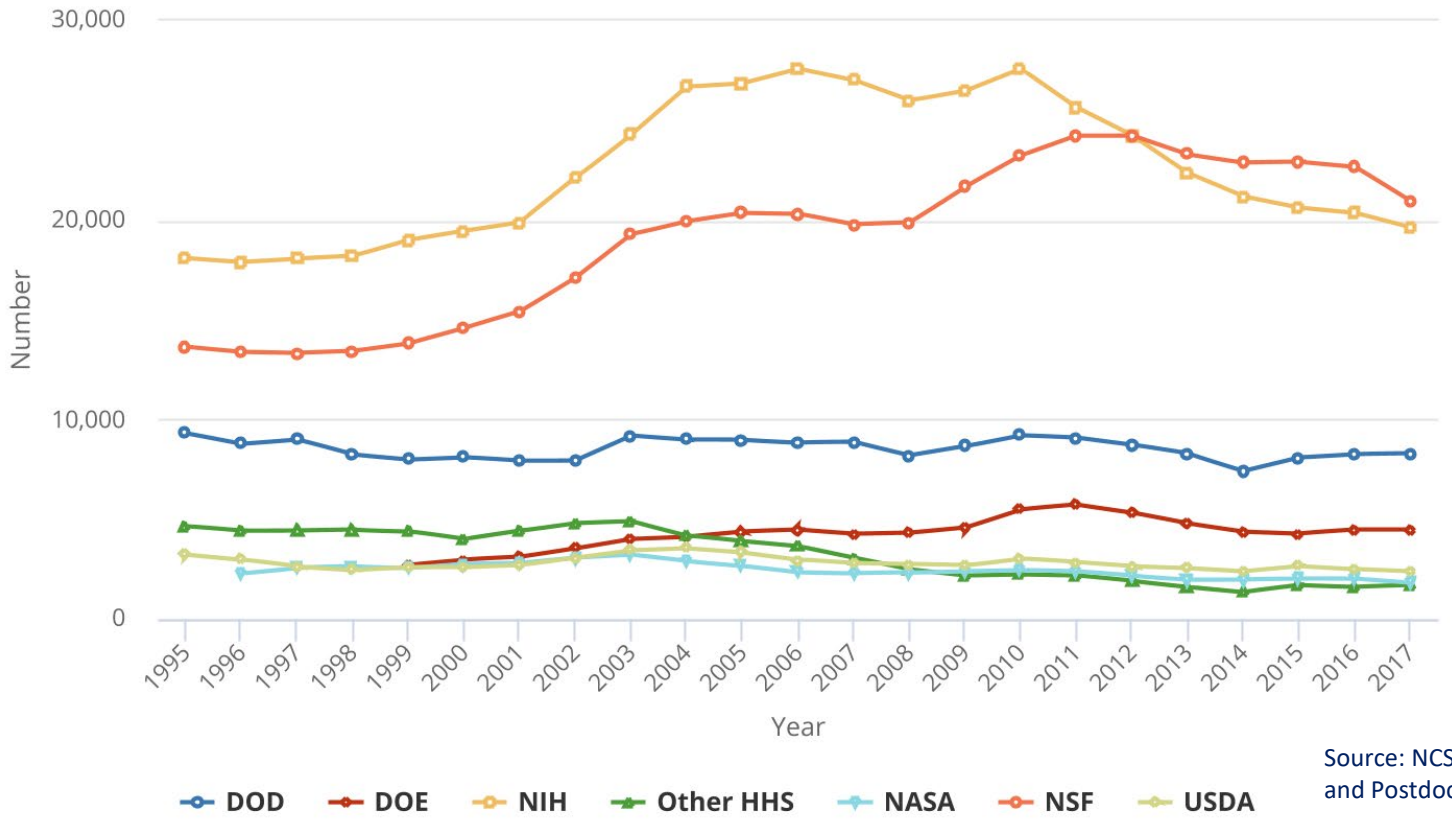
Mechanisms of support for doctoral recipients vary by demographic characteristics (which also relates to field of study differences).



Source: NCSES Survey of Earned Doctorates.

The number and percentage of full-time S&E graduate students supported by the federal government has declined.

Full-time graduate students in science, engineering, and health primarily supported by federal sources, by agency: 1995–2017

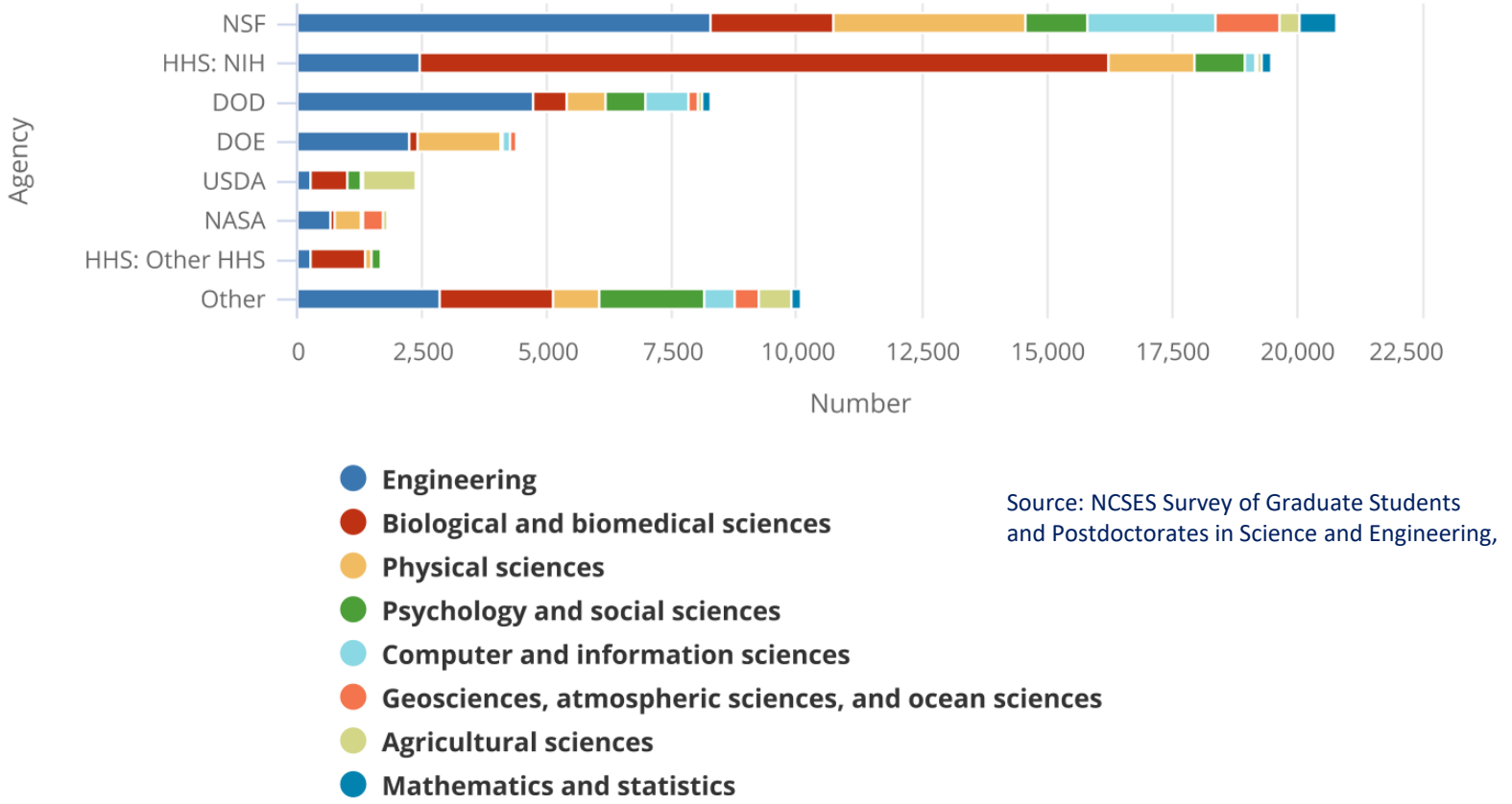


Source: NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering,

DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NIH = National Institutes of Health; NSF = National Science Foundation; USDA = Department of Agriculture.

In their support patterns across fields, federal agencies take on portfolios consistent with their missions.

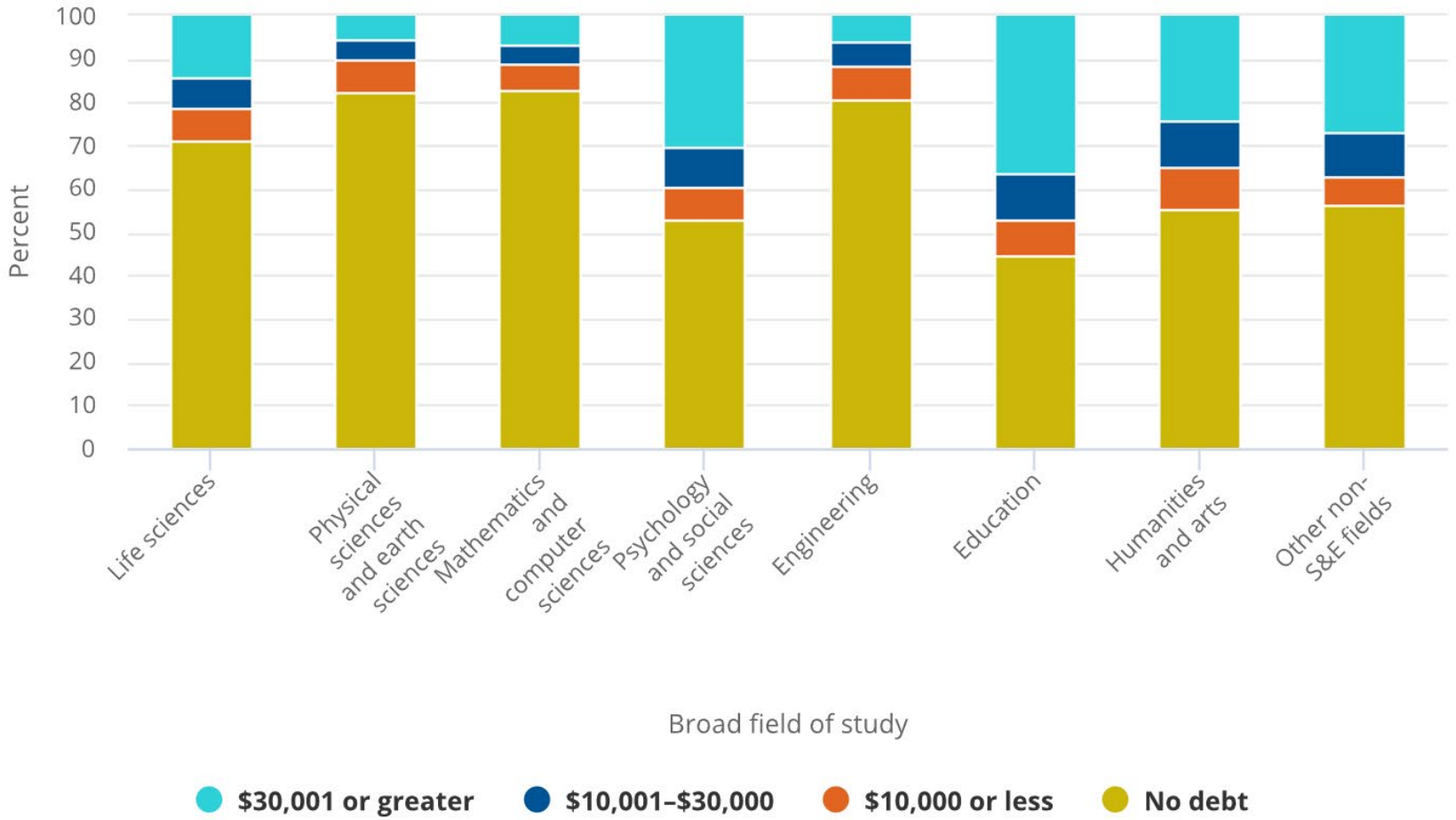
Full-time graduate students in science, engineering, and health primarily supported by the federal government, by field and agency: 2017



Source: NCSES Survey of Graduate Students and Postdoctorates in Science and Engineering,

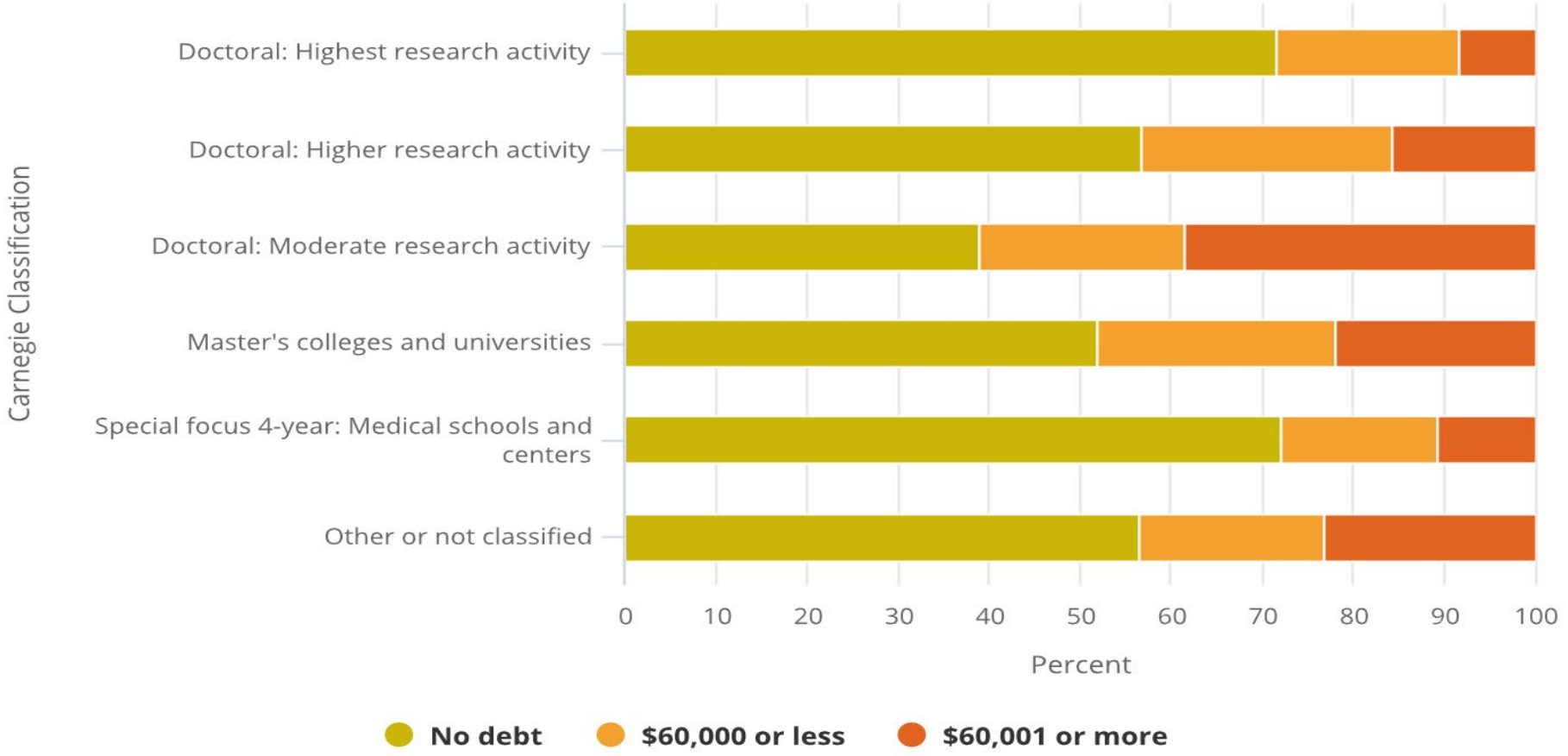
DOD = Department of Defense; DOE = Department of Energy; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NIH = National Institutes of Health; NSF = National Science Foundation; USDA = Department of Agriculture.

Graduate debt is highest among doctorate recipients in psychology and education and lowest in the natural sciences and engineering



Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

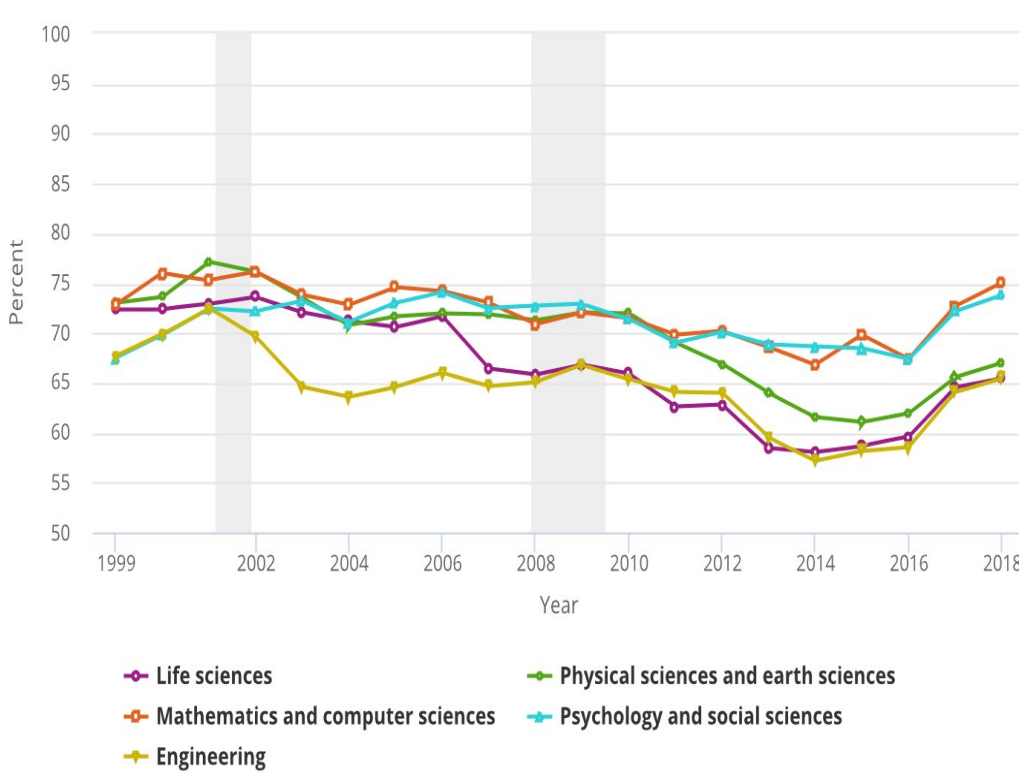
Graduate debt is lowest among doctorate recipients from institutions with the highest research activity and from 4-year medical schools and centers



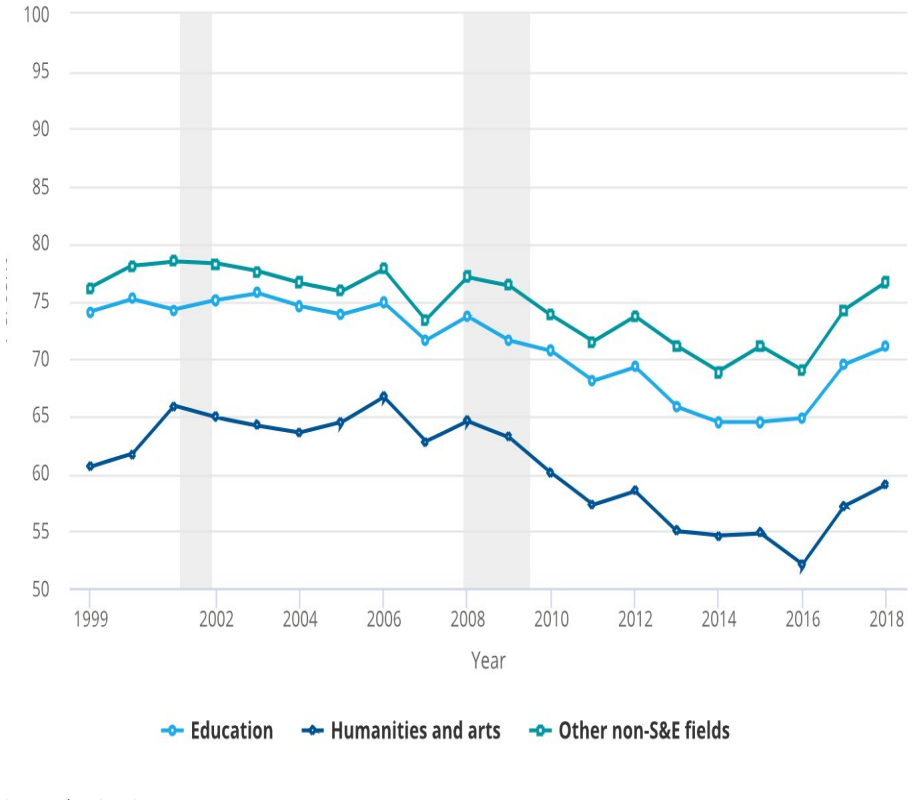
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Definite commitments for employment, including postdoc positions, hit low points in 2014-2016 but have rebounded.

By S&E broad field of study

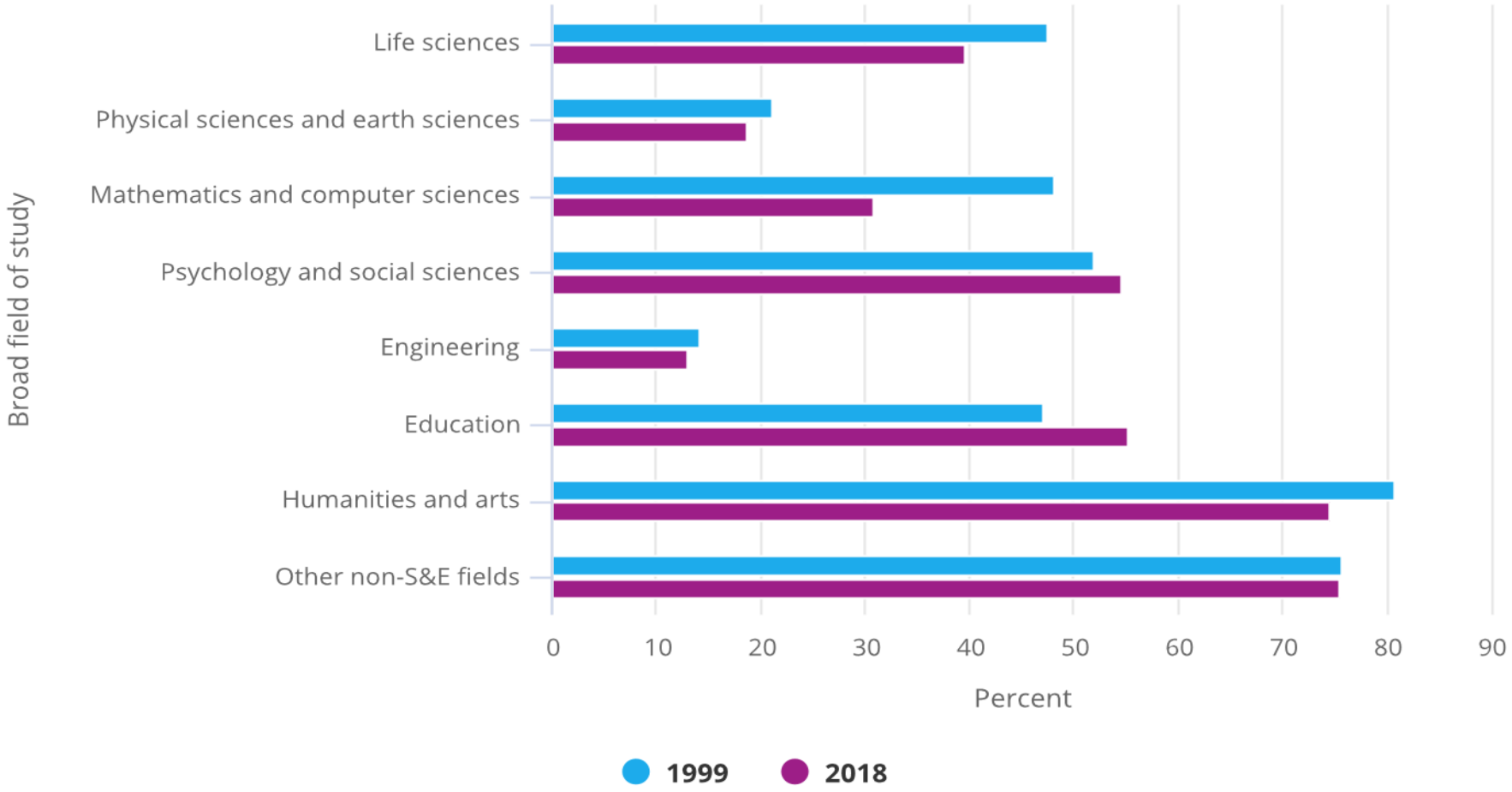


By non-S&E broad field of study



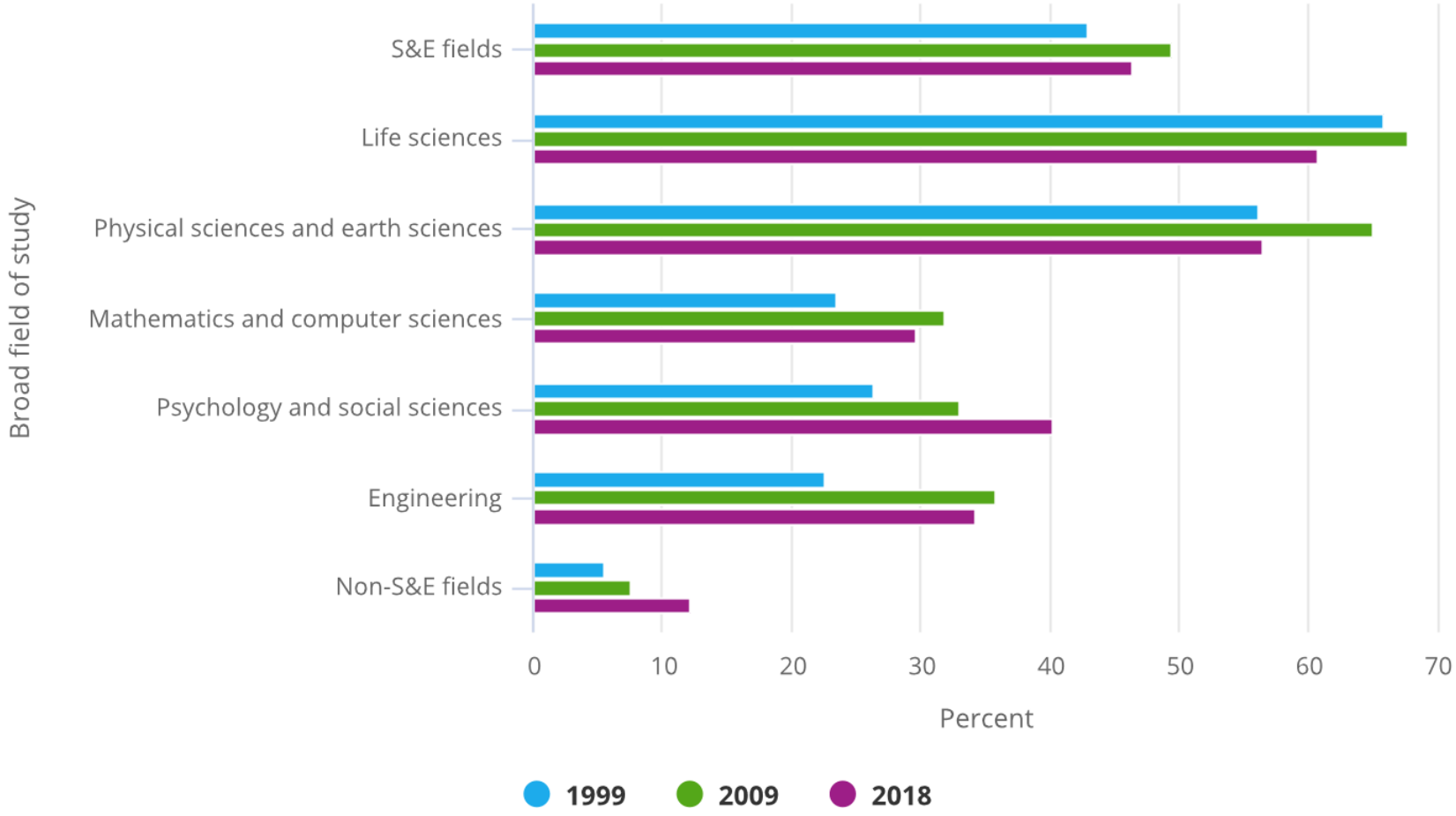
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

The highest rates of academic employment commitments are reported in the humanities and arts and in other non-S&E fields



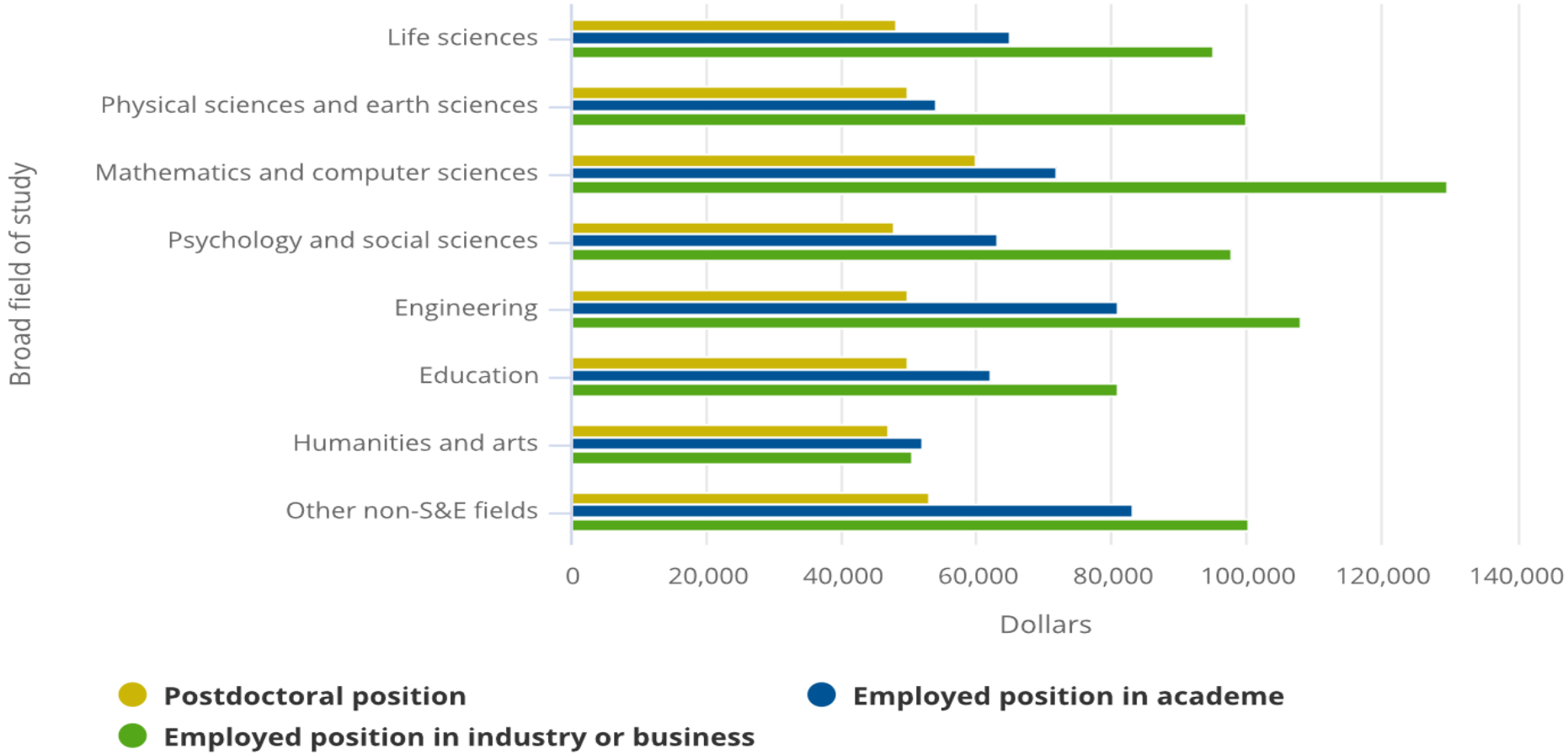
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Since 1999, postdocs have become more prevalent in math and computer sciences, psychology and social sciences, engineering, and non-S&E fields



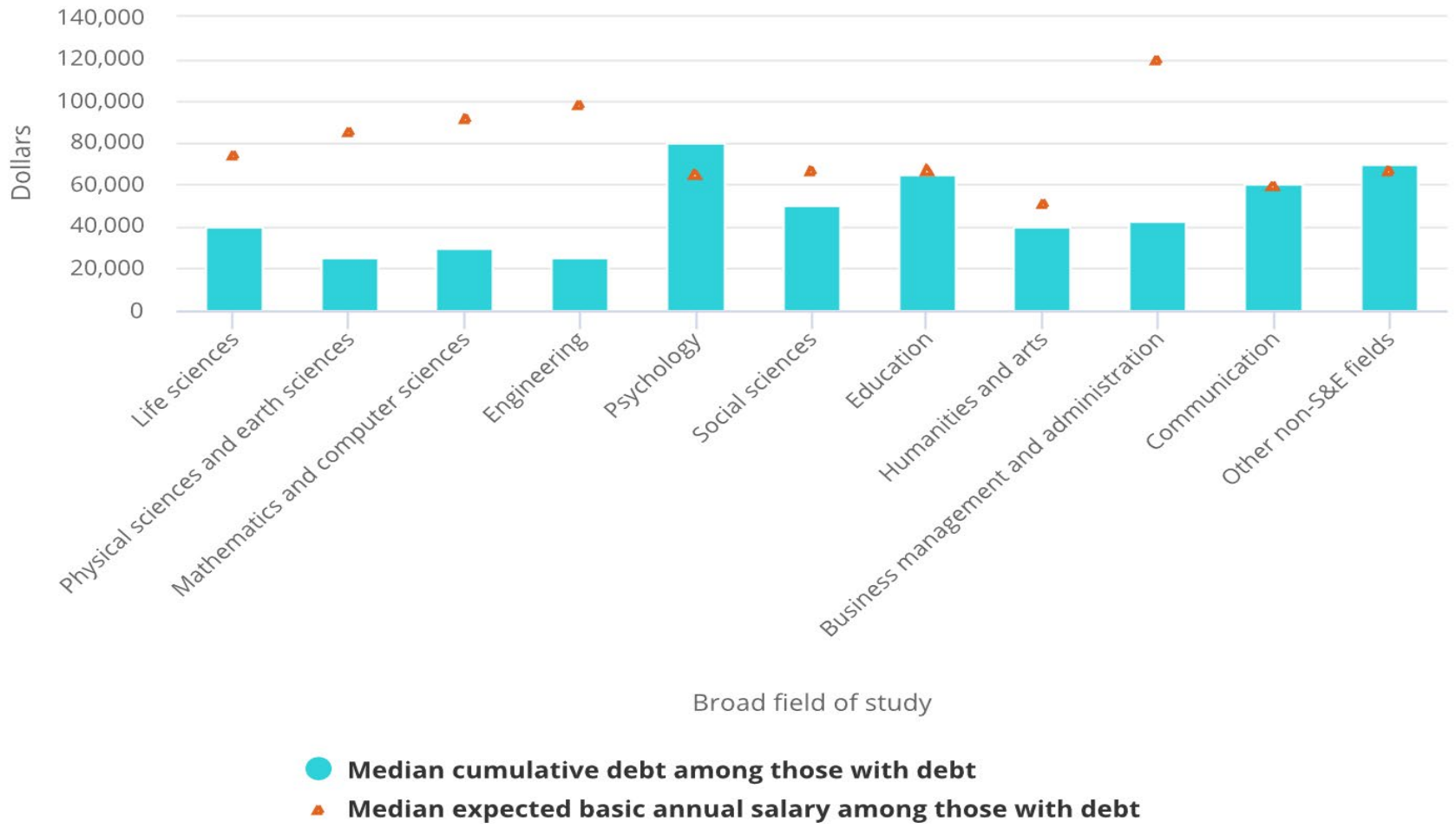
Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Median basic annual salary of doctorate recipients with definite commitments in the U.S. vary by field and type of position



Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Doctorate recipients in the fields with the lowest median cumulative debt had among the highest median expected annual salaries



Data source: National Center for Science and Engineering Statistics, Survey of Earned Doctorates, 2018

Take-Home Messages: 1 of 3

Master's Degrees

- Numbers of master's degrees awarded have grown rapidly in engineering and mathematics and computer sciences, largely due to increasing numbers of students on temporary visas.

Doctoral degrees

- Number of doctorates awarded shows a strong upward trend, and S&E doctorates are a growing share of all doctorates awarded.

- URM participation has increased in the last ten years, but numbers remain small overall.

- Since 2002, women have earned a slim majority of doctorates awarded to U.S. citizens and permanent residents.

Take-Home Messages: 2 of 3

International graduate students

- Changes in international graduate student enrollment vary by field of study and country of origin. Stay rates have not decreased significantly in recent years.

Financial Support Patterns

- Master's and doctoral students exhibit very different financial support patterns. There are also important differences between S&E fields.

- The federal role in financing graduate students remains important, though it has diminished over time.

Take-Home Messages: 3 of 3

Doctoral recipients' debt, career outcomes, and salary

- Graduate debt is highest among doctorate recipients in psychology and education and lowest in the natural sciences and engineering.
- Definite commitments for employment, including postdoc positions, hit low points between 2014 and 2016 but have since rebounded.
- The highest rates of academic employment commitments are reported in the humanities and arts and in other non-S&E fields.
- Median basic annual salary of doctorate recipients with definite commitments in the United States varies by field and type of position.

Data availability

GSS

- Latest data available at https://nsf.gov/statistics/srvygradpostdoc/
- Create custom tables in the NCSES Table Tool at https://ncsesdata.nsf.gov/ids/gss
- Microdata: Public-use files can be downloaded from the GSS website at http://nsf.gov/statistics/srvygradpostdoc/

SED

- Annual report at: http://nsf.gov/statistics/doctorates/
- Create custom tables in the NCSES table tool at https://ncsesdata.nsf.gov/ids/sed
- Microdata: Restricted-use files only through license with NCSES http://nsf.gov/statistics/license/

Additional NCSES Publications and Products

- **Congressionally mandated biennial reports**:
  - *Science and Engineering Indicators* (even numbered years) http://nsf.gov/statistics/seind/
  - *Women, Minorities, and Persons With Disabilities in Science and Engineering* (odd numbered years) http://nsf.gov/statistics/wmpd/\
- **InfoBriefs** – highlighting results from recent surveys and analyses http://nsf.gov/statistics/
- **Detailed Statistical Tables** – tabular data and technical material, usually for a particular survey and survey year http://nsf.gov/statistics/

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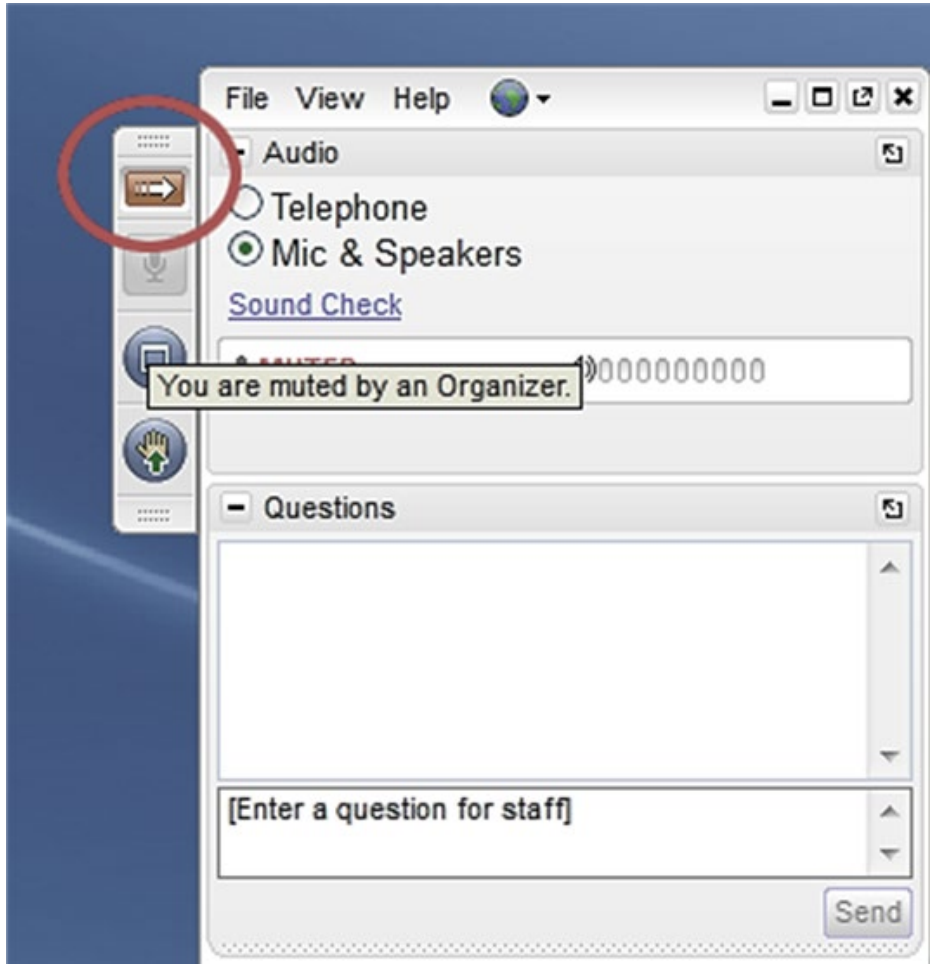
Questions?

Webinar **recording and slides** will be **emailed** to participants and **posted** on the CGS website.

Type them into the Questions box on the GoToWebinar control panel.



Thank You for Participating!

- Upcoming CGS webinar:
  - Culturally Aware Mentoring: Optimizing Mentoring Relationships
    - *Wednesday, March 18, 2020 from 2:00-3:00 PM ET*

    Visit http://cgsnet.org/cgs-webinars for more information on upcoming webinars as well as recordings of past webinars.