

Survey of Graduate Students and Postdoctorates in Science and Engineering, Fall 2012

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Technical Notes

Survey Universe

The Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) is an annual census of all academic institutions in the United States that grant master's degrees or research doctorates in science, engineering, and selected health (SEH) fields.¹ The data collected in the 2012 GSS represent national estimates of graduate student enrollment and employment of postdoctoral appointees (postdocs) as of fall 2012.

In 2012, the survey universe consisted of 565 academic institutions.² Data were collected at the organizational unit level (e.g., departments, degree-granting programs, research centers, health facilities) and included demographic and funding information for graduate students and postdocs. Counts of doctorate-holding nonfaculty researchers (NFRs) were also collected, by sex and type of degree. For graduate students, "field" refers to the field of the reporting unit in which the student is enrolled. For postdocs, "field" refers to the field of the unit that reports postdocs to the GSS. The Web survey was revised in the 2010 survey cycle to collect postdoc data and graduate student data at comparable levels of detail.

Detailed information on the institutions, schools, units, fields, response rates, imputation rates, and a crosswalk between the 2010 CIP codes and the GSS codes are provided in 16 technical tables for the 2012 GSS.

Revisions Affecting Survey Eligibility

No revisions affected the survey universe in 2012; revisions to the eligibility criteria for units and fields of study in 2007 and 2008 are described below.

Units

Survey procedures introduced in 2007 improved the inclusion of eligible units and the exclusion of ineligible units. In the 2012 GSS, the net number of units increased by 167 (table A-1). The large increase in the number of units added and deleted in the 2007 through 2012 surveys resulted in net gains of eligible units, suggesting an underreporting of GSS-eligible units and an overreporting of ineligible units in previous survey years. See the "Technical Notes" section of the 2007 GSS Detailed Statistical Tables (DST) report (<http://www.nsf.gov/statistics/nsf10307/>) for more detail on the changes introduced in 2007.

¹ The research doctorate is a research degree that (1) requires an original contribution of knowledge to a field (typically, but not always, in the form of a written dissertation), and (2) is not primarily intended for the practice of a profession. For additional survey information and available data related to graduate student enrollment and postdocs in S&E, see <http://www.nsf.gov/statistics/srvygradpostdoc/>

² In this report, the term school refers to a graduate school, medical school, dental school, nursing school, or school of public health; an affiliated research center; a branch campus; or any other organizational component within an academic institution that grants an S&E or selected health degree.

Fields of Study and Degree Granting Programs

In 2011, the degree-granting program fields eligible for the GSS were updated from the 2000 to the 2010 Classification of Instructional Programs (CIP) taxonomy of the National Center for Education Statistics (NCES). See “2011 GSS Code Changes,” appendix B, in the 2011 GSS DST report for more detail (<http://www.nsf.gov/statistics/nsf13331/>). In 2007, a comprehensive review of GSS-eligible program fields led to the following changes:

- GSS-eligible degree-granting programs were updated from the 1990 to the 2000 CIP taxonomy.
- Degree-granting programs were specified by a six-digit CIP code rather than a four-digit CIP code.
- Programs that lacked a research focus were eliminated, three new fields were added, and programs and fields were reclassified as needed.

See the "Technical Notes" section of the 2007 GSS DST report (<http://www.nsf.gov/statistics/nsf10307/>) for more detail.

Eligibility and Degree-Granting Status

Institutions are classified as doctorate granting if at least one GSS-eligible unit confers doctoral degrees. Seven institutions changed GSS degree-granting status and six institutions changed their institution name in 2012. The status of one institution changed from eligible to ineligible, based on criteria for inclusion in the GSS (see table A-2).

Revisions Affecting Survey Comparability

Because of the adjustments to the taxonomy and other survey changes introduced in 2007, data collected since 2007 are not directly comparable with data from previous years. For trend analyses, the data tables provide estimates of the counts that would have been collected in 2007 had the 2006 methodology been used (see "Bridge-Year Calculation and Display").

Other survey changes that affect comparability of the data are as follows:

- 2011: The GSS code list was updated to the CIP 2010. A total of 58 new 2010 CIP code titles were mapped to the GSS codes, 14 CIP code titles were moved between GSS codes, and 24 CIP code titles were removed as ineligible fields. Although the GSS code list update affected 33 of the 84 GSS codes, the impact on field-level counts was typically small and did not change the overall trend from 2010 to 2011. Impacts on individual fields were greatest for political science, architecture, and other health not elsewhere classified (nec). For political science and architecture, taxonomy related changes accounted for more than half of the observed change in graduate enrollment from 2010 to 2011. For five additional fields—psychology nec, communication, social sciences nec, chemical engineering, and biological sciences nec—taxonomy related changes were evident but accounted for less than half the observed change in graduate enrollment.
- 2010: The postdoc section of the survey was greatly expanded, and significant effort was made to ensure that appropriate personnel were providing postdoc and NFR data. As a result, it is unclear how much of the increase reported in 2010 represented actual growth in postdocs and how much resulted from improved data collection. More information on the improved data collection and changes in postdoc data are available at <http://www.nsf.gov/statistics/gradpostdoc/>.
- 2007: In the 2007 survey cycle, three newly eligible fields were added, some degree-granting programs became ineligible, and others were reclassified. Data collected under the new methodology are shown as "2007new." For trend analysis, an estimate of 2007 data under the 2006 methodology is shown as "2007old."

- 1975–2006: The data are intended to represent consistent coverage of S&E and selected health fields. In 1989 the National Science Foundation (NSF) revised the coverage of S&E fields in the survey. Some fields were excluded, and the data for 1975–88 subsequently were revised to reflect this change.
- 1984–87: Data on master's-granting institutions were collected on a sample basis. Enrollment data for this period have been adjusted to account for sampling and reflect estimated universe totals. Starting with the 1988 survey cycle, the GSS has attempted to cover all academic institutions that grant master's or doctoral degrees in S&E or selected health fields.
- 1978: Master's-granting institutions were not surveyed in 1978. Figures for 1978 for total enrollment and full-time enrollment in master's-granting institutions are estimates based on 1977 and 1979 data. Doctorate-granting institutions received a short form of the GSS that collected selected data items; the short form did not request any information on sex, citizenship, or mechanisms of support.
- 1972–74: Eligibility definitions changed, affecting both S&E fields and types of institutions surveyed. These data are not comparable to data collected before 1972 or after 1974.
- 1966–71: Totals are for the NSF Graduate Traineeship program only and are not comparable with data from 1972 through 2011.

Bridge-Year Data Calculation and Display

- Due to the methodological changes introduced in 2007, including modifications to the set of GSS-eligible fields, most data tables provide data for 2007 in two ways: "2007old" and "2007new." Data shown under 2007old provide estimates of the counts that would have been collected in 2007 had the 2006 methodology been used. Counts reported under 2007new were collected using the methodology introduced in 2007.
- To derive counts for 2007old, all units that were reported in the 2006 data collection and retained in 2007 were assigned the same GSS field as in 2006. This is consistent with the 2006 GSS coding because the Web survey system before 2007 did not have a direct mechanism for changing GSS codes, and very little recoding was done. Any new unit added in 2007 was given the GSS field code assigned to it, with the following exceptions:
 - Added units coded as communication, family and consumer sciences/human sciences, or multidisciplinary/interdisciplinary studies were not included in 2007old because these codes were newly eligible science fields in 2007 (unavailable in 2006).
 - Added units coded as architecture in 2007 were reassigned to civil engineering in 2007old because architecture was subsumed within civil engineering in the 2006 GSS taxonomy.
 - Added units coded as neuroscience in 2007 were reassigned to neurology in 2007old because neuroscience was subsumed within neurology in the 2006 GSS taxonomy.
 - The 2007old counts are based on a subset of the 2007 data due to the first exception listed above. A comparison of 2007old with 2007new data reflects differences due to the addition of the three newly added science fields and recoding of units from their 2006 fields to other fields.

Survey Instrument and Procedures

- In 2012, the Web survey was the primary mode of data submission. The survey cycle was launched in October 2012 and concluded in June 2013.
- The 2012 survey consisted of two parts. Part 1, which could only be completed using the Web survey system, required the identification of organizational units ("units") within the school. Part 2 collected counts and selected characteristics of graduate students, postdocs, and NFRs. A paper worksheet was provided for informational purposes and to assist in preparing figures to be entered later in Part 2 of the Web survey. The content and format of the paper worksheet were identical to

Part 2 of the Web survey. A small number of coordinators did not use the Web survey but chose to submit their Part 2 data in an Excel file. These data were loaded in the Web survey by the survey contractor.

- The deadline for Part 1, the update of the unit list, was 30 November 2012. Schools that missed the Part 1 deadline received special attention from the survey contractor early in the survey cycle. The deadline for submitting data for Part 2 was 28 February 2013.

To respond to Part 1 and Part 2, institutions selected coordinator(s) for each school that granted a graduate degree in a GSS-eligible field. Coordinators were responsible for the following:

- Identifying all eligible units (e.g., departments, degree-granting programs, research centers, health facilities).
- Reporting GSS data or delegating reporting to unit respondents, such as department personnel or personnel in nonacademic departments (e.g., the financial aid office or the registrar's office).
- Submitting the data for all units to the survey contractor.
- Providing data, by field of study, from administrative records.

Revisions to Survey Instrument

Only minor modifications were made to the 2012 GSS Web survey instruments. They are as follows:

- Modified a question to be opt-in rather than opt-out regarding requests for hard-copy survey materials for the next cycle (i.e., coordinators only received materials if they indicated they wanted hard-copy).
- Changes were made for the consolidation of user accounts. In cases where a respondent had multiple roles (either coordinator or unit respondent level) across different schools, the instrument allowed the respondent to use a single login and select the school to work with after login.

Revisions to Procedures

There were no revisions to procedures in the 2012 GSS.

Response Rates

Unit Response

In 2012, the GSS received complete responses from 11,914 (85.4%) of the 13,952 eligible units. An additional 1,984 units (14.2%) were partial respondents. The remaining 60 units (0.4%) were nonrespondents. Technical table A-6 shows the unit response rates from 1975 through 2012.

Unit response-rate calculation. In general, response rate calculations are based on responses to the survey's various data-collection grids (graduate student and postdoc counts, by ethnicity and race; full-time graduate student and postdoc counts, by primary source or mechanism of support; counts of postdocs, by type of doctoral degree and primary mechanism of support; counts of postdocs, by type of doctoral degree and citizenship; counts of postdocs, by origin of doctoral degree; and counts of NFRs, by type of doctoral degree and sex). The method for calculating response rates for units has changed over time.

2007–12.

- Complete response: Complete row and column totals for all grids and all details summing to the totals were reported.

- Partial response: Some data (e.g., only grand totals) were reported but data were incomplete for any of the grids.
- Nonresponse: No data were reported in any grid.

2004–06.

- Complete response: Complete row and column totals were reported in the data collection grids.
- Partial response: Only grand totals were reported for grids.
- Nonresponse: Responses other than as listed above.

These response rate calculations adhere to American Association for Public Opinion Research (AAPOR) standards for computing response rates.³

For information about the methods used though 2003 and the changes from 2003 to 2004, please see the 2004 technical notes (<http://www.nsf.gov/statistics/nsf06325/>).

Zeros versus Nonresponse. As in previous years, data collection grids in the Web survey were prefilled with zeros. Grids with a marked checkbox contributed to a complete response for the unit. Grids with unchanged, prefilled zeros and an unmarked checkbox disqualified the unit from complete response status.

School Response

Of the 684 schools eligible for the 2012 GSS, 679 schools (99.3%) were complete respondents, 1 school (0.1%) was a partial respondent, and 4 schools (0.6%) were nonrespondents.

The calculation of school response rate was unchanged from the method used from 2004 through 2011. School responses were calculated as follows:

- Complete response: 90% or more of its units provided complete or partial data.
- Partial response: at least 50% but less than 90% of its units provided complete or partial data.
- Nonresponse: less than 50% of its units provided data.

Institutional Response

Institutional response rates were calculated using the same criteria for schools. Of the 565 eligible institutions, 560 institutions (99.1%) were complete respondents, 1 institution (0.2%) was a partial respondent, and 4 institutions (0.7%) were nonrespondents.

Follow-up and Editing

Data quality is ensured by interactive edit checks built into the Web survey and a comprehensive review after the data are submitted by the coordinator. The Web survey edits verify that the data entered are internally consistent and are within an expected range, often based on the previous year's data. During follow-up, unit respondents are asked to explain the discrepancy whenever counts differ substantially from that of the previous year.

Postsubmission data quality checks were implemented to identify questionable data that needed further review. These quality checks were conducted when counts remained identical to the previous year and also when the school's unit list, total counts, and distribution of counts had notable changes. Changes to

³ See response rate 3 calculation, page 45, in AAPOR. 2011. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 7th ed. AAPOR.

the unit list included all unit additions and deletions, and changes to the highest degree granted status, GSS code, and unit name. All units that had total counts or a distribution of counts within a given data item that were substantially different from the previous survey cycle were reviewed.

Data fluctuations that were not sufficiently explained by the comments provided by the respondents during data collection were flagged for follow-up by telephone call to the coordinator. Revisions were made directly in the Web survey by the coordinator, unit respondents, or GSS contractor staff at the direction of the coordinator. See "Known or Suspected Sources of Nonsampling Error" below for a discussion of the types of measurement error detected in the 2012 data review and follow-up process.

Item Nonresponse and Imputation

The 2012 GSS collected 355 data items. Overall, item nonresponse rates ranged from 0.6% for total full-time graduate student count for all sources of financial support to 7.6% for the count of NFRs by doctoral degree type, with a mean of 4.6%. All missing data were imputed.

Different imputation techniques were used for units with and without comparable historical data. For units missing a key total (total part-time students, total postdocs, or total NFRs) with at least 1 year of qualified historical data, a carry-forward imputation method was used. Inflation factors were calculated for the key totals to account for year-to-year change. The previous year's key totals were then multiplied by these inflation factors to calculate the imputed values for the current year's key totals. Finally, all other variables were imputed by distributing the imputed key totals according to the previous year's proportions.

For units that reported totals but no details in 2012, details were imputed according to the prior distribution if qualified historical details were available. Otherwise, a nearest neighbor imputation method was used. In this method, a donor unit that was "nearest" to the unit whose data were being imputed (imputee) was identified among all responding units having similar characteristics as the imputee (such as having the same GSS code for program fields and offering a doctoral degree). When graduate student details were imputed, the nearest neighbor selected had full-time and part-time graduate enrollments that were most similar to the imputee's enrollments. When postdoc or doctorate-holding NFR details were imputed, the total number of postdocs or NFRs was used to choose the nearest neighbor. The imputed values were calculated by adjusting the donor's values to account for the difference in full-time and part-time enrollment totals between the two units.

If either the postdoc or NFR key total (or both) was missing, it was imputed by nearest neighbor using the other available key totals to select a donor. The same donor was then used to impute the details corresponding to the imputed key total(s).

In rare circumstances when no graduate student data were available from a new unit, Integrated Postsecondary Education Data System (IPEDS) completions and enrollment data were used to estimate graduate student totals. Based on the imputed totals, the details were then imputed by the nearest neighbor method mentioned above. Because IPEDS does not collect data on postdocs and doctorate-holding NFRs, a nearest neighbor was selected from the 2012 GSS data to estimate these counts, if necessary, using the graduate student totals to select a donor. For units in institutions that had not been in the GSS before, postdoc and NFR values were imputed as zero rather than using IPEDS-based imputation.

Missing values from the postdoc and nonfaculty researcher data collection that began in 2010 were imputed for the first time in 2012 using detailed, research-based imputation procedures.⁴ The 2010 and 2011 postdoc data updated in 2012 supersede all previously released data.

Tables A-7 through A-15 show the counts for imputed data and imputation rates.

Known or Suspected Sources of Nonsampling Error

Review of the data, cognitive interviews, usability tests, pilot tests, site visits, and other methodological activities with the institutions have pointed to a number of possible sources of measurement error. Possible sources of measurement error and the steps taken to minimize the impact on the data, where applicable, are as follows.

Double Counting

Anecdotal evidence indicated that some misreporting may have occurred when an institution had more than one coordinator or offered joint programs, although written instructions emphasized that each individual should be counted only once. To reduce double counting, facilitate inter-institution communication, and allow sharing of reported data, a screen in the Web survey provides names and contact information for all school coordinators at the institution.

Inclusion of Practitioner Degrees

Data review and telephone interviews conducted with school coordinators have revealed overreporting of graduate students working toward practitioner degrees, particularly in health fields. Starting with the 2007 survey cycle, survey materials indicated that students pursuing master's, DDS, MD, and certain other degrees in specified fields should be excluded from the counts. After the change in survey materials, coordinators often provided a comment explaining that they were deleting a unit because the degrees it offered were practitioner-based. These comments indicate that the explicit instructions may have reduced reporting error. However, the data quality control process in 2011 also indicated that some coordinators were still reporting graduate students in practitioner-based degree programs. Many coordinators revised downward the total count of graduate students in fields with degree exclusions, particularly among nursing units, after being contacted about questionable data during the follow-up. During the imputation process, new units that were suspected of having reported graduate students in excluded degree-field programs based on the GSS code were set to zero graduate students to be conservative, in the absence of other information.

In the 2011 survey cycle, checks were built into the Web survey to remind respondents to exclude students pursuing practitioner-based degrees.

Misreporting of Race and Ethnicity

Usability tests conducted with respondents in 2008 showed that there had been some misreporting of race and ethnicity that may have been due to the format of the GSS ethnicity and race questions. The format reflected NSF's interpretation of the Office and Management and Budget's (OMB's) 1997 revision of its standards on collecting these data. In 1999, the GSS began collecting data on Hispanics of one race separately from data on Hispanics of more than one race, although this was not necessary for compliance with the revised OMB standards. The cognitive interviews revealed that black Hispanics and white Hispanics were sometimes counted in the "Hispanic, More than one race" category, rather than in the appropriate "Only one race, Hispanic" category. In 2008, these two Hispanic categories were collapsed

⁴ See Harter R, Wang J, Einaudi P, Green P. 2013. GSS Imputation Research. Report to the National Science Foundation. Research Triangle Park, NC: RTI International.

into one: "Hispanic/Latino ethnicity (one or more races)." Subsequent cognitive interviews indicated that the new grouping was easier for respondents to understand.

Increasing numbers of students are choosing not to report their race to their institution, leading to growth over time in the "Unknown/race not stated" GSS category. This could lead to gradual declines in the proportion of students reported in some racial and ethnic groups. This item nonresponse trend is not unique to GSS.

Difficulty in Reporting Source and Mechanism of Support

Methodological research, data review and follow-up, and feedback from respondents indicated that graduate students' financial support data were difficult for respondents to report and, therefore, more prone to measurement error than other survey data. Difficulties in reporting these data may occur because the information may not be stored in one centralized database; financial support may not always be channeled through the institution (e.g., self-support); and foreign sources of support may not always be known. Respondents may also have difficulty categorizing financial information by field, such as when a student is enrolled in one unit but receives support from another. Finally, institutions define mechanisms of support differently (e.g., fellowships vs. traineeships) and may report individuals according to the institution's definition rather than that provided by the GSS. The grids now include "unknown" categories, beginning with the 2010 survey. The nonzero counts in these categories support the idea that school coordinators (SCs) sometimes have difficulty reporting sources and types of support.

The new postdoc and NFR details for sources and types of support, degree type, origin of degree, ethnicity, and race, also have "unknown" categories. In future years these counts may be reallocated to other categories, but for now there is insufficient research and data to reallocate the unknown counts.

Zeroes versus Nonresponse

Data review and follow-up indicated that zeroes reported by respondents sometimes represent nonresponse rather than actual zero counts. Not distinguishing the two could result in low estimates, given that data for a given variable are not imputed when item nonresponse is misinterpreted as a zero response. Prior to 2007, prefilled zeros were considered legitimate responses if the grid was left with all zeroes in place. Beginning with 2007, true zeroes reported by the respondents were distinguished from those remaining from nonresponse by a checkbox indicator, added to explicitly confirm zeroes for the grid prior to submission. In 2010, the first-time, full-time graduate student cells were the only cells with the potential for ambiguous zero counts; the remaining cells either had checkboxes to confirm a zero entry or were not prefilled with zeroes.

In the 2011 GSS, a checkbox was added for first-time, full-time graduate students to eliminate ambiguous zero counts.

Difficulty in Reporting Postdocs and NFRs

Interviews and usability tests with respondents as well as data review and follow-up efforts have found that data on postdocs and NFRs are particularly challenging for some respondents to report. Many respondents indicate in the Web survey that they are unable to provide data on their unit's postdocs or NFRs. Starting with the 2010 survey cycle, schools were given the option of appointing a separate postdoc coordinator who may be more knowledgeable about the postdocs or NFRs at their school to provide these data.

Data Revisions

In 2007, the GSS discontinued the practice of revising previous years' data based on changes the institutions report in units' eligibility and institutions' doctorate-granting status in the current survey cycle. Previously, reported counts for a given year fluctuated with each annual report because the current year's eligibility and doctorate-granting status changes were applied retroactively to all years in the data tables. When requested by the institution, the GSS will replace imputed estimates with actual data, but only for the most recent prior survey cycle. No such requests were made in the 2012 survey cycle.

Definitions

Data collected in 2012 included demographic and funding information for graduate students, postdocs, and doctorate-holding nonfaculty researchers. Definitions of key terms follow.

Enrollment Status

Full-time and part-time—Respondents were instructed to use their institution's definition.

First-time—Students enrolled for credit in a graduate degree program in an organizational unit for the first time in fall 2010. This may include graduate students previously enrolled in another graduate degree program at the institution or at another institution. It may also include students who already hold another graduate or professional degree.

Ethnicity and Race

The GSS uses definitions of ethnicity and race that are based on the OMB's "Standards for the Classification of Federal Data on Race and Ethnicity."

Hispanic or Latino (one or more races)⁵—All individuals of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race. This category includes individuals who are Hispanic or Latino and any other race(s).

Not Hispanic or Latino—Individuals who are not of Hispanic or Latino descent, regardless of race.

American Indian or Alaska Native—A person of only one race having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment.

Asian—A person of only one race having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent—for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand, and Vietnam.

Black or African American—A person of only one race having origins in any of the black racial groups of Africa.

Native Hawaiian or Other Pacific Islander—A person of only one race having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific islands.

⁵ The OMB standards designate Hispanics as an ethnic group rather than a racial group. Following these standards, Hispanic is not counted as a race in GSS. Cognitive interviews with respondents have shown that this is a source of considerable confusion. For example, black Hispanics and white Hispanics may be counted as "Hispanic, More than one race" rather than "Only one race, Hispanic." The ethnicity and race categories were aligned to IPEDS by combining the "Hispanic/Latino, More than one race," and "Hispanic/Latino, One race only," categories. In 2008 these two Hispanic categories were collapsed into one: "Hispanic/Latino ethnicity (one or more races)."

White—A person of only one race having origins in any of the original peoples of Europe, the Middle East, or North Africa.

More than one race—A person of two or more of the race categories listed above.

Unknown ethnicity or race—A person whose ethnicity or race is unknown or not stated.

The survey began collecting Asian and Native Hawaiian or Other Pacific Islander data separately in 1999, but past reports and data tables combined the data for these groups because less than 0.5% of graduate students were reported in the Native Hawaiian or Other Pacific Islander category. Starting in 2010, these two categories are reported separately.

From 1999 through 2007, the survey collected counts of single-race Hispanics separately from counts of Hispanics reporting two or more races. Reports and data tables from these years combined these data in one Hispanic or Latino category because no more than 0.5% of graduate students were classified as multiracial Hispanics. In 2008, the survey combined these categories into a single Hispanic or Latino category.

Prior to 2010, the not Hispanic or Latino multiracial category was combined with the unknown race category in reports and data tables because no more than 0.2% of graduate students were identified as such. Starting in 2010, these two categories are reported separately.

Historically Black Colleges and Universities (HBCUs)

Historically black colleges and universities (HBCUs)—Institutions of higher education that have been historically considered to enroll predominantly black students. The Department of Education maintains an official list of HBCUs, which is reviewed annually.

Graduate Student Mechanisms of Financial Support

Fellowship—A competitive award (often from a national competition) given to a graduate student that requires no work of the recipient.

Traineeship—A financial award given to a graduate student selected by the institution.

Research assistantship—A financial award given to a graduate student where most of the student's responsibilities are devoted primarily to research.

Teaching assistantship—A financial award given to a graduate student where most of the student's responsibilities are devoted primarily to teaching assistant activities.

Other support—All other mechanisms of support for graduate students.

Graduate Student Source of Financial Support

Federal sources—Financial support provided by the federal agencies. Excludes federally guaranteed student loans.

Nonfederal sources—Financial support from state and local government; institutional support, such as tuition waivers and stipends; support from foreign sources, such as foreign government, foreign firms,

and agencies of the United Nations; and other U.S. sources, such as support from nonprofit institutions, private industry, and all other nonfederal U.S. sources.

Self-support—Supported by loans (including federal loans) or personal or family financial contributions.

Postdoctoral Researchers (Postdocs)

Postdoc—The definition of a postdoc varies by institution. Respondents were instructed to use their institution's definition of a postdoc. NSF defines a postdoc as meeting both of the following qualifications:

1. Holds a recent doctoral degree, generally awarded within the last 5–7 years, such as
 - PhD or equivalent (e.g., ScD, DEng), or
 - First-professional degree in a medical or related field (e.g., MD, DDS, DO, DVM), or
 - Foreign degree equivalent to a U.S. doctoral degree
2. Has a limited-term appointment, generally no more than 5–7 years,
 - Primarily for training in research or scholarship, and
 - Working under the supervision of a senior scholar in a unit affiliated with the institution

Mechanisms of Financial Support for Postdocs

Fellowship—A competitive award (often from a national competition) given to a postdoc that requires no work of the recipient.

Traineeship—A financial award given to a postdoc selected by the institution.

Research grant—A financial assistance award given to an organization or an individual postdoc that supports specific research goals.

Other support—All other mechanisms of support for postdocs.

Sources of Financial Support for Postdocs

Federal sources—Financial support provided by the federal agencies.

Nonfederal sources—Financial support from state and local government; institutional support; support from foreign sources, such as foreign government, foreign firms, and agencies of the United Nations; and other U.S. sources, such as support from nonprofit institutions, private industry, and all other nonfederal U.S. sources.

Personal resources—The personal and family financial resources, including federal and other loans.

Unknown or not stated—Sources of financial support for the postdoc are unknown or cannot be determined.

Nonfaculty Researchers

Nonfaculty researchers—All doctorate-holding researchers who (1) are not considered either postdoctoral researchers or members of the faculty, and (2) are involved principally in S&E or health research activities. Also referred to as Other Doctorate-Holding Nonfaculty Researchers.

Historical Changes

Changes have been made to the coverage and content of the GSS to keep it relevant to the needs of data users. Such changes prevent precise maintenance of trend data; therefore some data items are not available for all institutions in all years. Major changes in the data collected (with the year in which changes became effective) include the following:

Data Revisions

- 1988–2006 Retrospective revisions of estimates based on changes in unit eligibility began in 1988 and continued through 2006. Data for units no longer eligible were removed from the counts that were originally published from 1975 through 1988, and revised estimates were produced. These changes resulted in a reduction in total enrollments and social science enrollments for all years.
- 1992–2006 Starting in 1992, annual reporting was revised retroactively to reflect the degree-granting status (master's or doctorate) of the institution responding to the current survey cycle. Over the years, a number of master's-granting institutions became doctorate-granting institutions, and a few doctorate-granting institutions became master's-granting institutions. As a consequence, the enrollment data in these institutions were reclassified to reflect their degree-granting status as of the most recent survey cycle. This practice was discontinued in 2007.

Demographic Characteristics

Sex

- 1975 Master's-granting institutions were first requested to provide data on full-time graduate students by sex.
- 1977 Data on part-time graduate students by sex collected from master's-granting institutions for first time.
- 1978 Doctorate-granting institutions received the short form of GSS that collected selected data items. The short form did not request any information on sex, and 1978 figures in the data tables represent estimates based on 1977 and 1979 data. Master's-granting institutions were not surveyed.
- 1979 Data on sex were requested for all graduate students at all institutions.
- 1993 Began collecting ethnicity and race data on all graduate students by sex.
- 2008 Began collecting the number of first-time, full-time male graduate students by ethnicity and race; full-time male graduate students by source of support; male postdocs by source of support; and male doctorate-holding nonfaculty researchers. Previously, the number of men was inferred by subtracting the number of women from the total.
- 2010 Began collecting citizenship, ethnicity, and race data on postdocs by sex.

Ethnicity and race

- 1979 Began collecting ethnicity and race data for full-time and part-time graduate students who were U.S. citizens as optional data item; collection of this information became an official part of the GSS in 1980.

- 1992 Began including permanent residents with counts of U.S. citizens, and ethnicity and race data for full-time and part-time graduate students include permanent residents.
- 1993 Began collecting ethnicity and race data by sex.
- 1999 Presented respondents with new ethnicity and race categories. The "Asian/Other Pacific Islander" category used in the previous years' surveys became two categories: "Asian" and "Native Hawaiian/Other Pacific Islander." Also, the survey included two new categories: "More than one race Hispanic/Latino" and "More than one race non-Hispanic/Latino." The 1999 survey excluded the "other" category that had been included in the previous years' surveys.
- 2008 Revised ethnicity and race categories to correspond to IPEDS by combining "Hispanic/Latino, One race only," and "Hispanic/Latino, More than one race," categories into "Hispanic/Latino (one or more races)."
- 2010 Began collecting ethnicity and race data for postdocs using same categories as in graduate students.

Citizenship

- 1972–79 Collected citizenship data for graduate students selectively in these years. These data are not included in the data file.
- 1977 Began collecting citizenship data for postdocs.
- 1978 Doctorate-granting institutions received the short form of the GSS that did not collect any data on postdocs. Master's-granting institutions were not surveyed.
- 1980 Began collecting citizenship data for all graduate students enrolled full-time. These data have been included in the data file since 1980.
- 1982 Began collecting citizenship data for all graduate students enrolled part-time. These data have been included in the data file since 1982.
- 1992 Changed definitions of foreign students and U.S. citizens to match those used by NCES. In 1992, GSS began including permanent residents with count of U.S. citizens instead of with count of foreign students.
- 2008 Clarification made for "non-U.S. citizens" to exclude non-U.S. citizens residing outside of the United States who are enrolled in an online degree program at a U.S. institution.
- 2010 Began collecting citizenship data on postdocs using the same categories as used for graduate students. In previous years, only counts of postdocs who are foreign nationals holding temporary visas were collected.

Other

Enrollment Status

- 1975 Graduate institutions that granted only master's degrees were asked to provide estimates for the number of full- and part-time students.

1999 Began collecting data on first-time, full-time enrollment by ethnicity, race, and sex; citizenship data was also collected but not reported until 2000.

Graduate Student Support

1978 GSS did not collect data on mechanisms of support but did collect data on sources of support for full-time students. Because actual mechanisms of support were unknown, these data were reported only as "other." Master's-granting institutions were not surveyed.

1979 Began collecting separate data on mechanisms of support for fellowships and traineeships (prior years had combined these mechanisms).

1985 Began collecting separate data on students receiving their primary support from the U.S. Department of Agriculture.

1996 Began collecting separate data on students receiving their primary support from the National Aeronautics and Space Administration.

1999 Began collecting separate data on students receiving their primary support from the U.S. Department of Energy.

2008 Data no longer collected for National Institutes of Health (NIH) teaching assistantships because NIH does not offer financial support to graduate students through this mechanism.

Began collecting number of full-time graduate students whose largest source of support came from a non-U.S. source via teaching assistantship.

Postdocs and NFRs

1972 Began collecting sources and mechanisms of financial support for postdocs and/or research associates as one combined category.

1977 Began collecting information on foreign postdocs and/or research associates.

1979 Changed "research associates" to "nonfaculty research staff with doctorates" and began collecting separate data on postdocs and nonfaculty research staff. GSS also began collecting information by sex. At this time, data item "sources of support by mechanism of support" was collected only for postdocs; it was not collected for other nonfaculty research staff with doctorates.

Began collecting separate data on mechanisms of support for federal fellowships and federal traineeships (prior years had combined these mechanisms).

1983 Began collecting information on postdocs' medical degree status.

2010 Began collecting ethnicity and race data for postdocs who are U.S. citizens and permanent residents. Began collecting data on the largest source of financial support, and the largest mechanism of support separately for postdocs. Mechanism of support (fellowship, traineeship, research grant) nonfederal sources of support was replaced with "other support."

Began collecting more detailed information on postdocs' and doctorate-holding nonfaculty researchers' doctoral degree type. Categories were added for those holding both doctoral

(e.g., PhD, ScD) and professional degrees (e.g., MD, DVM) and for whom type of degree was unknown.

Began collecting postdocs' doctoral degree type by citizenship, country of origin (U.S., foreign, unknown) of postdocs' doctoral degrees, and doctorate-holding nonfaculty researchers' doctoral degree type by sex.

Survey Instrument

- 1975–77 Data were collected for master's-granting institutions on abbreviated form of the GSS (short form).
- 1978 Doctorate-granting institutions received the short form of the GSS to collect selected data items; master's-granting institutions were not surveyed. Figures for 1978 for total enrollment and full-time enrollment in master's-granting institutions are estimates based on 1977 and 1979 data.
- 1979 All graduate institutions surveyed using same form and the full-scale survey was resumed.
- 1998 The GSS made the Web-based reporting system available to school coordinators and unit respondents.

Survey Universe

Institutions Surveyed

- 1966–71 Data were collected from a limited number of doctorate-granting institutions through NSF's Graduate Traineeship Program. These data are not comparable with data from 1972 through 2007.
- 1972–74 NSF assigned data collection efforts for the 1972 survey to the Universities and Nonprofit Institutions Studies Group and gradually expanded efforts during 1972–74 to include all institutions known to have programs leading to doctorate or master's degree. These data are not comparable with data collected before 1972 or after 1974. NSF has not inflated data for 1966–74 to reflect universe totals.
- 1975 Graduate institutions that granted only master's degrees in science, engineering, and health fields were asked to provide estimates for the number of full- and part-time students and the number of postdocs or research associates.
- 1975–77 Data for master's-granting institutions were collected on abbreviated form of the GSS (short form).
- 1978 Doctorate-granting institutions received the short form of the GSS to collect selected data items; master's-granting institutions were not surveyed. Figures for 1978 for total enrollment and full-time enrollment in master's-granting institutions are estimates based on 1977 and 1979 data.
- 1979 All graduate institutions were surveyed using the same form and the full-scale survey was resumed.
- 1984–87 The survey design was changed to stratified random sample with certainty stratum that included all doctorate-granting institutions; all master's-granting, historically black

colleges and universities; and all land-grant institutions. The remaining master's-granting institutions were divided into two sample strata, based on enrollment size. Enrollment data for 1984–87 have been adjusted to reflect universe totals.

- 1988 Surveying of the entire eligible survey population resumed for the first time since 1983. As of 1988, GSS has attempted to cover all academic institutions that grant master's degrees or research doctorates in science, engineering, and selected health fields.
- 1992 The definition of medical schools was revised during the fall 1992 survey cycle to include only those institutional components that are members of Association of American Medical Colleges (AAMC). Tables generated after the fall 1992 survey cycle differ from their counterparts in earlier years in that they exclude schools of nursing, public health, dentistry, veterinary medicine, and other health-related disciplines and should not be compared with the tables from earlier years.
- 2005 Because of Hurricane Katrina, the data for Tulane University and Loyola University New Orleans were not included, and Louisiana State University (LSU) data are for Graduate School (Baton Rouge) and Health Sciences Center (Shreveport) only; the two New Orleans campuses of LSU were closed. Data from these schools were not available and were not imputed.
- 2008 Three members of AAMC were added to GSS: Northeastern Ohio Universities Colleges of Medicine and Pharmacy, Universidad Central del Caribe School of Medicine, and University of Missouri–Kansas City School of Medicine.

GSS Eligible Fields

- 1966–71 Data were collected only for S&E fields supported by NSF from a limited number of doctorate-granting institutions through NSF's Graduate Traineeship Program. NSF has made no attempt to inflate data for 1966–71 to reflect universe totals.
- 1972–75 NSF assigned data collection efforts for the 1972 survey to Universities and Nonprofit Institutions Studies Group and gradually expanded efforts during period 1972–75 to include additional S&E fields and selected health fields. Because of this expansion, data for 1974 and earlier years are not strictly comparable with data from 1975 and later. NSF has not inflated data for 1972–74 to reflect universe totals.
- 1988 NSF reviewed and tightened criteria for including departments in survey universe. NSF considered those departments that were not primarily oriented toward granting research degrees as no longer meeting the definition of S&E. As a result of this review, NSF determined that several departments, especially in the field of "social sciences, not elsewhere classified," were engaged primarily in training teachers, practitioners, administrators, or managers rather than researchers; consequently, NSF deleted these departments from its database. NSF continued this process throughout 1989–2006 and expanded it to ensure trend consistency for the entire period from 1975 through 2006. As result of these changes, total enrollments and social sciences enrollments were reduced for all years.
- 2007 NSF reviewed and updated the classification scheme of GSS-eligible S&E and health fields. The new scheme was first used in the 2007 survey cycle. Three newly eligible

fields were added, some degree-granting programs became ineligible, and others were reclassified. Practitioner-based fields deemed ineligible.

2011 The GSS code list was updated to 2010 CIP codes; 58 new CIP program titles were added, 14 CIP program titles were moved between GSS codes, and 24 CIP program titles were determined to be ineligible for the GSS because they mostly referred to practitioner-oriented master's degree programs without a research doctorate component.

Data Availability

The data tables from this survey, available at <http://www.nsf.gov/statistics/gradpostdoc/>, are dynamically generated and are similar to those published for recent survey years. Data from this survey are also available through the WebCASPAR data system at <http://webcaspar.nsf.gov/>. Public-use data files from the GSS are available beginning with 1972 at http://www.nsf.gov/statistics/srvygradpostdoc/pub_data.cfm.

NSF includes selected data items from this survey for individual doctorate-granting institutions in the *NCSES Academic Institution Profiles* series (<http://www.nsf.gov/statistics/profiles>).

Data and analysis from this survey are available in InfoBriefs and other reports at <http://www.nsf.gov/statistics/gradpostdoc/> and in *Science and Engineering Indicators* and *Women, Minorities, and Persons with Disabilities in Science and Engineering*, available at <http://www.nsf.gov/statistics/>.

Changes in the Data Tables

The data tables on graduate students were reduced from 73 tables in 2009 to 26 tables in 2010. The remaining 47 tables are available on request. The three data tables on postdocs in the 2009 report were expanded to 24 tables in 2010 to provide similar details on the postdocs as the graduate students.

The postdoc data items collected starting in 2010 included the same or similar data items in 2009; however, these postdoc items were reformatted as part of the questionnaire redesign. For example, in the past, the degree-type question simply asked the respondents, "Of the total [postdoc count], how many have an MD, DO, DDS, or DVM?" In 2010, the question was expanded and asked the respondents to report the counts of postdocs by type of doctoral degree in the following categories: "Professional degree (MD, DVM, DO, DDS)," "Doctoral degree (PhD, ScD, DEng)," "Both professional and doctoral degree (MD-PhD, DVM-PhD)," and "Doctoral degree type unknown."

Therefore, the 2010 and later data may not be directly comparable with 2009 or prior year data because it is unclear how much change resulted from the redesigned questions. More information on the changes in postdoc data is available at <http://www.nsf.gov/statistics/infbrief/nsf13334/>.