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Numbers of Doctorates Awarded in the United States Declined in 2010

by Mark K. Fiegener¹

U.S. academic institutions awarded 48,069 research doctorates in 2010, down from 49,554 awards in 2009 and the first decline in doctorates awarded since 2002. The 2010 decline was magnified by the recent reclassification of many Doctor of Education (EdD) degree programs from the research doctorate to the professional doctorate category, and consequently the discontinuation of data collection from the reclassified degree programs by the Survey of Earned Doctorates (SED). The reclassification resulted in a substantially lower number of doctorates awarded in education than would have been the case had the graduates of the reclassified EdD degree programs participated in the 2010 SED (see “Data Sources and Limitations” for details). The total number of doctorates awarded in fields other than education also declined from 2009 to 2010, but by a much smaller amount than the decline in number of education doctorates.

Field of Study

Science and Engineering

The number of doctorates awarded in science and engineering (S&E) fields of study dipped slightly from 2009 after 7 consecutive years of growth (table 1). In total, 33,141 S&E doctorates were

awarded in 2010 (68.9% of all doctorates), 1.0% fewer than in 2009 but an increase of 27.6% since 2000. Doctoral awards were down from 2009 in five of the eight major science fields of study, with agricultural sciences showing the largest decrease (15.7%) and much smaller decreases (none greater than 2%) in physical sciences; psychology; social sciences; and earth, atmospheric, and ocean sciences. Computer sciences posted the largest gain (3.5%) over 2009.

Over the 2000–10 decade, doctorates awarded in agricultural sciences and psychology both fell by more than 5%, but numbers of doctorates in all other major science fields increased. Biological sciences reported the largest increase over the period, growing to 8,052 doctoral awards in 2010, almost one-quarter of all S&E doctorates. Computer sciences experienced the fastest growth (albeit starting from a lower base number of doctorates), nearly doubling in number over the decade.

Doctorates awarded in engineering fields fell to 7,552 in 2010, a 1.2% decrease from 2009 and the second straight year of decline following 6 consecutive years of growth. Materials science engineering and electrical engineering were the only engineering

fields showing noticeable growth in doctoral awards in 2010, increasing by 7.2% and 4.8%, respectively. Aerospace/aeronautical engineering and industrial/manufacturing engineering reported declines of more than 15% from 2009 to 2010. Except for other engineering (a category that includes 21 separate engineering subfields), electrical engineering remains the largest engineering subfield, awarding 23.5% of the total number of engineering doctorates in 2010.

Despite the recent declines in the numbers of engineering doctorates awarded, all engineering subfields experienced substantial growth over the decade. Materials science engineering and other engineering showed the largest percentage increases over the period, at 65.8% and 69.1%, respectively.

Non-Science and Engineering

The number of 2010 doctorates awarded in non-S&E fields other than education grew 0.8% over the 2009 total (table 1), led by a 2.1% increase in number of doctorates in humanities. Even after the EdD reclassification, education remained the largest non-S&E field, reporting 5,294 doctorates awarded in 2010.

TABLE 1. Doctorates awarded, by major field of study: 2000–10

| Field | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| All fields | 41,372 | 40,744 | 40,030 | 40,766 | 42,122 | 43,382 | 45,620 | 48,133 | 48,774 | 49,554 | 48,069 |
| Science and engineering | 25,966 | 25,529 | 24,608 | 25,283 | 26,275 | 27,984 | 29,867 | 31,831 | 32,836 | 33,466 | 33,141 |
| Science | 20,643 | 20,019 | 19,527 | 20,002 | 20,498 | 21,557 | 22,682 | 24,081 | 24,972 | 25,820 | 25,589 |
| Agricultural sciences | 1,037 | 977 | 1,009 | 1,060 | 1,045 | 1,038 | 1,033 | 1,140 | 1,088 | 1,167 | 984 |
| Biological sciences | 5,853 | 5,694 | 5,695 | 5,696 | 5,942 | 6,366 | 6,651 | 7,238 | 7,797 | 8,024 | 8,052 |
| Biochemistry | 776 | 729 | 781 | 772 | 703 | 693 | 784 | 864 | 899 | 858 | 865 |
| Molecular biology | 706 | 711 | 623 | 615 | 725 | 724 | 780 | 709 | 786 | 763 | 701 |
| Neurosciences | 495 | 486 | 491 | 474 | 584 | 690 | 741 | 777 | 883 | 982 | 953 |
| Other biological sciences | 3,876 | 3,768 | 3,800 | 3,835 | 3,930 | 4,259 | 4,346 | 4,888 | 5,229 | 5,421 | 5,533 |
| Computer sciences | 861 | 830 | 809 | 867 | 948 | 1,129 | 1,453 | 1,655 | 1,787 | 1,609 | 1,665 |
| Earth, atmospheric, and ocean sciences | 665 | 630 | 671 | 647 | 671 | 714 | 757 | 875 | 865 | 877 | 864 |
| Mathematics | 1,050 | 1,010 | 919 | 993 | 1,076 | 1,205 | 1,325 | 1,388 | 1,400 | 1,553 | 1,589 |
| Physical sciences ^a | 3,407 | 3,396 | 3,205 | 3,323 | 3,350 | 3,643 | 3,928 | 4,081 | 4,081 | 4,284 | 4,201 |
| Chemistry | 1,989 | 1,982 | 1,923 | 2,040 | 1,986 | 2,126 | 2,363 | 2,318 | 2,246 | 2,392 | 2,306 |
| Physics and astronomy | 1,389 | 1,384 | 1,264 | 1,247 | 1,349 | 1,517 | 1,565 | 1,763 | 1,835 | 1,892 | 1,895 |
| Psychology | 3,615 | 3,401 | 3,206 | 3,277 | 3,327 | 3,322 | 3,258 | 3,271 | 3,355 | 3,472 | 3,421 |
| Social sciences | 4,155 | 4,081 | 4,013 | 4,139 | 4,139 | 4,140 | 4,277 | 4,433 | 4,599 | 4,834 | 4,813 |
| Engineering | 5,323 | 5,510 | 5,081 | 5,281 | 5,777 | 6,427 | 7,185 | 7,750 | 7,864 | 7,646 | 7,552 |
| Aerospace/aeronautical engineering | 214 | 202 | 209 | 200 | 201 | 219 | 238 | 267 | 266 | 297 | 252 |
| Chemical engineering | 619 | 636 | 607 | 568 | 638 | 774 | 799 | 817 | 873 | 807 | 821 |
| Civil engineering | 480 | 501 | 540 | 552 | 547 | 622 | 655 | 703 | 713 | 709 | 645 |
| Electrical engineering | 1,330 | 1,346 | 1,211 | 1,238 | 1,389 | 1,547 | 1,786 | 1,967 | 1,888 | 1,695 | 1,776 |
| Industrial/manufacturing engineering | 176 | 206 | 230 | 214 | 217 | 221 | 234 | 279 | 280 | 252 | 214 |
| Materials science engineering | 404 | 448 | 364 | 438 | 474 | 493 | 583 | 646 | 636 | 625 | 670 |
| Mechanical engineering | 807 | 878 | 771 | 752 | 754 | 892 | 1,044 | 1,071 | 1,082 | 1,094 | 987 |
| Other engineering | 1,293 | 1,293 | 1,149 | 1,319 | 1,557 | 1,659 | 1,846 | 2,000 | 2,126 | 2,167 | 2,187 |
| Non-science and engineering | 15,406 | 15,215 | 15,422 | 15,483 | 15,847 | 15,398 | 15,753 | 16,302 | 15,938 | 16,088 | 14,928 |
| Education | 6,442 | 6,356 | 6,508 | 6,651 | 6,635 | 6,227 | 6,121 | 6,448 | 6,561 | 6,528 | 5,294 |
| Health | 1,591 | 1,540 | 1,655 | 1,633 | 1,718 | 1,784 | 1,907 | 2,143 | 2,090 | 2,096 | 2,112 |
| Humanities | 5,213 | 5,178 | 5,050 | 5,019 | 5,012 | 4,950 | 5,124 | 4,873 | 4,502 | 4,661 | 4,759 |
| Foreign languages and literature | 642 | 620 | 627 | 623 | 587 | 607 | 615 | 607 | 627 | 598 | 603 |
| History | 1,019 | 991 | 983 | 895 | 927 | 881 | 917 | 886 | 923 | 989 | 963 |
| Letters | 1,612 | 1,493 | 1,455 | 1,416 | 1,407 | 1,389 | 1,457 | 1,341 | 1,420 | 1,413 | 1,518 |
| Other humanities | 1,940 | 2,074 | 1,985 | 2,085 | 2,091 | 2,073 | 2,135 | 2,039 | 1,532 | 1,661 | 1,675 |
| Other non-science and engineering fields | 2,160 | 2,141 | 2,209 | 2,180 | 2,482 | 2,437 | 2,601 | 2,838 | 2,785 | 2,803 | 2,763 |
| Business management/administration | 1,070 | 1,067 | 1,114 | 1,037 | 1,256 | 1,170 | 1,311 | 1,506 | 1,421 | 1,405 | 1,366 |
| Communication | 389 | 390 | 397 | 415 | 450 | 487 | 510 | 560 | 557 | 626 | 637 |
| Fields not elsewhere classified | 697 | 684 | 698 | 728 | 776 | 779 | 773 | 765 | 807 | 772 | 760 |
| Unknown field | 4 | 0 | 0 | 0 | 0 | 1 | 7 | 7 | 0 | 0 | 0 |

^a Field totals for 2000–04 include other physical sciences fields not shown separately.

NOTE: Groupings of major fields and subfields of study differ from questionnaire and summary reports in that American/U.S. studies, archaeology, and history, science, and technology and society are in social sciences, not humanities; agricultural economics is in social sciences, not agricultural sciences; public administration is in social sciences, not other non-science and engineering fields; and agricultural business and management is included in business management/administration, not agricultural sciences, according to National Science Foundation taxonomy.

SOURCE: NSF/NIH/USED/NEH/USDA/NASA, 2010 Survey of Earned Doctorates.

Over the past decade, doctoral awards in non-S&E fields (other than education) increased 7.5%. The number of doctorates awarded in health showed substantial growth (32.7%) over this period, as did the number of doctorates in other non-S&E fields (27.9%). The number of doctorates awarded in humanities fell 8.7% from 2000 to 2010.

Demographics

Sex

S&E doctorates earned both by men and by women declined slightly from 2009 to 2010, by 1.3% and 0.4%, respectively (table 2). Over the period 2005–10, the percentage change in female S&E doctorate recipients (28.6%) was more than double that of their male counterparts (12.5%). As a result, the share of S&E doctorates awarded to women increased from 37.7% in 2005 to 40.9% in 2010. Women earned the majority of non-S&E doctorates awarded over the 5-year period, reaching a 60.0% share in 2010.

Race and Ethnicity among U.S. Citizens and Permanent Residents

The number of S&E doctoral degrees earned by U.S. citizens and permanent residents who self-reported as members of racial or ethnic minority groups increased to 4,739 in 2010, a 3.4% increase over 2009 and a rise of 35.5% from the 2005 total (table 2).² In comparison the number of S&E doctorates earned by individuals who self-reported as white grew 0.8% in 2010 and 21.2% over the period 2005–10.

Of all S&E doctorates earned by U.S. citizens and permanent residents, those earned by individuals self-reporting as members of minority groups rose from 21.8% in 2005 to 23.7% in 2010. The number of S&E doctorates earned over this period grew for all groups except

TABLE 2. Doctorates awarded, by selected characteristics of doctorate recipients: 2005–10

| Characteristic | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|--------|--------|--------|--------|--------|--------|
| All doctorate recipients | 43,382 | 45,620 | 48,133 | 48,774 | 49,554 | 48,069 |
| Science and engineering ^a | 27,984 | 29,867 | 31,831 | 32,836 | 33,466 | 33,141 |
| Male | 17,404 | 18,371 | 19,542 | 19,857 | 19,842 | 19,584 |
| Female | 10,539 | 11,477 | 12,277 | 12,972 | 13,596 | 13,548 |
| U.S. citizen or permanent resident ^b | 16,045 | 16,865 | 17,322 | 18,530 | 19,715 | 19,983 |
| White | 12,291 | 12,779 | 13,183 | 13,915 | 14,781 | 14,898 |
| All other race or ethnicity | 3,497 | 3,817 | 3,868 | 4,265 | 4,583 | 4,739 |
| American Indian or Alaska Native | 67 | 45 | 81 | 59 | 75 | 76 |
| Asian | 1,635 | 1,792 | 1,699 | 1,920 | 1,981 | 2,125 |
| Black or African American | 707 | 748 | 792 | 826 | 951 | 903 |
| Hispanic or Latino ^c | 805 | 889 | 931 | 1,085 | 1,100 | 1,155 |
| Native Hawaiian or Other Pacific Islander | 39 | 46 | 45 | 48 | 46 | 38 |
| Two or more races | 244 | 297 | 320 | 327 | 430 | 442 |
| Temporary visa holders | 10,426 | 11,587 | 12,369 | 12,626 | 12,211 | 11,302 |
| Non-science and engineering ^a | 15,398 | 15,753 | 16,302 | 15,938 | 16,088 | 14,928 |
| Male | 6,330 | 6,648 | 6,664 | 6,413 | 6,492 | 5,964 |
| Female | 9,043 | 9,083 | 9,624 | 9,522 | 9,590 | 8,957 |
| U.S. citizen or permanent resident ^b | 11,911 | 12,181 | 12,191 | 12,308 | 12,604 | 11,590 |
| White | 9,222 | 9,380 | 9,202 | 9,325 | 9,316 | 8,610 |
| All other race or ethnicity | 2,527 | 2,610 | 2,817 | 2,799 | 3,109 | 2,788 |
| American Indian or Alaska Native | 73 | 73 | 62 | 63 | 71 | 46 |
| Asian | 550 | 629 | 643 | 641 | 723 | 703 |
| Black or African American | 1,093 | 1,070 | 1,182 | 1,194 | 1,280 | 1,099 |
| Hispanic or Latino ^c | 626 | 646 | 722 | 686 | 780 | 695 |
| Native Hawaiian or Other Pacific Islander | 30 | 20 | 20 | 21 | 29 | 17 |
| Two or more races | 155 | 172 | 188 | 194 | 226 | 228 |
| Temporary visa holders | 2,421 | 2,618 | 2,794 | 2,627 | 2,503 | 2,323 |

^a Total includes doctorate recipients who did not indicate their sex.

^b Total includes doctorate recipients who did not indicate race and were not of Hispanic ethnicity and those of unknown race or ethnicity.

^c Includes Mexican American, Puerto Rican, and other Hispanic ethnicities.

SOURCE: NSF/NIH/USED/NEH/USDA/NASA, 2010 Survey of Earned Doctorates.

Native Hawaiians and Other Pacific Islanders: 13.4% for American Indians and Alaska Natives; 30.0% for Asians; 27.7% for black or African Americans; 43.5% for Hispanics or Latinos; and 81.1% for individuals reporting two or more races.³ Asians constituted the largest group (44.8%) among S&E doctorate recipients reporting minority race or ethnicity in 2010, followed by Hispanics (24.4%), blacks (19.1%), individuals reporting two or more races (9.3%), American Indians and Alaska Natives (1.6%), and Native Hawaiians and Other Pacific Islanders (0.8%).

A total of 2,788 U.S. citizens and permanent residents who self-reported as members of minority groups earned non-S&E doctoral degrees in 2010. In 2010, 24.1% of non-S&E doctorates awarded to U.S. citizens and permanent residents were earned by individuals self-reporting as members of minority groups. In 2010, blacks constituted the largest group (39.4%) of non-S&E doctorate recipients reporting minority race or ethnicity, followed by Asians (25.2%), Hispanics (24.9%), individuals reporting two or more races (8.2%), American Indians and Alaska Natives

(1.6%), and Native Hawaiians and Other Pacific Islanders (0.6%).

Citizenship

The number of S&E doctorate recipients with temporary visas decreased 7.4% from 2009 to 2010 (table 2), the second consecutive year of decline after several years of growth. Despite the recent downturn, the number of S&E doctorates awarded to temporary visa holders grew 8.4% from 2005 to 2010. The number of S&E doctorates awarded to U.S. citizens and permanent residents increased by 1.4% from 2009 to 2010 and by 24.5% over the 5-year period.

The proportion of S&E doctorates awarded to temporary visa holders declined from 37.3% in 2005 to 34.1% in 2010. Temporary visa holders constitute a much smaller share of the doctorate recipients in non-S&E fields, earning 15.6% of the non-S&E doctorates awarded in 2010.

Data Sources and Limitations

Survey of Earned Doctorates

Data reported in this InfoBrief were collected by the 2010 Survey of Earned Doctorates (SED), a survey of all individuals who earned research doctoral degrees from an accredited academic institution in the United States or Puerto Rico during academic year 2010 (1 July 2009 to 30 June 2010). Research doctoral programs are oriented toward preparing students to make original contributions to knowledge in a field; they typically require the completion of a dissertation or equivalent project and are not primarily intended for the practice of a profession. The SED recognized 18 distinct types of research doctorates in 2010. The vast majority (95.8%) of 2010 research doctorate recipients received the Doctor of Philosophy (PhD) degree and another

3.1% received the Doctor of Education (EdD) degree. 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.

The SED is sponsored by six federal agencies: the National Science Foundation, the National Institutes of Health (U.S. Department of Health and Human Services), the U.S. Department of Education, the U.S. Department of Agriculture, the National Endowment for the Humanities, and the National Aeronautics and Space Administration. In 2010, 92.9% of the 48,069 new doctorate recipients completed the survey. Limited records are constructed for nonrespondents from administrative lists of the university, such as commencement programs and graduation lists. Consequently, the 2010 item response rates for some items exceed the 92.9% unit response rate: the field of study information used in this report was obtained for all doctorate recipients, information on sex was obtained for 99.97%, race/ethnicity for 93.2%, and citizenship status for 94.0%.

EdD Degree Program Reclassifications

After a 3-year review of the EdD degree programs participating in the SED, 77 programs were reclassified from research doctorate to professional doctorate in 2010. Beginning with 2010, SED data are no longer being collected from graduates earning degrees from the reclassified EdD programs. The exact number of individuals who graduated with doctorates in the 77 reclassified EdD programs is unknown; however, the number of 2010 doctorates awarded in education programs reported here is substantially lower than would have been the case had those individuals participated in the 2010

SED. In 2009, 1,136 doctorate recipients earned degrees from EdD degree programs that were reclassified in 2010. Of these doctorate recipients, 96% identified their field of study as education, 2% reported a science and engineering field of study, and 2% identified a non-science and engineering field of study other than education.

Data Comparability and Availability

Readers are cautioned that the 2010 data on education doctorates are not strictly comparable with data of previous years, and cross-year comparisons of numbers of education doctorates do not appear in this report. Cross-year comparisons of doctorates awarded in non-science and engineering (non-S&E), a category of fields that subsumes education, are reported, but the counts explicitly exclude education doctorates from the total numbers of non-S&E doctorates. As the effects of the EdD reclassification on the number of 2010 doctorates awarded in fields other than education are small, cross-year comparisons of doctorates in those fields are reported.

The major fields and subfields of study are reported differently in this InfoBrief than in the SED questionnaire instrument and the interagency report *Doctorate Recipients from U.S. Universities: 2010* (forthcoming). In this InfoBrief, the major field “health” is in the non-S&E category rather than in S&E. The fine fields American/U.S. studies; archeology; and history, science, and technology and society are counted in social sciences (S&E category) rather than humanities (non-S&E category). Agricultural economics is included in social sciences rather than agricultural sciences. Finally, public administration is counted in social sciences (S&E category) rather than professional fields (non-S&E category).

The full set of detailed tables from this survey, providing more information on doctorates awarded, will appear in *Doctorate Recipients from U.S. Universities: 2010* and forthcoming reports of the *Science and Engineering Doctorate Awards* series, at <http://www.nsf.gov/statistics/doctorates/>. Individual detailed tables from recent surveys may be available in advance of publication of the full reports. For further information, please contact the author.

Notes

1. Mark K. Fiegener, Human Resources Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230 (mfiegene@nsf.gov; 703-292-4622).

2. Minority groups include American Indian or Alaska Native, Asian, black or African American, Hispanic or

Latino (Mexican American, Puerto Rican, and other Hispanic ethnicities), Native Hawaiian or Other Pacific Islander, and persons who reported being two or more races.

3. In this report, “black” is used interchangeably with “black or African American,” and “Hispanic” is used interchangeably with “Hispanic or Latino.”

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