

## 2004 DOCTORATE AWARDS INCREASE IN SCIENCE AND ENGINEERING FIELDS FOR THE SECOND YEAR IN A ROW

by Susan T. Hill

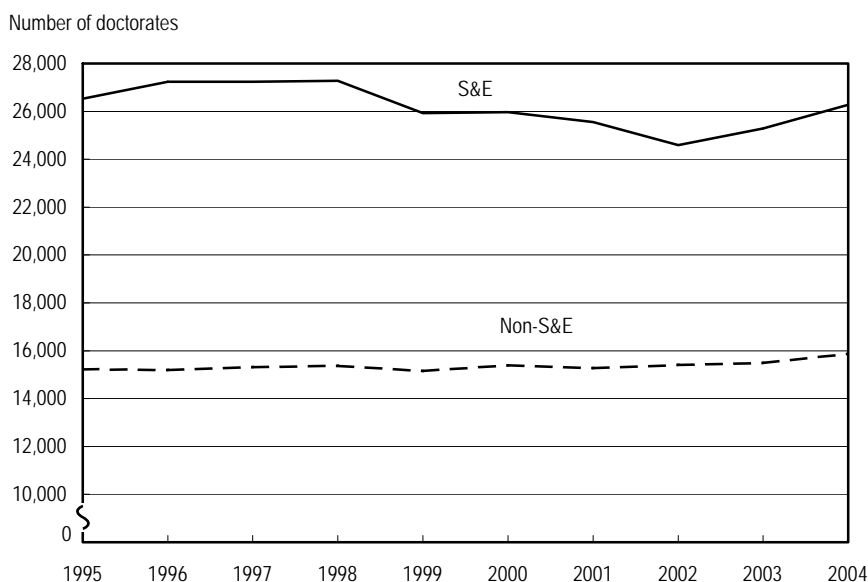
In 2004, total doctorate awards in science and engineering (S&E) increased for the second year in a row, up to 26,275. After reaching an all-time high in 1998 (27,278), the number of S&E doctorate awards generally declined until 2002 (to around 24,600). Although there was an increase for two successive academic years, there is not yet sufficient evidence for determining if there is a new trend (figure 1).

The demographic characteristics of persons awarded research doctorates from U.S. universities were

different in 2004 than in 1995. In 2004, women comprised 45 percent of doctorate recipients, up from 39 percent in 1995. While non-U.S. citizens comprised about a third of doctorate recipients in both years, there were changes among U.S. citizens. Both Asian and underrepresented racial/ethnic minority groups were a larger share of doctorates in the 2004 graduating class than in 1995 (table 1).

The 2004 count of doctorate awards (5,937) in the largest S&E field – biological sciences—brought it

FIGURE 1. Doctorate awards in S&E and non-S&E fields: 1995–2004



SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates, 2004.



Information and data from the Division of Science Resources Statistics are available on the web at <http://www.nsf.gov/statistics/>. To request a printed copy of this report go to <http://www.nsf.gov/publications/orderpub.jsp> or call (703) 292-PUBS (7827). For NSF's Telephonic Device for the Deaf, dial toll-free (800) 281-8749 or (703) 292-5090.

TABLE 1. Doctorate awards, by selected characteristics of doctorate recipients: 1995 and 2004

Characteristic of recipient	1995	2004
All doctorates	41,750	42,155
	Percent	
Male	61	55
Female	39	45
Non-U.S. citizen	32	33
U.S. citizen	68	67
White	87	80
Asian <sup>a</sup>	4	6
Underrepresented racial/ethnic minority <sup>b</sup>	9	12

<sup>a</sup> Pacific Islanders were included in this category in 1995.

<sup>b</sup> American Indians/Alaska Natives, blacks, and Hispanics.

NOTE: Percentages exclude those for whom characteristic is unknown.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates, 2004.

higher than the previous peak in 2000 (table 2). Physical sciences, psychology, and engineering in 2004 were still well below their past peaks. For non-S&E fields as a whole, the 2004 total of 15,880 was the all-time high. The number of non-S&E doctorates has grown since 1995, primarily in health fields.

Physics has shown the least recovery toward past peak levels of any science field.<sup>1</sup> From about 1,480 in 1995 and 1996 to the total of 1,186 in 2004, physics dropped about 20 percent. The drop in physics doctorate recipients since 1995 has been strongest among male U.S. citizens (236 of the total decline of 293 from 1995 to 2004) (table 3). The number of doctorates in physics

<sup>1</sup>It should be noted that graduate enrollment in physics has been increasing since fall 2000, so the number of doctorate awards may reverse the declines seen in the recent past. (See National Science Foundation, Division of Science Resources Statistics, *Graduate Enrollment in Science and Engineering Programs Up in 2003, but Declines for First-Time Foreign Students*, NSF-05-317, table 2.)

also declined among noncitizens, with significant declines in doctorates awarded to persons from China, India, Korea, and Taiwan, somewhat counterbalanced by increases in physics doctorate awards to persons from Russia, Romania, Italy, Turkey, Bulgaria, and Ukraine.

Some fields of science and engineering have large proportions of doctorates awarded to persons with citizenship outside the United States. In physics, engineering, mathematics, and computer science, more than 50 percent of doctorate recipients are not U.S. citizens (figure 2).

### Data Notes

The data presented here are from the Survey of Earned Doctorates (SED) for academic year 2004 (July 2003 to June 2004). All persons completing requirements for research doctorates from universities in the United States (including Puerto Rico) are eligible for the SED; the survey response rate in 2004 was 91 percent of the 42,155 new doctorate recipients. The field of study information used in this report was obtained for all research doctorates from the respondents or from commencement books for nonrespondents.

This survey is sponsored by six federal agencies: National Science Foundation, National Institutes of Health, U.S. Department of Education, U.S. Department of Agriculture, National Endowment for the Humanities, and National Aeronautics and Space Administration. Additional data on doctorates from all fields of study, including humanities, education, health and other fields, and the survey methodology are available in the interagency-sponsored report *Doctorate Recipients from U.S. Universities: Summary Report 2004* at: <http://www.norc.uchicago.edu/issues/docdata.htm>.

TABLE 2. Doctorates awarded, by major field of study: 1995–2004

Field	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
All fields	41,750	42,439	42,541	42,647	41,092	41,365	40,824	39,989	40,770	42,155
Science and engineering	26,536	27,241	27,232	27,278	25,933	25,966	25,548	24,588	25,289	26,275
Science	20,528	20,932	21,117	21,354	20,603	20,645	20,043	19,512	20,011	20,499
Agricultural sciences	1,117	1,118	1,078	1,110	1,065	1,038	975	1,009	1,061	1,046
Biological sciences	5,376	5,724	5,789	5,845	5,582	5,854	5,691	5,690	5,697	5,937
Computer sciences	997	920	909	927	856	859	826	807	865	949
Earth, atmospheric, and ocean sciences	699	711	782	741	706	663	630	673	646	672
Mathematics	1,190	1,122	1,123	1,177	1,083	1,050	1,007	918	994	1,075
Physical sciences	3,841	3,839	3,769	3,824	3,579	3,407	3,394	3,212	3,325	3,353
Astronomy	173	192	198	206	159	185	186	144	168	165
Chemistry	2,162	2,149	2,148	2,216	2,132	1,989	1,981	1,923	2,041	1,987
Physics	1,479	1,485	1,401	1,378	1,271	1,204	1,197	1,127	1,080	1,186
Other physical sciences	27	13	22	24	17	29	30	18	36	15
Psychology	3,429	3,495	3,557	3,675	3,668	3,618	3,442	3,199	3,281	3,336
Social sciences	3,879	4,003	4,110	4,055	4,064	4,156	4,078	4,004	4,142	4,131
Engineering	6,008	6,309	6,115	5,924	5,330	5,321	5,505	5,076	5,278	5,776
Aeronautical/astronautical engineering	252	287	273	241	206	214	203	209	200	201
Chemical engineering	708	798	767	776	674	725	729	705	648	723
Civil engineering	656	698	655	650	584	556	594	626	674	675
Electrical engineering	1,731	1,741	1,720	1,596	1,478	1,544	1,576	1,395	1,466	1,649
Industrial engineering	284	259	246	229	211	176	206	230	213	217
Materials/metallurgical engineering	588	574	582	565	469	451	497	396	474	509
Mechanical engineering	1,025	1,052	1,022	1,022	855	864	953	827	814	853
Other engineering	764	900	850	845	853	791	747	688	789	949
Non-science and engineering	15,214	15,198	15,309	15,369	15,159	15,399	15,276	15,401	15,481	15,880
Education	6,650	6,785	6,574	6,571	6,546	6,430	6,337	6,487	6,632	6,635
Health	1,329	1,324	1,421	1,500	1,407	1,592	1,622	1,653	1,636	1,730
Humanities	4,691	4,712	5,034	5,116	5,034	5,213	5,161	5,010	5,015	5,017
Professional/other/unknown	2,544	2,377	2,280	2,182	2,172	2,164	2,156	2,251	2,198	2,498

NOTES: Categories are grouped differently from questionnaire and summary reports in that linguistics, history of science, American studies, and archaeology are included in social science and not in humanities, and public administration is included in social science and not in professional fields.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates, 2004 .

TABLE 3. Doctorate awards in physics, by selected characteristics and countries/economies of doctorate recipients: 1995 and 2004

Characteristic	1995	2004	% change
All physics doctorates <sup>a</sup>	1,479	1,186	-20
U.S. citizen <sup>b</sup>	764	515	-33
Male	676	440	-35
Female	87	75	-14
Non-U.S. citizen	695	621	-11
China	265	185	-30
India	45	34	-24
Korea	79	33	-58
Taiwan	51	17	-67
Russia	*	56	*
Romania	*	31	*
Turkey	10	19	90
Italy	6	16	167
Ukraine	*	9	*
Bulgaria	*	9	*
Other/unknown	238	235	-1

\* = Suppressed because cell size < 5.

<sup>a</sup> Includes persons whose citizenship and sex is unknown.

<sup>b</sup> Includes persons whose sex is unknown.

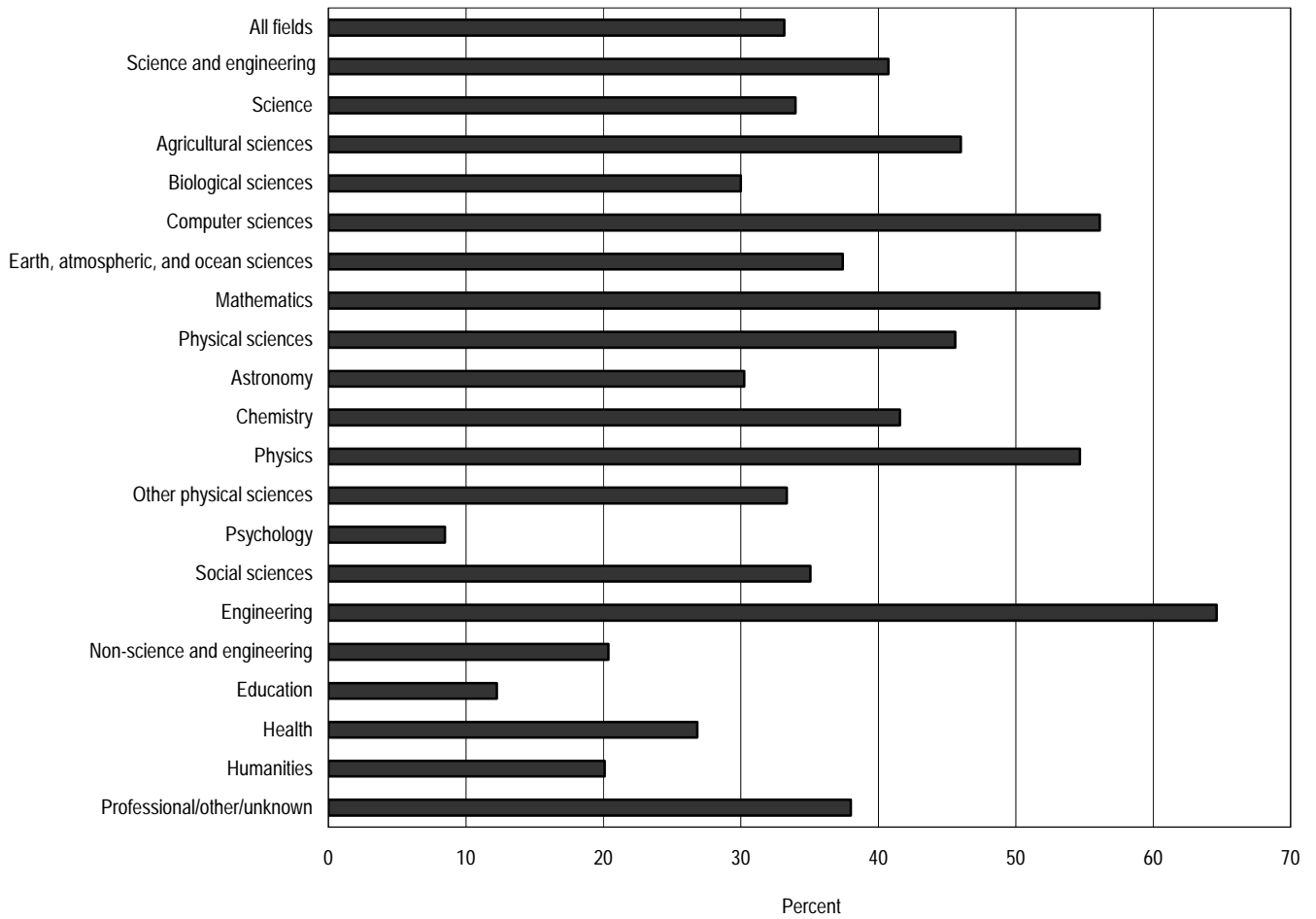
SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates, 2004.

More detailed data on science and engineering doctorate recipients and the survey are available from NSF in the forthcoming report *Science and Engineering Doctorate Awards: 2004* at <http://www.nsf.gov/statistics/doctorates>.

This InfoBrief was prepared by

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FIGURE 2. U.S. doctorate recipients who were non-U.S. citizens, by field of study: 2004



SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates, 2004.

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