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FIRST-TIME S&E GRADUATE ENROLLMENT OF FOREIGN STUDENTS REBOUNDS IN 2005

by Julia Oliver

Total U.S. enrollment of foreign graduate students in science and engineering (S&E) fields continued to decline in 2005, but enrollment of first-time, full-time foreign S&E graduate students rose 4% over the 2004 level—the first increase since 2001 (table 1).[1] First-time, full-time S&E graduate enrollment of students overall and of students with U.S. citizenship or permanent resident status both rose by about 3% over 2004 levels. Total S&E graduate student enrollment and numbers of postdoctoral appointees (postdocs) in S&E fields reached new peaks in 2005. Data are from the 2005 Survey of Graduate Students and Postdoctorates in Science and Engineering, cosponsored by the National Science Foundation (NSF) and the National Institutes of Health (NIH).

S&E Graduate Student Enrollment

S&E graduate enrollment increased slightly in 2005 due to a rise in enrollment of U.S. citizens and permanent residents (table 1). Since reaching its peak in 2003, foreign S&E graduate enrollment has dropped by almost 6%. Foreign students constituted 31% of all S&E graduate students enrolled in 2003; in 2005 that proportion was 29%. Foreign enrollment has increased by 41% over the 10-year period beginning in 1995, whereas enrollment for U.S. citizens and permanent residents has increased by 5% over the same period. In 2004 foreign student enrollment declined in both number and proportion, and this decline continued in 2005, with the number of foreign students dropping 3% and the proportion of students dropping from 30% to 29%.

[1] Foreign students are those with temporary visas.

Enrollment of U.S. citizens and permanent residents in 2005 was the highest ever (339,550); the previous peak was in 1993 (330,057). Although the gain in numbers in 2005 was greater than it was in 2004, it was much smaller than it was in 2002 or 2003.

Field of Study

Graduate enrollment in 2005 declined in four of the nine major S&E fields: agricultural sciences; computer sciences; earth, atmospheric, and ocean sciences; and engineering (table 2). Enrollment in computer sciences dropped 4% between 2004 and 2005; since 2002, enrollment has dropped 13%. Engineering enrollment dropped for the second straight year, with the largest decline (4%) in the subfield of electrical engineering; the only engineering subfields with increasing enrollment were aerospace engineering, biomedical engineering, and metallurgical/materials engineering. Of the fields of study with the largest graduate enrollments (10,000 or more), growth was greatest in psychology (6%) and in the social sciences subfield of political science (5%).

Trends in first-time, full-time S&E enrollment varied by field and citizenship (table 3, figure 1). The increase in 2005 in first-time, full-time enrollments of temporary visa holders is largely the result of enrollment increases in engineering and computer sciences—the two fields attracting the largest numbers of foreign students. First-time, full-time foreign graduate student enrollment in most other S&E fields, exemplified by the biological sciences, was relatively stable. Psychology and social sciences contributed most to the increase in 2005 in

TABLE 1. S&E graduate enrollment, by citizenship, enrollment status, sex, and race/ethnicity, and S&E postdocs by citizenship: 1995–2005

Characteristic	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	% change 2004–05
All S&E graduate students	422,466	415,181	407,630	404,856	411,182	413,536	429,242	454,847	474,694	476,195	478,782	0.5
Full time	287,171	284,039	280,669	278,943	283,893	291,355	304,021	325,472	339,028	340,545	341,778	0.4
First time	74,364	73,448	73,600	74,373	75,447	78,332	82,411	86,827	89,331	86,580	89,183	3.0
Other	212,807	210,591	207,069	204,570	208,446	213,023	221,610	238,645	249,697	253,965	252,595	-0.5
Part time	135,295	131,142	126,961	125,913	127,289	122,181	125,221	129,375	135,666	135,650	137,004	1.0
Men	262,256	253,510	245,619	241,429	242,786	243,057	251,812	266,219	276,260	274,113	272,119	-0.7
Women	160,210	161,671	162,011	163,427	168,396	170,479	177,430	188,628	198,434	202,082	206,663	2.3
U.S. citizens and permanent residents												
All S&E graduate students	323,962	317,075	308,668	302,879	301,254	290,711	294,711	309,235	327,358	332,624	339,550	2.1
Full time	204,113	200,674	195,974	191,945	190,076	185,673	188,225	200,200	212,988	217,620	221,403	1.7
First time	NA	NA	NA	NA	NA	46,316	48,232	54,653	59,669	58,966	60,469	2.5
Other	NA	NA	NA	NA	NA	139,357	139,993	145,547	153,319	158,654	160,934	1.4
Part time	119,849	116,401	112,694	110,934	111,178	105,038	106,486	109,035	114,370	115,004	118,147	2.7
Men	189,915	182,519	174,934	169,490	165,823	157,023	158,015	164,975	174,927	176,556	178,372	1.0
Women	134,047	134,556	133,734	133,389	135,431	133,688	136,696	144,260	152,431	156,068	161,178	3.3
White, non-Hispanic	245,857	238,032	228,007	220,667	216,750	205,569	206,027	213,144	222,709	225,039	226,137	0.5
Asian/Pacific Islander	25,902	25,929	26,012	26,726	27,570	25,058	26,584	29,332	31,921	30,881	30,852	-0.1
Black, non-Hispanic	18,285	19,066	19,341	19,651	20,273	20,834	21,459	22,672	24,174	24,684	25,346	2.7
Hispanic	14,112	14,571	14,984	15,487	16,520	17,203	17,974	19,634	21,244	22,277	23,481	5.4
American Indian/Alaska Native	1,516	1,538	1,599	1,607	1,553	1,602	1,683	1,734	1,879	1,863	2,124	14.0
Other or unknown race/ethnicity	18,290	17,939	18,725	18,741	18,588	20,445	20,984	22,719	25,431	27,880	31,610	13.4
Temporary visa holders												
All S&E graduate students	98,504	98,106	98,962	101,977	109,928	122,825	134,531	145,612	147,336	143,571	139,232	-3.0
Full time	83,058	83,365	84,695	86,998	93,817	105,682	115,796	125,272	126,040	122,925	120,375	-2.1
First time	NA	NA	NA	NA	NA	32,016	34,179	32,174	29,662	27,614	28,714	4.0
Other	NA	NA	NA	NA	NA	73,666	81,617	93,098	96,378	95,311	91,661	-3.8
Part time	15,446	14,741	14,267	14,979	16,111	17,143	18,735	20,340	21,296	20,646	18,857	-8.7
Men	72,341	70,991	70,685	71,939	76,963	86,034	93,797	101,244	101,333	97,557	93,747	-3.9
Women	26,163	27,115	28,277	30,038	32,965	36,791	40,734	44,368	46,003	46,014	45,485	-1.1
All S&E postdocs	26,160	26,569	27,264	27,876	28,980	30,224	30,194	31,908	33,546	33,937 r	34,584	1.9
U.S. citizens and permanent residents	12,823	12,930	12,835	12,966	12,725	12,627	12,088	13,524	13,524	13,945 r	14,175	1.6
Temporary visa holders	13,337	13,639	14,429	14,910	16,255	17,597	18,106	18,384	20,022	19,992 r	20,409	2.1

NA = not available; information on race/ethnicity and citizenship for full-time students enrolled for the first time was not collected before 2000.

r = data significantly revised; replaces previously published data.

S&E = science and engineering.

NOTE: Beginning in 2000, the few graduate students who were reported to be "Native Hawaiian/Other Pacific Islander" or "multiracial" were included in "Asian/Pacific Islander" or "other/unknown race/ethnicity," respectively.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering.

TABLE 2. S&E graduate enrollment, by field: 1995–2005

Field	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	% change 2004–05
All S&E fields	422,466	415,181	407,630	404,856	411,182	413,536	429,242	454,847	474,694	476,195	478,782	0.5
Science	315,265	311,957	306,482	304,818	309,491	309,424	319,749	335,179	347,317	352,629	358,309	1.6
Agricultural sciences	12,768	12,301	12,203	12,168	12,312	12,023	12,235	12,698	13,197	13,445	13,123	-2.4
Biological sciences	58,344	57,749	56,705	56,695	56,959	56,282	57,639	61,088	64,701	66,548	68,449	2.9
Computer sciences	33,458	34,626	35,991	38,027	42,478	47,350	52,196	55,269	53,696	50,016	48,046	-3.9
Earth, atmospheric, and ocean sciences	15,716	15,183	14,548	14,258	14,083	13,941	13,841	14,240	14,620	15,131	14,827	-2.0
Atmospheric sciences	1,072	1,086	1,092	965	913	963	924	1,036	1,150	1,086	1,146	5.5
Geosciences	7,582	7,304	6,959	6,687	6,637	6,596	6,544	6,712	6,889	7,358	7,212	-2.0
Oceanography	2,723	2,615	2,479	2,562	2,624	2,668	2,585	2,618	2,695	2,801	2,760	-1.5
Other earth, atmospheric, and ocean sciences	4,339	4,178	4,018	4,044	3,909	3,714	3,788	3,874	3,886	3,886	3,709	-4.6
Mathematical sciences	18,504	18,008	16,719	16,485	16,257	15,650	16,651	18,163	19,465	19,931	20,210	1.4
Physical sciences	33,399	32,333	31,105	30,575	30,691	30,385	31,038	32,341	34,298	35,761	36,396	1.8
Astronomy	912	874	778	820	832	888	916	990	1,080	1,119	1,191	6.4
Chemistry	19,570	19,334	18,774	18,482	18,416	18,105	18,366	19,045	20,049	20,776	21,122	1.7
Physics	12,425	11,728	11,147	10,809	10,869	10,841	11,248	11,701	12,555	13,298	13,472	1.3
Other physical sciences	492	397	406	464	574	551	508	605	614	568	611	7.6
Psychology	53,641	53,122	53,126	52,557	51,727	50,466	50,467	51,165	52,211	54,218	57,412	5.9
Social sciences	89,435	88,635	86,085	84,053	84,984	83,327	85,682	90,215	95,129	97,579	99,846	2.3
Agricultural economics	2,338	2,117	2,043	1,995	2,014	2,079	2,161	2,187	2,318	2,195	2,118	-3.5
Anthropology	7,693	7,773	7,560	7,577	7,633	7,626	7,491	7,481	7,789	7,826	7,706	-1.5
Economics	12,673	12,080	11,097	10,701	10,562	10,748	11,408	12,009	12,316	12,318	11,805	-4.2
Geography	4,371	4,331	4,287	4,326	4,250	4,036	4,304	4,383	4,721	4,809	4,772	-0.8
History and philosophy of science	401	409	443	508	557	532	571	663	737	994	965	-2.9
Linguistics	3,194	3,156	3,068	2,935	2,799	2,674	2,744	2,875	3,028	2,941	3,187	8.4
Political science	34,298	33,252	32,083	30,828	31,372	31,131	31,805	34,934	36,880	39,270	41,106	4.7
Sociology	9,564	9,425	9,413	9,058	8,966	8,652	8,812	8,946	9,127	8,874	9,037	1.8
Sociology/anthropology	941	923	948	857	741	745	808	719	773	839	848	1.1
Other social sciences	13,962	15,169	15,143	15,268	16,090	15,104	15,578	16,018	17,440	17,513	18,302	4.5
Engineering	107,201	103,224	101,148	100,038	101,691	104,112	109,493	119,668	127,377	123,566	120,473	-2.5
Aerospace engineering	3,343	3,208	3,083	3,137	3,349	3,407	3,451	3,685	4,048	4,089	4,170	2.0
Biomedical engineering	2,693	2,689	2,797	2,855	3,069	3,197	3,599	4,338	5,301	5,807	6,067	4.5
Chemical engineering	7,452	7,408	7,288	7,093	6,883	7,056	6,913	7,414	7,516	7,452	7,173	-3.7
Civil engineering	19,218	18,528	17,193	16,517	16,226	16,451	16,665	17,713	18,890	18,561	18,050	-2.8
Electrical engineering	30,861	29,941	30,787	31,384	31,822	33,611	36,100	39,948	41,763	38,995	37,444	-4.0
Industrial engineering	13,475	12,675	11,957	11,221	11,803	12,119	12,940	14,033	14,313	13,852	13,614	-1.7
Mechanical engineering	16,363	15,509	15,045	14,696	14,956	15,235	15,852	17,139	18,393	17,852	17,387	-2.6
Metallurgical/materials engineering	4,956	4,747	4,688	4,680	4,481	4,377	4,721	4,992	5,131	5,059	5,160	2.0
Other engineering	8,840	8,519	8,310	8,455	9,102	8,659	9,252	10,406	12,022	11,899	11,408	-4.1

S&E = science and engineering.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering.

TABLE 3. First-time, full-time S&E graduate enrollment and percent change, by field and citizenship: 2001–05

	U.S. citizens and permanent residents						Temporary visa holders					
Field	2001	2002	2003	2004	2005	% change 2004–05	2001	2002	2003	2004	2005	% change 2004–05
All science and engineering	48,232	54,653	59,669	58,966	60,469	2.5	34,179	32,174	29,662	27,614	28,714	4.0
Agricultural sciences	1,845	1,856	1,971	1,870	1,828	-2.2	493	464	453	446	432	-3.1
Biological sciences	8,772	9,263	9,763	9,828	9,932	1.1	2,836	2,864	2,956	2,968	2,964	-0.1
Computer sciences	2,621	3,534	3,891	3,651	3,664	0.4	6,456	5,503	4,243	4,132	4,594	11.2
Earth, atmospheric, and ocean sciences	2,210	2,550	2,573	2,469	2,288	-7.3	584	535	531	457	489	7.0
Mathematical sciences	2,030	2,311	2,527	2,637	2,571	-2.5	1,656	1,607	1,658	1,615	1,625	0.6
Physical sciences	3,325	3,775	4,095	4,039	4,154	2.8	2,686	2,505	2,746	2,564	2,503	-2.4
Psychology	7,167	7,902	8,285	8,960	9,838	9.8	524	518	573	518	539	4.1
Social sciences	11,573	12,689	14,285	14,314	15,272	6.7	4,327	4,344	4,352	4,087	4,117	0.7
Engineering	8,689	10,773	12,279	11,198	10,922	-2.5	14,617	13,834	12,150	10,827	11,451	5.8

S&E = science and engineering.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering.

first-time, full-time enrollments of U.S. citizens and permanent residents.

Demographics

The proportion of women among all S&E graduate students grew from 38% in 1995 to 43% in 2005 (table 1). Enrollment of female students has increased every year for the last 20 years, including a 2% increase in 2005. In contrast, after reaching a peak of about 280,300 in 1992, enrollment of men declined every year from 1993 to 1998. Enrollment of men grew by 14% between 1998 and 2003, with foreign men accounting for most (84%) of this growth. Since 2003 the number of male graduate students in S&E fields has decreased slightly each year (less than 1%). In both 2004 and 2005 enrollment of foreign men dropped; the 4% decline in 2005 was responsible for the small drop in enrollment of male S&E graduate students.

Enrollment of minority students with U.S. citizenship or permanent resident status has increased in graduate S&E programs over the past decade (table 1). In contrast, enrollment of white citizens and permanent residents fell until 2001 and has shown a smaller percentage increase between 2001 and 2005 than has minority enrollment. In 2005 white, non-Hispanic students accounted for 67% of all U.S. citizens and permanent residents enrolled in S&E graduate programs, down 1 percentage point since 2004 and 9 percentage points since 1995 (76%). Asian/Pacific Islanders were the second largest racial/ethnic group among U.S. citizens and permanent residents, accounting for 9% of enrollment in S&E graduate programs in 2005. Blacks accounted for 7.5% of all U.S. citizens and permanent residents, followed by Hispanics (6.9%), and American Indian/Alaska Natives (less than 1%). Underrepresented minority enrollment (black, non-Hispanic; Hispanic; American Indian/Alaska Native) has increased 50% since 1995 and in 2005 accounted for 15% of the U.S. citizens and permanent residents enrolled.

Postdoctoral Appointees

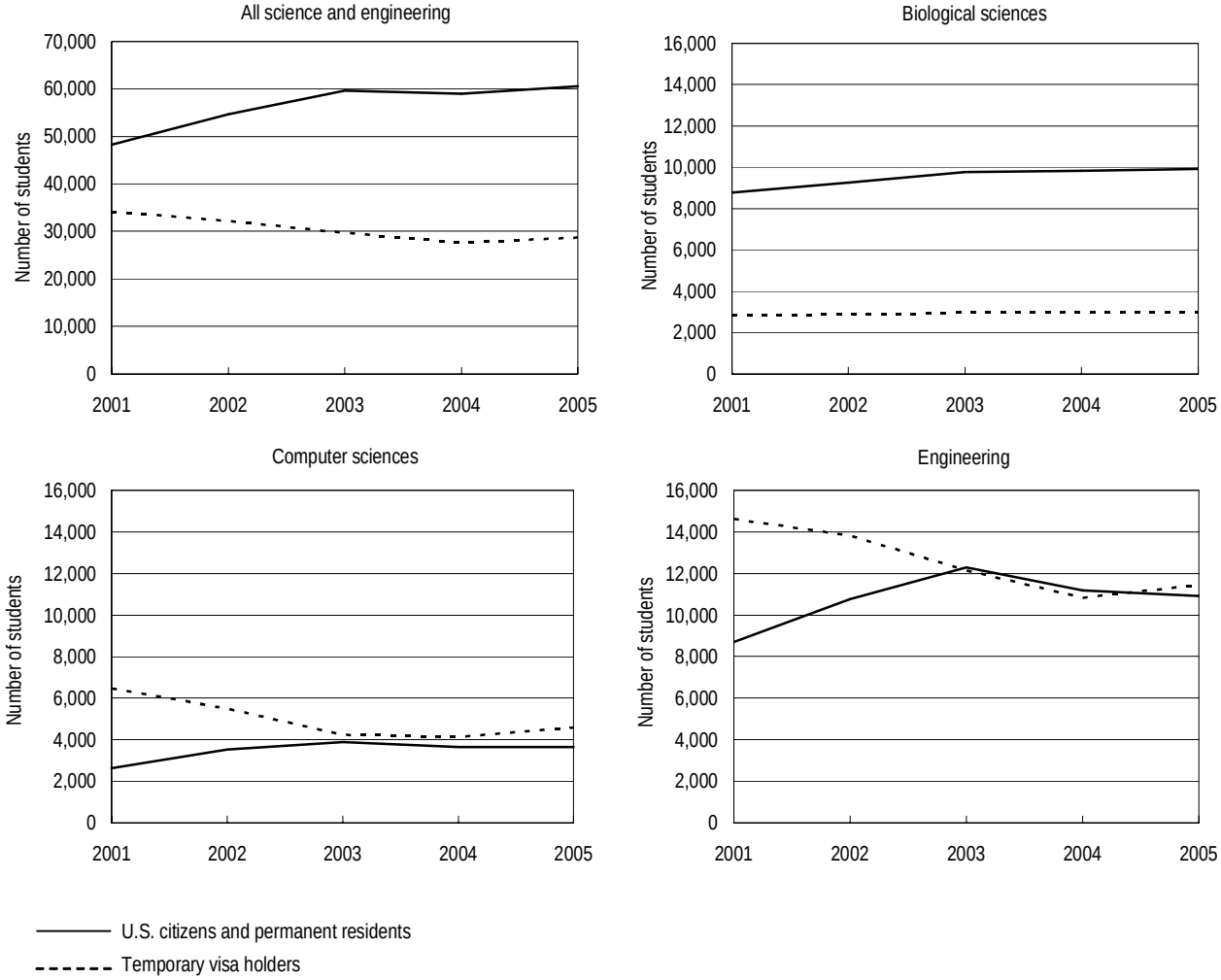
Numbers of postdocs in S&E fields rose over most of the period covered by this report, reaching a record high of 34,584 in 2005; however, growth slowed substantially in 2004 and 2005 (table 1). Numbers of postdocs who were U.S. citizens or permanent residents and numbers of postdocs with temporary visas each increased about 2% over 2004 levels.

The number of foreign postdocs has increased by 53% since 1995, whereas the number of U.S. citizen and permanent resident postdocs has grown by 11%.

Data Notes

This publication provides the first release of data from the fall 2005 NSF-NIH Survey of Graduate Students and Postdoctorates in Science and Engineering. This survey is intended to cover students and postdocs in U.S. academic institutions. Data were collected from

FIGURE 1. First-time, full-time graduate S&E enrollment by citizenship and selected field: 2001–05



S&E = science and engineering.

SOURCE: National Science Foundation/ Division of Science Resources Statistics, Survey of Graduate Students and Postdoctorates in Science and Engineering.

12,396 departments at 588 institutions of higher education in the United States, Puerto Rico, and Guam. Of the departments surveyed, 98% responded; however, 10% of the reporting departments required imputation of missing data.

The full set of detailed tables from this survey will be available in the report *Graduate Students and Postdoctorates in Science and Engineering: Fall 2005* at http://www.nsf.gov/statistics/gradpostdoc/. Individual detailed tables from the 2005 survey may be available in advance of the full report. For further information, or for details on the survey methodology used, contact

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