Data Sources: Recent Reports on Graduate Education Trends

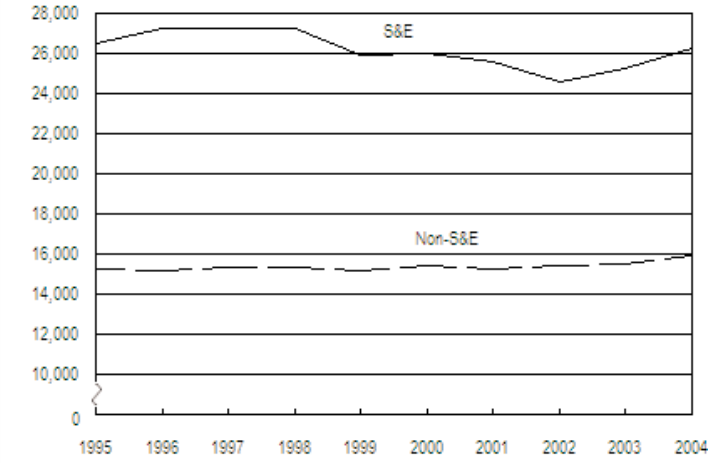
The CGS/GRE Survey of Graduate Enrollment and Degrees contributes to a national understanding of graduate trends, particularly as related to overall graduate enrollment, graduate degree production, and graduate admissions. Data collection and analysis conducted by the Department of Education, National Science Foundation, and others deepens our knowledge of graduate education. Two new Info Briefs from the National Science Foundation in particular add to our understanding of graduate trends.

Doctoral Degrees

A recent Info Brief by Susan Hill from the NSF focuses on current trends in doctoral production. The Info Brief draws on data from the 2004 Survey of Earned Doctorates (SED) which NSF conducts in partnership with the National Opinion Research Center (NORC). Typically, findings from the SED track closely with the CGS/GRE Survey, though the CGS/GRE Survey collects data on certain professional doctorates which are typically not counted as a part of the SED due to its exclusive focus on research doctorates. The SED collects other information which the CGS/GRE Survey does not, such as the demographic characteristics of doctoral degree recipients, along with information about the student's doctoral experience and post-graduation plans.

In 2004, NSF reports 42,155 total doctorates awarded; an increase of approximately 1% from 1995. Of all doctoral degrees, 26,275 were awarded in science and engineering, up from last year, but still down from the all-time highs in the mid-1990s (See Figure 1).

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.

Graduate programs in the biological sciences saw some of the largest increases, conferring 5,937 degrees, the highest total in recent history. Non-science and engineering doctoral production has remained relatively constant over the last decade.

The Info Brief shows that women received a larger portion of doctorates in 2004 with 45% earned versus 39% in 1995. Underrepresented racial/ethnic minorities also earned a larger percentage of doctorates in 2004 (12%), than in 1995 (9%). International students earned approximately the same percent of doctorates in 2004 (33%), as in 1995 (32%). Despite these positive signs, under-representation persists in many fields and graduate education in general for many demographic groups.

The Info Brief further highlights

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particular trends for the field of physics. Physics graduate programs have large numbers of international students. In fact, over 50% of physics doctorates were awarded to non-US citizens in 2004. The field of physics has also seen the most notable decreases in doctoral production. Overall, physics doctorates are down 20% between 1995 and 2004 and down 33% for US citizens. US citizen males earning physics doctorates have decreased 35% while US citizen women have decreased 14%. International doctorates in physics have also declined, 11% overall, with 30% from China, 24% from India, 58% from Korea, and 67% from Taiwan.

For more information, please see: http://www.nsf.gov/statistics/infbrief/nsf06301/.

Employment Outcomes

Another NSF Info Brief by John Tsapogas focuses on the career outcomes of recent graduates at the bachelor's and master's levels. Data for this Brief comes from the National Science Foundation's 2003 National Survey of Recent College Graduates (NSRCG). Data were collected between October 2003 and June 2004 and included bachelor's and master's graduates who received science, engineering, or health degrees between July 1, 2000 and June 30, 2002.

Table 1 shows that students in engineering, at the bachelor's and master's level, are more likely to be employed in careers in engineering, sciences, or health, than students in the sciences. Sixty-four percent of full-time employed students earning master's degrees in engineering are working in engineering, science, or health related jobs, while only 36% of students earning master's in the sciences are working in directly related jobs. In comparison, 87% of students earning master's degrees in health-related fields are employed in similar jobs. Some of this difference may be related to the longer tradition of students in engineering earning master's degrees. In other science fields, the master's degree has not played the prominent role it has in engineering. The emergence of the professional master's science degree is partially a response to this situation. It is important to note that students who are full-time students, meaning a bachelor's degree or master's degree earner who is pursuing a doctoral program, is not included in this data report.

An important related question is: in which sectors do master's graduates work? Overall, the largest percentage of master's graduates pursue jobs in the private sector, 58%, while 28% are employed in jobs in the education sector and 14% in government (See Table 2). The differences between engineering and sciences are quite notable. Thirty-eight percent of those students earning master's degrees in the sciences pursue jobs in government compared to 21% of engineering master's students. Similarly, 15% of science master's graduates pursue jobs in government compared to 8% of engineering master's graduates.

For more information, please see: http://www.nsf.gov/statistics/infbrief/nsf06303/.

The findings from this Info Brief provide useful information on career outcomes for certain graduate students, however these findings are clearly limited. A more in-depth understanding of career

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TABLE 1. S&E bachelor's and master's degree recipients in 2001 and 2002 employed in science, engineering, or health jobs, by field of degree: 2003

(Percent of employed graduates)

Field of degree	Bachelor's degree recipients	Master's degree recipients
All fields	17	31
Science	13	36
Biological, agricultural, and environmental life sciences	14	44
Computer and information sciences	46	50
Mathematics and statistics	16	46
Physical and related science s	24	50
Psychology	S	29
Social and related sciences	6	17
Engineering	60	64
Aerospace and related engineering	58	73
Chemical engineering	57	47
Civil and architectural engineering	77	78
Electrical, e lectronic, computer, and communications engineering	60	61
Industrial engineering	52	62
Materials/metallurgical engineering	S	S
Mechanical engineering	58	67
Other engineering	51	60
Health	88	87

S=data suppressed because of the small number of survey respondents used to generate the population estimate for this cell.

NOTE: Employed graduates include full -time and part -time employed graduates and exclude graduates who were full-time students on the refer ence date of the survey, October 1, 2003.

SOURCE: National Science Foundation/Division of Science Resources Statistics, National Survey of Recent College Graduates: 2003.

TABLE 2. Employed 2001 and 2002 science, engineering, or health bachelor's and master's degree recipients, by sector of employment and field of degree: 2003(Percent distribution)

Degree and field	Employed[a] (thousands)	Employment status: Full time	Employment status: Part time	Sector of primary full -time employment: All sectors	Educational institutions[b]	Government[c]	Private for-profit company[d]
Master's	186,600	86	14	100	28	14	58
All sciences	80,200	82	18	100	38	15	47
All engineering	33,700	88	12	100	21	8	71
Health	72,700	90	10	100	21	15	64

[a]Excludes full -time students.

[b]Educational institutions include elementary and secondary schools, 2 - and 4-year colleges and universities, medical schools, unive rsity-affiliated research organizations, and all other educational institutions.

[c]Government includes local, state, and federal government, military, and commissioned corps.

[d]Private industry and business include all private for -profit and private not -for-profit companies, businesses, and organizations, except those reported as educational institutions. It also includes persons reporting self -employment.

NOTE: Detail may not add to total because of rounding.

SOURCE: National Science Foundation/Divi sion of Science Resources Statistics, National Survey of Recent College Graduates: 2003.

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outcomes would include a fine-grained analysis of the relationship between the skills graduate students acquire and the jobs they get. For instance, we should better understand the extent to which students, who obtain jobs in business or management, rely on their graduate background in science or engineering. Career movement between sectors and fields is a related and important dimension of post-graduate school careers. To this point, CGS's Professional Science Master's project has as a goal the collection of more complete and detailed information on career outcomes for professional science master's graduates. Additionally, inherent in the PhD Completion Project is a recognition that better information on doctoral student outcomes, including career placements, could help make the process of doctoral education more transparent and, perhaps, more effective in the long run.

by Heath Brown, Director of Research and Policy Analysis

Editor's Note

CGS is changing its look. Premiering in March 2006:

The newly designed *Communicator*

and

the launch of the re-designed CGS website at www.cgsnet.org.