

training, are a relatively new direction in graduate education. (See sidebar “Professional Science Master’s Degrees.”)

Master’s degrees in S&E fields increased from 86,400 in 1993 to 121,000 in 2006 before dropping slightly in 2007 (appendix table 2-26). Increases occurred in most major science fields. Master’s degrees in engineering and computer sciences have dropped since 2004 (figure 2-11).

Master’s Degrees by Sex

The number of S&E master’s degrees earned by women rose from about 31,000 in 1993 to about 54,900 in 2007 (figure 2-12). The number of master’s degrees earned by men grew more slowly, from about 55,500 in 1993 to about 65,400 in 2007, with most of the growth between 2002 and 2004. The number of S&E master’s degrees earned by men declined between 2005 and 2007. As a result, the

percentage of women earning master’s degrees rose steadily during that time period. In 1993, women earned 36% of all S&E master’s degrees; by 2007, they earned 46% (appendix table 2-26).

Interdisciplinary Dissertation Research

One indicator of interdisciplinary research is the number of doctorate recipients reporting two or more dissertation fields. A recent analysis from the Survey of Earned Doctorates shows that during the period 2004–07, the share of doctorate recipients reporting more than one dissertation research field fluctuated between 28% and 30% (NSF/SRS 2009a).

The report found that interdisciplinary research at the dissertation research level occurred mostly within the same knowledge domain, whether science (80.2%), engineering (58.5%), or non-science and engineering (non-S&E, 69.3%). Respondents who reported a primary dissertation field in the sciences most frequently reported a secondary research field within the same broad field in the sciences. However, this varied considerably by field of primary dissertation research, from the biological sciences (81.2%) to computer sciences (11.2%). About half of the doctorate recipients who reported a primary dissertation research field in the earth, atmospheric, and ocean sciences; the physical sciences; psychology; or the social sciences reported a secondary dissertation research field within the same broad field. The biological sciences were also the most frequent secondary dissertation research field across all the other sciences except the social sciences.

About 29% of mathematics and 11% of computer sciences doctorate holders listed a secondary field within the same respective major field. Dissertations in which the primary research field was computer sciences most frequently had engineering (24.9%) or a non-S&E field (20.1%) as the secondary dissertation research field. Dissertations with mathematics as the primary research field most often had biological sciences (24.6%) or engineering (11.7%) as the secondary field.

Professional Science Master’s Degrees

Partially in response to the call for more realistic programs to serve the nation’s S&E needs and students’ professional goals, a number of universities have developed Professional Science Master’s (PSM) programs (CGS 2008d; Colwell 2009; NAS 2008; NPSMA 2009). These programs are designed to prepare people to work primarily in nonacademic sectors as laboratory administrators or project directors in, for example, large government or industrial laboratories or in small startup companies. They serve people who need advanced technical training (beyond the bachelor’s degree) within an S&E field combined with knowledge of and skills in business fundamentals, management, team building, and communication. Prospective students include people already working as S&E professionals and others who feel the “strictly research” approach does not appeal to them. The American Recovery and Reinvestment Act of 2009 (Public Law 111-5) includes funds specifically for support of such programs.*

Starting from a handful of PSM programs in 1997, there are now more than 125 such programs in more than 60 institutions in 25 states and the District of Columbia in disciplines such as mathematics, physics, biological sciences, computational science, forensics, chemistry, and geographical information systems. Most PSM programs are interdisciplinary in nature. About 2,500 students are enrolled annually, and these numbers are increasing. Student enrollment is highest in the biological sciences and biotechnology disciplines. More than 2,100 PSM students have graduated thus far, and 65% of these graduates have found employment in industry or government (NPSMA 2009). Many PSM programs were initiated with startup funds from the Sloan Foundation and the Council of Graduate Schools with the intent that they become self-supporting as their value to industry and their students’ professional aspirations become apparent. Also of note are the growing number of such programs abroad, as other nations see the value of preparing an S&E-trained managerial workforce, and the growing interest in them of professional societies and journals (CGS 2008a; Teitelbaum and Cox 2007).

* See the Joint Explanatory Statement—Division A of the American Recovery and Reinvestment Act of 2009, http://www.rules.house.gov/bills_details.aspx?NewsID=4149, accessed 12 June 2009.