

## Employment and Professional Productivity of Graduate Research Fellowship Program Fellows (1994–2011)

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The National Science Foundation's Graduate Research Fellowship Program (GRFP) awards merit-based fellowships to pursue graduate studies in STEM fields. Started in 1952, GRFP is the oldest and largest fellowship program in the United States. Fellowships are awarded to undergraduate seniors and graduate students who are within the first two years of their program. Since 2010, 2,000 fellowships have been awarded annually. The GRFP supports individuals who demonstrate potential for significant achievements in science and engineering.

This study examined whether being an NSF Graduate Fellow is associated with differences in types of employment (including employment sector and primary work activities) and academic productivity (as measured by presentations, publications, patents, and grants and contracts awarded) by comparing data on Fellows with data from similar populations of graduate students and doctorate recipients who did not receive the fellowship.

### METHODS

This study used data from two sources. The first source was a 2012 follow-up survey of a representative sample of NSF Graduate Fellows from 1994 to 2011 about their graduate school experiences and career outcomes. The follow-up survey was also administered to a comparison group of Honorable Mention (HM) designees. The NSF accords an Honorable Mention designation to meritorious applicants who do not receive Fellowship awards. Because most of the more recent Fellows and HM designees were still enrolled in their graduate program in 2012, most responders to the questions on career outcomes in the follow-up survey were from earlier cohorts of awardees.

The second data source was the Survey of Doctorate Recipients (SDR). Conducted every two years since 1973, the SDR tracks the employment history and research productivity of members of the science, engineering, and health doctoral labor force as they move through their careers in research and practice. The study used 2010 SDR data to benchmark the NSF Graduate Fellows and HM designee doctoral degree recipients against a nationally-representative sample with comparable demographic characteristics. The benchmark subsample from the SDR was restricted to U.S. citizens or permanent residents who first received their doctorates between 1996 and 2009 in a field of study that matched the list of current fields eligible for the GRFP.

### KEY FINDINGS

- A greater proportion of NSF Graduate Fellows from 1994 to 2011 worked in the higher education sector compared to NSF Honorable Mention designees and a national comparison group from the Survey of Doctorate Recipients (SDR).
- A greater proportion of Fellows from 1994 to 2011 engaged in R&D and teaching-related job activities compared to a national comparison group from the SDR.
- Fellows from 1994 to 2011 published more papers, gave more presentations, and received more grants than Honorable Mention designees.

This study focused on two sets of comparisons. The first analysis compared NSF Graduate Fellows who completed their doctoral degree to the SDR sample. This analysis contrasts the career outcomes of Fellows with those of a nationally-representative group of doctorate recipients. The second analysis compared Fellows to HM designees. This second analysis included students who entered the labor market whether or not they completed a doctoral degree program (this includes students who completed a master’s degree, or who left their graduate program without completing any degree).

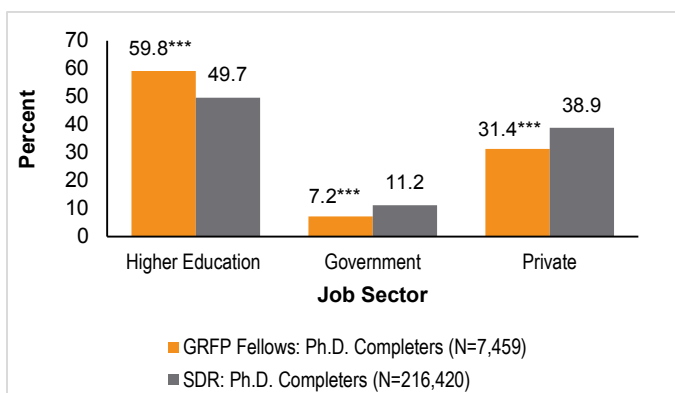
Fellows were eligible to be included in the SDR sample, but confidentiality protections prevented any case matching or other means of identifying Fellows in the SDR sample. The SDR and GRFP samples were treated as independent samples for purposes of statistical testing.

### FINDINGS

#### More Fellows are Employed in the Higher Education Sector

Compared to the SDR sample, a greater proportion of NSF Graduate Fellows were employed in the higher education sector<sup>1</sup> (Figure 1). Nearly 60 percent of Fellows who completed a Ph.D. were employed in the higher education sector compared to half of the national comparison group. Commensurately, Fellows were less likely than the national comparison group to be employed within the government<sup>2</sup> (7 percent versus 11 percent) or private<sup>3</sup> (31 percent versus 39 percent) sector.

Figure 1. Employment Sector of Current Job (in 2012) of NSF Graduate Fellows (from 1994–2011) who Completed a Doctoral Degree and the SDR National Comparison Group



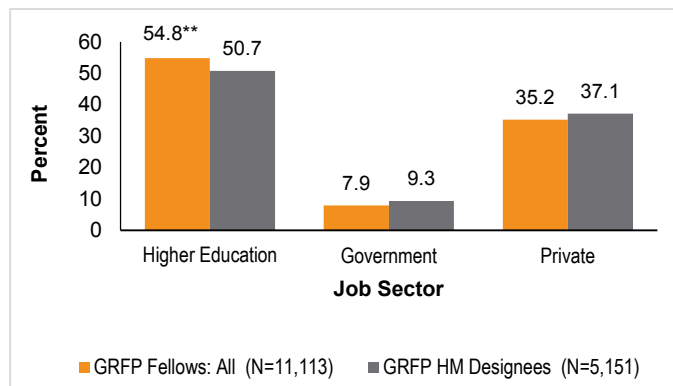
Note. Does not add to 100 because of exclusion of the “other” category. \*\*\* Difference is statistically significant,  $p < .001$ .

<sup>1</sup> For purposes of this study, the higher education sector included employment at a four-year college or university, a medical school, a university-affiliated research institute, a community or two-year college, or a foreign educational institution.

<sup>2</sup> U.S. or foreign government, including military.

<sup>3</sup> Non-educational for-profit or not-for-profit businesses or organizations.

Figure 2. Employment Sector of Current Job (in 2012) of all NSF Graduate Fellows and Honorable Mention Designees from 1994–2011



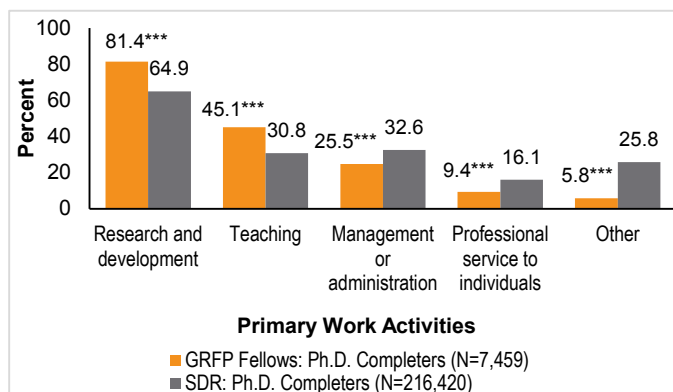
Note. Does not add to 100 because of exclusion of the “other” category. \*\* Difference is statistically significant,  $p < .01$ .

A similar trend was observed with respect to the HM designees (Figure 2). Approximately 55 percent of all Fellows (regardless of degree completion) were employed in the higher education sector compared with 51 percent of the HM designees. However, there were no differences between the two groups with respect to the percentages who were employed within the government or private sector.

#### More Fellows Are Engaged in Research and Development and Teaching

Compared to the nationally-representative SDR group, a greater proportion of NSF Graduate Fellows reported that their primary work activities included research and development (R&D) and teaching (Figure 3). About 81 percent of Fellows indicated their work activities included R&D compared to 65 percent of the SDR sample. Similarly, 45 percent of Fellows indicated their work activities included teaching compared to 31 percent of the national comparison group. Instead, the national comparison group were more likely than Fellows to be working in management and administration (33 versus 26 percent), professional service (16 versus 9 percent), and other activities (26 versus 6 percent).

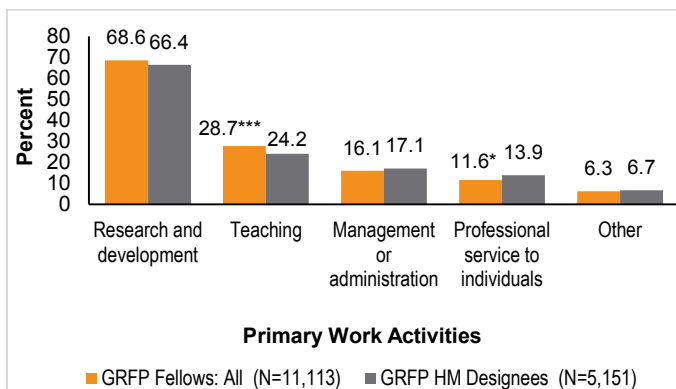
Figure 3. Primary Work Activities (in 2012) for NSF Graduate Fellows (from 1994–2011) who Completed a Doctoral Degree and the SDR National Comparison Group



\*\*\* Difference is statistically significant,  $p < .001$ .

Most of the differences between Fellows and the national comparison group were not found between Fellows and HM designees. There were no statistically significant differences between the Fellows and HM designees with respect to research and development, management and administration, and other types of work activities (Figure 4). However, Fellows were more likely to teach than HM designees (29 percent versus 24 percent), whereas HM designees were more likely to engage in professional services to individuals (for example, health care, counseling, financial services, or legal services) than Fellows (14 percent versus 12 percent).

**Figure 4. Primary Work Activities (in 2012) for all NSF Graduate Fellows and Honorable Mention Designees from 1994–2011**



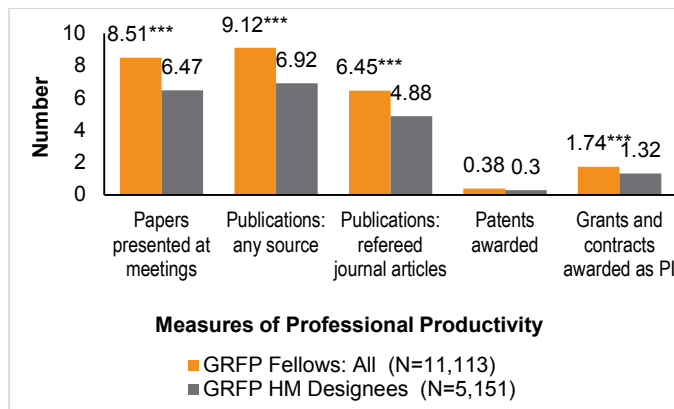
\*\*\* Difference is statistically significant,  $p < .001$ .

\* Difference is statistically significant,  $p < .05$ .

### NSF Graduate Fellows Report Greater Professional STEM Productivity

Relative to the HM designees, NSF Graduate Fellows from 1994 through 2011 who had entered the workforce at the time of the study (2012) demonstrated greater productivity on most measures of professional productivity after graduate school (Figure 5). (Because the SDR does not contain similar measures, the study was not able to compare Fellows who completed a Ph.D. with their national peers on productivity.) Although there were no differences between the two groups with respect to number of patents awarded, Fellows presented more papers at meetings than HM designees. Fellows reported an average of 8.5 presentations at meetings compared to 6.5 presentations for HM designees. Similarly, Fellows reported more publications—an average of 9 publications, of which 6.5 were refereed journal articles. In contrast, HM designees reported an average of 7 publications, of which 5 were refereed journal articles. Fellows also reported receiving more contracts or grants as a principal investigator than HM designees—an average of 1.7 contracts or grants versus 1.3 among the latter group.

**Figure 5. Measures of STEM Professional Productivity (as of 2012) for all NSF Graduate Fellows and Honorable Mention Designees from 1994–2011**



\*\*\* Difference is statistically significant,  $p < .001$ .

### IMPLICATIONS

Overall, this study found that being an NSF Graduate Fellow is associated with various measures of traditional academic career success in science and engineering fields. Fellows were more likely than a nationally-representative group of doctorate recipients and HM designees to be employed in the higher education sector and to report research and development and teaching as primary work activities. Fellows were also more productive than HM designees with respect to the number of presentations at meetings, publications, and grants and contracts received.

The results of this study provide evidence that the GRFP is successful in identifying and supporting individuals early in their careers with the demonstrated potential for significant achievements in science and engineering, and who remain actively engaged in science and engineering. As Fellows continue to progress and advance through their academic and professional careers, it will be important to understand their long-term contributions to innovation, research, teaching, and service in the STEM fields.

### ACKNOWLEDGEMENT AND DISCLAIMER

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## REFERENCES

The analyses and tables in this research brief are a part of the report *Evaluation of the National Science Foundation's Graduate Research Fellowship Program* (Chicago, IL: NORC at the University of Chicago, 2014). The full report can be found at [http://www.nsf.gov/ehr/Pubs/GRFP\\_Final\\_Eval\\_Report\\_2014.pdf](http://www.nsf.gov/ehr/Pubs/GRFP_Final_Eval_Report_2014.pdf).

## WEBSITES FOR THE NSF GRADUATE RESEARCH FELLOWSHIP PROGRAM

<http://www.nsf.gov/grfp>

<http://www.nsfgrfp.org/>

## SUGGESTED CITATION

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