National Center for Science and Engineering Statistics

InfoBrief

Retirement Experiences of U.S.-Trained Doctoral Scientists and Engineers: Findings from the 2023 Survey of Doctorate Recipients

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Wan-Ying Chang, Lance A. Selfa, Karen Grigorian, and Lynn Milan

In 2023, an estimated 1.2 million (1,222,400) individuals worldwide held a U.S. research doctorate in a science, engineering, or health (SEH) field, an increase of 3.1% (36,650) since 2021. The majority (86.6%, or 1,058,950 individuals) of U.S.-trained SEH doctorate recipients resided in the United States, yet a substantial portion (13.4%, or 163,450 individuals) resided abroad, contributing to the science, technology, engineering, and mathematics (STEM) enterprise globally. These highly skilled doctoral scientists and engineers participated in the workforce persistently across all age groups and locations. Even for those ages 71–75 years, 40.6% were employed in 2023, and of the employed, 54.8% were previously retired. Overall, 18.0% of doctoral scientists and engineers[1] have experienced retirement, and 6.7% (82,400) held a job in 2023 despite retiring previously.

These findings on U.S.-trained SEH doctorate holders are from the Survey of Doctorate Recipients (SDR)—a unique source of information about the educational background, occupational achievements, and career movements of doctoral scientists and engineers conducted since 1973 by the National Center for Science and Engineering Statistics (NCSES) within the U.S. National Science Foundation. The latest wave of the SDR in 2023 included new questions on retirement and volunteering. It provides an opportunity to assess retirement patterns and related employment outcomes of a highly trained segment of the population.[2]

Employment, Retirement, and Aging

The upward trend in the number of U.S.-granted SEH research doctoral degrees has resulted in a gradual change in their population age distribution (NCSES 2023). Specifically, doctorate holders ages 55–75 shrank in proportion from 42.9% in 2015 to 40.8% in 2023. Among those living in the United States, those ages 66–75 accounted for 19.1% of the entire population of U.S. residing doctorate recipients, in contrast with non-U.S. residing doctorate recipients, for which those ages 66–75 accounted for only 13.3% of the population (table 1).

Table 1

Age distribution of doctoral scientists and engineers, by residence location: 2023

(Number and percent)

Age	U.S. residing doctorate recipients		Non-U.S. residing doctorate recipients	
	Total	Percent	Total	Percent
Under 55	626,850	59.2	97,050	59.4
55–60	128,600	12.1	23,600	14.4
61–65	101,500	9.6	21,100	12.9
66–70	103,800	9.8	13,050	8.0
71–75	98,200	9.3	8,650	5.3

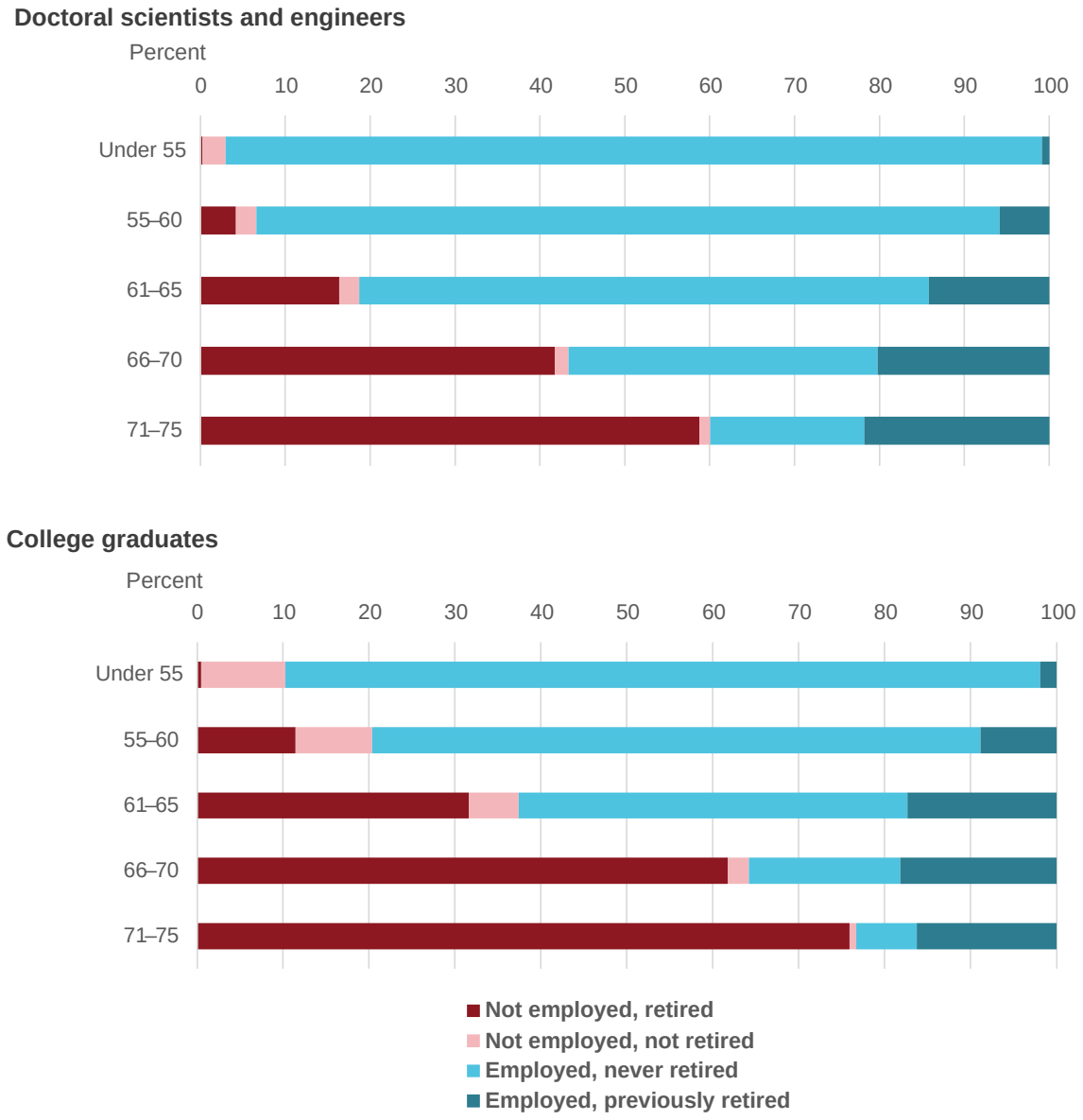
Note(s):
Numbers are rounded to the nearest 50. Percentages are rounded to the nearest 0.1%. Detail may not add to total because of rounding. Residence location is based on reported living location on 1 February 2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2023.

In 2023, the labor force participation rate of the U.S. residing SEH doctorate holding population was high compared with the general population (86.9%[3] versus 62.5%[4]). Among doctorate holders age 54 or younger living in the United States, 97.0% were employed in 2023.[5] Although the workforce participation rate decreased by age, it remained high for older groups. Even among the 71–75-year-olds residing in the United States, 39.9% were employed in 2023 (figure 1), and 54.6% of this group had previously retired before returning to work. Similar employment patterns were also observed for non-U.S. residing doctorate recipients. Overall, 82,400 (6.7%) U.S.-trained doctoral scientists and engineers worldwide held a job in 2023 despite retiring previously.

Figure 1

Employment status and retirement status by age of the U.S. residing doctoral scientists and engineers and college graduates: 2023



Note(s):
Percentages are rounded to the nearest 0.1%. Detail may not add to total because of rounding. College graduates includes bachelor's degree or higher and all fields of degree. Not employed includes both unemployed individuals who were not working during the survey reference week but had been seeking work in the prior 4 weeks or who were on layoff from their job and individuals not in the labor force who were not working during the survey reference week and had not been seeking work in the prior 4 weeks because of family responsibilities, chronic illness, or other reasons, such as retirement. Not employed and not retired includes individuals who were unemployed or not seeking work because of reasons other than retired. Employed and previously retired includes individuals who were working during the survey reference week and had retired previously from any position.

Source(s):
National Center for Science and Engineering Statistics, Survey of Doctorate Recipients and National Survey of College Graduates, 2023.

Of the U.S. residing doctoral scientists and engineers who were not working in 2023, retirement was the predominant reason (82.9%); however, the 2023 SDR data show that many retire and later return to work. Overall, 11.8% were retired and stopped working, and 6.6% were previously retired but held a job in 2023; jointly, 18.4% have experienced retirement. Retirement is more prevalent for older groups. Among U.S. residing doctoral scientists and engineers, the proportion of those retired and not working jumped from 16.3% for 61–65-year-olds to 41.8% for 66–70-year-olds and reached a majority of 58.8% for 71–75-year-olds (figure 1).[6] Although some retirees stayed retired, others chose to return to the workforce. The proportion of those previous retirees who returned to the workforce also climbed with age, reaching 21.8% for the 71–75 age group. Combined with the 18.1% of 71–75-year-olds who were employed and who had never retired, nearly 40% of the doctoral scientists and engineers ages 71–75 were still in the workforce in 2023. The doctorate population's persistently high employment level stands out in comparison to workforce participation of all U.S. college graduates. The general college-educated population showed a lower employment rate for all age groups when compared with U.S.-trained SEH doctorates. Only 23.3% of the 71–75-year-old college graduates were employed in 2023, compared with 39.9% of the 71–75-year-old doctorate population (figure 1).

Retirement Experiences

Aside from age-related financial benefits to retirement (like receiving Social Security or Medicare in the United States), factors such as physical health, employment situations, or personal matters can also influence retirement decisions.[7] At least 10% of the U.S. residing doctoral scientists and engineers who experienced retirement reported the following employment situations encouraged their retirement: "became eligible for pension" (28.7%), "work was not satisfying" (22.9%), and "early retirement incentive offer" (13.0%).[8] These employment situations also ranked high for those residing abroad. The most common personal factors that encouraged retirement included "had sufficient income to retire" (73.6%), "wanted to spend more time on personal pursuits and leisure" (62.9%), "wanted to spend more time with family and friends" (47.8%), "became eligible for a government retirement benefit program" (32.8%), and "my personal health" (18.4%). Overall, retired doctoral scientists and engineers reported satisfaction with retirement, with 69.3% reporting being "very satisfied" and 25.8% reporting being "somewhat satisfied."[9] Those in the United States who retired and had not returned to work were the most satisfied with their retirement experience, with 72.3% reporting being "very satisfied" versus only 58.1% of retirees who returned to work full-time reporting being "very satisfied" with their retirement.

Postretirement Employment and Capacity to Return to Work

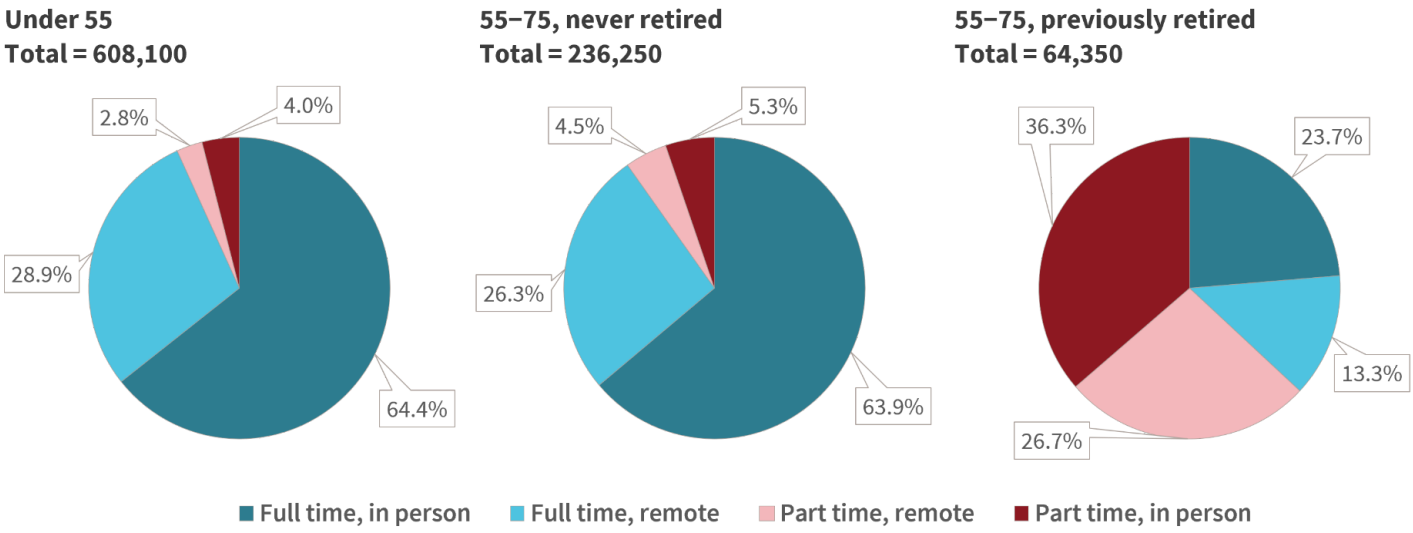
Among the 1.1 million doctoral scientists and engineers living in the United States in 2023, 194,500 individuals have experienced retirement (18.4%). Among the retirees, 85,200 individuals (43.8%) worked for pay after retiring, and 69,850 individuals (35.9%) held a job in 2023. The most common reasons given by doctorate holders for working after retiring were that they "wanted a professional identity," "wanted additional income," "wanted social connection," and were "asked to continue working or return to work" (65.7%, 57.5%, 49.9%, and 38.8%, respectively).[10]

During the COVID-19 pandemic in 2021, the majority of U.S. residing employed SEH doctorate holders were allowed or required to telework or work remotely (89.6%), and this trend continued in 2023 (71.1%). Of the U.S. residing employed SEH doctorate holders, 60.2% reported occasionally or consistently telecommuting or working remotely, compared with a lower rate of 55.4% for the non-U.S. residing employed group. The availability of remote working options and the retirement behavior of late-career doctorate holders continue to reshape the doctorate-level SEH workforce globally.

U.S. residing doctoral scientists and engineers ages 55–75 who were employed but previously retired follow a distinct pattern, with a majority (63.1%) in a part-time job (figure 2). This group also worked remotely at a higher rate (40.0%) than those who were under age 55 (31.7%) and those who were ages 55–75 and never retired (30.9%). For the 55–75-year-olds who were employed but previously retired, 59.1% still held a job closely related to their doctorate and 71.2% worked in a science and engineering (S&E) or S&E-related occupation. Compared with those who had not retired, a much higher proportion of the previous retirees were self-employed (26.4% versus 5.2%).

Figure 2

Age and retirement status of U.S. residing employed doctoral scientists and engineers, by employment circumstances: 2023



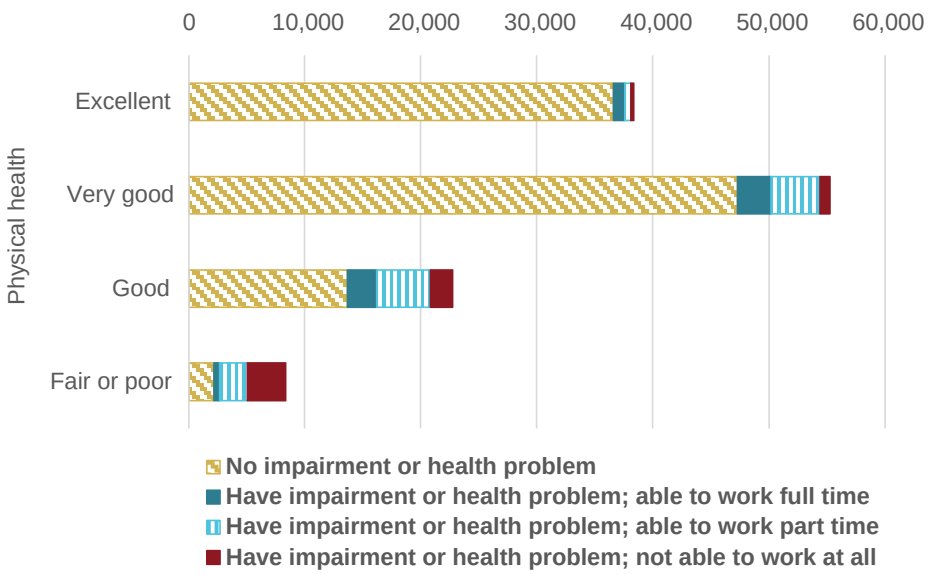
Note(s):
Numbers are rounded to the nearest 50. Percentages are rounded to the nearest 0.1%. Detail may not add to total because of rounding. Designation of full-time and part-time employment status is based on principal job only, not on all jobs held in labor force. For example, an individual could work part time in his or her principal job but full time in the labor force. Full time is based on working 35 or more hours per week. In person work is based on teleworking 2 or fewer days per week. Remote work is based on teleworking 3 or more days per week. Residence location is based on reported living location on 1 February 2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2023.

Among fully retired U.S. residing doctoral scientists and engineers in 2023, 75.0% (93,550 individuals) reported “excellent” or “very good” physical health, 18.3% reported “good” physical health, and the remaining 6.7% reported “fair” or “poor” physical health (figure 3). A greater number of those with physical health ranging from good to excellent reported no impairment or health problem that limits the kind or amount of paid work they could do. Overall, with or without health-related limitations, 95.0% (118,350) of this group reported having the ability to work at least part time should the need arise.

Figure 3

U.S. residing fully retired doctoral scientists and engineers, by physical health and work capacity: 2023



Note(s):
Numbers are rounded to the nearest 50. Detail may not add to total because of rounding. Retired and not employed respondents were asked if they had an impairment or health problem that limits the kind or amount of work they could do. Those who were impaired were asked their capacity to work. Residence location is based on reported living location on 1 February 2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2023.

In this context of workforce capacity, it is worthwhile to note that doctoral scientists and engineers often held jobs close to the field of their doctoral degree. For U.S. residing SEH doctorate holders who had ever retired, 60.2% reported that the job they retired from was closely related to their first doctoral degree, indicating a lasting tie between long-term career and doctoral training. In all, 77.6% of the SEH doctorate holders who had ever retired did retire from an S&E or S&E-related occupation, and a large majority (87.2%) retired from a full-time job.

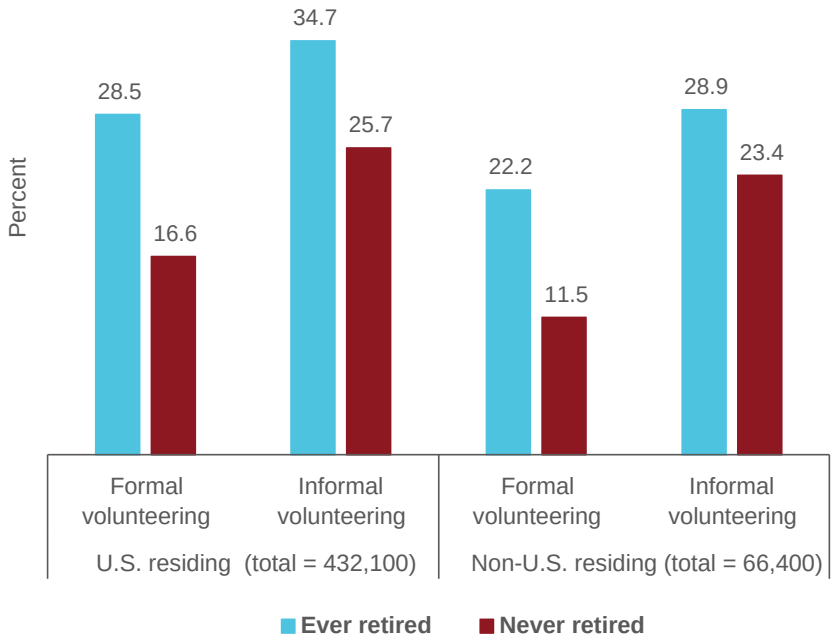
Other Professional Activities and Volunteering

Those who were fully retired in 2023 reported continuing professional activities related to their first U.S. doctorate, with 35.8% of the U.S. residing group reporting doing these activities in the past 12 months. Among them, 53.0% spent at least 50 hours engaged in professional activities during the past 12 months.

The latest data on volunteering from the 2021 Civic Life Supplement of the Current Population Survey estimated that 22.7% of older adults (age 55 and over), irrespective of education, formally volunteered with organizations, and 57.2% informally helped others (AmeriCorps). In 2023, 45.3% of the U.S. residing doctoral scientists and engineers ages 55–75 reported volunteering for religious, educational, health-related, or other charitable organizations in the past 12 months. Nearly half (48.0%) of these volunteers spent 50 or more hours volunteering during the past 12 months. An even higher proportion (67.1%) reported spending time helping friends, neighbors, or relatives, and 44.1% of these volunteers spent 50 or more hours in the past 12 months on these activities.[11] Those who had ever retired reported a higher rate of both formal and informal volunteering than those who had never retired. Also, the U.S. residing group reported a higher rate of both formal and informal volunteering, compared with those who lived abroad (figure 4).

Figure 4

Volunteering experiences of at least 50 hours annually among doctoral scientists and engineers ages 55–75, by retirement status and residence location: 2023



Note(s):
Numbers are rounded to the nearest 50. Percentages are rounded to the nearest 0.1%. Detail may not add to total because of rounding. Formal volunteering includes those who spent 50 hours or more in the past 12 months for religious, educational, health-related, or other charitable organizations. Informal volunteering includes those who spent 50 hours or more for helping friends, neighbors, or relatives. Residence location is based on reported living location on 1 February 2023.

Source(s):
National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2023.

Data Sources, Limitations, and Availability

Data are from the 2023 SDR, which collects data on individuals who earned research doctoral degrees in SEH fields from U.S. institutions. The target population of the SDR consists of all U.S.-trained SEH doctoral graduates who were younger than 76 years of age and not institutionalized or terminally ill on 1 February 2023. To provide context, comparisons with results from prior cycles of the SDR are also included. The SDR has been conducted since 1973 under the sponsorship of NCSES and the National Institutes of Health. The estimates in this InfoBrief are based on responses from a sample of the population and may differ from actual values because of sampling variability. As a result, apparent differences between the estimates for two or more groups may not be statistically significant. All comparative statements in this report have undergone statistical testing and are significant at the 90% confidence level unless noted otherwise. In addition, the estimates presented are rounded to the nearest 50, although percentage calculations are based on unrounded estimates. Retirement status in this InfoBrief refers to those who have ever retired which comprises two separate population groups: (1) retired individuals who were not working on the survey reference date and indicate retirement is a reason for not working and (2) previously retired individuals who were working on the survey reference date and indicate they previously retired in response to the question, “Although you were working during the week of February 1, 2023, had you previously retired from any position?” Some results in this InfoBrief are based on special tabulations not available in the survey data tables. The data tables and technical information about the SDR are available at https://ncses.nsf.gov/surveys/doctorate-recipients/.

NCSES has reviewed this product for unauthorized disclosure of confidential information and approved its release (NCSES-DRN24-056).

References

National Center for Science and Engineering Statistics (NCSES). 2023. *Doctorate Recipients from U.S. Universities: 2022*. NSF 24-300. Alexandria, VA: U.S. National Science Foundation. Available at https://ncses.nsf.gov/pubs/nsf24300.

AmeriCorps. *Volunteering and Civic Life in America Research Summary.* Available at https://americorps.gov/about/our-impact/volunteering-civic-life/demographics.

Notes

1 The Survey of Doctorate Recipients (SDR) target population includes individuals that earned an SEH research doctoral degree from a U.S. academic institution prior to 1 July 2021, were not institutionalized or terminally ill on 1 February 2023, and were less than 76 years of age as of 1 February 2023.

2 See "Data Sources, Limitations, and Availability" for information about how retirement status was measured in the 2023 SDR.

3 See the full set of survey data tables: table 4-3.

4 See https://www.dol.gov/newsroom/economicdata/empsit_03102023.pdf.

5 See the full set of survey data tables: table R-1.

6 See the full set of survey data tables: table R-1.

7 The 2023 SDR questionnaire included two mark-all-that-apply response questions related to reasons for retirement. One question listed eleven employment situations that may encourage individuals to retire, and the other question listed nine personal factors that may encourage retirement.

8 See the full set of survey data tables: table R-2.

9 See the full set of survey data tables: table R-2.

10 See the full set of survey data tables: table R-3.

11 See the full set of survey data tables: table R-4.

Suggested Citation

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Contact Us

Report Authors

Wan-Ying Chang
Senior Analyst, NCSES
E-mail: wchang@nsf.gov

Lance A. Selfa
NORC, under contract to NCSES

Karen Grigorian
NORC, under contract to NCSES

Lynn Milan
Survey Manager, NCSES
E-mail: lmilan@nsf.gov

NCSES

National Center for Science and Engineering Statistics
Directorate for Social, Behavioral and Economic Sciences
U.S. National Science Foundation
2415 Eisenhower Avenue, Suite W14200
Alexandria, VA 22314
Tel: (703) 292-8780
FIRS: (800) 877-8339
TDD: (800) 281-8749
E-mail: ncsesweb@nsf.gov