Selected Results from the 2008 Survey of Doctorate Recipients

Lynn Milan

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Graduate Education Research and Policy Forum
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National Science Foundation
National Center for Science and Engineering Statistics (NCSES)
www.nsf.gov/statistics
Presentation Outline

• NCSES background
• Human Resources Statistics (HRS) program overview
• Survey of Doctorate Recipients (SDR) background
• 2008 SDR results
• Access to SDR data
• International Survey of Doctorate Recipients (ISDR)
NCSES: Formerly the Division of Science Resources Statistics

NCSES is responsible for statistical data on the following:

- The science and engineering workforce
- Research and development (R&D)
- U.S. competitiveness in science, engineering, technology, and R&D
- The condition and progress of Science, Technology, Engineering, and Mathematics (STEM) education in the United States
HRS Postsecondary Education & Workforce Data

- Survey of Institutions: Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS)

- Surveys of Individuals
  - Survey of Earned Doctorates (SED)
  - Survey of Doctorate Recipients (SDR)
  - National Survey of Recent College Graduates (NSRCG)
  - National Survey of College Graduates (NSCG)

- Statistical Data System: Scientists and Engineers Statistical Data System (SESTAT) - combines SDR, NSCG, and NSRCG

- Project: Early Career Doctorates Project (ECD)
SDR Background

- Biennial longitudinal survey of individuals who earned research doctorates in science, engineering, or health (SEH) fields from U.S. academic institutions
- Conducted since 1973
- Federal agency support from National Institutes of Health
- Current data collection modes
  - Web (55%)
  - Mail (33%)
  - Computer Assisted Telephone Interviews (CATI) (12%)
Target population consisted of all individuals meeting the following criteria:

- earned a research doctorate in an SEH field from a U.S. academic institution
- less than 76 years of age
- not institutionalized
- living in the U.S. during the survey reference week of October 1, 2008
SDR Sample

- SDR sample is drawn from the Survey of Earned Doctorates (SED) respondents
- Sample members may be followed throughout their careers until age 76
- Random sample is cut each cycle to add newly awarded doctorates while holding constant the sample size
- 2008 SDR Sample Size: 40,093
  - including 3,449 newly awarded doctorates from the 2006 and 2007 SED
  - Target population size = 751,960
2008 SDR Response Rate

• Weighted response rate = 80.5%
  – 29,974 completed surveys from eligible respondents
Recurring SDR Survey Questions

- Demographics
- Recent training, education
- Employment during reference date
  - Employer type; change since last survey
  - Occupation; change since last survey
  - Faculty rank, tenure status
  - Postdoc status, reasons for holding postdoc
  - Work activities, including primary/secondary
  - Relation between job and degree
  - Salary and earned income
  - Overall job satisfaction
SDR Special Topic Module

• Work-Related Experiences (2008)
  – Number of papers, articles, & books authored
  – Number of patents, patent applications, and commercialized products/processes on which named as an inventor
  – Second job
### Doctoral scientists and engineers, by U.S. citizenship status: 2008

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>All doctorate recipients</td>
<td>656,500</td>
<td>685,300</td>
<td>711,800</td>
<td>752,000</td>
<td>100.0%</td>
</tr>
<tr>
<td>US citizens</td>
<td>597,300</td>
<td>622,600</td>
<td>644,000</td>
<td>675,200</td>
<td>89.8%</td>
</tr>
<tr>
<td>Permanent residents</td>
<td>42,100</td>
<td>42,400</td>
<td>43,000</td>
<td>49,800</td>
<td>6.6%</td>
</tr>
<tr>
<td>Temporary residents</td>
<td>17,200</td>
<td>20,200</td>
<td>24,800</td>
<td>26,900</td>
<td>3.6%</td>
</tr>
</tbody>
</table>

Notes: Numbers are rounded to nearest 100. Detail may not add to total because of rounding.

Race/ethnicity of doctoral scientists and engineers, by broad field of doctorate: 2008

*Includes Native Hawaiians/Other Pacific Islanders and non-Hispanic respondents reporting 2 or more races.

Single- and multiple-race identification within each racial group among U.S. citizens and permanent residents who have self-identified as not Hispanic/Latino: 2008

- **American Indian/Alaska Native**: 1,500 (single race) + 3,600 (single race in combination with white) + 500 (other combinations of 2 or more races)
- **Asian**: 107,600 (single race) + 800 (single race in combination with white) + 600 (other combinations of 2 or more races)
- **Black/African American**: 20,600 (single race) + 200 (single race in combination with white) + 600 (other combinations of 2 or more races)
- **Native Hawaiian/Other Pacific Islander**: 700 (single race) + 200 (single race in combination with white) + 600 (other combinations of 2 or more races)
- **White**: 565,600 (single race) + 7,300 (single race in combination with white) + 0 (other combinations of 2 or more races)

**NOTE**: Numbers are rounded to nearest 100. **SOURCE**: Survey of Doctorate Recipients, 2008.
Employment status of doctoral scientists and engineers: 2008

- Employed full time: 77%
- Employed part time: 10%
- Unemployed: 1%
- Retired: 1%
- Not employed/not seeking work: 2%

Employment status of doctoral scientists and engineers, by sex: 2008

Employment sector of employed doctoral scientists and engineers: 2008

- 4-year educational institution: 41%
- Other educational institution: 6%
- Private for-profit: 7%
- Private nonprofit: 7%
- Federal government: 33%
- State/local government: 3%
- Self-employed: 3%
- Other: 0%

Employed doctoral scientists and engineers in 4-year educational institutions, by sex and faculty rank: 2008

*No ranks designated at this institution or no ranks designated for this position.

Doctoral scientists and engineers on postdoctoral appointments, by citizenship status: 2006 & 2008

<table>
<thead>
<tr>
<th>U.S. Citizenship Status</th>
<th>2006</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Total on postdoc</td>
<td>29,890</td>
<td>100.0%</td>
</tr>
<tr>
<td>U.S. citizen</td>
<td>18,260</td>
<td>61.1%</td>
</tr>
<tr>
<td>Non-U.S. citizen</td>
<td>11,630</td>
<td>38.9%</td>
</tr>
</tbody>
</table>

NOTES: Numbers are rounded to nearest 10 in 2006 and nearest 100 in 2008. Detail may not add to total because of rounding.

Postdoc status of doctoral scientists and engineers, by years since doctorate and broad field of doctorate: 2008

# Doctoral scientists and engineers employed in postdocs, by field of doctorate: 2008

<table>
<thead>
<tr>
<th>Field</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total in postdoc</td>
<td>27,300</td>
<td>100.0%</td>
</tr>
<tr>
<td>Science</td>
<td>23,600</td>
<td>86.4%</td>
</tr>
<tr>
<td>Biological/agricultural/environmental life sciences</td>
<td>14,900</td>
<td>54.6%</td>
</tr>
<tr>
<td>Computer/information sciences</td>
<td>300</td>
<td>1.1%</td>
</tr>
<tr>
<td>Mathematics/statistics</td>
<td>600</td>
<td>2.2%</td>
</tr>
<tr>
<td>Physical sciences</td>
<td>5,100</td>
<td>18.7%</td>
</tr>
<tr>
<td>Psychology</td>
<td>2,200</td>
<td>8.1%</td>
</tr>
<tr>
<td>Social sciences</td>
<td>500</td>
<td>1.8%</td>
</tr>
<tr>
<td>Engineering</td>
<td>3,000</td>
<td>11.0%</td>
</tr>
<tr>
<td>Health</td>
<td>700</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

**NOTES:** Numbers are rounded to nearest 100. Detail may not add to total because of rounding.

**SOURCE:** Survey of Doctorate Recipients, 2008.
# Doctoral scientists and engineers on postdoctoral appointments, by employment sector: 2006 & 2008

<table>
<thead>
<tr>
<th>Employment sector</th>
<th>2006</th>
<th>2008</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>All sectors</td>
<td>29,890</td>
<td>100.0%</td>
<td>27,300</td>
<td>100.0%</td>
</tr>
<tr>
<td>Educational institutions</td>
<td>23,600</td>
<td>79.0%</td>
<td>18,200</td>
<td>66.7%</td>
</tr>
<tr>
<td>Business/industry</td>
<td>3,780</td>
<td>12.6%</td>
<td>5,600</td>
<td>20.5%</td>
</tr>
<tr>
<td>Government</td>
<td>2,500</td>
<td>8.4%</td>
<td>3,500</td>
<td>12.8%</td>
</tr>
</tbody>
</table>

**NOTES:** Numbers are rounded to nearest 10 in 2006 and nearest 100 in 2008. Detail may not add to total because of rounding.

**SOURCE:** Survey of Doctorate Recipients, 2008.
Median annual salaries of full-time doctoral scientists and engineers (in dollars), by field of doctorate and sex: 2008

<table>
<thead>
<tr>
<th>Field</th>
<th>All full-time employed</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fields</td>
<td>98,000</td>
<td>101,000</td>
<td>82,000</td>
</tr>
<tr>
<td>Science</td>
<td>92,000</td>
<td>100,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Biological/agricultural/environmental life sciences</td>
<td>91,000</td>
<td>98,000</td>
<td>80,000</td>
</tr>
<tr>
<td>Computer/information sciences</td>
<td>107,000</td>
<td>109,000</td>
<td>98,000</td>
</tr>
<tr>
<td>Mathematics/statistics</td>
<td>95,000</td>
<td>97,000</td>
<td>83,000</td>
</tr>
<tr>
<td>Physical sciences</td>
<td>100,000</td>
<td>103,000</td>
<td>87,000</td>
</tr>
<tr>
<td>Psychology</td>
<td>84,000</td>
<td>94,000</td>
<td><strong>77,000</strong></td>
</tr>
<tr>
<td>Social sciences</td>
<td>88,000</td>
<td>93,000</td>
<td>79,000</td>
</tr>
<tr>
<td>Engineering</td>
<td>110,000</td>
<td><strong>114,000</strong></td>
<td>97,000</td>
</tr>
<tr>
<td>Health</td>
<td>90,000</td>
<td>100,000</td>
<td>84,000</td>
</tr>
</tbody>
</table>

NOTE: Median annual salaries are for principal job and are rounded to nearest $1,000.

Median annual salaries of full-time doctoral scientists and engineers (in dollars), by field of doctorate and years since doctorate: 2008

### Median annual salaries of full-time doctoral scientists and engineers (in dollars), by broad field of doctorate and employment sector: 2008

<table>
<thead>
<tr>
<th>Field</th>
<th>All full-time employed</th>
<th>4-year educational institution</th>
<th>Private for-profit</th>
<th>Private non-profit</th>
<th>Federal gov’t</th>
<th>Self-employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fields</td>
<td>98,000</td>
<td>80,000</td>
<td>117,000</td>
<td>100,000</td>
<td>107,000</td>
<td>99,000</td>
</tr>
<tr>
<td>Science</td>
<td>92,000</td>
<td>80,000</td>
<td>115,000</td>
<td>95,000</td>
<td>105,000</td>
<td>93,000</td>
</tr>
<tr>
<td>Engineering</td>
<td>110,000</td>
<td>100,000</td>
<td>119,000</td>
<td>120,000</td>
<td>117,000</td>
<td>116,000</td>
</tr>
<tr>
<td>Health</td>
<td>90,000</td>
<td>82,000</td>
<td>119,000</td>
<td>101,000</td>
<td>104,000</td>
<td>95,000</td>
</tr>
</tbody>
</table>

**NOTE:** Median annual salaries are for principal job and are rounded to nearest $1,000.

**SOURCE:** Survey of Doctorate Recipients, 2008.
Employed doctoral scientists and engineers engaged in patent-related activities, by broad field of doctorate and employment sector: 2008

<table>
<thead>
<tr>
<th>Field</th>
<th>4-year educational institution</th>
<th>Other educational institution</th>
<th>Private for-profit</th>
<th>Private non-profit</th>
<th>Federal gov’t</th>
<th>State/local gov’t</th>
<th>Self-employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fields</td>
<td>23.9%</td>
<td>0.5%</td>
<td>63.7%</td>
<td>4.0%</td>
<td>4.6%</td>
<td>0.7%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Science</td>
<td>26.2%</td>
<td>0.8%</td>
<td>59.0%</td>
<td>5.2%</td>
<td>5.4%</td>
<td>0.9%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Engineering</td>
<td>19.3%</td>
<td>D</td>
<td>71.6%</td>
<td>1.8%</td>
<td>3.4%</td>
<td>D</td>
<td>3.6%</td>
</tr>
<tr>
<td>Health</td>
<td>37.5%</td>
<td>D</td>
<td>62.5%</td>
<td>D</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>

D = suppressed for confidentiality.

Employed doctoral scientists and engineers engaged in publication-related activities, by broad field of doctorate and employment sector: 2008

<table>
<thead>
<tr>
<th>Field</th>
<th>4-year educ. institution</th>
<th>Other educ. institution</th>
<th>Private for-profit</th>
<th>Private non-profit</th>
<th>Federal gov’t</th>
<th>State/local gov’t</th>
<th>Self-employed</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>All fields</td>
<td>51.1%</td>
<td>2.1%</td>
<td>27.0%</td>
<td>6.6%</td>
<td>7.3%</td>
<td>2.2%</td>
<td>3.5%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Science</td>
<td>54.3%</td>
<td>2.5%</td>
<td>22.5%</td>
<td>7.1%</td>
<td>7.4%</td>
<td>2.3%</td>
<td>3.7%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Engineering</td>
<td>33.6%</td>
<td>0.5%</td>
<td>50.3%</td>
<td>3.5%</td>
<td>7.0%</td>
<td>1.7%</td>
<td>3.1%</td>
<td>D</td>
</tr>
<tr>
<td>Health</td>
<td>60.7%</td>
<td>2.1%</td>
<td>16.5%</td>
<td>9.5%</td>
<td>6.2%</td>
<td>2.9%</td>
<td>1.7%</td>
<td>D</td>
</tr>
</tbody>
</table>

D = suppressed for confidentiality.

Access to SDR Data

- InfoBriefs - highlight results from recent surveys or analyses
- Detailed Statistical Tables (DSTs) - standard tabulations (electronic only)
- Online database: SESTAT Data Tool table generator
- Downloadable public use data files
- Restricted use data files with a license
SDR Info on the Web

- **Survey Overview**

- **Questionnaires**

- **Publications (including Detailed Statistical Tables)**

- **SESTAT Data Tool and Public Use Files**

- **Restricted-Use Data License**
  http://www.nsf.gov/statistics/database.cfm#MICRODATA
NCSES Secure Data Access Facility (SDAF)

- A virtual data access facility is being built to provide secure access to confidential microdata from NCSES surveys for statistical analysis
- Initially will include Doctorate Records File (1958-2009) and NSRCG, SDR, and SESTAT (1993-2008)
- Research work can be saved in the virtual data center; multiple members of a research team can share work; anything shared publicly must undergo disclosure review
- Similar licensing process as with restricted-use data
- Access provided with a secure, thin-client terminal
- Available by December 2011
Limitations of 20th-Century SDR

• Undercoverage of non-U.S. citizens who...
  – reported definite plans to leave U.S. after doctorate award so were not sampled, but ended up staying in U.S., or
  – reported definite plans to stay in U.S. but subsequently lived in foreign country for 2 consecutive survey cycles and were dropped from SDR sample

• Doctorate-holders in SDR sample who were residing in a foreign country on the survey reference date were not surveyed
National/International SDR (NSDR/ISDR)

• 2003 SDR tested the feasibility of obtaining surveys from sample members who were living abroad

• ISDR currently has two components
  – Sampled non-U.S. citizens from 2001 or later cohorts who reported plans to emigrate
  – Non-U.S. citizen NSDR panel members found outside U.S. for 2 consecutive cycles

• Combining the two ISDR components with the traditional NSDR yields an integrated data set with virtually complete coverage of U.S.-earned SEH doctorates awarded in 2001 or later
Current Status of ISDR

- Extensive statistical work to determine the best methods of integrating the NSDR and ISDR samples
- 2010 ISDR sample = 5,712
- Analysis potential
  - ISDR sample becoming large enough to enable analysis of aggregated categories of respondents (by field of study, employment sector, occupations, demographics)
  - Can examine international mobility
- ISDR data are not yet available
For further information on the SDR, contact

Lynn Milan, Ph.D.
SDR Project Officer
Email: l milan@nsf.gov