

# 2009 Annual Survey of the Mathematical Sciences

*(First Report)*

## Preliminary Report on the 2008–2009 New Doctoral Recipients

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This report presents a statistical profile of recipients of doctoral degrees awarded by departments in the mathematical sciences at universities in the United States during the period July 1, 2008, through June 30, 2009. All information in the report was provided over the summer and early fall of 2009 by the departments that awarded the degrees. The report includes a preliminary analysis of the fall 2009 employment plans of 2008–09 doctoral recipients and a demographic profile summarizing characteristics of citizenship status, gender, and racial/ethnic group. This preliminary report will be updated in the Second Report of the 2009 Annual Survey to reflect subsequent reports of additional 2008–2009 doctoral recipients from the departments that did not respond in time for this report. No adjustments have been made to the numbers in this report for the non-responding departments. The Second Report, to appear in the August 2010 issue of *Notices*, will also reflect additional information provided by the new doctoral recipients themselves, including their starting salaries.

Table 1 provides the number of departments responding to the 2009 Survey of New Doctoral Recipients in time for this

report. This year's response rates were above 80% for all groups except Group IV which was 74% (up from 67% last year.) Overall, eighteen more departments responded in time for the First Report this year than responded in time for last year's First Report. Efforts continue to obtain data from as many of the non-responding departments as possible.

**Table 2: New Doctoral Degrees Awarded by Group, Preliminary Count**

| Group   | I (Pu) | I (Pr) | II  | III | IV  | Va  | TOTAL |
|---------|--------|--------|-----|-----|-----|-----|-------|
| 1999–00 | 256    | 157    | 223 | 132 | 284 | 67  | 1119  |
| 2000–01 | 233    | 129    | 203 | 125 | 237 | 81  | 1008  |
| 2001–02 | 218    | 139    | 164 | 124 | 222 | 81  | 948   |
| 2002–03 | 258    | 138    | 170 | 121 | 239 | 91  | 1017  |
| 2003–04 | 195    | 187    | 215 | 111 | 243 | 90  | 1041  |
| 2004–05 | 243    | 146    | 203 | 153 | 285 | 86  | 1116  |
| 2005–06 | 307    | 184    | 216 | 140 | 287 | 111 | 1245  |
| 2006–07 | 300    | 119    | 234 | 138 | 279 | 87  | 1157  |
| 2007–08 | 234    | 172    | 290 | 142 | 291 | 106 | 1235  |
| 2008–09 | 326    | 211    | 282 | 171 | 352 | 88  | 1430  |

**Table 1: Number of Departments Responding to Doctorates Granted Survey**

|                     |                    |                    |
|---------------------|--------------------|--------------------|
| <b>Group I (Pu)</b> | 23 of 25 including | 0 with no degrees  |
| <b>Group I (Pr)</b> | 21 of 23 including | 0 with no degrees  |
| <b>Group II</b>     | 50 of 56 including | 3 with no degrees  |
| <b>Group III</b>    | 72 of 81 including | 18 with no degrees |
| <b>Group IV</b>     | 68 of 92 including | 4 with no degrees  |
| Statistics          | 45 of 57 including | 2 with no degrees  |
| Biostatistics       | 23 of 36 including | 2 with no degrees  |
| <b>Group Va</b>     | 18 of 21 including | 0 with no degrees  |

See "Definitions of the Groups" on page 258.

### Doctoral Degrees Granted in 2008–09

Table 2 shows the number of new doctoral degrees granted by the different doctoral groups surveyed in the Annual Survey for the past ten years. The preliminary count of 1,430 new doctorates granted by these departments in 2008–09 is an increase of 195 from the preliminary count for 2007–08.

From Table 2 we see that all groups except Groups II and Va reported an increase in the number of doctoral recipients from the previous year. The

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decrease reported for Group II is almost certainly the result of the three departments in Group II that responded in time for last year's report but not this year's report. These departments have awarded an average of 17 doctoral degrees each year over the past four years. The final count for 2008-09 is likely to be very close to 1,500.

The 2008-09 numbers in Table 2 will be broken down in various ways, such as by gender, in later sections of this report. The names of the 1,430 new doctoral recipients are found on pages 276-99 of this issue of the *Notices*.

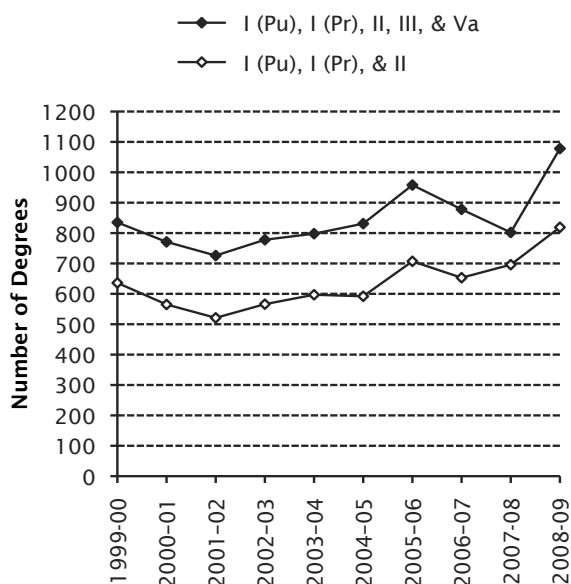
By way of background, additional information about various types of full-time graduate students is available in the Third Report of the 2008 Annual Survey (*Notices*, November 2008), Table 6B, page 1299.

### Employment Plans of 2008-09 New Doctoral Recipients

Tables 4A and 4B each provide a cross-tabulation of the 1,430 new doctoral recipients in the mathematical sciences. These tables contain a wealth of information about these new doctoral recipients, some of which will be discussed in this report. Note that these tables give a breakdown by gender for type of employer and type of degree-granting department. Additional information is available on the AMS website at [www.ams.org/employment/surveyreports.html](http://www.ams.org/employment/surveyreports.html).

The preliminary unemployment rate for these data is 7.9%. This preliminary rate will be updated later with information gathered from the

**Figure 1: New Doctoral Degrees Awarded by Combined Groups, Preliminary Count**



### Highlights

There were 1,430 new doctoral recipients reported for 2008-09 by departments responding in time for the 2009 First Report. The number of departments responding in time for this year's report increased by 8 and in every group except Group IV. When one considers only the 208 departments that responded in time for the First Report in both years, the 2009 figure reported by these departments is up 9.7% over that reported for 2008.

There were 669 U.S. citizens reported among this year's new doctoral recipients, 47% of the total. Last year's figure was 44%. The fall preliminary 2009 unemployment rate for the 1,231 new doctoral recipients whose employment status is known is 7.9%, up from 5.4% for fall 2008.

Seventy-two new doctoral recipients hold positions at the institution that granted their degree, although not necessarily in the same department. This is 6% of the new doctoral recipients who are currently known to have jobs and 10% of those who have academic positions in the U.S. Seventeen new doctoral recipients have part-time positions.

The number of new doctoral recipients employed in the U.S. is 987, up 101 from last year. The number of new doctoral recipients employed in academic positions in the U.S. has increased to 741, compared to 650 last year.

Of the 987 new doctoral recipients taking positions in the U.S., 184 (19%) have jobs in business and industry, a decrease of 11% from last year's figure of 207. The fall 2009 number remains up 69 (60%) from fall 2005. The number of new doctoral recipients taking jobs in government is up 30 (107%) over fall 2008.

Among the 987 new doctoral recipients having employment in the U.S., 501 (51%) are U.S. citizens (up from 426 (48%) last year). The number of non-U.S. citizens having employment in the U.S. is 486; last year it was 460.

Among the 333 new doctoral recipients hired by U.S. doctoral-granting departments, 47% are U.S. citizens (down from 49% last year). Among the 408 having other academic positions in the U.S., 62% are U.S. citizens (up from 57% last year).

Of the 1,430 new doctoral recipients, 32% (462) are female, the same percentage reported in fall 2008. Of the 669 U.S. citizen new doctoral recipients, 30% (202) are females, down from 31% in fall 2008.

Among the 669 U.S. citizen new doctoral recipients, 4 are American Indian or Alaska Native, 44 are Asian, 19 are Black or African American, 19 are Hispanic or Latino, 1 is Native Hawaiian or Other Pacific Islander, 575 are White, and 7 are of unknown race/ethnicity.

Group IV produced 352 new doctorates, of which 159 (45%) are female, compared to all other groups combined, where 303 (28%) are female. In Group IV, 92 (26%) of the new doctoral recipients are U.S. citizens (while in the other groups 54% are U.S. citizens).

Twenty-nine percent of the new doctorates had a dissertation in statistics/biostatistics (410). The next highest percentage was in algebra and number theory with 14% (203).

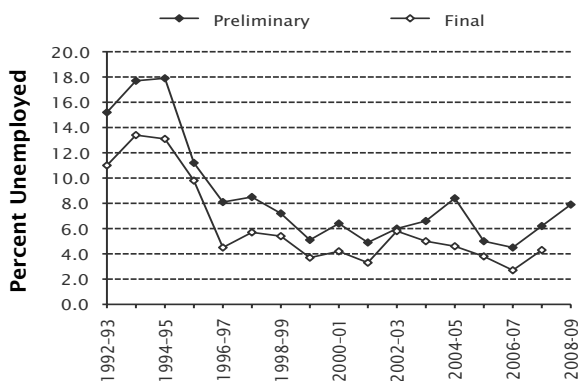
The Faculty Salary Survey report, will appear in the March issue of *Notices*.

**Table 4A: Employment Status of 2008–09 New Doctoral Recipients in the Mathematical Sciences by Type of Degree-Granting Department**

| TYPE OF EMPLOYER                       | TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT |                         |                |                 |                     |                        | TOTAL       | Row Subtotals |            |
|--|---|-------------------------|----------------|-----------------|---------------------|------------------------|-------------|---------------|------------|
|  | Group I (Public) Math.                      | Group I (Private) Math. | Group II Math. | Group III Math. | Group IV Statistics | Group Va Applied Math. |             | Male          | Female     |
| Group I (Public)                       | 41  | 18                      | 16             | 2               | 0                   | 3                      | 80          | 67            | 13         |
| Group I (Private)                      | 22  | 38                      | 7              | 3               | 1                   | 1                      | 72          | 56            | 16         |
| Group II                               | 24  | 10                      | 20             | 4               | 4                   | 2                      | 64          | 44            | 20         |
| Group III                              | 9   | 3                       | 13             | 18              | 0                   | 1                      | 44          | 31            | 13         |
| Group IV                               | 0   | 0                       | 3              | 2               | 54                  | 1                      | 60          | 37            | 23         |
| Group Va                               | 5   | 1                       | 0              | 0               | 0                   | 7                      | 13          | 12            | 1          |
| Master's                               | 11  | 3                       | 19             | 10              | 5                   | 2                      | 50          | 30            | 20         |
| Bachelor's                             | 34  | 16                      | 59             | 30              | 16                  | 5                      | 160         | 92            | 68         |
| Two-Year College                       | 3   | 1                       | 4              | 12              | 0                   | 2                      | 22          | 16            | 6          |
| Other Academic Dept.                   | 21  | 10                      | 15             | 15              | 55                  | 18                     | 134         | 80            | 54         |
| Research Institute/<br>Other Nonprofit | 11  | 4                       | 2              | 1               | 20                  | 4                      | 42          | 25            | 17         |
| Government                             | 7   | 1                       | 10             | 13              | 27                  | 4                      | 62          | 35            | 27         |
| Business and Industry                  | 31  | 17                      | 23             | 13              | 85                  | 15                     | 184         | 124           | 60         |
| Non-U.S. Academic                      | 38  | 37                      | 22             | 9               | 17                  | 6                      | 129         | 99            | 30         |
| Non-U.S. Nonacademic                   | 4   | 3                       | 2              | 1               | 3                   | 2                      | 15          | 10            | 5          |
| Not Seeking Employment                 | 3   | 4                       | 2              | 1               | 5                   | 0                      | 15          | 11            | 4          |
| Still Seeking Employment               | 22  | 13                      | 18             | 18              | 9                   | 5                      | 85          | 64            | 21         |
| Unknown (U.S.)                         | 21  | 12                      | 29             | 8               | 31                  | 8                      | 109         | 74            | 35         |
| Unknown (non-U.S.)*                    | 19  | 20                      | 18             | 11              | 20                  | 2                      | 90          | 61            | 29         |
| <b>TOTAL</b>                           | <b>326</b>                                  | <b>211</b>              | <b>282</b>     | <b>171</b>      | <b>352</b>          | <b>88</b>              | <b>1430</b> | <b>968</b>    | <b>462</b> |
| <b>Column</b> Male                     | 262   | 166                     | 185            | 100             | 193                 | 62                     | 968         |               |            |
| <b>Subtotals</b> Female                | 64  | 45                      | 97             | 71              | 159                 | 26                     | 462         |               |            |

\*Includes those whose status is reported as "unknown" or "still seeking employment".

**Figure 2: Percentage of New Doctoral Recipients Unemployed in the U.S.**



\*Excludes those whose status is reported as "unknown", "not seeking" or having employment outside the U.S. (Non-U.S. Academic or Non-U.S. Nonacademic). This is a change from prior reports which excluded only the unknown categories.

individual new doctoral recipients. The additional information from prior years is reflected in the final unemployment rates displayed in Figure 2. The preliminary rate for fall 2008 was 6.0%. The unemployment rates shown in Figure 2 differ from those given in previous Annual Survey reports. The rates shown are now based on only those 1,072 individuals in the U.S. labor market.

For further details, see the explanatory note on unemployment rates at the end of the report. The unemployment rates, calculated by type of doctoral degree-granting department using Table 4A, vary from group to group, with a high of 12.8% for Group III and a low of 3.3% for Group IV.

There are 987 new doctoral recipients employed in the U.S. Table 5A gives a breakdown of type of employer by type of degree-granting department for these 987 new doctoral recipients. Of these, 741 (75%) hold academic positions, 62 (6%) are employed by government, and 184 (19%) hold positions in business and industry. In the First Report for 2007–08, there were 886 new doctoral recipients employed in the U.S., of which 649 (73%) held academic positions, 30 (3%) were in government, and 207 (23%) were in business and industry. The number of new doctoral recipients employed in the U.S. increased in all categories except "Business and Industry" which decreased 11%. "Government" showed the largest percentage increase, 107%.

Table 5B shows the number of new doctoral recipients who took positions in business and industry by the type of department granting their degree for fall 2005 to fall 2009. The number of new doctoral recipients taking jobs in business and industry, which had been steadily increasing, decreased from 207 to 184, an 11%

**Table 4B: Field of Thesis of 2008–09 New Doctoral Recipients by Type of Degree-Granting Department**

| TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT | FIELD OF THESIS              |   |                       |  |             |                         |                  |   |   |   |                |                   | TOTAL       |
|---|------------------------------|---|-----------------------|--|-------------|-------------------------|------------------|---|---|---|----------------|-------------------|-------------|
|   | Algebra/<br>Number<br>Theory | Real, Comp.,<br>Funct., &<br>Harmonic<br>Analysis | Geometry/<br>Topology | Discr. Math./<br>Combin./<br>Log./<br>Comp. Sci. | Probability | Statistics/<br>Biostat. | Applied<br>Math. | Numerical<br>Analysis/<br>Approx-<br>imations | Linear<br>Nonlinear<br>Optim./<br>Control | Differential,<br>Integral, &<br>Difference<br>Equations | Math.<br>Educ. | Other/<br>Unknown |             |
| Group I (Public)                            | 77                           | 29  | 56                    | 34   | 23          | 11                      | 40               | 21  | 2   | 31  | 1              | 1                 | 326         |
| Group I (Private)                           | 52                           | 10  | 53                    | 24   | 19          | 3                       | 22               | 7   | 1   | 16  | 0              | 4                 | 211         |
| Group II                                    | 57                           | 30  | 28                    | 32   | 19          | 12                      | 42               | 27  | 6   | 28  | 1              | 0                 | 282         |
| Group III                                   | 16                           | 22  | 9                     | 20   | 4           | 32                      | 16               | 16  | 4   | 21  | 11             | 0                 | 171         |
| Group IV                                    | 0                            | 0   | 0                     | 0  | 4           | 343                     | 4                | 0   | 0   | 0   | 0              | 1                 | 352         |
| Group Va                                    | 1                            | 1   | 0                     | 12   | 8           | 9                       | 36               | 12  | 5   | 4   | 0              | 0                 | 88          |
| <b>Column Total</b>                         | <b>203</b>                   | <b>92</b>   | <b>146</b>            | <b>122</b>                                       | <b>77</b>   | <b>410</b>              | <b>160</b>       | <b>83</b>                                     | <b>18</b>                                 | <b>100</b>  | <b>13</b>      | <b>6</b>          | <b>1430</b> |
| <b>Column Subtotals</b>                     |                              |   |                       |  |             |                         |                  |   |   |   |                |                   |             |
| Male  | 153                          | 68  | 112                   | 86   | 52          | 227                     | 113              | 62  | 15  | 73  | 4              | 3                 | 968         |
| Female                                      | 50                           | 24  | 34                    | 36   | 25          | 183                     | 47               | 21  | 3   | 27  | 9              | 3                 | 462         |

drop. Among the 987 new doctoral recipients known to have employment in the U.S. in fall 2009, Group III has the smallest percentage taking jobs in business and industry at 11% and Group IV the highest at 32%.

Table 5C shows the number of new doctoral recipients who took academic positions in the U.S. by type of department granting their degree for fall 2005 to fall 2009. The total number of new doctoral recipients taking academic employment in fall 2009 increased 14% to 741 from 649 last year. Among the 987 new doctoral recipients employed in the U.S. in fall 2009, 75% have academic positions. This percentage is highest for Group I (Pr) at 85% and lowest for Groups IV at 58%.

Table 5D shows the number of positions filled with new doctoral recipients for each type of academic employer. Increases in positions filled by new doctoral recipients were realized by all groups. The biggest increase in hires of new doctorates into academic positions was in Groups IV and Va with 43% and 44%, respectively. Hires of new doctorates into positions at research institutes increased from 29 in fall 2008 to 42 in fall 2009.

In fall 2009, 72 new doctoral recipients held positions in the institution that granted their degree, although not necessarily in the same

department. This represents 6% of new doctoral recipients who are currently employed in the U.S. and 10% of the U.S. academic positions held by new doctoral recipients. In fall 2008 there were 69 such individuals making up 7% of the new doctoral recipients who were employed at the time of the First Report. Seventeen new doctoral recipients have taken part-time positions in fall 2009 compared with 18 in fall 2008.

**Information about 2008–09 Female New Doctoral Recipients**

Tables 4A and 4B give the breakdown of the new doctoral recipients in 2008–09 by Field of Thesis, by Type of Degree-Granting Department and by Type of Employer.

Overall, 462 (32%) of the 1,430 new doctoral recipients in 2008–09 are female. In 2007–08, 388 (31%) of the new doctoral recipients were female. This percentage varies over the different groups, and these percentages are given in the first row of Table 5E. This year the percentage of females produced is highest again for Group IV at 45%, compared with 52% last year. The second row of Table 5E gives the percentage of the new doctoral recipients hired who are female for each of the Groups I, II, III, IV, and Va. In addition, 40% of the

**Table 5A: 2008–09 New Doctoral Recipients Employed in the U.S. by Type of Degree-Granting Department**

| Type of Employer in U.S.                  | Group      |            |            |            |            |           | TOTAL      |
|---|------------|------------|------------|------------|------------|-----------|------------|
|   | I (Pu)     | I (Pr)     | II         | III        | IV         | Va        |            |
| Groups I, II, III, IV, and Va             | 101        | 70         | 59         | 29         | 59         | 15        | 333        |
| Master’s, Bachelor’s, and 2-Year Colleges | 48         | 20         | 82         | 52         | 21         | 9         | 232        |
| Other Academic and Research Institutes    | 32         | 14         | 17         | 16         | 75         | 22        | 176        |
| Government                                | 7          | 1          | 10         | 13         | 27         | 4         | 62         |
| Business and Industry                     | 31         | 17         | 23         | 13         | 85         | 15        | 184        |
| <b>TOTAL</b>                              | <b>219</b> | <b>122</b> | <b>191</b> | <b>123</b> | <b>267</b> | <b>65</b> | <b>987</b> |

**Table 5B: Number of New Doctoral Recipients Taking Positions in Business and Industry in the U.S. by Type of Degree-Granting Department, Fall 2005 to Fall 2009**

| Year      | Group  |        |    |     |    |    | TOTAL |
|-----------|--------|--------|----|-----|----|----|-------|
|           | I (Pu) | I (Pr) | II | III | IV | Va |       |
| Fall 2005 | 5      | 9      | 14 | 15  | 64 | 8  | 115   |
| Fall 2006 | 27     | 14     | 19 | 9   | 80 | 18 | 167   |
| Fall 2007 | 39     | 10     | 16 | 19  | 88 | 15 | 187   |
| Fall 2008 | 24     | 19     | 32 | 22  | 87 | 23 | 207   |
| Fall 2009 | 31     | 17     | 23 | 13  | 85 | 15 | 184   |

**Table 5C: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 2005 to Fall 2009**

| Year      | Group  |        |     |     |     |    | TOTAL |
|-----------|--------|--------|-----|-----|-----|----|-------|
|           | I (Pu) | I (Pr) | II  | III | IV  | Va |       |
| Fall 2005 | 131    | 88     | 130 | 83  | 131 | 39 | 602   |
| Fall 2006 | 167    | 108    | 123 | 86  | 137 | 50 | 671   |
| Fall 2007 | 178    | 76     | 146 | 87  | 120 | 43 | 650   |
| Fall 2008 | 126    | 90     | 174 | 77  | 133 | 49 | 649   |
| Fall 2009 | 181    | 104    | 158 | 97  | 155 | 46 | 741   |

**Table 5E: Females as a Percentage of 2008-09 New Doctoral Recipients Produced by and Hired by Doctoral-Granting Groups**

| Percent  | Group  |        |     |     |     |     | TOTAL |
|----------|--------|--------|-----|-----|-----|-----|-------|
|          | I (Pu) | I (Pr) | II  | III | IV  | Va  |       |
| Produced | 20%    | 21%    | 34% | 42% | 45% | 30% | 32%   |
| Hired    | 16%    | 22%    | 31% | 30% | 38% | 8%  | 26%   |

new doctoral recipients hired in Group M, Master's departments, are female; 43% of the new doctoral recipients hired in Group B, Bachelor's departments, are female, up from 40% last year. This year, Group IV hired the highest percentage of women with 38%, while Groups I, II, III ranged from 16% to 31%.

The unemployment rate for female new doctoral recipients is 5.8%, compared to 9.0% for males and 7.9% overall.

The percentage of female new doctoral recipients within fields of thesis ranged from 19%

**Table 5D: Academic Positions in U.S. Filled by New Doctoral Recipients by Type of Hiring Department, Fall 2005 to Fall 2009**

| Year      | Group |    |    |     |        | TOTAL |
|-----------|-------|----|----|-----|--------|-------|
|           | I-III | IV | Va | M&B | Other* |       |
| Fall 2005 | 231   | 45 | 12 | 188 | 126    | 602   |
| Fall 2006 | 262   | 69 | 12 | 185 | 143    | 671   |
| Fall 2007 | 264   | 39 | 17 | 186 | 144    | 650   |
| Fall 2008 | 256   | 42 | 9  | 180 | 162    | 649   |
| Fall 2009 | 260   | 60 | 13 | 210 | 198    | 741   |

\*Includes other academic and research institutes/nonprofit.

in linear, nonlinear optimization/control, to 69% in mathematics education and 45% in statistics.

Later sections in this First Report give more information about the female new doctoral recipients by citizenship and the female new doctoral recipients in Group IV.

**Employment Information about 2008-09 New Doctoral Recipients by Citizenship and Type of Employer**

Table 5F shows the pattern of employment within employer categories broken down by citizenship status of the new doctoral recipients.

The unemployment rate for the U.S. citizens is 8.6% compared to 5.8% in fall 2008. The unemployment rate for non-U.S. citizens is 7.3%. This varies by type of visa. The unemployment rate for non-U.S. citizens with a permanent visa is 8.3%, while that for non-U.S. citizens with a temporary visa is 7.2%. Among U.S. citizens whose employment status is known, 84% are employed in the U.S.

**Table 5F: Employment Status of 2008-09 New Doctoral Recipients by Citizenship Status**

| TYPE OF EMPLOYER                   | CITIZENSHIP   |                   |                |              | TOTAL       |
|------------------------------------|---------------|-------------------|----------------|--------------|-------------|
|                                    | U.S. CITIZENS | NON-U.S. CITIZENS |                |              |             |
|                                    |               | Permanent Visa    | Temporary Visa | Unknown Visa |             |
| U.S. Employer                      | 501           | 66                | 414            | 6            | 987         |
| U.S. Academic                      | 412           | 45                | 280            | 4            | 741         |
| Groups I, II, III, and Va          | 135           | 14                | 122            | 2            | 273         |
| Group IV                           | 23            | 6                 | 31             | 0            | 60          |
| Non-Ph.D. Department               | 238           | 20                | 107            | 1            | 366         |
| Research Institute/Other Nonprofit | 16            | 5                 | 20             | 1            | 42          |
| U.S. Nonacademic                   | 89            | 21                | 134            | 2            | 246         |
| Non-U.S. Employer                  | 39            | 3                 | 99             | 3            | 144         |
| Non-U.S. Academic                  | 36            | 3                 | 87             | 3            | 129         |
| Non-U.S. Nonacademic               | 3             | 0                 | 12             | 0            | 15          |
| Not Seeking Employment             | 8             | 0                 | 7              | 0            | 15          |
| Still Seeking Employment           | 47            | 6                 | 32             | 0            | 85          |
| SUBTOTAL                           | 595           | 75                | 552            | 9            | 1231        |
| Unknown (U.S.)                     | 72            | 8                 | 29             | 0            | 109         |
| Unknown (non-U.S.)*                | 2             | 1                 | 80             | 7            | 90          |
| <b>TOTAL</b>                       | <b>669</b>    | <b>84</b>         | <b>661</b>     | <b>16</b>    | <b>1430</b> |

\*Includes those who left the U.S. and whose employment status is reported as "unknown" or "still seeking employment".

**Table 5G: 2008–09 New Doctoral Recipients Having Employment in the U.S. by Type of Employer and Citizenship**

| U.S. EMPLOYER                   | CITIZENSHIP |            | TOTAL      |
|---------------------------------|-------------|------------|------------|
|                                 | U.S.        | Non-U.S.   |            |
| Academic                        | 412         | 329        | 741        |
| Groups I–Va                     | 158         | 175        | 333        |
| M, B, & 2-Year                  | 166         | 66         | 232        |
| Other Acad. & Research Inst.    | 88          | 88         | 176        |
| Government, Business & Industry | 89          | 157        | 246        |
| <b>TOTAL</b>                    | <b>501</b>  | <b>486</b> | <b>987</b> |

Among non-U.S. citizens with a permanent visa whose employment status is known, 88% have jobs in the U.S. (last year this percentage was 90%), while the similar percentage for non-U.S. citizens with a temporary visa is 75% (last year the percentage was 76%). The number of non-U.S. citizens having employment in the U.S. is 486, up from 459 last year.

Table 5G is a cross-tabulation of the 987 new doctoral recipients who have employment in the U.S. by citizenship and broad employment categories, using numbers from Table 5F. Of the 987 new doctoral recipients having jobs in the U.S., 51% are U.S. citizens (up from 48% last year). Of the 333 new doctoral recipients who took jobs in U.S. doctoral-granting departments, 47% are U.S. citizens (down from 49% last year). Of the 408 who took other academic positions, 62% are U.S. citizens (up from 57% last year). Of the 246 who took nonacademic positions, 36% are U.S. citizens. Of the 501 U.S. citizens employed in the U.S., 32% have jobs in a doctoral-granting department, 51% are in other academic positions, and 18% are in nonacademic positions. For the 486 non-U.S. citizens employed in the U.S., the analogous percentages are 36%, 32%, and 32% respectively.

### Gender, Race/Ethnicity, and Citizenship Status of 2008–09 New Doctoral Recipients

Table 6 presents a breakdown of new doctoral recipients according to gender, racial/ethnic group, and citizenship status. The information reported in this table was obtained in summary form from the departments granting the degrees. Additional reports on gender, race/ethnicity, and citizenship is available on the Web at [www.ams.org/employment/specialreports.html](http://www.ams.org/employment/specialreports.html).

There were 669 (47%) U.S. citizens among the 1,430 new doctoral recipients in 2008–09. Among U.S. citizens, 4 are American Indian or Alaska Native, 44 are Asian, 19 are Black or African American, 19 are Hispanic or Latino, 1 is Native Hawaiian or Other Pacific Islander, 575 are White, and 7 are of unknown race/ethnicity. Among non-U.S. citizens, there are no American Indians or Alaska Natives, 471 Asians, 18 Blacks or African Americans, 49 Hispanics or Latinos, 217 Whites, and 6 of unknown race/ethnicity.

Table 7 gives the number of new U.S. doctoral recipients and the number of U.S. citizens back to 1998–99. The 669 U.S. citizen new doctoral recipients is up by 236 (55%) from its low in 2004–05.

Females make up 30% of the 669 U.S. citizens receiving doctoral degrees in the mathematical sciences in 2008–09. Last year this percentage was 31%. Among the 761 non-U.S. citizen new doctoral recipients, 34% (260) are female, up from last year's 32%. Figure 3 gives the historical record of U.S. citizen female new doctoral recipients and the percentage of females among U.S. citizen (full-time) graduate students beginning in fall 1989. The number of female U.S. citizen new doctoral recipients is up 15 (8%) from 187 in 1998–99; reaching an all time new high. Additional historical information on U.S. citizen doctoral recipients is available on the Web

**Table 6: Gender, Race/Ethnicity, and Citizenship of 2008–09 New Doctoral Recipients**

| RACIAL/ETHNIC GROUP                       | MALE          |                   |                |              |            | FEMALE        |                   |                |              |              | TOTAL       |
|---|---------------|-------------------|----------------|--------------|------------|---------------|-------------------|----------------|--------------|--------------|-------------|
|   | U.S. CITIZENS | NON-U.S. CITIZENS |                |              | Total Male | U.S. CITIZENS | NON-U.S. CITIZENS |                |              | Total Female |             |
|   |               | Permanent Visa    | Temporary Visa | Unknown Visa |            |               | Permanent Visa    | Temporary Visa | Unknown Visa |              |             |
| American Indian or Alaska Native          | 0             | 0                 | 0              | 0            | 0          | 4             | 0                 | 0              | 0            | 4            | 4           |
| Asian                                     | 31            | 14                | 263            | 4            | 312        | 13            | 26                | 161            | 3            | 203          | 515         |
| Black or African American                 | 8             | 3                 | 12             | 1            | 24         | 11            | 1                 | 1              | 0            | 13           | 37          |
| Hispanic or Latino                        | 10            | 4                 | 35             | 1            | 50         | 9             | 0                 | 9              | 0            | 18           | 68          |
| Native Hawaiian or Other Pacific Islander | 0             | 0                 | 0              | 0            | 0          | 1             | 0                 | 0              | 0            | 1            | 1           |
| White                                     | 413           | 24                | 131            | 3            | 571        | 162           | 12                | 43             | 4            | 221          | 792         |
| Unknown                                   | 5             | 0                 | 6              | 0            | 11         | 2             | 0                 | 0              | 0            | 2            | 13          |
| <b>TOTAL</b>                              | <b>467</b>    | <b>45</b>         | <b>447</b>     | <b>9</b>     | <b>968</b> | <b>202</b>    | <b>39</b>         | <b>214</b>     | <b>7</b>     | <b>462</b>   | <b>1430</b> |

**Table 7: U.S. Citizen Doctoral Recipients, Preliminary Counts**

| Year    | Total Doctorates Granted by U.S. Institutions | Total U.S. Citizen Doctoral Total | %   |
|---------|---|-----------------------------------|-----|
| 1998-99 | 1133  | 554                               | 49% |
| 1999-00 | 1119  | 537                               | 48% |
| 2000-01 | 1008  | 494                               | 49% |
| 2002-03 | 1017  | 489                               | 48% |
| 2003-04 | 1041  | 441                               | 42% |
| 2004-05 | 1116  | 433                               | 39% |
| 2005-06 | 1245  | 522                               | 42% |
| 2006-07 | 1157  | 500                               | 43% |
| 2007-08 | 1235  | 540                               | 44% |
| 2008-09 | 1430  | 669                               | 47% |

at [www.ams.org/employment/specialreports.html](http://www.ams.org/employment/specialreports.html).

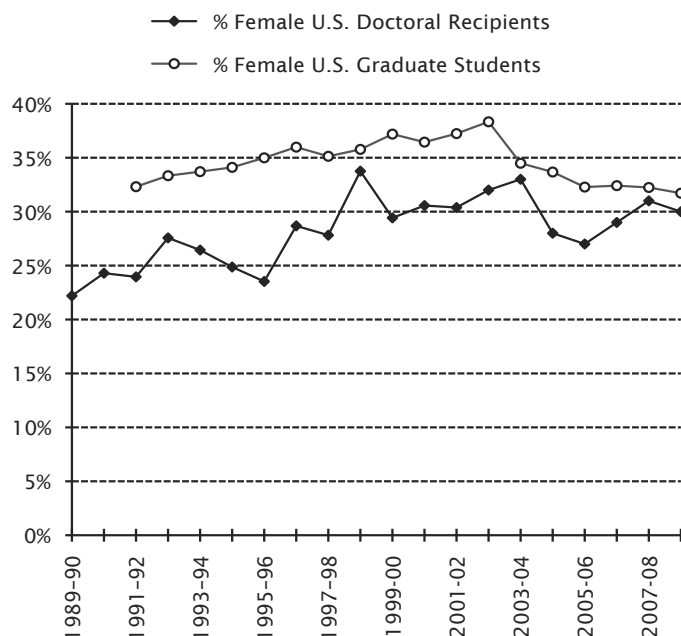
**2008-09 New Doctoral Recipients with Dissertations in Statistics/Biostatistics and Probability**

Group IV contains U.S. departments (or programs) of statistics, biostatistics, and biometrics reporting a doctoral program. In the Annual Survey Reports, Group IV is referred to as the Statistics Group. In addition, other groups in the Annual Survey produce new doctoral recipients with dissertations in statistics/biostatistics or probability. The other groups produced 140 new doctoral recipients with dissertations in statistics/biostatistics or probability in 2008-09 and have averaged 90 per year over the ten-year period reported in Table 8. Information about these 140 new doctoral recipients and the 347 new doctoral recipients in Group IV is found in this section of the report.

Table 8 contains information about new doctoral recipients in Group IV as well as those with dissertations in statistics/biostatistics and probability in other groups for this year as well as for the past nine years. In addition, the last two rows of Table 8 give a split of the 2008-09 results between the 57 statistics departments and the 35 biostatistics and biometrics departments in Group IV. This year 487 new doctorates had a dissertation in statistics/biostatistics (410) or probability (77), a 27% increase from last year's number. Those with dissertations in statistics/biostatistics and probability accounted for 34% of new doctorates in 2008-09. Quite a bit of the year-to-year variation in these numbers is due to the changes made in the departments included in Group IV over the ten years and to the response rate variation in this group.

Group IV has 92 departments for 2008-09, 11 more than the next largest doctoral group. It contains 31% of all doctoral departments surveyed,

**Figure 3: Females as a Percentage of U.S. Citizen Doctoral Recipients and Graduate Students, Preliminary Counts**



and the 68 Group IV departments responding to the Annual Survey reported 352 new doctoral recipients, 25% of all new doctoral recipients in 2008-09. The number of new doctoral recipients in Group IV is up 61 from the number reported at this time last year, while the number of departments responding is up 8 from the number responding by this time last year.

Because of its size, the data from Group IV have a large effect on the results when all doctoral groups are combined. Furthermore, Group IV results are often quite different from those for Groups I (Pu), I (Pr), II, III, and Va. Group IV results can mask important changes in the other doctoral groups. In the following paragraphs some of these differences are presented.

Group IV is producing a larger percentage of female doctorates than the other doctoral groups. Females accounted for 45% of the 352 new doctoral recipients in Group IV, while 28% of 1,078 are female in the other doctoral groups. Among U.S. citizens, females accounted for 59% of the 92 Group IV new doctoral recipients, while for the other groups 26% of 577 were female. Overall, 30% of the 669 U.S. citizen new doctoral recipients were female:

Group IV is producing a smaller percentage of U.S. citizen new doctorates than the other doctoral groups. In Group IV, 36% of the 352 new doctoral recipients are U.S. citizens, while in other groups 50% of the 1,078 are U.S. citizens. In Group IV, 66% of the 159 females were not U.S. citizens.

Group IV doctorates are more likely to take jobs in business and industry than those in other doctoral

**Table 8: New Doctoral Recipients with Dissertations in Statistics/Biostatistics and Probability**

| Year          | Group IV Depts Surveyed | Group IV Depts Responding (percent) | New Doctoral Recipients in Group IV only |                  |                   |                       | New Doctoral Recipients in Statistics/Biostatistics and Probability, Group IV and Other* Groups |          |              |                       | New Doctoral Recipients Hired by Group IV |        |
|---------------|-------------------------|-------------------------------------|--|------------------|-------------------|-----------------------|---|----------|--------------|-----------------------|---|--------|
|               |                         |                                     | Total                                    | Female (percent) | Jobs in Bus & Ind | Percentage Unemployed | Total   | Group IV | Other Groups | Percentage Unemployed | Male                                      | Female |
| 1999-00       | 89                      | 75 (84%)                            | 284                                      | 110 (39%)        | 79                | 2.6%                  | 351   | 278      | 73           | 2.2%                  | 24  | 22     |
| 2000-01       | 86                      | 70 (81%)                            | 237                                      | 98 (41%)         | 59                | 5.9%                  | 289   | 221      | 68           | 6.1%                  | 27  | 14     |
| 2001-02       | 86                      | 72 (84%)                            | 222                                      | 92 (41%)         | 56                | 6.6%                  | 288   | 221      | 67           | 6.1%                  | 31  | 15     |
| 2002-03       | 86                      | 74 (86%)                            | 239                                      | 98 (41%)         | 45                | 2.3%                  | 302   | 234      | 68           | 3.6%                  | 20  | 19     |
| 2003-04       | 87                      | 65 (75%)                            | 243                                      | 97 (40%)         | 50                | 3.4%                  | 318   | 241      | 77           | 4.2%                  | 48  | 15     |
| 2004-05       | 87                      | 63 (72%)                            | 285                                      | 126 (44%)        | 64                | 5.1%                  | 374   | 283      | 91           | 6.1%                  | 26  | 19     |
| 2005-06       | 88                      | 60 (68%)                            | 287                                      | 134 (47%)        | 80                | 1.8%                  | 396   | 278      | 118          | 3.2%                  | 41  | 28     |
| 2006-07       | 86                      | 50 (58%)                            | 279                                      | 127 (46%)        | 88                | 3.1%                  | 380   | 279      | 101          | 4.2%                  | 24  | 15     |
| 2007-08       | 89                      | 60 (67%)                            | 291                                      | 151 (52%)        | 87                | 1.3%                  | 382   | 281      | 101          | 3.2%                  | 21  | 21     |
| 2008-09       | 92                      | 68 (74%)                            | 352                                      | 159 (45%)        | 85                | 3.3%                  | 487   | 347**    | 140***       | 5.0%                  | 37  | 23     |
| Statistics    | 57                      | 45 (79%)                            | 245                                      | 103 (42%)        | 74                | 3.7%                  |   |          |              |                       | 25  | 12     |
| Biostatistics | 35                      | 23 (66%)                            | 107                                      | 56 (52%)         | 11                | 1.3%                  |   |          |              |                       | 12  | 11     |

\* Includes other academic departments and research institutes/other nonprofits.

\*\* Of 347, there were 343 in statistics/biostatistics and 4 in probability. For complete details, see Table 4B.

\*\*\* Of 140, there were 67 in statistics/biostatistics and 73 in probability. For complete details, see Table 4B.

groups. Of the 267 new doctoral recipients from Group IV who found employment in the U.S., 85 (32%) took jobs in business or industry. From the other groups, 720 new doctoral recipients found employment in the U.S., of which 99 (14%) took jobs in business or industry.

Group IV doctorates have a lower unemployment rate than the other doctoral groups. The employment status for 301 Group IV new doctoral recipients is known, and 9 (3.3%) are unemployed. For the other groups, the employment status of 930 is known, and 66 (9.5%) are unemployed. Group IV is hiring a bigger percentage of females than the other doctoral groups. Twenty-three of 60 (38%) new doctoral recipients hired by Group IV departments were female, down from last year's 50%. The other doctoral groups reported that 63 of 273 (23%) new doctoral recipients hired were female, up from last year's 22%.

Group IV had 347 new doctoral recipients with fields of thesis in statistics/biostatistics (343) and the other doctoral departments had 140 with fields of thesis in statistics/biostatistics (67) and probability (73) (last year the other doctoral departments had 57 new doctorates in statistics and 44 in probability). The distribution of these degrees among the various groups can be found in Table 4B. The number of new doctoral recipients with theses in statistics/biostatistics and probability (487) is substantially larger than any other field, with algebra and number theory next with 203.

### Changes in Reporting of Unemployment Rate

In the unemployment calculations provided in this report the individuals employed outside the U.S. have been removed from the denominator used in the calculation of the rate, in addition to the routine removal of all individuals whose employment status is unknown. This is a change from prior Annual Survey Reports. As a consequence, the unemployment rate now being reported more accurately reflects the U.S. labor market experienced by the new doctoral recipients. This change tends to increase the rate of unemployment over that produced in prior years.

In a further small change from prior years, those individuals reported as not seeking employment have also been removed from the denominator. The number of individuals so designated is small each year, and the impact of this change is to produce a slight increase in the rate over that reported in prior years.

The unemployment rates for years prior to 2009 shown in this report have been recalculated using this new method. One can view a comparison of the unemployment rates using the traditional method and the new method by visiting the AMS website at [www.ams.org/employment/surveyreports.html](http://www.ams.org/employment/surveyreports.html).

### Previous Annual Survey Reports

The 2008 First, Second, and Third Annual Survey Reports were published in the *Notices of the AMS* in the February, August, and November 2009 issues respectively. These reports and earlier reports, as well as a wealth of other information from these surveys, are available on the AMS website at [www.ams.org/employment/surveyreports.html](http://www.ams.org/employment/surveyreports.html).



## Acknowledgments

The Annual Survey attempts to provide an accurate appraisal and analysis of various aspects of the academic mathematical sciences scene for the use and benefit of the community and for filling the information needs of the professional organizations. Every year, college and university departments in the United States are invited to respond. The Annual Survey relies heavily on the conscientious efforts of the dedicated staff members of these departments for the quality of its information. On behalf of the Annual Survey Data Committee and the Annual Survey Staff, we thank the many secretarial and administrative staff members in the mathematical sciences departments for their cooperation and assistance in responding to the survey questionnaires.

## Other Sources of Data

Vist the AMS website at [www.ams.org/employment/specialreports.html](http://www.ams.org/employment/specialreports.html) for a listing of additional sources of data on the Mathematical Sciences.

The Annual Survey series begun in 1957 by the American Mathematical Society is currently under the direction of the Data Committee, a joint committee of the American Mathematical Society, the American Statistical Association, the Institute of Mathematical Statistics, the Mathematical Association of America, and the Society of Industrial and Applied Mathematics. The current members of this committee are Richard Cleary, Richard M. Dudley, Susan Geller, John W. Hagood, Abbe H. Herzig, Ellen Kirkman, Joanna Mitro, James W. Maxwell (ex officio), Bart Ng, Polly Phipps (chair), Douglas Ravanel, Jianguo (Tony) Sun, and Marie Vitulli. The committee is assisted by AMS survey analyst Colleen A. Rose. Comments or suggestions regarding this Survey Report may be directed to the committee.

## Definitions of the Groups

As has been the case for a number of years, much of the data in these reports is presented for departments divided into groups according to several characteristics, the principal one being the highest degree offered in the mathematical sciences. Doctoral-granting departments of mathematics are further subdivided according to their ranking of “scholarly quality of program faculty” as reported in the 1995 publication *Research-Doctorate Programs in the United States: Continuity and Change*.<sup>1</sup> These rankings update those reported in a previous study published in 1982.<sup>2</sup> Consequently, the departments which now compose Groups I, II, and III differ significantly from those used prior to the 1996 survey.

The subdivision of the Group I institutions into Group I Public and Group I Private was new for the 1996 survey. With the increase in number of the Group I departments from 39 to 48, the Annual Survey Data Committee judged that a further subdivision of public and private would provide more meaningful reporting of the data for these departments.

Brief descriptions of the groupings are as follows:

Group I is composed of 48 departments with scores in the 3.00–5.00 range. Group I Public and Group I Private are Group I departments at public institutions and private institutions respectively.

Group II is composed of 56 departments with scores in the 2.00–2.99 range.

Group III contains the remaining U.S. departments reporting a doctoral program, including a number of departments not included in the 1995 ranking of program faculty.

Group IV contains U.S. departments (or programs) of statistics, biostatistics, and biometrics reporting a doctoral program.

Group V contains U.S. departments (or programs) in applied mathematics/applied science, operations research, and management science which report a doctoral program.

Group Va is applied mathematics/applied science; Group Vb, which was no longer surveyed as of 1998–99, was operations research and management science.

Group M contains U.S. departments granting a master’s degree as the highest graduate degree.

Group B contains U.S. departments granting a baccalaureate degree only.

*Listings of the actual departments which compose these groups are available on the AMS website at [www.ams.org/employment/groups\\_des.html](http://www.ams.org/employment/groups_des.html).*

<sup>1</sup>Research-Doctorate Programs in the United States: Continuity and Change, edited by Marvin L. Goldberger, Brendan A. Maher, and Pamela Ebert Flattau, National Academy Press, Washington, DC, 1995.

<sup>2</sup>These findings were published in An Assessment of Research-Doctorate Programs in the United States: Mathematical and Physical Sciences, edited by Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall, National Academy Press, Washington, DC, 1982. The information on mathematics, statistics, and computer science was presented in digest form in the April 1983 issue of the Notices of the AMS, pages 257–67, and an analysis of the classifications was given in the June 1983 Notices of the AMS, pages 392–3.