

2008 Annual Survey of the Mathematical Sciences

(First Report)

Preliminary Report on the 2007–2008 New Doctoral Recipients

Polly Phipps, James W. Maxwell, and Colleen Rose

The preliminary report of the 2008 Annual Survey gives a broad picture of 2007–08 new doctoral recipients from U.S. departments in the mathematical sciences, including their employment status in fall 2008. This report is based on information collected from a questionnaire distributed to departments in April 2008. A follow-up questionnaire was distributed to the individual new doctoral recipients in October 2008. This questionnaire will be used to update and revise results in this report, which are based on information from the departments that produced the new doctorates. Those results will be published in the Second Report of the 2008 Annual Survey in the August 2009 issue of the *Notices* of the AMS. The Faculty Salary Survey report, traditionally published as part of this report, will appear in the March issue of *Notices* of the AMS.

Another questionnaire concerned with data on fall 2008 course enrollments, graduate students, and departmental faculty was distributed to departments in September 2008. Results from this questionnaire will appear in the Third Report of the 2008 Annual Survey in the November 2009 issue of the *Notices* of the AMS.

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, John W. Hagood, Abbe H. Herzig, Ellen Kirkman, David J. Lutzer, Joanna Mitro, James W. Maxwell (ex officio), Bart Ng, Polly Phipps (chair), Douglas Ravelle, 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.

Polly Phipps is a senior research statistician with the Bureau of Labor Statistics. James W. Maxwell is AMS associate executive director for special projects. Colleen A. Rose is AMS survey analyst.

Preliminary Report on the 2007–2008 New Doctoral Recipients

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, 2007, through June 30, 2008. All information in the report was provided over the summer and early fall of 2008 by the departments that awarded the degrees. The report includes a preliminary analysis of the fall 2008 employment plans of 2007–2008 doctoral recipients and a demographic profile summarizing characteristics of citizenship status, sex, and racial/ethnic group. This preliminary

Table 1: Number of Departments Responding to Doctorates Granted Survey

Group I (Pu)	20 of 25 including 0 with no degrees
Group I (Pr)	22 of 23 including 0 with no degrees
Group II	52 of 56 including 2 with no degrees
Group III	61 of 75 including 11 with no degrees
Group IV	60 of 89 including 4 with no degrees
Group Va	19 of 21 including 1 with no degrees

See "Definitions of the Groups" on page 267.

report will be updated in the Second Report of the 2008 Annual Survey to reflect subsequent reports of additional 2007–2008 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 these departments. The Second Report, to appear in the August 2009 issue of *Notices*, will also reflect additional information

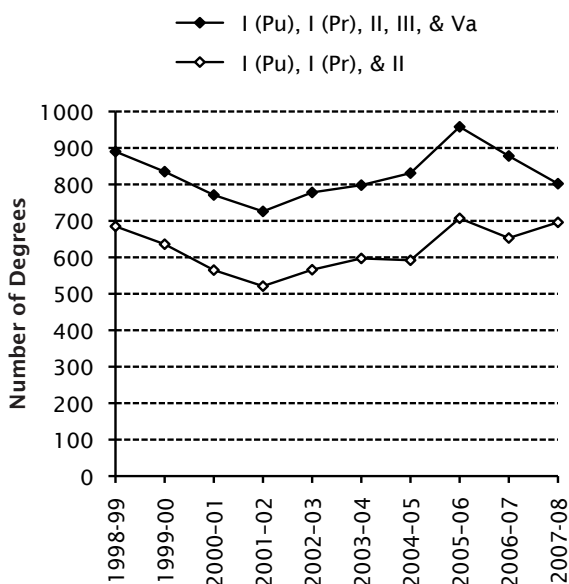
provided by the new doctoral recipients themselves, including their starting salaries.

Table 1 provides the number of departments responding to the 2008 Survey of New Doctoral Recipients in time for this report. This year's response rates were above 80% for all groups except Group IV and increased over last year in all groups except Group I (Pu). Overall, nineteen 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
1998-99	292	152	241	136	243	69	1133
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

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



Highlights

There were 1,235 new doctoral recipients reported for 2007-08 by departments responding in time for the 2008 First Report.

The number of departments responding in time for this year's report increased by 18 and in every group except Group I (Pu).

There were 540 U.S. citizens reported among this year's new doctoral recipients, 44% of the total. Last year's figure was 43%.

Based on responses from departments alone, the fall 2008 unemployment rate for the 1,083 new doctoral recipients whose employment status is known is 5.4%, up from 4% for fall 2007.

Sixty-nine new doctoral recipients hold positions at the institution that granted their degree, although not necessarily in the same department. This is 7% of the new doctoral recipients who are currently known to have jobs and 11% of those who have academic positions in the U.S. Eighteen new doctoral recipients have part-time positions.

The number of new doctoral recipients employed in the U.S. is 886, up 22 from last year. The number of new doctoral recipients employed in academic positions in the U.S. remains relatively stable at 650, it was 651 last year.

Of the 886 new doctoral recipients taking positions in the U.S., 207 (23%) have jobs in business and industry, increasing for the fifth consecutive year. The fall 2008 number is up 11% from fall 2007, and is up 108 (109%) from fall 2004. The number of new doctoral recipients taking jobs in government is up 3 (11%) over fall 2007.

Among the 886 new doctoral recipients having employment in the U.S., 426 (48%) are U.S. citizens (up from 405 (47%) last year).

The number of non-U.S. citizens having employment in the U.S. is 460; last year it was 459.

Among the 307 new doctoral recipients hired by U.S. doctoral-granting departments, 49% are U.S. citizens (up from 48% last year). Among the 342 having other academic positions in the U.S., 57% are U.S. citizens (up from 53% last year).

Of the 1,235 new doctoral recipients, 31% (388) are female, the same percentage reported in fall 2007. Of the 540 U.S. citizen new doctoral recipients, 31% (166) are females, up from 29% in fall 2007.

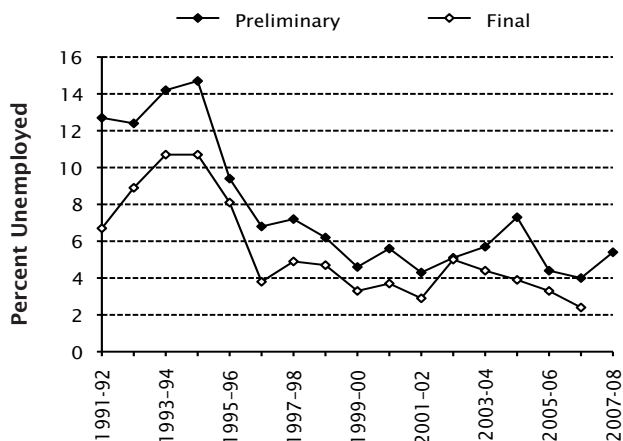
Among the 540 U.S. citizen new doctoral recipients, 4 are American Indian or Alaska Native, 23 are Asian, 22 are Black or African American, 19 are Hispanic or Latino, 5 are Native Hawaiian or Other Pacific Islander, 461 are White, and 6 are of unknown race/ethnicity.

Group IV produced 291 new doctorates, of which 151 (52%) are females, compared to all other groups combined, where 237 (25%) are females. In Group IV, 89 (31%) of the new doctoral recipients are U.S. citizens (while in the other groups 48% are U.S. citizens).

Twenty-seven percent of the new doctorates had a dissertation in statistics/biostatistics (334). The next highest percentage was in algebra and number theory with 16% (195).

The Faculty Salary Survey report, traditionally published as part of this report, will appear in the March issue of *Notices*.

Figure 2: Percentage of New Doctoral Recipients Unemployed (as reported in the respective Annual Survey Reports 1991–2007)



Doctoral Degrees Granted in 2007-08

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 1,235 new doctorates granted by these departments in 2007-08 is an increase of 78 from the preliminary count for 2006-07.

From Table 2 we see that all groups except Group I (Pu) reported an increase in the number of doctoral recipients from the previous year. The decrease reported for Group I (Pu) is almost certainly the result of the four departments in Group I (Pu) that responded in time for last year’s report but not this year’s report. These departments have awarded an average of 55 doctoral recipients each year over the past four

years. The final count for 2007-08 is likely to be very close to the final count for 2006-07 of 1,333.

The 2007-08 numbers in Table 2 will be broken down in various ways, such as by sex, in later sections of this report. The names of the 1,235 new doctoral recipients are found on pages 276-96 of this issue of the *Notices*.

By way of background to this report on new doctoral recipients, Table 3 gives historical information about various types of full-time graduate students in Groups I, II, III, and Va combined. These data are reprinted from Table 6B of the Third Report of the 2007 Annual Survey (*Notices*, November 2007).

Employment Plans of 2007-08 New Doctoral Recipients

Tables 4A, 4B, and 4C each provide a different cross-tabulation of the 1,235 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 sex for type of employer, type of degree-granting department, and field of thesis. Keep in mind that the results in this report come from the departments giving the degrees and not from the degree recipients themselves. These tables will be updated using information from the doctoral recipients themselves in the 2008 Second Report in the August 2009 issue of *Notices*.

The last column (Total) in Table 4A can be used to find the overall unemployment rate. In this and other unemployment calculations in this report, the individuals whose employment status is not known (Unknown (U.S.) and Unknown (non-U.S.)) are first removed, and the unemployment fraction is the number still seeking employment divided by the total number of individuals left after the “Unknowns” are removed. The preliminary unemployment rate for these data is 5.4%. This preliminary rate will be updated later with information gathered

Table 3: Full-Time Graduate Students in Groups I, II, III, & Va by Sex and Citizenship, Fall 1998 to Fall 2007

(Data Reprinted from Table 6B in Third Report, 2007 Annual Survey)

	1998	1999	2000	2001	2002	2003	2004	2005	2006 ²	2007
Total full-time graduate students	8791	8838	9637	9361	9972	10444	10707	10565	10984	10937
Female	2770	2766	3016	2899	3136	3215	3245	3111	3279	3249
% Female	32%	31%	31%	31%	31%	31%	30%	29%	30%	30%
% U.S. citizen	55%	53%	53%	49%	51%	54%	55%	56%	56%	56%
% Underrepresented minorities ¹						10%	9%	10%	9%	9%
Total first-year graduate students	2458	2664	2839	2875	2996	2711	3004	2832	2960	2964
Female	859	866	879	1014	1038	902	983	851	961	950
% Female	35%	33%	31%	35%	35%	33%	33%	30%	32%	32%
% U.S. citizen	55%	53%	54%	53%	55%	56%	60%	59%	55%	56%
% Underrepresented minorities						12%	9%	10%	10%	10%

¹ Underrepresented minorities includes any person having origins within the categories *American Indian or Alaska Native, Black or African American, Hispanic or Latino, and Native Hawaiian or Other Pacific Islander.*

² Numbers in this column reflect corrections of those previously reported. For further information visit our website at <http://www.ams.org/employment/surveyreports.html>.

Table 4A: Employment Status of 2007-08 New Doctoral Recipients in the Mathematical Sciences by Field of Thesis

TYPE OF EMPLOYER	FIELD OF THESIS												TOTAL
	Algebra/ Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/ Topology	Discr. Math./ Combin./ Logic/ Comp. Sci.	Probability	Statistics/ Biostat.	Applied Math.	Numerical Analysis/ Approxi- mations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math. Educ.	Other/ Unknown	
Group I (Public)	27	6	13	3	5	1	6	5	3	8	0	0	77
Group I (Private)	17	1	17	5	3	2	8	1	0	6	0	0	60
Group II	14	11	8	5	1	4	9	6	2	12	2	1	75
Group III	14	2	2	2	1	8	4	2	2	2	5	0	44
Group IV	0	0	0	0	1	41	0	0	0	0	0	0	42
Group Va	0	0	1	1	0	0	7	0	0	0	0	0	9
Master's	8	4	3	6	1	11	6	7	1	4	3	0	54
Bachelor's	27	9	16	15	2	12	22	3	2	14	4	0	126
Two-Year College	2	4	2	2	0	1	5	1	0	4	1	0	22
Other Academic Dept.	7	2	2	8	1	54	27	4	3	3	0	0	111
Research Institute/ Other Nonprofit	2	0	1	3	1	12	7	1	0	2	0	0	29
Government	0	0	2	2	0	17	6	1	1	1	0	0	30
Business and Industry	14	8	10	10	18	104	23	8	2	8	0	2	207
Non-U.S. Academic	20	7	16	10	5	15	23	0	3	10	0	0	109
Non-U.S. Nonacademic	4	0	0	1	2	7	0	4	0	2	0	0	20
Not Seeking Employment	3	0	1	0	0	3	1	0	0	2	0	0	10
Still Seeking Employment	13	5	6	4	3	7	9	3	0	8	0	0	58
Unknown (U.S.)	15	5	6	6	2	23	17	8	3	8	1	1	95
Unknown (non-U.S.)*	8	2	8	6	2	12	9	4	0	5	0	1	57
TOTAL	195	66	114	89	48	334	189	58	22	99	16	5	1235
Column Male	156	50	92	63	43	164	131	48	18	69	8	5	847
Subtotals Female	39	16	22	26	5	170	58	10	4	30	8	0	388

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

Table 4B: Employment Status of 2007-08 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)	30	20	15	6	1	5	77	62	15
Group I (Private)	12	37	4	1	3	3	60	48	12
Group II	23	9	27	10	3	3	75	56	19
Group III	9	1	15	13	5	1	44	31	13
Group IV	0	0	1	1	39	1	42	21	21
Group Va	0	2	2	0	0	5	9	9	0
Master's	12	3	20	6	12	1	54	39	15
Bachelor's	25	7	59	21	8	6	126	76	50
Two-Year College	6	1	7	5	1	2	22	18	4
Other Academic Dept.	7	6	18	13	49	18	111	60	51
Research Institute/ Other Nonprofit	2	4	6	1	12	4	29	13	16
Government	3	4	4	1	16	2	30	18	12
Business and Industry	24	19	32	22	87	23	207	132	75
Non-U.S. Academic	34	27	16	8	16	8	109	88	21
Non-U.S. Nonacademic	4	4	4	1	4	3	20	18	2
Not Seeking Employment	2	0	2	3	2	1	10	2	8
Still Seeking Employment	21	8	12	11	3	3	58	44	14
Unknown (U.S.)	7	12	28	13	22	13	95	73	22
Unknown (non-U.S.)*	13	8	18	6	8	4	57	39	18
TOTAL	234	172	290	142	291	106	1235	847	388
Column Male	184	143	207	96	140	77	847		
Subtotals Female	50	29	83	46	151	29	388		

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

Table 4C: Field of Thesis of 2007–08 New Doctoral Recipients by Type of Degree-Granting Department

TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT	FIELD OF THESIS												TOTAL
	Algebra/ Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/ Topology	Discr. Math./ Combin./ Comp. Sci.	Probability	Statistics/ Biostat.	Applied Math.	Numerical Analysis/ Approx- imations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math. Educ.	Other/ Unknown	
Group I (Public)	61	16	35	33	12	2	34	6	6	26	0	3	234
Group I (Private)	56	12	34	12	10	0	27	2	2	17	0	0	172
Group II	64	24	32	16	12	15	61	27	5	27	7	0	290
Group III	14	12	9	14	4	20	19	16	4	19	9	2	142
Group IV	0	0	0	0	4	277	9	0	0	1	0	0	291
Group Va	0	2	4	14	6	20	39	7	5	9	0	0	106
Column Total	195	66	114	89	48	334	189	58	22	99	16	5	1235

Table 5A: 2007–08 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	74	69	64	31	51	18	307
Master's, Bachelor's, and 2-Year Colleges	43	11	86	32	21	9	202
Other Academic and Research Institutes	9	10	24	14	61	22	140
Government	3	4	4	1	16	2	30
Business and Industry	24	19	32	22	87	23	207
TOTAL	153	113	210	100	236	74	886

from the 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 2007 was 4.0%. The unemployment rates, calculated by type of doctoral degree-granting department using Table 4B, vary from group to group, with a high of 9.8% for Group I (Pu) and a low of 1.1% for Group IV.

There are 886 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 886 new doctoral recipients. Of these, 649 (73%) hold academic positions, 30 (3%) are employed by government, and 207 (23%) hold positions in business and industry. In the First Report for 2006–07, there were 864 new doctoral recipients employed in the U.S., of which 650 (75%) held academic positions, 27 (3%) were in government, and 187 (22%) were in business and industry. The number of new doctoral recipients employed in the U.S. increased in all categories except Group I–Va which decreased 4%. “Business and Industry” and “Government” showed the largest increase at 11%.

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 2004 to fall 2008. The number of new doctoral recipients taking jobs in business and industry has been steadily increasing since 2004. From fall 2004 to fall 2008, the number of

Table 5B: Number of New Doctoral Recipients Taking Positions in Business and Industry in the U.S. by Type of Degree-Granting Department, Fall 2004 to Fall 2008

Year	Group						TOTAL
	I (Pu)	I (Pr)	II	III	IV	Va	
Fall 2004	9	13	9	9	50	9	99
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

new doctoral recipients entering the business and industry sector more than doubled, from 99 to 207, an increase of 108. In addition, the fall 2008 number is up 11% from fall 2007.

Among the 886 new doctoral recipients known to have employment in the U.S. in fall 2008, Group I (Pu) has the smallest percentage taking jobs in business and industry at 16% and Group IV the highest at 37%.

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 2004 to fall 2008. The total number of new doctoral recipients taking academic employment in fall 2008 is relatively unchanged from fall 2007. Among the 886 new doctoral recipients employed in the U.S. in fall 2008, 73% have academic positions. This

Table 5C: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 2004 to Fall 2008

Year	Group						TOTAL
	I (Pu)	I (Pr)	II	III	IV	Va	
Fall 2004	110	113	130	70	142	49	614
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

Table 5D: Academic Positions in U.S. Filled by New Doctoral Recipients by Type of Hiring Department, Fall 2004 to Fall 2008

Year	Group					TOTAL
	I-III	IV	Va	M&B	Other*	
Fall 2004	222	63	17	154	158	614
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

*Includes other academic and research institutes/nonprofit.

percentage is highest for Group II at 83% and lowest for Groups IV at 56%.

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 only by Groups IV and Other. The biggest increase in hires of new doctorates into academic positions was in Group Other (13%). Hires of new doctorates into positions at research institutes remained relatively

Table 5G: 2007-08 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	344	305	649
Groups I-Va	149	158	307
M, B, & 2-Year	129	73	202
Other Acad. & Research Inst.	66	74	140
Government, Business & Industry	82	155	237
TOTAL	426	460	886

Table 5F: Employment Status of 2007-08 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	426	52	395	13	886
U.S. Academic	344	32	265	8	649
Groups I, II, III, and Va	132	9	120	4	265
Group IV	17	1	23	1	42
Non-Ph.D. Department	182	22	107	2	313
Research Institute/Other Nonprofit	13	0	15	1	29
U.S. Nonacademic	82	20	130	5	237
Non-U.S. Employer	29	2	95	3	129
Non-U.S. Academic	27	1	78	3	109
Non-U.S. Nonacademic	2	1	17	0	20
Not Seeking Employment	6	1	3	0	10
Still Seeking Employment	26	3	29	0	58
SUBTOTAL	487	58	522	16	1083
Unknown (U.S.)	53	4	34	4	95
Unknown (non-U.S.)*	0	1	53	3	57
TOTAL	540	63	609	23	1235

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

Table 5E: Females as a Percentage of 2007-08 New Doctoral Recipients Produced by and Hired by Doctoral-Granting Groups

Percent	Group						TOTAL
	I (Pu)	I (Pr)	II	III	IV	Va	
Produced	21%	17%	29%	32%	52%	27%	31%
Hired	19%	20%	25%	30%	50%	0%	26%

unchanged from 30 in fall 2007 to 29 in fall 2008.

In fall 2008, 69 new doctoral recipients held positions in the institution that granted their degree, although not necessarily in the same department. This represents 7% of new doctoral recipients who are currently employed in the U.S. and 11% of the U.S. academic positions held by new doctoral recipients. In fall 2007 there were 78 such individuals making up 8% of the new doctoral recipients who were employed at the time of the First Report. Eighteen new doctoral recipients have taken part-time positions in fall 2008 compared with 22 in fall 2007.

Information about 2007-08 Female New Doctoral Recipients

Tables 4A and 4B give male and female breakdowns of the new doctoral recipients in 2007-08 by Field of Thesis, by Type of Degree-Granting Department, and by Type of Employer.

Overall, 388 (31%) of the 1,235 new doctoral recipients in 2007-08 are female. In 2006-07, 365 (32%) 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 52%,

Table 6: Sex, Race/Ethnicity, and Citizenship of 2007–08 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	2	0	0	0	2	2	0	1	0	3	5
Asian	11	11	263	4	289	12	9	135	10	166	455
Black or African American	11	8	17	0	36	11	1	1	0	13	49
Hispanic or Latino	19	2	22	0	43	0	1	5	1	7	50
Native Hawaiian or Other Pacific Islander	5	0	1	0	6	0	0	0	0	0	6
White	324	17	120	2	463	137	13	39	2	191	654
Unknown	2	1	3	2	8	4	0	2	2	8	16
TOTAL	374	39	426	8	847	166	24	183	15	388	1235

compared with 46% 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, 28% of the new doctoral recipients hired in Group M, master's departments, are female; 40% of the new doctoral recipients hired in Group B, bachelor's departments, are female, up from 37% last year. This year, Group IV hired the highest percentage of women with 50%, while Groups I, II, III ranged from 19 to 30%, and Group Va hired no women.

The unemployment rate for female new doctoral recipients is 4%, compared to 6% for males and 5.4% overall.

The percentage of female new doctoral recipients within fields of thesis ranged from 10% in probability, to 50% in mathematics education and 51% 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 2007–08 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 540 U.S. citizens is 5.3% compared to 5.1% in fall 2007. The unemployment rate for non-U.S. citizens is 5.4%. This varies by type of visa. The unemployment rate for non-U.S. citizens with a permanent visa is 5.2%, while that for non-U.S. citizens with a temporary visa is 5.6%. Among U.S. citizens whose employment status is known, 87% are employed in the U.S. Among non-U.S. citizens with a permanent visa whose employment status is known, 90% have jobs in the U.S. (last year this percentage was 95%), while

the similar percentage for non-U.S. citizens with a temporary visa is 76% (last year the percentage was 77%). The number of non-U.S. citizens having employment in the U.S. is 460, relatively unchanged from last year (459).

Table 5G is a cross-tabulation of the 886 new doctoral recipients who have employment in the U.S. by citizenship and broad employment categories, using numbers from Table 5F. Of the 886 new doctoral recipients having jobs in the U.S., 48% are U.S. citizens (up from 47% last year). Of the 307 new doctoral recipients who took jobs in U.S. doctoral-granting departments, 49% are U.S. citizens (up from 48% last year). Of the 342 who took other academic positions, 57% are U.S. citizens (up from 53% last year). Of the 237 who took nonacademic positions, 35% are U.S. citizens. Of the 426 U.S. citizens employed in the U.S., 35% have jobs in a doctoral-granting department, 46% are in other academic positions, and 19% are in nonacademic positions. For the 460 non-U.S. citizens employed in the U.S., the analogous percentages are 34%, 32%, and 34% respectively.

Sex, Race/Ethnicity, and Citizenship Status of 2007–08 New Doctoral Recipients

Table 6 presents a breakdown of new doctoral recipients according to sex, racial/ethnic group, and citizenship status. The information reported in this table was obtained in summary form from the departments granting the degrees.

There were 540 (44%) U.S. citizens among the 1,235 new doctoral recipients in 2007–08. Among U.S. citizens, 4 are American Indian or Alaska Native (2 male and 2 female), 23 are Asian (11 males and 12 females), 22 are Black or African American (11 males and 11 female), 19 are Hispanic or Latino (males), 5 are Native Hawaiian or Other Pacific Islander (males), 461 are White (324 males and 137 females), and 6 are of unknown race/ethnicity (2

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

Year	Total Doctorates Granted by U.S. Institutions	Total U.S. Citizen Doctoral Total	%
1997-98	1216	586	48%
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%

*Prior to 1998-99, the counts include new doctoral recipients from Group Vb. In addition, prior to 1982-83, the counts include recipients from computer science departments.

Table 8: Sex of U.S. Citizen Doctoral Recipients, Preliminary Counts

Year	Total U.S. Citizen Doctoral Recipients	Male	Female	% Female
1997-98	586	423	163	28%
1998-99*	554	367	187	34%
1999-00	537	379	158	29%
2000-01	494	343	151	31%
2002-03	489	332	157	32%
2003-04	441	297	144	33%
2004-05	433	313	120	28%
2005-06	522	379	143	27%
2006-07	500	355	145	29%
2007-08	540	374	166	31%

*Prior to 1998-99, the counts include new doctoral recipients from Group Vb. In addition, prior to 1982-83, the counts include recipients from computer science departments.

males and 4 females). Among non-U.S. citizens, there are 1 American Indian or Alaska Native, 432 Asians, 27 Blacks or African Americans, 31 Hispanics or Latinos, 1 Native Hawaiian or Other Pacific Islander, 193 Whites, and 10 are of unknown race/ethnicity.

Table 7 (and Figure 3) gives the number of new U.S. doctoral recipients and the number of U.S. citizens back to 1997-98. The 540 U.S. citizen new doctoral recipients is up by 46 (8%) from 2000-01. The percentage of U.S. citizen new doctoral recipients has increased this year to 44% from 43% in fall 2007.

Females make up 31% of the 540 U.S. citizens receiving doctoral degrees in the mathematical sciences in 2007-08. Last year this percentage was 29%. Among the 695 non-U.S. citizen new doctoral recipients, 32% (222) are female, down from last year's 33%.

Figure 3: U.S. Citizen Doctoral Recipients, Preliminary Counts

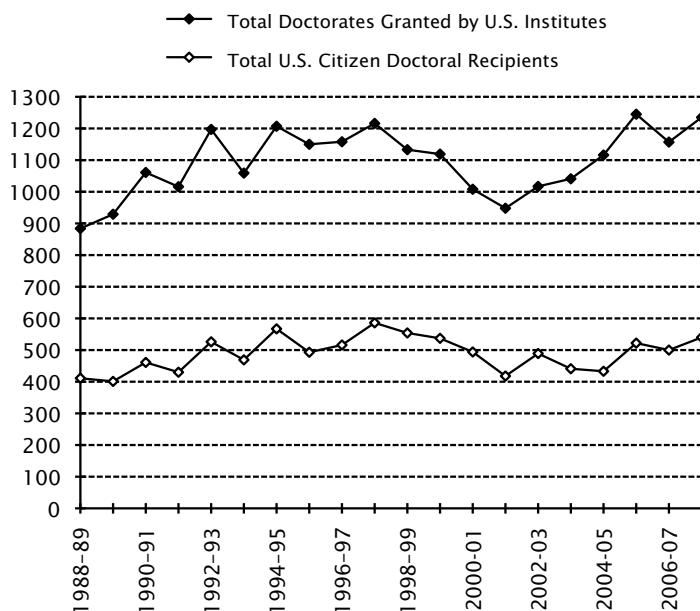


Figure 4: Females as a Percentage of U.S. Citizen Doctoral Recipients and Graduate Students, Preliminary Counts

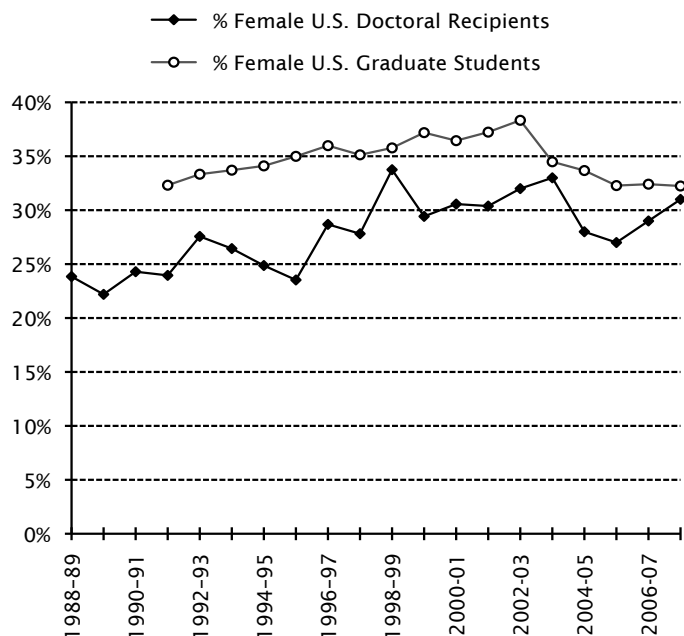


Table 8 (and Figure 4) gives the historical record of U.S. citizen new doctoral recipients, broken down by male and female for past years, going back to 1997-98. The number of female U.S. citizen new doctoral recipients is up 15 (10%) from 151 in 2000-01 and down 11% from an all-time high of 187 in 1998-99. Figure 4 also displays the percentage of females among U.S. citizen (full-time) graduate students beginning in fall 1988.

Table 9: Sex and Citizenship of 2007–08 New Doctoral Recipients by Type of Degree–Granting Department

CITIZENSHIP	GROUP												TOTAL	
	I (Pu)		I (Pr)		II		III		IV		Va			
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
U.S.	79	26	72	8	105	43	39	25	39	50	40	14	374	166
Non-U.S.	105	24	71	21	102	40	57	21	101	101	37	15	473	222
TOTAL	184	50	143	29	207	83	96	46	140	151	77	29	847	388

Table 9 gives a sex and citizenship breakdown of the new doctorates within each of the six groups of doctoral-granting departments. Among all 1,235 new doctoral recipients, 44% of the males and 43% of the females are U.S. citizens.

2007–08 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 101 new doctoral recipients with dissertations in statistics/biostatistics or probability in 2007–08 and have averaged 84.4 per year over the ten-year period reported in Table 10. Information about these 101 new doctoral recipients and the 281 new doctoral recipients in Group IV is found in this section of the report.

Table 10 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 10 give a split of the 2007–08 results

between the 57 statistics departments and the 32 biostatistics and biometrics departments in Group IV. This year 382 new doctorates had a dissertation in statistics/biostatistics (334) or probability (48), a slight increase from last year's number. Those with dissertations in statistics/biostatistics and probability accounted for 31% of new doctorates in 2007–08. Quite a bit of the variation in numbers from year to year in Table 10 is due to the changes made in the departments in Group IV over the ten years and to the relatively low response rate for this group. At the time of the Second Report last year, 70 of 88 (80%) of Group IV departments had responded.

Group IV has 89 departments for 2007–08, 14 more than the next largest doctoral group. It contains 31% of all doctoral departments surveyed, and the 60 Group IV departments responding to the Annual Survey reported 291 new doctoral recipients, 24% of all new doctoral recipients in 2007–08. The number of new doctoral recipients in Group IV is up 12 from the number reported at this time last year, while the number of departments responding is up 10 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

Table 10: 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
1998–99	91	72 (79%)	243	87 (36%)	57	4.9%	320	240	80	5.8%	29	20
1999–00	89	75 (84%)	284	110 (39%)	79	2.4%	351	278	73	2.0%	24	22
2000–01	86	70 (81%)	237	98 (41%)	59	5.1%	289	221	68	5.3%	27	14
2001–02	86	72 (84%)	222	92 (41%)	56	6.0%	288	221	67	5.4%	31	15
2002–03	86	74 (86%)	239	98 (41%)	45	2.1%	302	234	68	3.3%	20	19
2003–04	87	65 (75%)	243	97 (40%)	50	3.0%	318	241	77	4.0%	48	15
2004–05	87	63 (72%)	285	126 (44%)	64	4.5%	374	283	91	5.4%	26	19
2005–06	88	60 (68%)	287	134 (47%)	80	1.6%	396	278	118	2.0%	41	28
2006–07	86	50 (58%)	279	127 (46%)	88	2.9%	380	279	101	3.9%	24	15
2007–08	89	59 (66%)	291	151 (52%)	87	1.1%	382	281**	101***	2.9%	21	21
Statistics	57	43 (75%)	215	100 (47%)	68	1.1%					10	11
Biostatistics	32	16 (50%)	76	51 (67%)	18	1.0%					11	10

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

** Of 281, there were 277 in statistics/biostatistics and 4 in probability. For complete details, see Table 4C.

*** Of 101, there were 57 in statistics/biostatistics and 44 in probability. For complete details, see Table 4C.

mask important changes in the other doctoral groups. In the following paragraphs some of these differences are presented. The trends noted below have also been observed in past reports.

Group IV is producing a larger percentage of female doctorates than the other doctoral groups. Table 9 shows that for the Group IV new doctoral recipients, 151 of 291 (52%) are female, while 237 of 944 (25%) are female in the other doctoral groups. Among U.S. citizens, females accounted for 50 of the 89 (56%) Group IV new doctoral recipients, while for the other groups 116 of 451 (26%) were female. Overall, 166 of 540 (31%) 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, 89 of 291 (31%) new doctoral recipients are U.S. citizens, while in other groups 451 of 944 (48%) are U.S. citizens. In Group IV, 101 (69%) of the 151 females were not U.S. citizens.

Group IV doctorates are more likely to take jobs in business and industry than those in other doctoral groups. Of the 236 new doctoral recipients from Group IV who found employment in the U.S., 87 (37%) took jobs in business or industry. From the other groups, 650 new doctoral recipients found employment in the U.S., of which 120 (18%) took jobs in business or industry.

Group IV doctorates have a lower unemployment rate than the other doctoral groups. The employment status for 261 Group IV new doctoral recipients is known, and 3 (1.1%) are unemployed. For the other groups, the employment status of 822 is known, and 55 (6.7%) are unemployed. Group IV is hiring a bigger percentage of females than the other doctoral groups. Twenty-one of 42 (50%) new doctoral recipients hired by Group IV departments were female, up from last year's 38% and the first-time female hires has equaled male hires. The other doctoral groups reported that 59 of 265 (22%) new doctoral recipients hired were female, down from last year's 30%.

Group IV had 281 new doctoral recipients with fields of thesis in statistics/biostatistics (277) and the other doctoral departments had 101 with fields of thesis in statistics/biostatistics (57) and probability (44) (last year the other doctoral departments had 60 new doctorates in statistics and 41 in probability). The distribution of these degrees among the various groups can be found in Table 4C. The number of new doctoral recipients with theses in statistics/biostatistics and probability (382) is substantially larger than any other field, with algebra and number theory next with 195.

Previous Annual Survey Reports

The 2007 First, Second, and Third Annual Survey Reports were published in the *Notices of the AMS* in the February, August, and November 2008 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.

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 Data Sources

American Association of University Professors, *The Annual Report on the Economic Status of the Profession 2007-2008*, Academe: Bull. AAUP (March/April 2008), Washington, DC.

Commission on Professionals in Science and Technology, *Professional Women and Minorities*, 17th ed., CPST, Washington, DC, 2008.

Conference Board of the Mathematical Sciences, *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States: Fall 2005 CBMS Survey*, American Mathematical Society, Providence, RI, 2007.

_____, *Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the United States: Fall 2000 CBMS Survey*, American Mathematical Society, Providence, RI, 2002.

National Opinion Research Center, *Doctorate Recipients from United States Universities: Summary Report 2006*, Survey of Earned Doctorates, Chicago, IL, 2006.

National Research Council, *Strengthening the Linkages between the Sciences and the Mathematical Sciences*, National Academy Press, Washington, DC, 2000.

_____, *U.S. Research Institutes in the Mathematical Sciences: Assessment and Perspectives*, National Academy Press, Washington, DC, 1999.

National Science Board, *Science and Engineering Indicators—2008*. Two volumes. (volume 1, NSB 08-01; volume 2, NSB 08-01A), National Science Foundation, Arlington, VA, 2006.

National Science Foundation, *U.S. Doctorates in the 20th Century* (NSF 06-319), Arlington, VA, 2006.

_____, *Characteristics of Doctoral Scientists and Engineers in the United States: 2003* (NSF 06-329), Detailed Statistical Tables, Arlington, VA, 2006.

_____, *Graduate Students and Postdoctorates in Science and Engineering: Fall 2008* (NSF 08-306), Arlington, VA, 2006. (<http://www.nsf.gov/statistics/nsf08306>)

_____, *Plans for Postdoctoral Research Appointments Among Recent U.S. Doctorate Recipients* (NSF 04-308), Arlington, VA, 2004.

_____, *Science and Engineering Degrees: 1966-2006. Detailed Statistical Tables* (NSF 08-321), Arlington, VA, 2006. (<http://www.nsf.gov/statistics/nsf08321>)

_____, *Science and Engineering Degrees, by Race/Ethnicity of Recipient: 1995-2004*. January 2007. NSF 07-308, Arlington, VA.

_____, *Science and Engineering Doctorate Awards: 2005* (NSF 07-305), Arlington, VA, 2004.

_____, *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2007* (NSF 07-315), Arlington, VA, 2004. (<http://www.nsf.gov/statistics/wmpd>)

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*.¹ These rankings update those reported in a previous study published in 1982.² 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.

¹Research-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.

²These 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.