

# 1999 Annual Survey of the Mathematical Sciences

(Second Report)

Updated Report on the 1999 Survey of New Doctoral Recipients, Starting Salary Survey of New Doctoral Recipients, Faculty Profile, Enrollment and Undergraduate Majors Profile, and Graduate Student Profile

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This Second Report of the 1999 Survey gives an update of the 1998–99 new doctoral recipients from the First Report, which appeared in the *Notices of the AMS* in February 2000, pages 231–43. It also gives information about faculty size, departmental enrollments, majors, and graduate students for departments of mathematical sciences in four-year colleges and universities in the United States. The First Report gave salary data for faculty members in these same departments.

The 1999 Annual Survey represents the forty-third in an annual series begun in 1957 by the Society. The 1999 Survey is under the direction of the Annual Survey Data Committee, a joint committee of the American Mathematical Society, the American Statistical Association, the Institute of Mathematical Statistics, and the Mathematical Association of America. The current members of this committee are Lorraine Denby, J. Douglas Faires, Mary W. Gray, Alfred W. Hales, Peter E. Haskell, Ellen E. Kirkman, James Kister, James Lewis, Don O. Loftsgaarden (chair), James W. Maxwell (*ex officio*), and Yashiswini Mittal. The committee is assisted by AMS survey analyst Kinda Remick Priestley and survey coordinator Colleen Rose. Comments or suggestions regarding this Survey Report may be directed to the committee.

## Introduction

The Annual Survey of the Mathematical Sciences collects information each year about departments, faculties, and students in the mathematical sciences at four-year colleges and universities in the United States. Definitions of the various groups surveyed in the Annual Survey can be found in the box on page 904 of this report. For the first time this year, departments in Group Vb are no longer being surveyed. More discussion of this can be found in the 1999 First Report referenced above. This Second Report includes data from three parts of the 1999 Annual Survey. First, we update information about new doctoral recipients reported earlier in the February 2000 issue of the *Notices of the American Mathematical Society* (pages 231–43). Second, we present the starting salaries of the new

doctoral recipients who responded to a follow-up survey. Third, we present information about the faculties and instructional programs at the undergraduate and graduate levels in these departments for the 1999–2000 academic year. We report the same kinds of information in the Second Report that was reported last year and in earlier years. Several tables have been added specifically showing time trends for many variables for the 1990s.

The updated information for new doctoral recipients, since the First Report, was gathered using a questionnaire, Employment Experiences of New Doctoral Recipients, which was sent in early October 1999 to all new doctoral recipients whose address was known. This questionnaire has a number of questions on it that are the same as those on a questionnaire used by several other scientific disciplines, so that results from this questionnaire can be compared with those in other fields. Reports on these comparative data are available through *Science* magazine's Next Wave Web site at [www.nextwave.org/](http://www.nextwave.org/). This particular questionnaire has been used since 1997, and more information about it can be found in the Second Report for 1998.

Information about departments and their faculties is gathered on a questionnaire, the Departmental Profile, mailed to all departments of mathematical sciences in the U.S. Projections to the entire population have been made using the data from the responding departments within each group. Since the projections are made using data from the departments who respond in a given year as opposed to a scientific random sample, biases in the projections can occur. Since the response rates for the doctoral grant-

ing departments is very high, it is felt that any biases in the projections for these groups are likely small. However, the response rates for the bachelor's and master's departments are much lower, usually less than 50% for bachelor's departments.

Because of the low response rates for the bachelor's and master's groups, past projections for these groups have been less reliable than those for the doctoral groups. Examination of past results and comparison with results from other sources indicate that some projections for these groups in the past were likely to have been on the high side. Beginning this year, stratified random samples of departments in Groups B and M were drawn, and projections were made from the Departmental Profile survey using these stratified random samples. These projections should be more accurate and free of the biases that may have been present in past projections for Groups M and B. The stratification in each group was based on the size of the school and whether it was a public or private school. Because of this change in methodology, results from the Departmental Profile Survey for 1999 that involve Groups M and B may not be directly comparable to the same results from last year and earlier years.

### Update on the 1999 Survey of New Doctoral Recipients

Information about recipients of doctoral degrees awarded between July 1, 1998, and June 30, 1999, was collected from doctorate-granting departments in late spring 1999 and from a follow-up census of individual degree recipients beginning in October. The "1999 Annual Survey First Report" (*Notices of the AMS*, February 2000, pages 231-43) presents the survey results obtained about new doctoral recipients from the departments. Here we update the earlier figures on the basis of the follow-up census of the doctoral recipients themselves.

The names of the 1998-99 doctoral recipients and their thesis titles were published in "Doctoral Degrees Conferred" (*Notices of the AMS*, February 2000, pages 253-271). A supplement to this list appears at the end of this report.

Table/Figure 1 shows the fall and final counts of new doctoral recipients in the mathematical sciences awarded by U.S. institutions from 1992 through 1999. This year's final count of 1,135 represents a decrease of 3.5% from the 1,176 doctorates awarded during 1997-98. Numbers in this table/figure have been revised from previous reports to exclude new doctorates data from

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### Highlights

There were 1,135 new doctoral recipients from U.S. institutions for 1998-99, down 3.5% from the previous year.

The 560 U.S. citizen new doctoral recipients was 49.3% of the total, the highest percentage since 1986-87. Women totaled 318 of the new doctoral recipients, a new high, surpassing the previous high of 298 set last year. There were 188 female U.S. citizen new doctorates, surpassing last year's record high of 163. The percentage of females among U.S. citizens was 33.6%, another all-time high. The number of male U.S. citizen new doctorates was down 51 from last year, a 12.1% drop.

The final fall 1999 unemployment rate for new doctoral recipients was 4.7%, following 4.9% in fall 1998 and 3.8% in Fall 1997.

Among 1998-99 doctoral recipients taking employment in the U.S., 26.9% took nonacademic employment (government or business and industry), compared to 35.3% for 1997-98. Forty-nine fewer new doctoral recipients accepted positions in business and industry than last year.

Sixty-three more new doctoral recipients found employment in U.S. academic institutions than in 1997-98.

Median salaries for new doctoral recipients taking 9-10 month positions in U.S. academic institutions had nice increases from 1997-98. Median female salaries increased from \$37,700 to \$39,000, while those for males increased from \$37,000 to \$40,000.

Groups I, II, III, M, and B had openings in fall 1999 for 1,510 full-time doctoral faculty, of which only 996 (66.0%) were tenure-track positions.

For all groups surveyed for this report, the estimated number of full-time faculty was 20,137, of which 23.3% were females. Groups having the highest percentage of females among their full-time faculty were Group B (30.6%), Group M (27.7%), Group III (20.2%), and Group IV (19.1%).

The number of junior/senior mathematics majors dropped from 72,800 in 1992 to 56,200 in 1999, a drop of 22.8%. Female majors dropped 22.9% during this same time period. The percentage of the majors who are females remained relatively constant during this time period at close to 43%.

The number of full-time graduate students in Groups I, II, and III dropped from 10,121 in 1992 to 8,016 in 1999, a drop of 20.8%. This same drop for full-time females was 2,895 to 2,489, a drop of 14.1%. The drop for males was 23.5%. Full-time U.S. citizen graduate students dropped from 5,759 in 1992 to 4,231 in 1999, a drop of 26.5%.

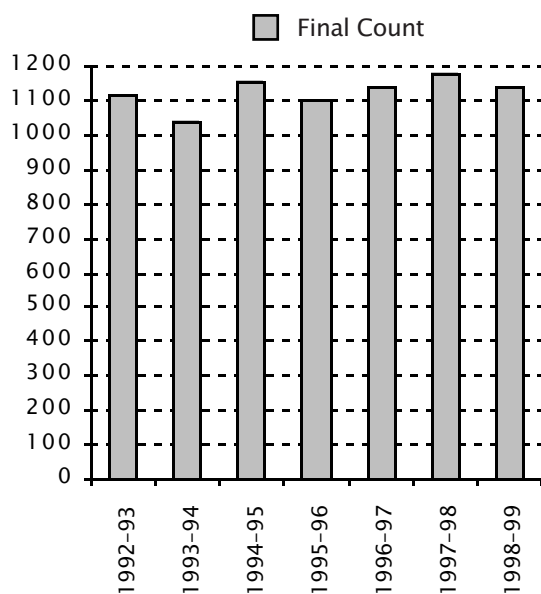
Part-time graduate students are reported for the first time this year. Groups I, II, and III combined had 1,255 part-time graduate students, with 54.2% in Group III. Group M had 7,254 part-time graduate students, which makes up 77.2% of their graduate students. A high percentage of part-time graduate students are U.S. citizens.

Group Vb departments, which are no longer surveyed.

Citizenship status is known for all of the 1,135 new doctoral recipients. The final count of new doctoral recipients who are U.S. citizens is 560. The percentage of 1998-99 new doctoral recipients who are U.S. citizens is 49.3%, up slightly from the reported 48.1% of the past year, and is the largest percentage reported by the Annual Survey since 1986-87. The final count of new doctoral recipients who are non-

**Table/Figure 1: U.S. New Doctoral Recipients, Fall and Final Counts, 1992 to 1999**

Year	Fall	Final
1992-93	1104	1116
1993-94	1025	1034
1994-95	1148	1157
1995-96	1098	1099
1996-97	1123	1130
1997-98	1163	1176
1998-99	1133	1135



total number of new doctorates for 1998-99 is down slightly from last year. The number of U.S. citizen men, 372, decreased by 51 (12.1%) from 1997-98.

Tables 2A and 2B display updates of employment data, found in these same tables in the First Report, for the fall count of 1998-99 doctoral recipients plus two additional doctoral recipients reported late. These tables are partitioned by field of thesis research and by the survey group of their degree department. At the time of this Second Report, the fall 1999 employment status of 1,021 of the 1,135 doctoral recipients was known.

The fall 1999 unemployment rate for new doctoral recipients, based on information gathered by the time of the Second Report, was 4.7%. The unemployment rate rose steadily in the early 1990s and reached its all-time high of 10.7% in 1994 and held that rate through 1995. It began to decrease in 1996 and dropped off in 1997 to 3.8%. Last year it was 4.9%. All of these rates are still well above the rates of the 1970s

and 1980s. The counts on which these rates are determined do not include those new doctoral recipients whose fall employment status was unknown at the time of the Second Report. Figure 3 presents the fall 1978 through fall 1999 trend in the final fall unemployment rate of new doctoral recipients. Note that prior to 1999, the unemployment rate for Group Vb is included in the total unemployment rate for each year.

Of the 1,021 new doctoral recipients whose employment status is known, 59.7% found academic employment in the U.S. (including 3.1% in research institutes and other nonprofits). Another 10.0% took academic employment in other countries. These same figures for 1997-98 were 52.2% (including 2.9% in research institutes and other nonprofits) and 11.0%

While employment of 1998-99 doctoral recipients by U.S. Ph.D.-granting institutions increased by 27.8% from the corresponding figure for 1997-98, employment by research institutes, government, and business and industry decreased by 24.3% (including a decrease of 27.0% in employment by business and industry).

Among those 1998-99 doctoral recipients taking employment in the U.S., 26.9% took nonacademic employment (government or business and industry). This is down from 35.3% in 1997-98. This is a substantial change from the past few years and is almost certainly due to the fact that more academic jobs were available in the U.S. for fall 1999. Among new doctoral recipients who are known to have employment, the number taking nonacademic employment (U.S. government, U.S. business and industry, and non-U.S. nonacademic) varied significantly by field of thesis.

Of those whose field of thesis was algebra/number theory; real, complex, functional, or harmonic analysis; or geometry/topology, 12.5% took nonacademic employment. For probability or statistics the analogous figure is 40.5%; and for applied mathematics, discrete mathematics, combinatorics, logic, computer science, numerical analysis, approximations, linear, or nonlinear optimization the analogous figure is 29.2%.

Of the 1,135 doctoral degrees awarded in the mathematical sciences between July 1, 1998, and June 30, 1999, 39.1% (444) were awarded by Group I departments, 21.2% (241) by Group II, and 12.2% (138) by Group III.

Tables 4A through 4G first appeared in the First Report for 1998-99, although they do not have the same table numbers in that report. They have all been updated with information obtained from the individual new doctoral recipients using a follow-up questionnaire. Here are a few things we can glean from these tables. Forty-nine fewer new doctoral recipients accepted jobs in business and industry compared to last year, a drop of 20.9%. Sixty-three more

**Table 2A: Fall 1999 Employment Status of 1998-99 U.S. Doctoral Recipients in the Mathematical Sciences, Updated April 2000**

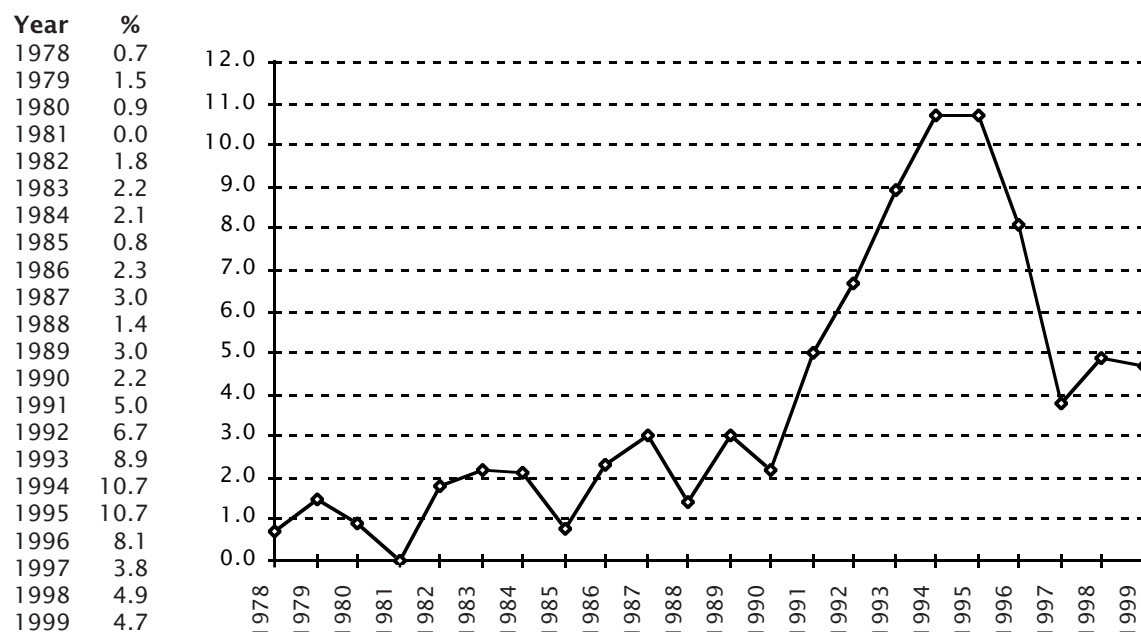
TYPE OF EMPLOYER	FIELD OF THESIS												TOTAL	
	Algebra Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/Topology	Discr. Math./Combin./Logic/Comp. Sci.	Probability	Statistics	Applied Math.	Numerical Analysis/Approximations	Linear Nonlinear Optim./Control	Differential, Integral, & Difference Equations	Math. Education	Other/Unknown		
Group I (Public)	23	9	22	11	3	0	3	4	1	12	0	0	<b>88</b>	
Group I (Private)	13	6	14	2	3	1	7	3	0	6	0	0	<b>55</b>	
Group II	16	12	9	5	2	0	4	7	1	6	0	0	<b>62</b>	
Group III	5	2	3	1	0	8	1	0	1	5	2	0	<b>28</b>	
Group IV	1	0	0	0	1	43	0	0	0	2	0	0	<b>47</b>	
Group Va	0	0	1	2	0	2	6	3	2	3	0	0	<b>19</b>	
Master's	14	9	11	4	0	6	2	3	1	2	2	0	<b>54</b>	
Bachelor's	34	15	19	22	3	10	8	9	1	14	3	1	<b>139</b>	
Two-Year College	4	2	2	2	2	1	0	2	0	3	0	0	<b>18</b>	
Other Academic Dept.	3	3	4	7	2	20	12	5	3	3	6	0	<b>68</b>	
Research Institute/ Other Nonprofit	6	1	0	0	4	13	1	3	1	3	0	0	<b>32</b>	
Government	1	7	1	0	5	13	3	5	0	3	0	1	<b>39</b>	
Business and Industry	10	5	15	15	8	70	22	18	5	16	0	1	<b>185</b>	
Non-U.S. Academic	18	15	11	11	3	21	5	5	1	12	0	0	<b>102</b>	
Non-U.S. Nonacademic	1	2	2	0	4	5	2	1	0	2	0	0	<b>19</b>	
Not Seeking Employment	3	2	5	2	0	4	0	1	0	1	0	0	<b>18</b>	
Still Seeking Employment	9	8	6	1	4	9	6	0	0	5	0	0	<b>48</b>	
Unknown (U.S.)	6	4	8	7	6	28	7	5	1	2	2	0	<b>76</b>	
Unknown (non-U.S.) <sup>1</sup>	4	1	6	3	0	15	5	2	0	1	0	1	<b>38</b>	
<b>COLUMN TOTAL</b>	<b>171</b>	<b>103</b>	<b>139</b>	<b>95</b>	<b>50</b>	<b>269</b>	<b>94</b>	<b>76</b>	<b>18</b>	<b>101</b>	<b>15</b>	<b>4</b>	<b>1135</b>	
<b>COLUMN</b>	Male	125	77	107	73	34	173	67	58	13	78	10	2	817
<b>SUBTOTALS</b>	Female	46	26	32	22	16	96	27	18	5	23	5	2	318

<sup>1</sup> Includes those whose status is reported as "unknown" or "still seeking employment".**Table 2B: Fall 1999 Employment Status of 1998-99 U.S. Doctoral Recipients by Type of Degree-Granting Department, Updated April 2000**

TYPE OF EMPLOYER	TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT							ROW TOTAL	ROW SUBTOTAL	
	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)	50	23	10	2	0	3	<b>88</b>	63	25	
Group I (Private)	17	29	3	1	1	4	<b>55</b>	43	12	
Group II	22	6	28	3	1	2	<b>62</b>	43	19	
Group III	7	0	4	11	6	0	<b>28</b>	17	11	
Group IV	1	2	0	2	40	2	<b>47</b>	27	20	
Group Va	3	2	1	0	1	12	<b>19</b>	15	4	
Master's	14	3	21	13	3	0	<b>54</b>	40	14	
Bachelor's	32	13	54	30	6	4	<b>139</b>	91	48	
Two-Year College	5	1	6	4	1	1	<b>18</b>	14	4	
Other Academic Dept.	10	5	16	15	15	7	<b>68</b>	48	20	
Research Institute/ Other Nonprofit	5	7	3	1	12	4	<b>32</b>	21	11	
Government	6	1	11	4	14	3	<b>39</b>	27	12	
Business and Industry	32	24	28	21	66	14	<b>185</b>	141	44	
Non-U.S. Academic	37	18	18	3	21	5	<b>102</b>	78	24	
Non-U.S. Nonacademic	5	2	3	1	7	1	<b>19</b>	16	3	
Not Seeking Employment	3	5	1	3	4	2	<b>18</b>	10	8	
Still Seeking Employment	15	4	12	5	9	3	<b>48</b>	36	12	
Unknown (U.S.)	16	6	14	15	23	2	<b>76</b>	56	20	
Unknown (non-U.S.) <sup>1</sup>	12	1	8	4	13	0	<b>38</b>	31	7	
<b>COLUMN TOTAL</b>	<b>292</b>	<b>152</b>	<b>241</b>	<b>138</b>	<b>243</b>	<b>69</b>	<b>1135</b>	<b>817</b>	<b>318</b>	
<b>COLUMN</b>	Male	214	114	175	104	156	53	817		
<b>SUBTOTALS</b>	Female	78	38	66	33	87	16	318		

<sup>1</sup> Includes those whose status is reported as "unknown" or "still seeking employment".

**Figure 3: Percentage of New Doctoral Recipients Unemployed, As Reported in the Respective Annual Survey Second Reports, 1978-1999**



new doctoral recipients were hired in U.S. academic institutions than last year, an increase of 11.5%. Group I, II, and III departments hired 46 more new doctoral recipients this year than they

**Table 4A: Number of New Doctoral Recipients Taking Positions in Business and Industry by Type of Degree-Granting Department, Fall 1998 and Fall 1999**

Group	I (Pu)	I (Pr)	II	III	IV	Va	Total
Fall 1998	37	27	44	25	75	26	234
Fall 1999	32	24	28	21	66	14	185

did last year, an increase of 24.6%, while the number of new doctoral recipients hired by Group M and B departments is down by 10 (4.9%). New doctoral recipients from Group I Public departments have the highest unemployment rate this year at 5.7%, while those from Group I Private departments have the lowest unemployment rate at 2.8%. Table 4F shows that academic doctoral departments, Groups I through Va, hired 50% U.S. citizens, and the same thing is true for the hiring for nonacademic positions in the

**Table 4B: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 1998 and Fall 1999**

Group	I (Pu)	I (Pr)	II	III	IV	Va	Total
Fall 1998	133	100	138	61	85	30	547
Fall 1999	166	91	146	82	86	39	610

First Report, the 977 whose addresses were known were sent the Employment Experiences of New Doctoral Recipients (EENDR) survey in October 1999, and 590 (60.4%) responded. The response rates varied considerably among the various subgroups of new doctorates defined by their employment status as reported by departments. They ranged from 63.9% for those employed in academia in the U.S. down to 37.5% for individuals in the U.S. whose employment status was unknown to the department.

**Table 4C: U.S. Academic Positions Filled by New Doctoral Recipients by Type of Hiring Department, Fall 1998 and Fall 1999**

Group	I-III	IV	Va	M&B	Other	Total
Fall 1998	187	36	5	203	116	547
Fall 1999	233	47	19	193	118	610

The EENDR gathered details on employment experiences not available through departments. The rest of this section presents the additional information available on this subset of the 1998-99 doctoral recipients.

Of the 590 total respondents to the EENDR, 512 were employed in the U.S., 53 were employed outside the U.S., and 25 were unemployed in the U.S. as of the week of October 11, 1999. Among those employed in the U.S., 485 were employed full-time and 27 were employed part-time. Of the 27 reporting part-time employment, 13 reported that they were working

U.S. For academic positions other than in the doctoral departments, about two-thirds of the new doctoral recipients hired were U.S. citizens. Table 4G shows the citizenship of the 1,135 new doctoral recipients and the fact that 834 new doctoral recipients found jobs in the U.S. this year.

Of the 1,133 new doctoral recipients reported in the

part-time because a suitable full-time job was not available. Five also reported they were working part-time while they pursued additional education.

Among the 512 employed in the U.S., 273 reported obtaining a permanent position and 237

**Table 4D: Percentage of Female New Doctoral Recipients Produced by and Hired by Doctoral-Granting Departments, 1998-99**

%	I (Pu)	I (Pr)	II	III	IV	Va	Total
Produced	26.7	25.0	27.4	23.9	35.8	23.2	28.0
Hired	28.4	21.8	30.6	39.3	42.6	21.1	30.4

a temporary position (2 individuals did not answer this question). Of the 237 in temporary positions, 101 (42.6%) reported taking temporary employment because a suitable permanent position was not available and 155 (65.4%) classified their position as postdoctoral. Furthermore, among those in postdoctoral positions, 37.4% responded that they took the position because a suitable permanent position was not available.

Among the 273 who reported obtaining a permanent position in the U.S., 59.3% were employed in academia (including 4.0% in research institutes and other nonprofits), 36.6% in business or industry, and 4.0% in government. Women held 31.1% of the permanent positions.

Among the 237 individuals with temporary employment in the U.S., 94.1% were employed in academia (including 5.1% in research institutes and other nonprofits), 0.4% in business or industry, and 5.5% in government.

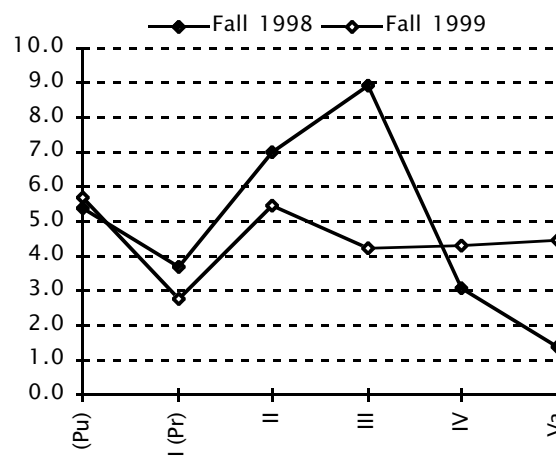
Among the 53 individuals employed outside the U.S., 83.0% were employed in academia (in-

cluding 13.2% in research institutes and other nonprofits), 15.1% in business or industry, and 1.9% in government. Seven of those employed outside the U.S. were U.S. citizens, and three were U.S. permanent residents.

The most frequently used job search resources were electronic at 58.0%, periodicals (newsletters, magazines, and journals) at 44.5%, informal channels (networking with colleagues or friends) at 43.3%, and faculty advisor at 42.9%. The re-

**Table/Figure 4E: Percentage of Unemployed New Doctoral Recipients by Type of Degree-Granting Department, Fall 1998 and Fall 1999**

%	I (Pu)	I (Pr)	II	III	IV	Va	Total
Fall 1998	5.4	3.7	7.0	8.9	3.1	1.4	4.9
Fall 1999	5.7	2.8	5.5	4.2	4.3	4.5	4.7



**Table 4F: New Doctoral Recipients Having Employment in the U.S. by Type of Employer and Citizenship**

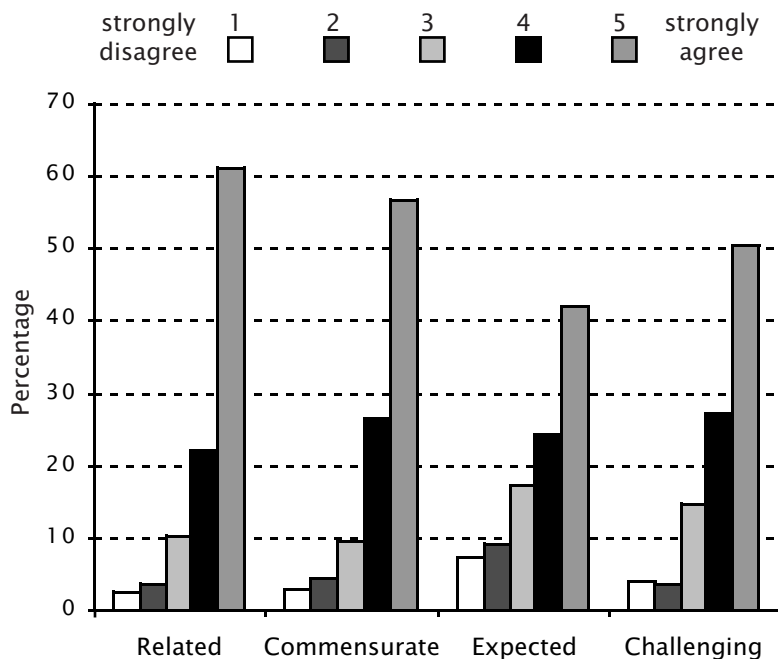
Employer	U.S.	Non-U.S.	Total
U.S. Academic, Groups I-Va	151	148	299
U.S. Academic, Other	209	102	311
U.S. Nonacademic	113	111	224
Total	473	361	834

**Table 4G: Employment Status of 1998-99 U.S. New Doctoral Recipients by Type of Citizenship**

TYPE OF EMPLOYER	CITIZENSHIP				TOTAL DOCTORAL RECIPIENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
<b>U.S. Employer</b>	473	70	280	11	834
U.S. Academic	360	45	198	7	610
Groups I, II, III, and Va	132	14	104	2	252
Group IV	19	7	18	3	47
Non-Ph.D. Department	197	20	61	1	279
Research Institute/Other Nonprofit	12	4	15	1	32
U.S. Nonacademic	113	25	82	4	224
<b>Non-U.S. Employer</b>	18	4	91	8	121
Non-U.S. Academic	14	2	80	6	102
Non-U.S. Nonacademic	4	2	11	2	19
<b>Not Seeking Employment</b>	10	1	7	0	18
<b>Still Seeking Employment</b>	22	3	23	0	48
<b>SUBTOTAL</b>	<b>523</b>	<b>78</b>	<b>401</b>	<b>19</b>	<b>1021</b>
Unknown (U.S.) <sup>1</sup>	36	10	23	7	76
Unknown (non-U.S.) <sup>1</sup>	1	0	29	8	38
<b>TOTAL</b>	<b>560</b>	<b>88</b>	<b>453</b>	<b>34</b>	<b>1135</b>

<sup>1</sup> Includes those whose status is reported as "unknown" or "still seeking employment".

Figure 5: Distribution of Job Satisfaction



maining types of resources are used much less often, each below 18%. When asked to indicate the single most effective job search resource, 43.8% chose electronic resources. The next highest was informal channels at 18.2%, followed by periodicals at 9.4%. Not surprisingly, 74.6% reported using two or more of these methods. The AMS’s Web site, e-MATH, was the most frequently mentioned electronic resource. The *Notices of the AMS* was the most frequently mentioned publication, followed by *Amstat News*, the *Chronicle of Higher Education*, and then the publications of other mathematical societies.

Figure 6: Age Distribution of New Doctoral Recipients

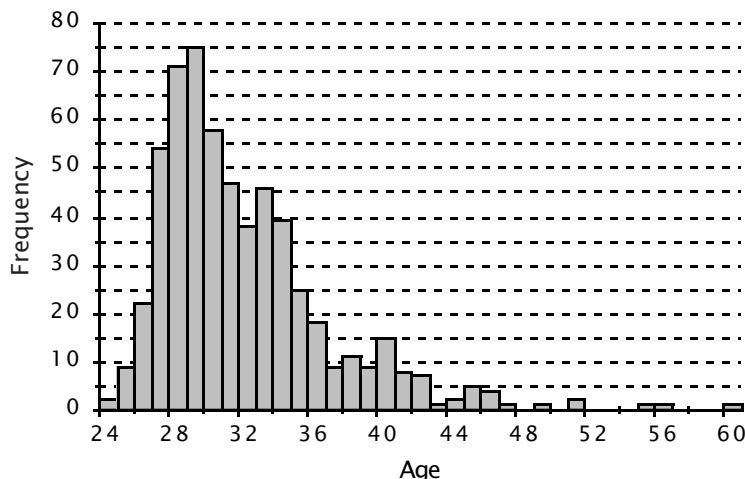


Figure 5 presents the distribution of responses to the following set of four statements to which doctoral recipients were asked to indicate their degree of agreement or disagreement regarding the position they obtained for fall 1999. Response options ranged from 5 for “strongly agree” down to 1 for “strongly disagree”.

1. The position is related to my field.
2. The position is commensurate with my education and training.
3. The position is similar to what I expected to be doing when I began my doctoral program.
4. The position is professionally challenging.

Figure 6 gives the age distribution of the 582 new doctoral recipients who responded to this question. The median age of new doctoral recipients was 30.5, while the mean age was 31.8. The first and third quartiles were 28 and 34 respectively. These figures are almost identical to those reported last year.

### Starting Salary Survey of New Doctoral Recipients

The salary figures for 1999 were compiled from information gathered on the EENDR questionnaires sent to individuals who received doctoral degrees in the mathematical sciences during the 1998-99 academic year from universities in the United States (see previous section for more details).

The questionnaires were distributed to 977 recipients of degrees using addresses provided by the departments granting the degrees; 590 individuals responded between late October and April. Responses with insufficient data or from individuals who indicated they had part-time employment were considered unusable. Numbers of usable responses for each salary category are reported in the following tables.

Readers should be warned that the data in this report are obtained from a self-selected sample, and inferences from them may not be representative of the population. [Also note that no projections have been made with this salary data. The salaries of the responding new doctoral recipients have simply been summarized in the various categories into which they fall.]

**Key to Tables.** Salaries are listed in hundreds of dollars. Nine-month salaries are based on 9-10 months’ teaching and/or research, not adding extra stipends for summer grants or summer teaching or the equivalent. Years listed are the academic year in which the doctorate was received. M and F are male and female respectively. Some persons receiving a doctoral degree had been employed in their present position for several years. Quartile figures are given only in cases where the number of responses is large

enough to make them meaningful. All categories of "Teaching or Teaching and Research" and "Research" contain only those recipients employed at academic institutions. The "Research, 9-10-Month Salaries" table was dropped as of last year because so few recipients respond in this category that the data was not considered meaningful. Starting salaries for those reporting a postdoctoral position are available for a third year on page 893. These salaries are also included within the academic tables and box plots on pages 893-94.

Note that salaries for teaching or teaching and research have yet to return to their high point of 1970, although considerable progress has been made since 1980.

**Graphs.** The graphs show standard box plots summarizing salary distribution information for the years 1994 through 1999. Values plotted for 1994 through 1998 are converted to 1999 dollars using the implicit price deflator prepared annually by the Bureau of Economic Analysis, U.S. Department of Commerce.

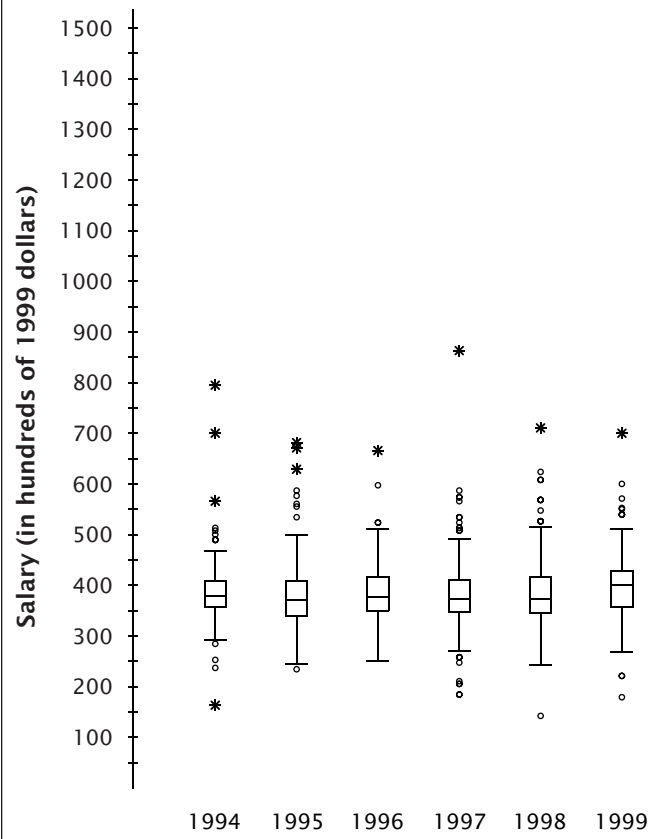
For each boxplot, the box shows the first quartile (Q1), the median (M), and the third quartile (Q3). The interquartile range (IQR) is defined as Q3-Q1. Think of constructing invisible fences 1.5xIQR below Q1 and 1.5xIQR above Q3. Whiskers are drawn from Q3 to the largest observation that falls below the upper invisible fence and from Q1 to the smallest observation that falls above the lower invisible fence. Think of constructing two more invisible fences, each falling 1.5xIQR above or below the existing invisible fences. Any observation that falls between the fences on each end of the boxplots is called an outlier and is plotted as ° in the boxplots. Any observation that falls outside of both fences either above or below the box in the boxplot is called an extreme outlier and is marked as \* in the boxplot.

**Academic Postdoctorates  
9-10-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1997	180	350	385	410	450	395
1998	290	350	390	420	500	396
1999	130	365	400	418	540	400
1997M	250	350	380	405	446	-----
1997F	180	350	385	408	450	-----
1998M	290	340	390	430	500	-----
1998F	310	361	375	390	436	-----
Total (54 men/25 women)						
1999M	220	373	400	428	540	
1999F	130	350	390	410	475	

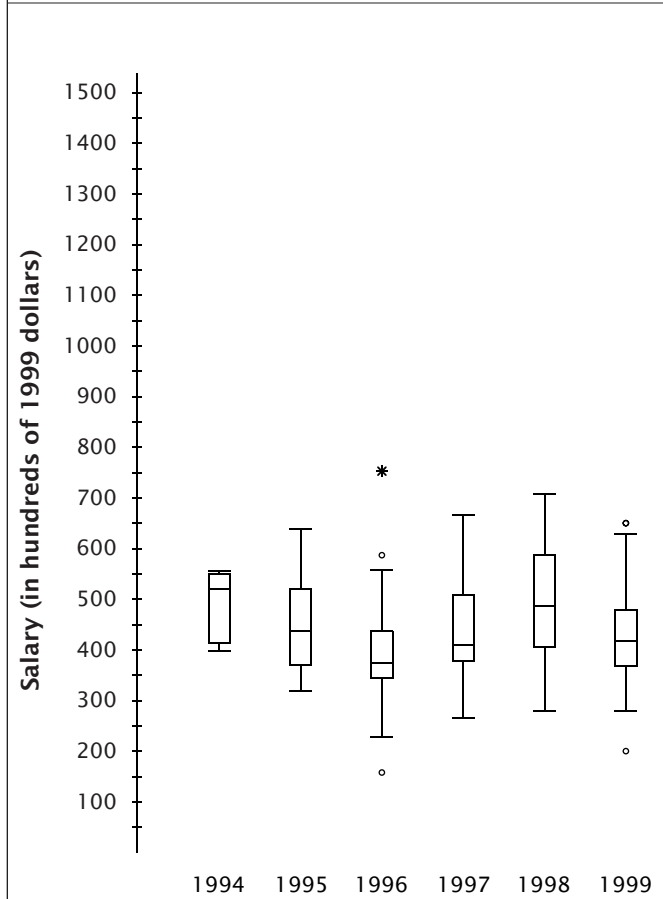
**Academic Teaching/Teaching and Research  
9-10-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1965	70		80		105	352
1970	85		110		195	396
1975	90	120	128	135	173	335
1980	105	155	171	185	250	314
1985	170	230	250	270	380	355
1990	230	305	320	350	710	387
1994	150	330	350	375	730	381
1995	220	320	350	382	640	373
1996	240	333	360	400	636	377
1997	180	340	366	400	840	376
1998	140	340	370	410	700	375
1999	180	360	400	430	700	400
1995M	220	320	350	388	640	-----
1995F	240	323	350	380	525	-----
1996M	240	330	360	400	636	-----
1996F	270	345	365	399	500	-----
1997M	180	340	367	400	571	-----
1997F	180	340	366	396	840	-----
1998M	140	340	370	411	700	-----
1998F	250	350	377	409	600	-----
Total (172 men/70 women)						
1999M	220	370	400	430	700	
1999F	180	350	390	420	540	
One year or less experience (147 men/67 women)						
1999M	220	365	400	430	700	
1999F	180	355	390	420	540	



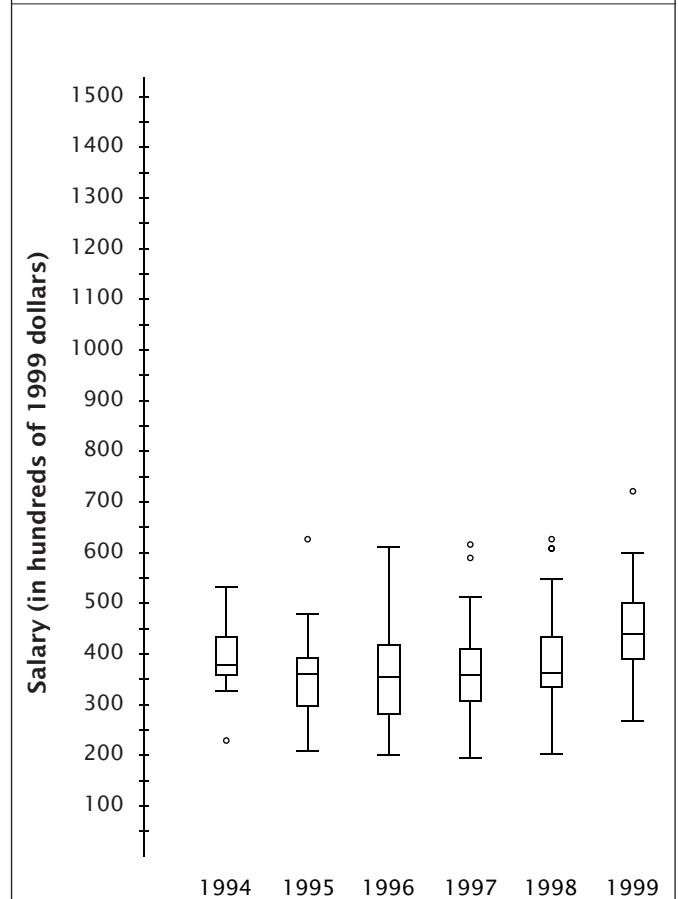
**Academic Teaching/Teaching and Research  
11-12-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1965	78		104		121	532
1970	95		128		200	720
1975	87		145		204	533
1980	143		195		350	642
1985	220	230	273	300	470	667
1990	225	318	365	404	670	810
1994	365	391	480	503	510	556
1995	300	354	410	478	600	640
1996	150	302	340	390	720	753
1997	260	370	400	497	650	667
1998	275	403	480	578	700	710
1999	200	374	420	469	650	420
1995M	300	380	420	490	600	----
1995F	----	----	----	----	----	----
1996M	150	280	330	460	720	----
1996F	330	340	358	368	400	----
1997M	260	360	400	420	635	----
1997F	260	393	447	505	650	----
1998M	275	410	495	573	700	----
1998F	300	395	464	575	630	----
Total (30 men/14 women)						
1999M	280	370	420	458	650	
1999F	200	393	435	590	630	
One year or less experience (25 men/10 women)						
1999M	280	370	420	450	650	
1999F	200	379	425	533	630	



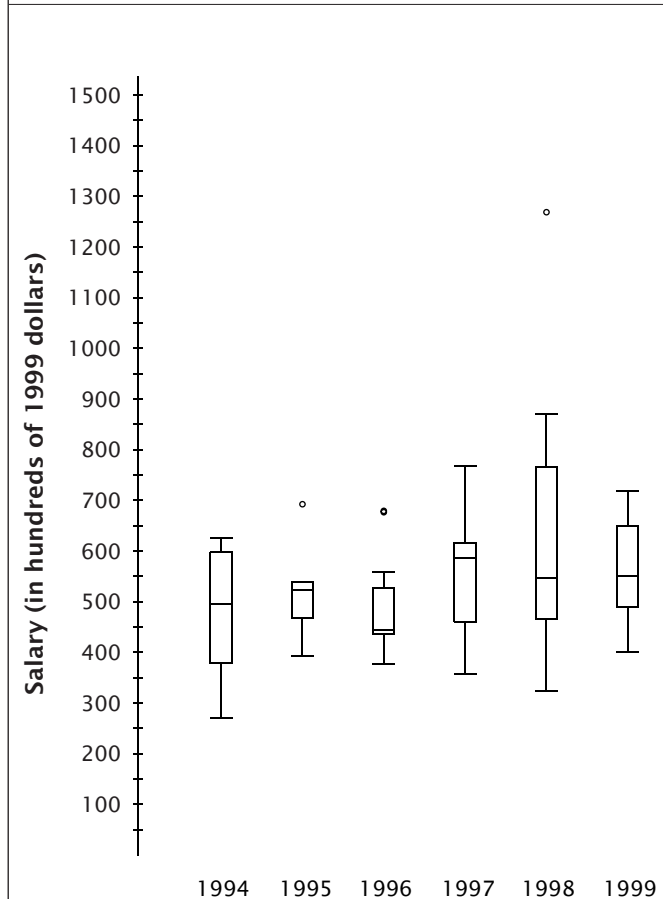
**Academic Research Only  
11-12-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1965	81		93		107	409
1970	90		120		205	432
1975	90		119		180	311
1980	120		180		321	330
1985	190	295	342	400	520	485
1990	180	280	300	365	546	363
1994	210	330	350	400	490	381
1995	196	280	340	370	587	363
1996	192	270	330	400	585	345
1997	190	300	350	400	600	359
1998	200	333	360	428	617	465
1999	270	390	440	500	720	440
1995M	196	280	350	370	587	----
1995F	200	----	287	----	400	----
1996M	210	273	330	360	585	----
1996F	192	265	390	455	500	----
1997M	210	300	350	406	500	----
1997F	190	313	350	386	600	----
1998M	200	340	360	400	600	----
1998F	285	330	360	540	617	----
Total (22 men/8 women)						
1999M	270	383	400	493	600	
1999F	340	468	530	581	720	
One year or less experience (21 men/4 women)						
1999M	270	390	400	500	600	
1999F	----	----	----	----	----	----



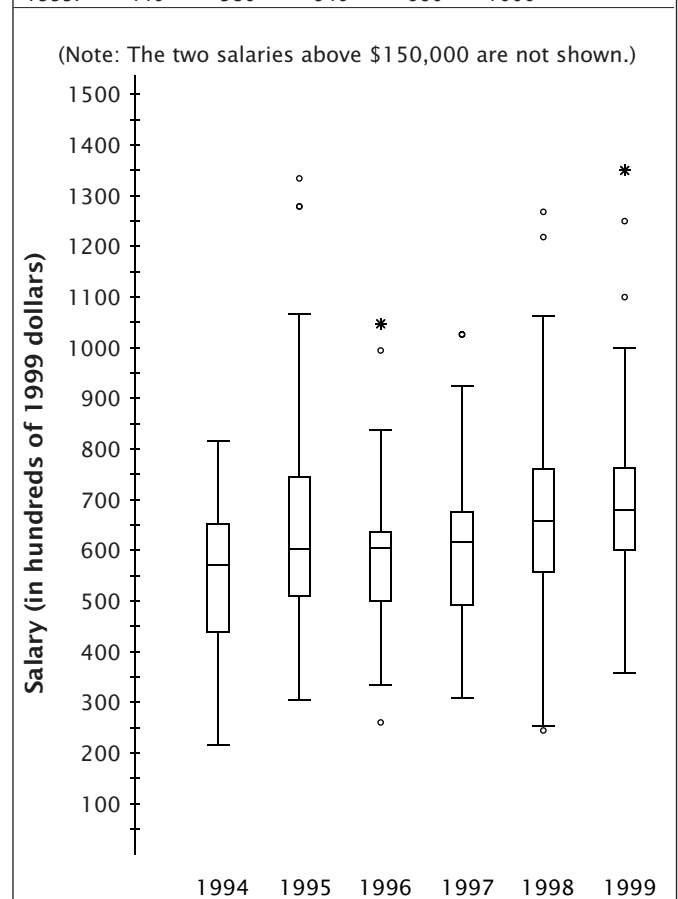
**Government  
11-12-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1965	70		126		160	554
1970	100		150		223	540
1975	78		182		247	476
1980	156		244		501	447
1985	263	294	325	381	440	461
1990	320	345	378	430	587	457
1994	250	355	455	530	576	496
1995	370	440	494	507	650	527
1996	360	420	427	504	650	447
1997	350	454	573	600	750	588
1998	320	475	540	736	1250	548
1999	400	495	550	651	720	550
1995M	440	-----	499	-----	650	-----
1995F	-----	-----	-----	-----	-----	-----
1996M	360	405	427	500	650	-----
1996F	-----	-----	-----	-----	-----	-----
1997M	370	476	573	608	750	-----
1997F	350	465	560	586	680	-----
1998M	320	500	568	756	1250	-----
1998F	-----	-----	-----	-----	-----	-----
Total (15 men/4 women)						
1999M	400	495	540	587	720	
1999F	-----	-----	-----	-----	-----	
One year or less experience (11 men/1 women)						
1999M	400	495	540	565	720	
1999F	-----	-----	-----	-----	-----	



**Business and Industry  
11-12-Month Salaries  
(in hundreds of dollars)**

Ph.D. Year	Min	Q <sub>1</sub>	Median	Q <sub>3</sub>	Max	Reported Median in 1999 \$
1965	100		136		180	598
1970	96		170		235	612
1975	114		187		240	489
1980	190		284		400	521
1985	260	360	400	420	493	568
1990	320	438	495	533	700	599
1994	200	418	525	600	750	572
1995	288	480	568	690	1250	606
1996	250	510	580	610	1000	607
1997	300	483	600	658	1000	616
1998	240	550	650	750	2250	660
1999	360	600	680	761	2450	680
1995M	288	480	550	690	1250	-----
1995F	397	550	630	680	1000	-----
1996M	250	480	580	610	1000	-----
1996F	520	-----	590	-----	650	-----
1997M	300	490	600	670	1000	-----
1997F	400	460	540	620	900	-----
1998M	240	550	650	750	1250	-----
1998F	305	565	662	765	2250	-----
Total (70 men/22 women)						
1999M	360	626	700	763	2450	
1999F	440	580	644	676	1100	
One year or less experience (47 men/21 women)						
1999M	450	625	700	755	1350	
1999F	440	580	640	660	1000	

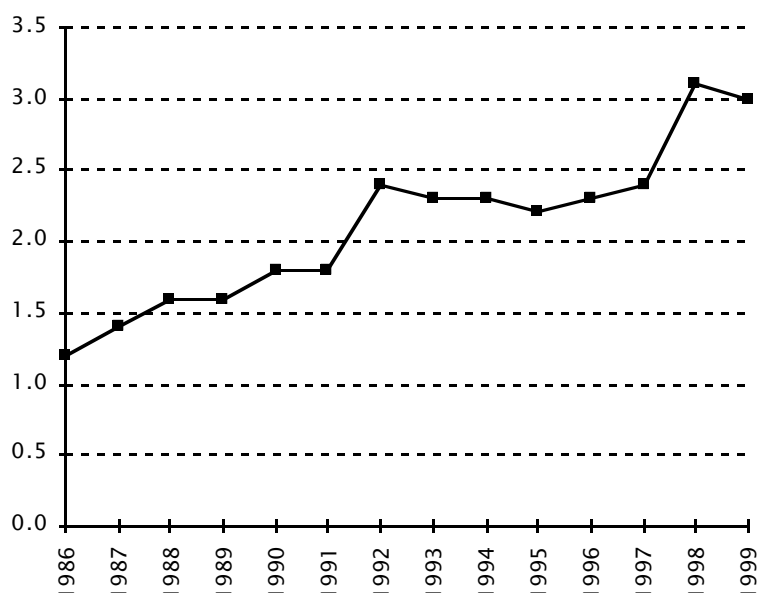


**Table 7A: Faculty Attrition<sup>1</sup>**

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	B	I, II, III, M & B
<b>Full-time faculty who retired or died</b>										
Total number	47	14	64	50	175	30	5	152	225	553
Percentage (%)	2.9	1.8	2.6	2.4	2.5	2.2	1.7	3.4	3.2	3.0

<sup>1</sup> Number and percentage of full-time faculty who were in the department in fall 1998 but were reported to have retired or died by fall 1999.

**Figure 7B: Percent of Full-Time Doctoral Faculty Who Retired or Died in Groups I, II, III, M & B Combined**



**Faculty Profile**

The Departmental Profile Survey, sent in fall 1999 to mathematical sciences departments at four-year colleges and universities as part of the Annual Survey, gathered information about faculties at these schools, which is reported in this section. All numbers in tables are projections made using data from responding departments. For the first time this year, projections for Groups M and B are based on respondents in a stratified random sample for each group. This method should provide estimates for M and B parameters which are more accurate, hence provide more reliable year to year comparisons. In addition to the information reported here, the First Report presented data collected earlier about faculty salaries (pages 239-42 of the February 2000 issue of the *Notices of the AMS*).

Table 7A displays losses of full-time mathematical sciences faculty due to retirements and deaths. The fall 1999 mathematics faculty attrition rate for Groups I, II, III, M, and B combined was 3.1% compared with fall 1998, 1997, and 1996 values of 3.1%, 2.4%, and 2.3%. Groups M

**Table 7C: Recruitment of Doctoral Faculty**

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	B	I, II, III, M & B
<b>Posted Doctoral Positions</b>										
Total number <sup>1</sup>	157	105	173	164	599	129	28	309	602	1510
Tenured/tenure-track	64	33	99	120	316	100	5	258	422	996
Open to new doctoral recipients	116	75	138	136	464	100	23	253	550	1267
Tenured/tenure-track	32	10	83	98	223	74	0	253	384	859
Open at assoc/full level	27	19	20	29	94	40	4	14	88	196
<b>Reported Hires for Above</b>										
Male doctoral hires	126	82	125	108	441	70	18	144	309	894
Male new doctoral hires	56	40	51	41	188	38	7	47	183	418
Female doctoral hires	15	16	20	27	78	18	9	47	120	245
Female new doctoral hires	7	10	12	16	45	6	5	24	61	130
Male nondoctoral hires	2	0	4	0	6	0	0	8	33	47
Female nondoctoral hires	0	0	1	5	6	0	0	28	40	73
<b>Unfilled positions</b>	14	7	23	24	68	41	2	82	101	251

<sup>1</sup> Number of full-time doctoral positions under recruitment in 1998-99 to be filled for 1999-2000. Subtotals of rounded table values may exhibit rounding errors.

and B had the highest attrition rates at 3.4% and 3.2% respectively. Figure 7B graphically shows the trend in this attrition rate for mathematics departments during the years 1986 to 1999. For the most part, the attrition rate has been growing, going from 1.2% in 1986 to 3.0% in 1999.

Table 7C contains detailed information on the number of full-time faculty positions in mathematical sciences departments under recruitment in 1998-99 for academic year 1999-2000. Table 7D is a brief summary of Table 7C. The 1,510 positions in mathematics departments (Groups I, II, III, M, and B) under recruitment is down slightly, 1.2%, compared to 1997-98. Figure 7E shows the number of full-time doctoral positions available in these groups and the number unfilled for the years 1990 to 1999. There was a steady decrease in available positions in the first half of the decade of the '90s, but this number has been increasing since 1996.

Table 7C shows that 1,267 (83.9%) of the positions under recruitment in 1998-99 by Groups I, II, III, M, and B were available to new doctorates. Of these 1,267 positions only 859 (67.8%) were tenure-track positions. The 859 tenure-track positions open to new doctorates is down slightly from the 890 such positions in 1997-98.

Tables 7F and 7G give a detailed picture of the faculty in mathematical sciences departments. Table 7F gives the number of faculty for six different variables for all faculty broken down by group. Table 7G gives the same information for females only. The estimated total number of full-time faculty in Groups I, II, III, M, and B combined is 18,490, down 1,202 from the number reported last year. Group M is down 539 full-time faculty, while Group B is down 825 and Groups I, II, and III are up 162 full-time faculty. For Groups M and B other faculty numbers show drops as well. The authors do not believe there has been a big drop in full-time faculty numbers in Groups M and B and offer the following three comments about these drops.

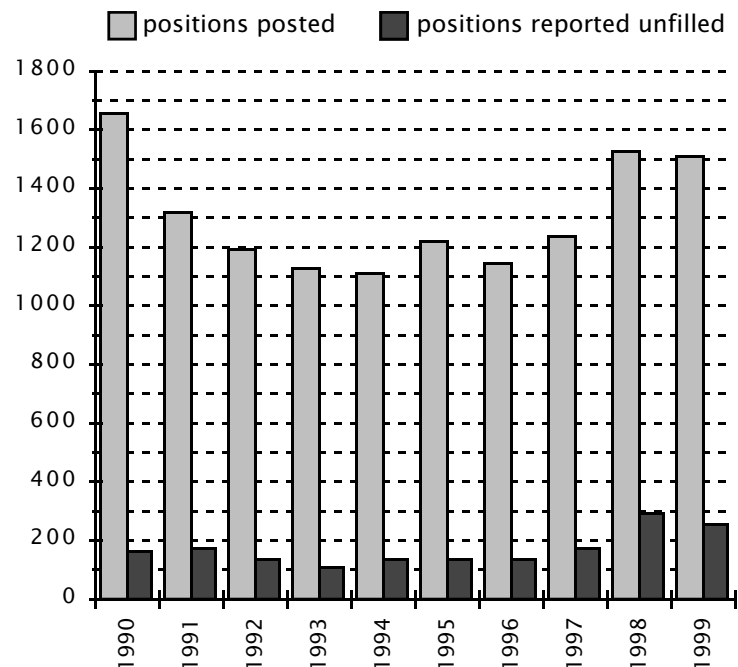
1. The Group B estimates for last year were most likely too high. Estimates of full-time faculty for Group B for the past three years are fall 1997 at 7,306, fall 1998 at 7,926, and fall 1999 at 7,101. If this conjecture is true, then it explains that much of the drop in B numbers for this year compared to last year.

2. Stratified random samples were used to produce the Group M and B results for the first time this year. The M and B estimates obtained in this way should be more accurate estimates than those obtained in the past and should show less variation from year to year in the future. Our feeling is that in the past Group B estimates have tended to be on the high side, with the same

**Table 7D: A Summary of Recruitment of Doctoral Faculty**

	GROUP		
	I, II, III, Va, M, & B	IV	Total
<b>Posted Doctoral Positions</b>			
Total number	1538	129	1667
Tenured/tenure-track	1001	100	1101
Open to new doctoral recipients	1290	100	1390
<b>Reported Hires for Above</b>			
Total doctoral hires	1166	88	1254
Male	912	70	982
Female	254	18	272
<b>Unfilled positions</b>	253	41	294

**Figure 7E: Number of Full-Time Doctoral Positions under Recruitment and Reported as Unfilled in Groups I, II, III, M & B Combined**



thing possibly true for the Group M schools. The estimates of Groups M and B faculty numbers for this year are somewhat low compared to other recent years, and this probably accounts for some of the drop in their faculty numbers for this year. It is a little hard to say exactly what is happening until we get numbers for a few more years using the new sampling methods put into place this year.

3. Even with all the other Group M numbers dropping, the number of part-time faculty increased by 138 compared to last year. This could mean less full-time faculty.

**Table 7F: Faculty Size, Fall 1999**

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	B	I, II, III, M & B
Full-time faculty	1584	821	2440	2069	<b>6913</b>	1338	309	4476	7101	<b>18490</b>
Doctoral full-time faculty	1535	815	2305	1817	<b>6473</b>	1297	308	3745	5094	<b>15312</b>
Tenured doctoral full-time faculty	1158	497	1790	1351	<b>4795</b>	906	172	2766	3502	<b>11064</b>
Untenured, tenure-track doctoral full-time faculty	118	114	242	297	<b>770</b>	245	28	833	1078	<b>2680</b>
Non-tenure-track doctoral full-time faculty	259	204	274	170	<b>907</b>	146	107	146	514	<b>1567</b>
Part-time faculty	166	43	278	705	<b>1192</b>	161	25	1906	3298	<b>6395</b>

**Table 7G: Female Faculty Size, Fall 1999**

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	B	I, II, III, M & B
Full-time female faculty	165	85	324	417	<b>991</b>	255	30	1242	2174	<b>4407</b>
Doctoral full-time female faculty	133	83	245	274	<b>735</b>	229	30	807	1277	<b>2819</b>
Tenured, doctoral full-time female faculty	74	23	112	137	<b>346</b>	98	9	491	789	<b>1626</b>
Untenured, tenure-track doctoral full-time female faculty	19	20	53	91	<b>183</b>	84	7	234	366	<b>783</b>
Non-tenure-track doctoral full-time female faculty	40	40	81	46	<b>206</b>	47	14	82	122	<b>410</b>
Part-time female faculty	66	9	120	260	<b>455</b>	38	5	670	1343	<b>2468</b>

**Table 7H: Number and Percentage of Full-time Faculty by Group, Fall 1999**

	GROUP									
	I Public	I Private	II	III	IV	Va	M	B	I, II, III, IV, Va, M, & B	
<b>Full-time Faculty</b>										
Number	1584	821	2440	2069	1338	309	4476	7101	<b>20137</b>	
Percentage of full-time faculty	7.9	4.1	12.1	10.3	6.6	1.5	22.2	35.3		
<b>Female Full-time Faculty</b>										
Number	165	85	324	417	255	30	1242	2174	<b>4692</b>	
Percentage of female full-time faculty	3.5	1.8	6.9	8.9	5.4	0.6	26.5	46.3		
<b>Female Full-time Faculty</b>										
Percentage female full-time faculty in each group	10.4	10.4	13.3	20.2	19.1	9.7	27.7	30.6	<b>23.3</b>	

The number of non-tenure-track doctoral full-time faculty has been increasing rapidly in recent years. The number of such full-time faculty for Groups I, II, III, M, and B combined for the most recent four years is 1,175 in 1996, 1,269 in 1997, 1,411 in 1998, and 1,567 in 1999. This increase in non-tenure-track full-time doctoral positions continues a disturbing trend reported in "Changes in Mathematics Faculty Composition, Fall 1990–Fall 1996" (*Notices of the AMS*, November 1997, pages 1321–3.) This article is a much more refined analysis of the changes in mathematics faculties than can be done with the data reported here. There are plans to update this study in the future.

Table 7J: Summary of Full-time Faculty by Sex, Fall 1999

	GROUP			
	I, II, & III		I, II, III, IV, Va, M & B	
	Male	Female	Male	Female
Full-time faculty				
Number	5922	991	15445	4692
Percentage	85.7	14.3	76.7	23.3
Doctoral full-time faculty				
Number	5738	735	13839	3078
Percentage	88.6	11.4	81.8	18.2
Tenured doctoral full-time faculty				
Number	4449	346	10409	1733
Percentage	92.8	7.2	85.7	14.2
Untenured, tenure-track doctoral full-time faculty				
Number	587	183	2079	874
Percentage	76.2	23.8	70.4	29.6
Non-tenure-track doctoral full-time faculty				
Number	701	206	1049	471
Percentage	77.3	22.7	74.1	25.9
Part-time faculty				
Number	737	455	4070	2511
Percentage	61.8	38.2	61.8	38.2

### Faculty Profile for Females

In this section full-time faculty for all groups is used. The total number of full-time faculty in all groups for 1999–2000 is 20,137, of which 4,692 (23.3%) are females. Table 7H shows the number and percentage of all full-time faculty that fall in each group for 1999–2000 and the number and percentage of all female full-time faculty that fall in each group for 1999–2000. In addition, the percentage of the full-time faculty in each group who are female is given in the bottom section of Table 7H. We see that female full-time faculty are underrepresented in all groups except M and B, where they are overrepresented relative to the 23.3% of all full-time faculty who are females. Note: In Table 7H the percentages for each group in rows 2 and 4 are of the row

totals. The percentages in row 5 are column percents using the numbers in rows 1 and 3.

Table 7J gives the male/female breakdown by count and percentage for Groups I, II, and III combined for various categories of faculty in columns 1 and 2. Columns 3 and 4 give the same breakdowns for all groups combined. The percentage of females for each category of full-time faculty members in Groups I, II, and III combined is always less than the percentage of females for all groups combined for the same category.

Table 8A: Undergraduate and Graduate Enrollments (thousands), Fall 1999

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	B	I, II, III, IV, Va, M & B
<b>Undergraduate course enrollments</b>										
Total number (thousands)	182	45	271	251	749	92	13	568	810	2232
<b>Graduate course enrollments</b>										
Total number (thousands)	7	5	9	12	32	29	2	11		73

### Enrollment Profile and Undergraduate Majors Profile

The Departmental Profile Survey obtains information about enrollments and distribution of instructional effort in mathematical sciences departments. Table 8A gives the total undergraduate and total graduate enrollments in mathematics courses for each group that is part of the Annual Survey. Each enrollment in this and other tables in this section is projected from schools responding to the survey. In fall 1999, for the first time, the projections for Groups M and B were made using the responding schools that were part of a carefully designed stratified random sample.

**Table 8B: Total Undergraduate Enrollments (thousands), Fall 1996 to Fall 1999**

	GROUP								Total <sup>3</sup>
	I Public	I Private	II	III	IV	Va <sup>2</sup>	M	B	
1996	215 <sup>1</sup>		245	212	98		589	705	<b>2085</b>
1997	173	42	247	220	69		561	701	<b>2037</b>
1998	182	43	258	214	78		585	741	<b>2124</b>
1999	182	45	271	251	92	13	568	810	<b>2232</b>

<sup>1</sup> Prior to 1997, Group I was not separated into Public and Private.  
<sup>2</sup> Prior to 1999, Group Va was combined with Group Vb, which is no longer surveyed. Group Va figures for these years are not available.  
<sup>3</sup> Totals are sums of unrounded enrollments and may not be exactly the same as the sums of rounded figures in the table.

Table 8C presents a further breakdown of the undergraduate enrollments into eight categories of courses. For each group the percentage of the total enrollment in each of these eight categories is also given. Row totals in Table 8C give the total enrollment in each of the eight categories for all mathematical sciences departments. Table 8D shows these same enrollments for fall 1992 to fall 1999. Column totals in Table 8C give the total enrollments for each group, and they are the numbers given in the first row of Table 8A. Table 8B gives these totals for fall 1996 to fall 1999.

Table 8E gives the undergraduate enrollments per faculty member and the graduate enrollments per faculty member for each group. Table 8F give the undergraduate enrollments per faculty member for fall 1996 to fall 1999.

Table 9A gives the number of junior/senior majors and the number of female junior/senior majors for each group. Table 9B gives the total number of junior/senior majors and female junior/senior majors for fall 1991 to fall 1999. The number of junior/senior mathematics majors has dropped from 72,800 in 1992 to 56,200 in 1999, a drop of 22.8%. The number of female junior/senior majors has experienced a similar drop from 31,900 in 1992 to 24,600 in 1999, a drop of 22.9%. The percentage of the junior/senior majors who are females has remained relatively constant during the years 1991 through 1999.

**Table 8C: Distribution of Undergraduate Enrollments (thousands), Fall 1999**

	GROUP																			
	I Public		I Private		II	III	I, II, III, & IV		IV	Va	M	B	I, II, III, IV, Va, M, & B							
<b>Remedial mathematics*</b>	12	7	0	0	21	8	33	13	66	9	0	0	0	0	92	16	123	15	281	13
Total number (thousands), %**																				
<b>Precalculus</b>	38	21	1	1	69	25	62	25	169	23	0	0	1	5	122	22	137	17	429	19
Total number (thousands), %																				
<b>1st-year Calculus (mainstream)</b>	51	28	21	47	52	19	37	15	160	21	0	0	2	14	65	11	94	12	321	14
Total number (thousands), %																				
<b>1st-year Calculus (nonmainstream)</b>	21	12	3	6	33	12	24	10	81	11	1	1	0	0	33	6	36	4	151	7
Total number (thousands), %																				
<b>Statistics</b>	3	2	2	4	12	5	21	8	38	5	90	99	4	34	47	8	103	13	282	13
Total number (thousands), %																				
<b>Computer Science</b>	3	2	1	1	2	1	7	3	12	2	0	0	0	1	44	8	85	11	142	6
Total number (thousands), %																				
<b>Other Enrollments for Majors</b>	35	19	9	19	27	10	25	10	95	13	0	0	3	24	51	9	85	11	235	11
Total number (thousands), %																				
<b>Remaining Undergraduate Enroll.</b>	19	10	9	20	56	21	43	17	127	17	0	0	3	23	114	20	146	18	390	17
Total number (thousands), %																				
<b>Total</b>	<b>182</b>	<b>45</b>	<b>271</b>	<b>251</b>	<b>749</b>	<b>92</b>	<b>13</b>	<b>568</b>	<b>810</b>	<b>2232</b>										

<sup>1</sup> Arithmetic, high school algebra, geometry.  
<sup>2</sup> Percents are "column percents" describing relative enrollments within the respective survey groups of the different types of undergraduate courses.

**Table 8D: Distribution of Undergraduate Enrollments (thousands), Fall 1992 to Fall 1999**

	1992	1993	1994	1995	1996	1997	1998	1999
Remedial	300	294	279	275	269	274	322	281
Precalculus	356	341	342	336	332	303	347	429
1st-year Calculus (mainstream)	315	319	298	314	312	309	325	321
1st-year Calculus (nonmainstream)	127	138	131	145	144	146	148	151
Statistics	213	215	199	209	218	233	233	282
Computer Science	141	111	119	108	119	113	116	142
Other Enrollments for Majors	270	258	233	257	263	233	218	235
Remaining Enrollments	392	353	353	411	428	426	412	390
<b>Total Enrollment<sup>1</sup></b>	<b>2114</b>	<b>2029</b>	<b>1954</b>	<b>2055</b>	<b>2085</b>	<b>2037</b>	<b>2124</b>	<b>2232</b>

<sup>1</sup> Totals are sums of unrounded enrollments and may not be exactly the same as the sums of rounded figures in the table.

**Table 8E: Undergraduate and Graduate Enrollments per Full-time Faculty Member, Fall 1999**

	GROUP							
	I Public	I Private	II	III	IV	Va	M	B
<b>Undergraduate course enrollments</b> Number per full-time faculty member	115	54	111	122	68	43	127	114
<b>Graduate course enrollments</b> Number per full-time faculty member	4	6	4	6	21	7	2	

### Graduate Student Profile

Table 10A summarizes information gathered about graduate students by the 1999 Departmental Profile Survey. This table gives the number of full-time, full-time first-year, and part-time graduate students for each type of graduate department. These same numbers are also given for only female graduate students and also for only U.S. citizen graduate students. Figure 10B shows the total number of full-time, full-time female, and full-time U.S. citizen graduate students for fall 1991 to fall 1999 for Group M. Table 10C gives for Groups I, II, and III the total number of full-time, full-time first-year, full-time female, full-time male, full-time U.S. citizen, and full-time non-U.S. citizen graduate students for fall 1991 to fall 1999.

Everything in this paragraph is for Groups I, II, and III. The 8,016 full-time graduate students is down 2.1% from 1998. The 2,486 full-time first-year graduate students is up 5.9% from 1998. The 2,486 full-time female graduate students is down 3.2% from 1998. The 4,231 U.S. citizen graduate students is down 5.5% from 1998.

For the first time this year the number of part-time graduate students for various categories is reported. Groups I, II, and III have a

**Table 8F: Undergraduate Enrollments per Full-time Faculty Member, Fall 1996 to Fall 1999**

	GROUP							
	I Public	I Private	II	III	IV	Va <sup>2</sup>	M	B
1996	88 <sup>1</sup>		110	108	69		112	100
1997	110	52	115	113	57		106	96
1998	109	52	114	108	60		117	94
1999	115	54	111	122	68	43	127	114

<sup>1</sup> Prior to 1997, Group I was not separated into Public and Private.

<sup>2</sup> Prior to 1999, Group Va was combined with Group Vb, which is no longer surveyed. Group Va figures for these years are not available.

total of 1,255 part-time graduate students, with 680 (54.2%) being in Group III. For Group III, 24.1% of all graduate students are part-time. Group M schools have 7,254 part-time graduate students compared to 2,146 full-time graduate students. For Group M, 77.2% of all graduate students are part-time. For Groups I, II, and III, 73.8% of the part-time graduate students are U.S. citizens. For Group M, 92.8% of the part-time graduate students are U.S. citizens.

From Table 10C it is seen that 1992 was a peak year for graduate students in Groups I, II,

**Table 9A: Undergraduate Junior/Senior Majors (hundreds), Fall 1999**

	GROUP								
	I Public	I Private	II	III	IV	Va	M	B	I, II, III, M & B
<b>Total Undergraduate</b> Junior/senior majors (hundreds)	47	16	47	54	9	6	169	230	562
<b>Female Undergraduate</b> Junior/senior majors (hundreds)	17	5	19	24	4	2	77	104	246

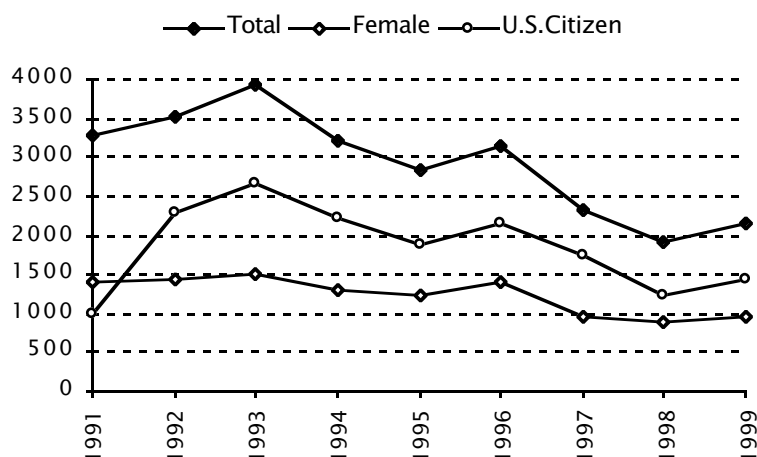
**Table 9B: Junior/Senior Majors (hundreds) in Groups I, II, III, M & B Combined, Fall 1991 to Fall 1999**

	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Total Undergraduate</b> Junior/senior majors (hundreds)	668	728	689	663	671	626	590	580	562
<b>Female Undergraduate</b> Junior/senior majors (hundreds)	293	319	299	285	284	271	255	251	246
Percentage female	43.8	43.8	43.4	43.0	42.3	43.3	43.2	43.3	43.8

**Table 10A: Graduate Students, Fall 1999**

	GROUP									
	I Public	I Private	II	III	I, II, & III	IV	Va	M	I, II, III, & M	
<b>Total Graduate Students</b>	2221	1055	2603	2136	8016	3567	822	2146	10162	
Number who are full-time	630	298	752	806	2486	1183	178	696	3182	
Number who are first-year	198	10	367	680	1255	528	112	7254	8509	
Number who are part-time										
<b>Female Graduate Students</b>	544	242	887	813	2486	1638	280	954	3440	
Number who are full-time	188	79	275	323	866	596	79	353	1219	
Number who are first-year	94	3	128	270	495	238	47	2968	3463	
Number who are part-time										
<b>U.S. Citizen Graduate Students</b>	1067	499	1559	1107	4231	1722	437	1442	5673	
Number who are full-time	318	138	454	399	1308	543	93	472	1780	
Number who are first-year	138	9	257	523	926	392	100	6734	7661	
Number who are part-time										

**Figure 10B: Number of Full-Time Graduate Students in Group M, Fall 1991 to Fall 1999**



and III. The number of full-time graduate students dropped from 10,121 in 1992 to 8,016 in 1999, a drop of 20.8%, while the number of full-time first-year graduate students dropped 8.1% during this same time period. The number of full-time female graduate students dropped from 2,895 in 1992 to 2,486 in 1999, a drop of 14.1%, while the drop for males during the same time period was 23.5%. The number of full-time U.S. citizen graduate students dropped from 5,759 in 1992 to 4,231 in 1999, a drop of 26.5%, while the drop for non-U.S. citizens for this same time period was 13.2%.

**Table 10C: Full-time Graduate Students in Groups I, II, & III by Sex and Citizenship, Fall 1991 to Fall 1999**

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total full-time graduate students	9826	10121	9863	9714	9140	8774	8399	8186	8016
First-year full-time graduate students	2871	2705	2602	2546	2459	2256	2229	2348	2486
Female full-time graduate students	2768	2895	2816	2772	2696	2539	2504	2568	2486
Male full-time graduate students	7058	7226	7047	6942	6444	6235	5895	5618	5530
U.S. citizen full-time graduate students	5540	5759	5497	5678	5261	5035	4608	4475	4231
Non-U.S. citizen full-time graduate students	4286	4362	4366	4036	3879	3739	3791	3711	3785

### Other Data Sources

American Association of University Professors, *The Annual Report on the Economic Status of the Profession 1999–2000*, Academe: Bull. AAUP (March/April 2000), Washington, DC.

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—, *Employment Outcomes of Doctorates in Science and Engineering: Report of a CPST Workshop*, CPST, Washington, DC, 1998.

—, *Supply and Demand Indicators for New Science and Engineering Doctorates: Results of a Pilot Study*, CPST, Washington, DC, 1997.

D. O. Loftsgaarden, D. C. Rung, and A. E. Watkins, *Statistical abstract of undergraduate programs in the mathematical sciences in the U.S.*, Fall 1995 CBMS Survey, MAA Reports No. 2, 1997.

D. E. McClure, *Academic hiring survey, 1991–1992*, Notices Amer. Math. Soc. 39 (1992), 311–316.

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

—, *Summary Report 1996, Doctorate Recipients from United States Universities*, National Academy Press, Washington, DC, 1998.

—, *Research-Doctorate Programs in the United States: Continuity and Change*, National Academy Press, Washington, DC, 1995.

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National Science Foundation, *Science and Engineering Degrees: 1966–97* (NSF 00-310), Detailed Statistical Tables, Arlington, VA, 2000.

—, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1989–97* (NSF 00-311), Detailed Statistical Tables, Arlington, VA, 2000.

—, *Science and engineering doctorate awards: 1998* (NSF 00-304), Detailed Statistical Tables, Arlington, VA, 2000.

—, *Graduate Students and Postdoctorates in Science and Engineering: Fall 1998* (NSF 00-322), Arlington, VA, 2000.

—, *Characteristics of Doctoral Scientists and Engineers in the United States: 1997* (NSF 00-308), Detailed Statistical Tables, Arlington, VA, 1999.

—, *Women, Minorities, and Persons with Disabilities in Science and Engineering: 1998* (NSF 99-338), Arlington, VA, 1999.

—, *Statistical Profiles of Foreign Doctoral Recipients in Science and Engineering: Plans to Stay in the United States* (NSF 99-304), Arlington, VA, 1998.

—, *Who Is Unemployed? Factors Affecting Unemployment Among Individuals with Degrees in Science and Engineering*, Higher Education Surveys Report (NSF 97-336), Arlington, VA, 1997.

## 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 comprise 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 is 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 comprise these groups are available on the AMS Web site at [www.ams.org/employment/](http://www.ams.org/employment/).

<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, pages 257–67, and an analysis of the classifications was given in the June 1983 Notices, pages 392–3.

## Acknowledgments

The Annual Survey of the Mathematical Sciences 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.

## Supplemental Listing of New Doctoral Recipients 1998–1999

### ALABAMA

#### University of Alabama, Tuscaloosa (1)

##### MATHEMATICS

*Libis, Carl*, Sums of powers and generalizations of Bernoulli and related polynomials.

### ILLINOIS

#### Illinois State University (2)

##### MATHEMATICS

*Miller, Daniel*, Exploring the integration of technology in collegiate mathematics.

*Mooney, Edward S.*, Development of a middle school statistical thinking framework.