

2004 Annual Survey of the Mathematical Sciences

(Third Report)

Faculty Profile
Enrollment and Degrees Awarded Profile
Graduate Student Profile

Ellen E. Kirkman, James W. Maxwell, and Colleen A. Rose

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 883 of this report. Departments in the former Group Vb are no longer surveyed. We present information about the faculties and instructional programs at the undergraduate and graduate levels in these departments for the 2004–2005 academic year. For 1999–2000 and earlier years, these data were presented as part of the Second Report.

Information about departments was gathered on a questionnaire called the Departmental Profile. This questionnaire was mailed to all departments in Groups I, II, III, IV, and Va and to stratified random samples from Groups M and B. The percentage of the departments responding in each of the doctoral groups was greater than 94 percent. Prior to 2001, if doctoral departments did not respond, simple projections were made to the whole population using the data from those departments who did respond. Beginning in 2002, if a department did not return the Departmental Profile questionnaire but had returned one within the last three years, the data from the most recent questionnaire was used.

The Departmental Profile questionnaire is mailed to a stratified random sample of departments drawn from each of Groups M and B, and standard statistical projections are made using the data from the respondents. The stratification for Groups M and B is based on the enrollment of the school and whether

This Third Report of the 2004 Annual Survey 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. Prior to 2000, these data were included as part of the Second Report.

The 2004 Annual Survey represents the forty-eighth in an annual series begun in 1957 by the American Mathematical Society. The 2004 Survey is under the direction of the 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 Amy Cohen-Corwin, Donald M. Davis, Nicholas M. Ercolani, J. Douglas Faires, Naresh Jain, Donald R. King, Ellen E. Kirkman (chair), David J. Lutzer, James W. Maxwell (ex officio), Polly Phipps, David E. Rohrlich, and Henry Schenck. The committee is assisted by AMS survey analyst Colleen A. Rose. Comments or suggestions regarding this Survey Report may be directed to the committee.

it is a public or a private school. For the third year, standard errors are reported for several of the more important projections made in Groups M and B. The box on page 872 discusses these standard errors in more detail.

The careful reader will note that a row or column total may differ slightly from the sum of the individual entries. All the table entries are the rounded values of the individual projections associated with each entry, and the differences are the result of this rounding (as the sum of rounded numbers is not always the same as the rounded sum).

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Highlights

The number of nondoctoral full-time faculty is estimated at 3,673, up from 3,602 last year. The estimated number of part-time faculty is 8,089, up from 7,338 last year. The number of full-time doctoral non-tenure-track faculty (including postdoctoral appointments) is estimated at 2,064, up from 2,032 last year. The size of the standard error makes it possible that the changes observed are due to sampling error.

The estimated total number of full-time doctoral positions under recruitment during 2003–04 in Groups I, II, III, Va, M, and B combined is up to 1,721 from 1,504 last year (an increase of 14%). Of these 1,721 full-time positions, 1,128 were tenured/tenure-track, up from 1,007 last year (an increase of 12%). Of the 1,721 full-time tenured/tenure-track doctoral positions, 919 were open to new doctorates, up from 869 last year (an increase of 6%).

The estimated total number of full-time doctoral positions filled with a doctoral hire in mathematics departments is up to 1,344 from 1,116 last year (an increase of 20%). The total number of tenured/tenure-track doctoral hires is down 3% in Groups I, II, III, and Va combined (to 214 from 220 last year), and up 20% in Groups M and B combined (to 606 from 503 last year).

The estimated total number of new doctoral hires in mathematics departments is up 54% (590 from 384) this year from last year: it is up 33% (to 232 from 174) in Groups I, II, III, and Va combined; and up 70% (to 358 from 210) in Groups M and B combined. The number of new doctoral tenured/tenure-track hires is up 65% (318 from 193): it is up 12% (to 37 from 33) in Groups I, II, III, and Va combined; and up 76% (to 281 from 160) in Groups M and B combined.

The estimated total number of not-new doctoral hires into tenured/tenure-track positions is down 5% in the mathematics groups combined. In Groups I, II, III, and Va combined 66% of those hired into tenured/tenure-track positions had held a non-tenure-track position the previous year (52% held a postdoctoral position); in Groups M & B combined these percentages were 43% and 21%, respectively.

Group IV (statistics) showed even more improvement than mathematics in terms of increased numbers of positions posted and increased hires. There was a 34% increase in the total number of doctoral positions under recruitment, and there were 119 new full-time doctoral hires, a 31% increase over last year.

The estimated number of full-time graduate students in mathematics departments in fall 2004 increased to 12,853 from 11,997 last year. In Groups I, II, III, and Va combined the numbers of full-time graduates students, of full-time graduate students that are U.S. citizens, of full-time graduate students that are first-year, of full-time graduate students that are first-year and U.S. citizens, and of full-time graduate students that are female are each at the highest in the past ten years.

Remarks on Statistical Procedures

This report is based on information gathered from departments of mathematical sciences in the U.S., separated into groups by highest degree granted as defined on page 883. Groups for doctoral-granting departments are I (Public), I (Private), II, III, IV, and Va. Groups M and B consist of those departments offering master's and bachelor's degrees respectively.

While the questionnaire on which this report is based is sent to every doctoral department, it is sent to a stratified random sample in Group M and B departments.

The response rate is typically between 90 and 100 percent for the doctoral groups. Prior to last year, simple projections were made using the questionnaires that were returned to get estimated totals for the entire population. After a couple of years of experimentation, a new procedure was begun for the 2001 survey. If a doctoral department did not return its questionnaire this year but had returned one within the past three years, those numbers were used as its response for the current year. This procedure will give us even more accurate estimates than we have gotten in the past.

The stratified random sampling procedures used for Groups M and B were put in place four years ago. Beginning with the 2001 Annual Survey, standard errors were calculated for some of the key estimates. Standard errors are calculated using the variability in the data and can be used to crudely measure how close our estimate is to the true value for the population. As an example, the number of full-time faculty in Group M is estimated at 4,224, with a standard error of 134. This means the actual number of full-time faculty in Group M is most likely between 4,224 plus or minus two standard errors, or between 3,956 and 4,492. This is much more informative than simply giving the estimate of 4,224.

Estimates are also given for parameters that are totals from all groups, such as the total number of full-time faculty. The values given for the doctoral groups are assumed to be the true parameters for these groups, because they are not sampled and hence are not subject to sampling variability. The only variability in a total of several groups comes from the sampling for Groups M and B. Using the standard errors for M and B, it is possible to calculate a standard error for the total. For example, an estimate of the total number of full-time faculty in all groups but group IV is 20,224, with a standard error of 308.

Standard errors, when calculated for an estimate, appear in the tables in parentheses underneath the estimate.

Table 1A: Total Faculty, Fall 2004

	GROUP									
	I Public	I Private	II	III	Va	I, II, III, & Va	M	B	I, II, III, Va, M, & B	IV
Total full-time faculty (Standard error)	1753	951	2516	2093	307	7620	4224 (134)	8380 (278)	20224 (308)	1597
Doctoral full-time faculty	1690	945	2229	1762	292	6918	3390	6243	16551	1537
Tenured	1142	554	1589	1260	170	4715	2287	4045	11046	841
Untenured, tenure-track	165	73	275	343	33	889	826	1726	3441	332
Postdoctoral appointments	250	186	198	30	66	730	10	24	764	126
Other non-tenure-track (Standard error)	133	132	167	129	23	584	267 (63)	448 (66)	1300 (92)	238
Nondoctoral full-time faculty	63	6	287	331	15	702	835	2137	3673	60
Total part-time faculty (Standard error)	233	58	409	611	44	1355	1888 (222)	4846 (336)	8089 (403)	246

Faculty Profile

The Departmental Profile, sent in fall 2004 to mathematical sciences departments at four-year colleges and universities as part of the Annual Survey, gathered information about faculties at these schools in fall 2004; this section presents some of that data. The 2004 First Report presented data collected earlier about faculty salaries (pages 236–51 of the February 2005 issue of the *Notices of the AMS*).

Faculty

Table 1A gives the number of faculty for different categories of faculty broken down by group. Table 1B gives the same information for females only. Table 1C gives some percentages based on the information in Tables 1A and 1B. The estimated total number of full-time faculty in the mathematics groups (Groups I, II, III, Va, M, and B combined) is 20,224, down 197 from last year, with a standard error of 308. We can be quite confident that the actual total number of faculty in these groups is in the interval 20,224 plus or minus 616. The doctoral mathematics departments I, II, III, and Va are up 42 full-time faculty members, Group M is up 123 faculty members, and Group B is down 362. Since the standard errors for the total number of full-time faculty in Groups M and B are 134 and 278 respectively, there may not be an actual change, as these increases are well within the variability we expect with standard errors of 134 and 278. The total faculty size in the statistics group (Group IV) is up to 1,597 this year from 1,482 last year (an 8% increase).

The number of non-tenure-track doctoral full-time faculty and the number of part-time faculty in mathematics departments had been increasing in recent years, a disturbing trend highlighted in “Staffing shifts in mathematical sciences departments, 1990–2000” (David J. Lutzer and James W. Maxwell, *Notices*,

June/July 2003, pages 683–6). This year the estimated number of part-time faculty in Groups I, II, III, Va, B, and M combined is up to 8,089 (with a standard error of 403) from 7,338 last year, and the number of non-tenure-track doctoral faculty (including postdoctoral positions) is estimated at 2,064 this year, up slightly from 2,032 last year. This year the increase in part-time faculty seems largely due to changes in Group B. This year in Group B the estimated number of full-time faculty is down by 389 (the standard error is 278), and the number of part-time faculty is up by 849 (the standard error is 336) to 4,846, considerably larger than any value in the last seven years; while in Groups I, II, III, and Va combined the number of non-tenure-track doctoral faculty and number of part-time faculty decreased slightly over last year. In Group IV the number of part-time faculty decreased from 263 last year to 240 this year, and the number of non-tenure-track doctoral faculty increased from 327 last year to 364 this year due to the increased number of postdoctoral positions. Table 1D gives a seven-year history of tenure/tenure-track, non-tenure-track, and part-time faculty for Groups I, II, III, and Va combined, for Group M, and for Group B. Also shown for each number in this table is the percentage of females. Comparing the values over the last seven years, we see that in Groups I, II, III, and Va combined the number of tenured/untentured, tenure-track appointments is down 1%, the number of non-tenure-track doctoral appointments is up 45%, and the number of part-time faculty is up 19%. Over the last seven years in Group M the estimated number of tenured/untentured, tenure-track appointments is down 22%, the estimated number of non-tenure-track doctoral appointments is up 98%, and the estimated number of part-time faculty is up 7%; and in Group B, the estimated number of tenured/untentured, tenure-track appointments is up 1%, the estimated number

Table 1B: Female Faculty, Fall 2004

	GROUP									
	I Public	I Private	II	III	Va	I, II, III, & Va	M	B	I, II, III, Va, M, & B	IV
Female full-time faculty <i>(Standard error)</i>	255	113	475	477	51	1371	1345 <i>(58)</i>	2586 <i>(143)</i>	5302 <i>(154)</i>	415
Doctoral full-time faculty	213	111	300	291	41	956	853	1568	3378	383
Tenured	95	32	130	156	18	431	438	912	1780	132
Untenured, tenure-track	26	7	67	86	5	191	283	518	992	114
Postdoctoral appointments	53	41	37	7	13	151	6	3	159	34
Other non-tenure-track	39	31	66	42	5	183	126	136	446	103
Nondoctoral full-time faculty	42	2	175	186	10	415	492	1018	1925	32
Female part-time faculty	82	6	149	252	16	505	700	2131	3335	91

Table 1C: Full-Time Faculty, Fall 2004

	GROUP									TOTAL
	I Public	I Private	II	III	Va	M	B	IV		
Full-time faculty										
Number	1753	951	2516	2093	307	4224	8380	1597		21821
Percentage of total full-time faculty	8%	4%	12%	10%	1%	19%	38%	7%		100%
Female full-time faculty										
Number	255	113	475	477	51	1345	2586	415		5717
Percentage of female full-time faculty	4%	2%	8%	8%	1%	24%	45%	7%		100%
Female full-time faculty Percentage female full-time faculty by group	15%	12%	19%	23%	17%	32%	31%	26%		26%

Table 1D: Faculty Counts and Percentage Female, Fall 1998-2004

	1998	1999	2000	2001	2002	2003	2004
Groups I, II, III, & Va							
Doctoral full-time faculty							
Tenured/Untenured, tenure-track	5662	5765	5568	5598	5616	5559	5604
Percentage female	9%	9%	9%	10%	10%	10%	11%
Non-tenure-track	904	1014	993	1233	1274	1343	1314
Percentage female	21%	22%	21%	21%	23%	25%	25%
Part-time faculty	1141	1217	1399	1467	1504	1389	1355
Percentage female	38%	38%	37%	38%	35%	35%	37%
Group M							
Doctoral full-time faculty							
Tenured/Untenured, tenure-track	3991	3599	3670	3191	3188	3005	3113
Percentage female	19%	20%	21%	23%	22%	22%	23%
Non-tenure-track	140	146	262	183	276	230	277
Percentage female	27%	56%	29%	24%	39%	33%	48%
Part-time faculty	1768	1768	1906	2323	2393	1952	1888
Percentage female	43%	43%	35%	36%	37%	37%	37%
Group B							
Doctoral full-time faculty							
Tenured/Untenured, tenure-track	5726	4580	5486	5665	5569	6172	5770
Percentage female	23%	25%	22%	24%	23%	26%	25%
Non-tenure-track	427	514	407	504	507	460	472
Percentage female	31%	24%	30%	29%	36%	20%	29%
Part-time faculty	3585	3298	3580	4197	4117	3997	4846
Percentage female	42%	41%	40%	43%	45%	42%	44%

Table 1E: Summary of Full-Time and Part-Time Faculty, Fall 2004

	GROUP					
	I, II, III, & Va		M & B		IV	
	Male	Female	Male	Female	Male	Female
Full-time faculty Percentage	6249 82%	1371 18%	8673 69%	3931 31%	1182 74%	415 26%
Doctoral full-time faculty Percentage	5959 86%	956 14%	7211 75%	2421 25%	1154 75%	383 25%
Tenured Percentage	4284 91%	431 9%	4982 79%	1349 21%	709 84%	132 16%
Untenured, tenure-track Percentage	698 78%	191 22%	1751 69%	801 31%	217 66%	114 34%
Postdoctoral appointments Percentage	579 79%	151 21%	26 75%	9 25%	92 73%	34 27%
Other non-tenure-track Percentage	401 69%	183 31%	453 63%	263 37%	135 57%	103 43%
Nondoctoral full-time faculty Percentage	287 41%	415 59%	1461 49%	1510 51%	28 47%	32 53%
Part-time faculty Percentage	850 63%	505 37%	3904 58%	2830 42%	154 63%	91 37%

of non-tenure-track doctoral appointments is up 11%, and the number of part-time faculty is up 35%. Another group that has been increasing the past few years is the nondoctoral full-time faculty; this year this group is estimated at 3,674 in Groups I, II, III, Va, M, and B combined, up from 3,602 last year.

Table 1E gives a summary of the various types of faculty found in departments of mathematical sciences by sex and group.

Tables 1F and 1G give more information about two types of faculty: full-time faculty without a doctorate and part-time faculty. The top half of Table 1F is a somewhat condensed version of the doctoral full-time faculty in Table 1A broken down by sex. The bottom half of Table 1F shows this same information for the 3,674 full-time faculty who do not have doctoral degrees. The majority of these faculty, 2,971 (81%), are found in Groups M and B departments. Table 1G shows the part-time faculty broken down by sex and whether they have a doctoral degree.

Table 1F: Doctoral and Nondoctoral Full-Time Faculty, Fall 2004

	GROUP					
	I, II, III, & Va		M & B		TOTAL	
	Male	Female	Male	Female	Male	Female
Doctoral full-time faculty	5959	956	7211	2421	13170	3378
Tenured	4284	431	4982	1349	9266	1780
Untenured, tenure-track	698	191	1751	801	2449	992
Postdoctoral appointments	579	151	26	9	605	159
Other non-tenure-track	401	183	453	263	854	446
Nondoctoral full-time faculty	287	415	1461	1510	1749	1925
Tenured	15	7	613	319	628	326
Untenured, tenure-track	3	4	149	216	152	220
Postdoctoral appointments	2	1	0	0	2	1
Other non-tenure-track	269	404	699	976	968	1379

Faculty Profile for Females

Table 1B gives a complete breakdown of all categories of female faculty by group and shows increasing estimated numbers of female faculty in most categories. The estimated total number of full-time faculty in Groups I, II, III, Va, M, and B combined for 2004–2005 is 20,224, of which 5,302 (26%) are females, up from 5,195 (25%) last year. In the B group the estimated number of doctoral female faculty decreased to 1,568 from 1,698 last year, of tenured female faculty decreased from 921 last year to 912 this year, of untenured tenure-track female faculty decreased from 685 last year to 518 this year (a 24% decrease), and of non-tenure-track doctoral female faculty increased from 92 last year to 136 this year. In the M group estimated doctoral full-time female faculty increased from 752 last year to 853 this year; in Groups I, II, III, and Va combined doctoral full-time female faculty increased from 919 to 956; and in Group IV doctoral full-time female faculty increased from 372 to 383.

Table 1C shows the number and percentage of all full-time and female full-time faculty that fall into each group for 2004–2005. The number of

Table 1G: Part-Time Faculty, Fall 2004

	GROUP				
	I, II, III, & Va		M & B		TOTAL
	Male	Female	Male	Female	
Doctoral part-time faculty	393	118	886	277	1673
Nondoctoral part-time faculty	457	387	3018	2553	6416
TOTAL	850	505	3904	2830	8089

faculty in each group and the percentage who are female are given in the bottom section of Table 1C. The number of females as a percentage of full-time faculty varies considerably among the groups, from 12% for Group I Private to 32% for Group M; this year the percentage of females in each mathematical group was greater than or equal to the per-

Table 2A: Recruitment of Doctoral Faculty, Fall 2004

	GROUP									
	I Public	I Private	II	III	Va	I, II, III, & Va	M	B	I, II, III, Va, M, & B	IV
Posted Doctoral Positions										
Total number¹ <i>(Standard error)</i>	162	130	188	136	23	639	345 <i>(52)</i>	736 <i>(74)</i>	1721 <i>(91)</i>	180
Tenured/tenure-track	62	35	96	100	17	309	270	549	1128	130
Open to new doctoral recipients	120	95	148	110	18	491	284	647	1423	123
Tenured/tenure-track	22	7	67	83	13	192	229	497	919	95
Open at assoc/full level	22	21	25	31	11	110	69	125	305	62
Reported Hires for Above										
Total number	136	120	165	111	20	551	279	668	1499	123
Male doctoral hires	103	89	131	78	17	417	182	341	939	68
Tenured/tenure-track	29	18	52	49	11	159	134	260	553	40
Female doctoral hires	33	31	26	23	3	117	79	208	404	51
Tenured/tenure-track	12	9	12	20	2	55	65	147	267	33
Male temporary hires	0	0	8	9	0	16	7	54	78	4
Female temporary hires	0	0	0	1	0	1	11	65	77	0
Total new doctoral hires	75	51	64	34	9	232	114	243	590	65
Male new doctoral hires	54	35	48	22	8	166	71	150	388	38
Tenured/tenure-track	0	0	7	13	2	22	65	98	185	23
Female new doctoral hires	21	16	15	12	1	66	43	93	202	27
Tenured/tenure-track	1	0	4	10	0	16	35	83	134	23
Unfilled positions	26	10	23	25	3	88	66	68	222	57

¹ Number of full-time doctoral positions under recruitment in 2003-2004 to be filled for 2004-2005.

Table 2B: A Summary of Recruitment of Doctoral Faculty, Fall 2004

	GROUP		
	I, II, III, & Va	M & B	IV
Posted Doctoral Positions			
Total number	639	1081	180
Tenured/tenure-track	309	819	130
Open to new doctoral recipients	491	932	123
Tenured/tenure-track	192	726	95
Reported Hires for Above			
Total new doctoral hires¹	232	358	65
Tenured/tenure-track	37	281	45
Male	166	222	38
Tenured/tenure-track	22	163	23
Female	66	136	27
Tenured/tenure-track	16	118	23
Total other doctoral hires	302	452	54
Tenured/tenure-track	177	325	27
Male	251	301	30
Tenured/tenure-track	137	230	17
Female	51	152	24
Tenured/tenure-track	39	94	10

¹ New doctoral hires are individuals who have held a doctorate for less than one year at the time of hiring.

centage of females last year. Note: In Table 1C the percentages for each group in rows 2 and 4 are of the row totals. The percentages in row 5 are column percentages using the numbers in rows 1 and 3.

Table 1D contains information about the percentage of female tenure/untentured, tenure-track, non-tenure-track doctoral full-time faculty, and

part-time faculty for the years 1998 to 2004 for Groups I, II, III, and Va combined, M, and B. This table includes the total number for each category as well as the percentage of females for each number. While this year females comprise 26% of the full-time faculty, they are a larger percentage of the part-time faculty in all three categories and a larger percentage of the non-tenure-track faculty in Groups M and B.

Table 1E gives the male/female breakdown by count and percentage for Groups I, II, III, and Va combined, Groups M and B combined, and Group IV for various categories of faculty. It shows that the percentage of women is generally higher in statistics (Group IV) than in the doctoral mathematics groups (Groups I, II, III, and Va combined) and that the percentage of tenured faculty who are women is highest in Groups M and B combined.

Table 1F shows that of the 3,674 nondoctoral full-time faculty in Groups I, II, III, Va, M, and B combined, 1,925 (52%) are females. In Table 1G we see that in these same groups there are 8,089 part-time faculty, of which 3,335 (41%) are females.

Faculty Recruitment

Table 2A contains detailed information on the number of full-time doctoral faculty positions in mathematical sciences departments under recruitment in 2003-2004 for employment beginning in the academic year 2004-2005. Among mathematics departments (Groups I, II, III, Va, M, and B), 1,721 positions were under recruitment in 2003-2004 for em-

**Table 2C: Positions Posted and Filled,
Fall 2004**

Positions	GROUP		
	I, II, III, & Va	M & B	IV
Posted positions opened to new doctoral recipients	491	932	123
% tenured/tenure-track	39%	78%	77%
Positions filled by new doctoral recipients	232	358	65
% tenured/tenure-track	16%	79%	70%
Positions filled by not-new doctoral recipients ¹	302	452	54
% tenured/tenure-track	59%	72%	50%

¹Not-new doctoral recipients are individuals who have held their doctorate for more than one year.

ployment beginning in the academic year 2004–2005, up 14% compared to last year. Of those 1,721 positions, 1,423 (83%) were available to new doctoral recipients, and of those 1,423 positions, 919 (65%) were tenured/tenure-track positions. The 919 tenured/tenure-track positions open to new doctoral recipients is up 6% from the 869 such positions under recruitment in 2002–2003. The total number of tenured/tenure-track full-time doctoral positions under recruitment in Groups I, II, III, Va, M, and B combined is 1,128, up from last year's 1,007 (an increase of 12%). In Groups I, II, III, and Va combined, the total number of posted doctoral positions open at the associate/full level increased from 108 last year to 110 this year.

Table 2B condenses the information in Table 2A. It also reorganizes the doctoral hires into one section

for new doctoral hires and another for other doctoral hires (so excludes posted doctoral positions that were temporarily filled with a person without a doctorate). Table 2C is derived from Table 2B, with the percentage of the filled positions that were tenured/tenure-track included in the table.

From Table 2B we find that the total number of full-time doctoral positions filled in mathematics departments (Groups I, II, III, Va, M, and B combined) is up to 1,344 from 1,116 last year (an increase of 20%); it is up

25% in Groups I, II, III, and Va combined and 18% in Groups B and M combined. This year Groups I, II, III, and Va combined filled 534 doctoral positions, of which 214 (40%) were tenured/tenure-track positions. Last year these same groups filled 427 doctoral positions, of which 220 (52%) were tenured/tenure-track. Groups M and B combined filled 810 doctoral positions this year, and 606 (75%) of these were tenured/tenure-track positions. Last year these two groups filled 689 doctoral positions, of which 503 (73%) were tenured/tenure-track.

Beginning with the 2004 Annual Survey, departments were asked to report the number of doctoral hires in tenured/tenure-track positions filled by individuals who held a non-tenure-track position the previous year and of those, how many were post-doctoral appointments. For Groups I, II, III, and Va

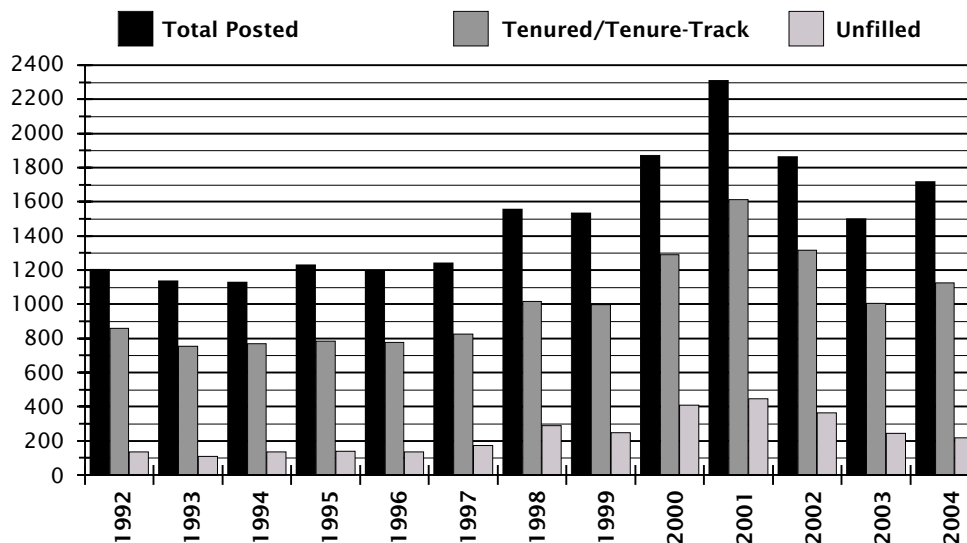
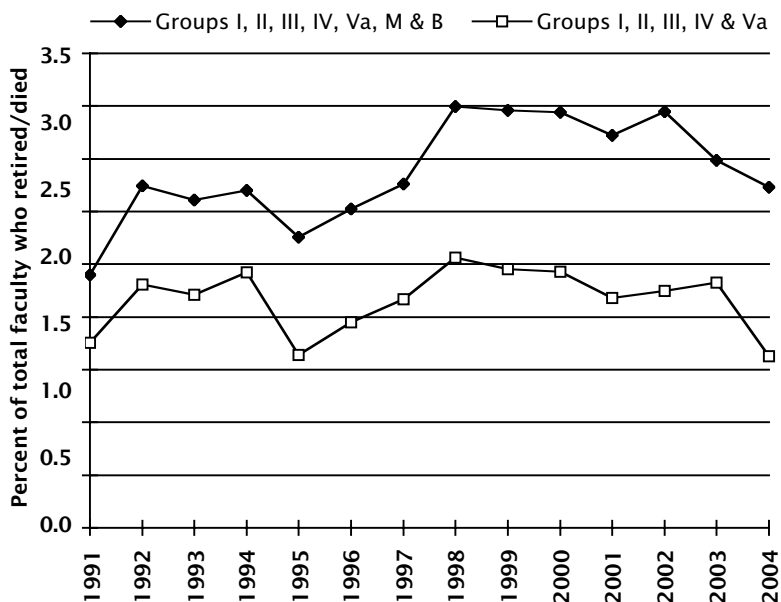
**Figure 1: Number of Full-Time Doctoral Positions under Recruitment
Groups I, II, III, Va, M, & B Combined, Fall 1992 to Fall 2004**

Table 3: Faculty Attrition,¹ Fall 2004

	GROUP									
	I Public	I Private	II	III	Va	I, II, III, & Va	M	B	I, II, III, Va, M, & B	IV
Full-time faculty who retired or died										
Total number (Standard error)	46	15	34	34	3	132	102 (16)	303 (44)	538 (47)	18
Percentage	2.6	1.6	1.4	1.6	1.1	1.7	2.5	3.6	2.7	1.2

¹ Number and percentage of full-time faculty who were in the department in fall 2003 but were reported to have retired or died by fall 2004.

Figure 2: Faculty Attrition



combined, 142 (66% of the 214 tenure-track hires) individuals reported having held a non-tenure-track position the previous year, with 112 (52%) individuals having held a postdoctoral appointment the previous year; last year 93 (42%) were filled by individuals who held a postdoctoral appointment the previous year. For Groups M and B combined, 258 (43% of the 606 tenure-track hires) individuals reported having held a non-tenure-track position the previous year, with 127 (21%) individuals having held a postdoctoral appointment the previous year; last year 188 (37%) were filled by individuals who held a postdoctoral appointment the previous year.

This year the estimated total number of new doctoral hires in mathematics departments is up 54% (590 from 384) from last year; it is up 33% (to 232 from 174) in Groups I, II, III, and Va combined, and up 70% (to 358 from 210) in Groups M and B combined. The number of new doctoral tenured/tenure-track hires is up 65% (318 from 193); it is up 12% (to 37 from 33) in Groups I, II, III, and Va combined, and up 76% (to 281 from 160) in Groups M and B combined. From Table 2C we see that in Groups I, II, III, and Va 16% of the hires of new doctoral recipients

are in tenured/tenure-track positions (last year it was 19%), while in Groups M and B 79% of the new doctoral hires are in tenured/tenure-track positions (last year it was 76%).

The estimated number of not-new doctoral hires in mathematics departments is 754, up from 732 last year. The estimated total of not-new doctoral hires into tenured/tenure-track positions is down 5% in all the mathematics groups combined; it is down in Groups I, II, III, and Va combined (177 from 187 last year), and down in Groups M and B combined (325 from 344). This year the percentage of not-new doctoral recipients among those hired is about the same in both the doctoral and nondoctoral mathematics groups; in Groups I, II, III, and Va combined 57% of the positions hired went to not-new doctoral recipients (last year 59%), while in Groups M and B combined 56% of the positions hired went to not-new doctoral recipients (last year 69%).

From Table 2B we find that of the new doctoral recipients hired in Groups I, II, III, and Va combined, 13% of the males and 24% of the females took tenured/tenure-track positions. For new doctoral recipients hired in Groups M and B combined, 73% of the males and 87% of the females took tenured/tenure-track positions.

Figure 1 shows the number of full-time doctoral positions available in all groups except Group IV, as well as the number of those that were tenured/tenure-track and the number unfilled for the years 1992 to 2004. There was a sharp decrease in available positions in the first few years of the 1990s, but the number of positions and the number of tenured/tenure-track positions steadily increased, reaching a maximum in 2001; this number declined the next two years and is slightly up this year.

This year the recruitment situation in statistics (Group IV) shows even more improvement than that in mathematics. The number of positions under recruitment is up 34% (to 180 from 134), the number of tenure-track positions under recruitment is up 44% (to 130 from 90), and the number of tenure-track positions open to new doctoral recipients under recruitment is up 61% (to 95 from 59). Except for the number of not-new doctoral hires into tenure-track positions, the number of hires in Group IV is generally improved over last year. The number of hires of new doctoral recipients is 65 (45 tenure-track) this

Table 4A: Total Undergraduate Course Enrollments (thousands)

Fall	GROUP								Total
	I Public	I Private	II	III	Va	M	B	IV	
1999	182	45	271	251	13	568	810	92	2232
2000	175	47	279	241	13	526	729	77	2087
2001	176	42	279	246	12	513	743	81	2092
2002	187	41	275	250	16	507	774	76	2125
2003	185	41	283	255	17	498	774	72	2125
2004 (Standard error)	159	42	277	261	16	492 (15)	782 (31)	72	2101 (34)

Table 4B: Total Graduate Course Enrollments (thousands)

Fall	GROUP							Total
	I Public	I Private	II	III	Va	M	IV	
1999	4	6	4	6	7	2	21	50
2000	7	4	9	9	2	14	24	69
2001	7	5	9	9	2	14	26	72
2002	10	4	11	10	3	12	29	79
2003	10	5	11	11	2	16	31	87
2004	9	4	12	10	2	12	31	81

Table 4C: Undergraduate and Graduate Enrollments per Full-Time Faculty Member, Fall 2004

	GROUP							
	I Public	I Private	II	III	Va	M	B	IV
Undergraduate Course Enrollments Number per full-time faculty member	90	44	113	126	49	120	89	49
Graduate Course Enrollments Number per full-time faculty member	5	5	5	4	6	3	—	14

Table 4D: Undergraduate Enrollments per Full-Time Faculty Member

Fall	GROUP							
	I Public	I Private	II	III	Va	M	B	IV
1999	115	54	111	122	43	127	114	68
2000	107	52	117	119	39	110	95	56
2001	101	47	114	120	41	118	94	57
2002	107	43	114	121	50	117	95	55
2003	104	42	113	121	46	121	89	46
2004	90	44	113	126	49	120	89	49

year and 43 (30 tenure-track) last year, up 51% (50%) respectively. The number of not-new doctoral hires is 54 (27 tenure-track) this year and 48 (34 tenure-track) last year. Females were 51% of the new doctoral tenure-track hires and 37% of the not-new doctoral tenure-track hires; last year these percentages were 34% and 26% respectively.

Faculty Attrition

Table 3 displays losses of full-time mathematical sciences faculty due to retirements and deaths over the

Table 5A: Undergraduate Degrees Awarded (hundreds), Fall 2004

	GROUP								
	I Public	I Private	II	III	Va	M	B	I, II, III, Va, M, & B	IV
Total Undergraduate Degrees Awarded <i>(Standard error)</i>	21	10	20	16	3	42	133	244	3
Computer science only	1	0	0	2	0	10	34	47	0
Female Undergraduate Degrees Awarded	7	3	8	7	1	19	57	102	2
Computer science only	0	0	0	0	0	2	10	13	0

Table 5B: Undergraduate Degrees Awarded (hundreds)
Groups I, II, III, Va, M & B Combined

Fall	2002	2003	2004
Total Undergraduate Degrees Awarded	217	220	244
Female Undergraduate Degrees Awarded Percentage female	91 42%	90 41%	102 42%

past year for each departmental grouping. The fall 2004 mathematics faculty attrition rate for Groups I, II, III, Va, M, and B combined is 2.7%, and in statistics (Group IV) it is 1.2%. For fall 2004, Group Va had the lowest attrition rate at 1.1%, while Group B the highest at 3.6%.

Figure 2 shows the trends in these attrition rates between 1991 and 2004. While the rates vary from group to group and from year to year within each group, the dominant trend over this time period has been one of increasing attrition. There is preliminary evidence of a change in the trend toward reduced attrition in the coming years. The trend in attrition rates for Groups I, II, II, IV, and Va (combined) roughly parallels the overall trend, though they are consistently lower.

Enrollment Profile and Degrees Awarded Profile

Enrollment

The Departmental Profile Survey obtained information about enrollments and numbers of undergraduate degrees awarded in mathematical sciences departments. Tables 4A and 4B give the total undergraduate and total graduate enrollments in mathematics courses in fall 2004 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, as discussed on page 872. In fall 2004, for the sixth year the projections for Groups M and B were made from those schools responding in the stratified random sample for each of these groups. This makes it possible to calculate standard errors for the estimated enrollments for these groups and for the estimated total enrollment for all groups. These standard errors, available for the fourth year, are also found in Table 4A. The estimated total undergraduate enrollment in fall 2004 for all groups combined is 2,101,000, with a standard error of

Table 5C: Master's Degrees Awarded (hundreds), Fall 2004

	GROUP							
	I Public	I Private	II	III	Va	M	I, II, III, Va, M, & B	IV
Total Master's Degrees Awarded <i>(Standard error)</i>	4	4	6	6	1	13	34	11
Computer science only	0	0	0	1	0	2	3	0
Female Master's Degrees Awarded	1	1	3	3	0	6	15	5
Computer science only	0	0	0	0	0	1	1	0

34,000, indicating that the actual total enrollment is likely within 2,101,000 plus or minus 68,000. Table 4A gives these totals for fall 1999 to fall 2004. Total undergraduate enrollments for all groups combined is down 1% from last year; the total is down 14% in Group I Public.

Table 4B gives total graduate enrollments for 1999 to fall 2004. Total graduate course enrollments for all groups combined is down 6% from last year; the total is down 25% for Group M and up only slightly in Group II.

Looking at the historical data on enrollment numbers presented in Tables 4A and 4B for fall 1999 to fall 2004, one sees no major trends; though one sees variability from year to year, this has been a relatively stable period for enrollments.

Table 4C gives the undergraduate enrollments per faculty member and the graduate enrollments per faculty member for each group. Table 4D gives the undergraduate enrollments per faculty member in each group for fall 1999 to fall 2004. Table 4D on

undergraduate enrollments per faculty member shows a slightly downward trend over the period shown.

Beginning with the 2002 survey, the Departmental Profile form no longer requests a breakdown of the total undergraduate enrollments into eight subcategories of courses. For a comprehensive survey of specific undergraduate courses, please refer to the report of the 2000 CBMS survey, Statistical Abstract of Undergraduate Programs in the Mathematical Sciences in the U.S.: Fall 2000 CBMS Survey (American Mathematical Society, Providence, RI, 2002). This publication is available on the AMS website at www.ams.org/cbms/.

Undergraduate and Master's Degrees

Beginning with the 2004 Annual Survey, departments were asked to report the number of master's degrees awarded, as well as undergraduate degrees awarded, during 2003-2004. Tables 5A and

Table 6A: Graduate Students, Fall 2004

	GROUP								
	I Public	I Private	II	III	Va	I, II, III, & Va	M	I, II, III, Va, & M	IV
Total Graduate Students									
Full-time	2906	1451	3221	2329	800	10707	2146	12853	4190
(Standard error)							(160)	(160)	
First-year full-time	676	404	966	765	193	3004	923	3927	1337
Part-time	223	168	406	902	83	1782	1794	3576	626
(Standard error)							(188)	(188)	
Female Graduate Students									
Full-time	749	334	1056	858	248	3245	904	4149	2144
First-year full-time	184	105	327	303	65	983	371	1354	670
Part-time	94	37	193	384	27	735	879	1615	320
U.S. Citizen Graduate Students									
Full-time	1541	717	1895	1261	463	5877	1698	7567	1636
(Standard error)							(158)	(158)	
First-year full-time	393	202	600	486	122	1803	687	2490	582
Part-time	171	105	349	758	76	1459	1701	3160	458
(Standard error)							(170)	(170)	

Table 6B: Full-Time Graduate Students in Groups I, II, III, & Va by Sex and Citizenship

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total full-time graduate students	9761	9476	9003	8791	8838	9637	9361	9972	10444	10707
First-year full-time	2601	2443	2386	2458	2664	2839	2875	2996	2711	3004
First-year full-time, U.S. citizen	1551	1465	1316	1349	1401	1527	1517	1630	1527	1803
Female full-time graduate students	2877	2760	2691	2770	2766	3016	2899	3136	3215	3245
Male full-time graduate students	6884	6716	6312	6021	6072	6621	6462	6836	7229	7462
U.S. citizen full-time graduate students	5623	5445	4947	4831	4668	5085	4631	5055	5590	5877
Non-U.S. citizen full-time graduate students	4138	4031	4056	3960	4170	4552	4730	4917	4854	4830

5C give the number of undergraduate and master's degrees awarded in 2003–2004, the number of each that are female, and the number that are computer science for each group. In 2002 we began tabulating the number of “undergraduate degrees”, rather than the number of “junior/senior majors”; hence comparisons to previous years' numbers of undergraduate degrees can be made only to the last two years, and this is done in Table 5B. These three years show a trend of increasing numbers of undergraduate degrees awarded in mathematics.

The reader should be aware that at least 50 of the 192 departments in the 2004 Group M population and at least 270 of the 1,029 departments in the 2004 Group B population also offer a computer science program in addition to their offerings in mathematics. In some instances, these computer programs account for a major fraction of the department's undergraduate degrees. This year's estimated 24,400 undergraduate degrees awarded includes 4,700 in computer science, and 300 of the 3,400 master's degrees awarded were in computer science.

The report of the 2000 CBMS survey provides a more comprehensive study of departmental bachelor's degrees.

Graduate Student Profile

Table 6A summarizes information gathered by the 2004 Departmental Profile survey about graduate students enrolled in fall 2004. 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 female graduate students and for U.S. citizen graduate students.

The total number of full-time graduate students in Groups I, II, III, and Va combined increased from 10,444 in 2003 to 10,707 in 2004; this year's total is the highest during the period 1995–2004. The number of U.S. citizen full-time graduate students in Groups I, II, III, and Va combined increased by 5% to 5,877; this year's number is the highest during the period 1995–2004. The number of first-year full-time students in Groups I, II, III, and Va combined increased by 11%, from 2,711 last year to 3,004 this year (both the number of first-year U.S. citizens and the number of first-year non-U.S. citizens were up); both this year's number of first-year full-time graduate students and the number of first-year full-time U.S. citizens are the highest during the period 1995–2004. The number of female full-time graduate students in Groups I, II, III, and Va combined increased from 3,215 to 3,245; this year's number is also the highest during the period 1995–2004. In Group IV the number of full-time graduate students decreased this year by 2% to 4,190, but the number of U.S. citizen full-time graduate students increased by 4% to 1,636. The first-year full-time graduate student enrollment in Group IV decreased by 36 to 1,337, a decrease of 3%, but the number of first-year full-time U.S. citizens was up from 550 to 582. The number of female full-time graduate students in Group IV decreased from 2,203 to 2,144, a 3% decrease. The

number of full-time graduate students in Group M declined from 2,265 to 2,146. There is a great deal of variability in the number of full-time graduate students in Group M, even in universities that are roughly the same size, and this is reflected in the standard errors of 160 this year and 172 last year. The number of part-time graduate students in Groups I, II, III, and Va increased to 1,782, an 11% increase this year, and in Group IV decreased 14% to 626. Group III has 902 (51%) of the part-time graduate students in the doctoral mathematics groups. In the doctoral mathematics groups, 41% of the part-time graduate students are females and 82% are U.S. citizens, and in Group IV 51% of the part-time graduate students are females and 73% are U.S. citizens. The number of Group M part-time graduate students decreased from 2,387 to 1,794, with a standard error of 188 this year and 308 last year. For Group M, 49% of the part-time graduate students are females and 95% are U.S. citizens.

Table 6B gives 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 in Groups I, II, III, and Va combined for fall 1995 through fall 2004. From this data we can see that total full-time graduate enrollment in the doctoral mathematics groups was falling until 1998 and has been generally increasing beginning in 1999. The number of first-year full-time graduate students declined in 1995–1997 and has been generally increasing since then. The number of full-time graduate students who are U.S. citizens has been increasing since 2001, and the number of non-U.S. citizens has been decreasing since 2002. The number of female full-time graduate students has been generally increasing since 1997 and is up 21% since 1997, slightly above the total increase of 19% in number of full-time graduate students.

Previous Annual Survey Reports

The 2004 Annual Survey First and Second Reports were published in the *Notices of the AMS* in the February and August 2005 issues respectively. For the last version of this report, the 2003 Annual Survey Third Report was published in the *Notices of the AMS* in the September 2004 issue. 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

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 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 the number of Group I departments from 39 to 48, the 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 doctoral-granting departments with scores in the 3.00–5.00 range. Group I Public and Group I Private are Group I doctoral-granting departments at public institutions and private institutions respectively.

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

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

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

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

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

Group B or Bachelor’s contains U.S. departments granting a baccalaureate degree only.

Listings of the actual departments which comprise these groups are available on the AMS website at www.ams.org/outreach.

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

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 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.