

2002 Annual Survey of the Mathematical Sciences

(Second Report)

Updated Report on the 2001–2002 U.S. Doctoral Recipients
Starting Salary Survey of the 2001–2002 U.S. Doctoral Recipients

Ellen E. Kirkman, James W. Maxwell, and Kinda Remick Priestley

Update on the 2001–2002 U.S. Doctoral Recipients

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 812 of this report. Departments in the former Group Vb (operations research and management science) are no longer being surveyed.

This Second Report includes data from two parts of the 2002 Annual Survey. First, we update information about new doctoral recipients reported earlier in the February 2003 issue. Second, we present the starting salaries of the new doctoral recipients who responded to a follow-up survey. Prior to 2000 this report contained a third part presenting information about the faculties and instructional programs at the undergraduate and graduate levels in these departments. Starting with the 2000 survey, we chose to present this data in a separate report that is now published in the September issue of the *Notices of the AMS*.

The names of the 2001–2002 doctoral recipients and their thesis titles were published in “Doctoral Degrees Conferred” (*Notices of the AMS*, February 2003, pages 264–80). This list has been supplemented by fourteen additional new doctorates, twelve of which have been reported since the original list was published. The supplemental listing appears at the end of this report on page 813.

This Second Report of the 2002 Annual Survey gives an update of the 2001–2002 new doctoral recipients from the First Report, which appeared in the *Notices of the AMS* in February 2003, pages 238–53. Prior to 2000 this report included 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. This information is now published as a third report in the September *Notices of the AMS*. The First Report gave salary data for faculty members in these same departments. It also had a section on new doctoral recipients in statistics that is not updated here.

The 2002 Annual Survey represents the forty-sixth in an annual series begun in 1957 by the American Mathematical Society. The 2002 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, Lorraine Denby, Alexander J. Hahn, Naresh Jain, G. Samuel Jordan, Stephen F. Kennedy, Ellen E. Kirkman (chair), David J. Lutzer, and James W. Maxwell (ex officio). 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.

Information about recipients of doctoral degrees awarded between July 1, 2001, and June 30, 2002, was collected from doctorate-granting departments beginning in late spring 2002 and from a follow-up census of individual degree recipients beginning in October. The “2002 Annual Survey First Report” (*Notices of the AMS*, February 2003, pages 238–53) presented survey results obtained about new doctoral

Ellen E. Kirkman is professor of mathematics, Wake Forest University. James W. Maxwell is AMS associate executive director for Membership and Programs. Kinda Remick Priestley is AMS survey analyst.

Highlights

- There were 960 doctoral recipients from U.S. institutions for 2001–2002, down 105 (10%) from the previous year's number. This is the lowest annual number of new doctoral recipients reported since 1989–1990, when there were 950. The annual number of new doctoral recipients has declined each year since the all-time high of 1,176 reported for 1997–1998.
- This year's drop of 105 in the number of doctoral recipients is almost entirely due to the drop of 104 in the number of recipients who are U.S. citizens (a decline of 20% over the previous year's number, 532). This year's count of 428 doctoral recipients who are U.S. citizens is the lowest annual figure reported since 1989–1990. The percentage of U.S. citizens among all doctoral recipients this year is 45%, down from 50% last year. This percentage had been close to 50% for the past three years.
- The number of new doctoral recipients who are non-U.S. citizens, while down by only one from the previous year, has been declining every year for the past five years: from 639 in 1997–1998 to 532 in 2001–2002.
- Females totaled 296 (31%) of all new doctoral recipients, down in number (and up in percentage) from 311 (29%) last year. Of the 428 U.S. citizen new doctoral recipients, 130 are female (30%, down from 31% last year). The highest percentage of females among the annual counts of U.S. doctoral recipients was 34%, reported for 1998–1999.
- The final unemployment rate for 2001–2002 doctoral recipients was 2.9%, the lowest reported since 1990, when it was 2.2%.
- Of the 829 new doctoral recipients known to have employment in fall 2002, 732 (88%) new doctoral recipients found employment in the U.S.; last year this percentage was 90%.
- The proportion of this year's total employed doctoral recipients who took U.S. academic positions in fall 2002 is 67%, up over last year's figure of 63%.
- The total number of new doctoral recipients taking positions in U.S. business and industry was 136 in fall 2002, a 30% decrease from last year's number and down from 234 reported in fall 1998 (a 42% decrease).
- The number of new doctoral recipients hired by master's and bachelor's institutions was 148 this year. This number has been dropping each of the past five years, resulting in a 27% decrease in the annual number from fall 1998 to fall 2002. This decline may reflect more hiring at these institutions of individuals completing a postdoctoral appointment.
- There were 572 new doctoral recipients responding to the EENDR survey; of the 510 who found employment in the U.S., 52% reported obtaining a permanent position (last year this percentage was 56%).

recipients from the departments. Here we update information for new doctoral recipients using data gathered with a questionnaire, Employment Experiences of New Doctoral Recipients (EENDR). The EENDR was sent in early October 2002 to all new

doctoral recipients whose address was known. When a new doctoral recipient did not respond or no address was known, information supplied by the department was used.

Updated Employment Status of 2001–2002 U.S. Doctoral Recipients

Table 1A shows the fall and final counts of doctoral recipients in the mathematical sciences awarded by U.S. institutions in each year from 1993 through 2002. Final counts include those new doctoral recipients reported from departments who missed the deadline for inclusion in the First Report. Numbers

Table 1A: Annual U.S. Doctoral Recipients, Fall and Final Counts, 1993 to 2002

Year	Fall	Final
1992–1993	1104	1116
1993–1994	1025	1034
1994–1995	1148	1157
1995–1996	1098	1099
1996–1997	1123	1130
1997–1998	1163	1176
1998–1999	1133	1135
1999–2000	1119	1127
2000–2001	1008	1065
2001–2002	948	960

Table 1B: Citizenship of Annual U.S. Doctoral Recipients, 1998 to 2002

Year	U.S.	Non-U.S.	TOTAL
1997–1998	537	639	1176
1998–1999	560	575	1135
1999–2000	566	561	1127
2000–2001	532	533	1065
2001–2002	428	532	960

in this table have been revised from reports prior to 1998–1999 to exclude new doctorates data from Group Vb departments, which are no longer surveyed.

Table 1C: 2001–2002 U.S. Doctoral Recipients by Type of Degree-Granting Department

	I (Pu)	I (Pr)	II	III	IV	Va
Number	218	140	173	124	224	81
%	23	15	18	13	23	8

Table 1B shows trends in the number of new doctoral recipients for the past five years broken down by U.S. citizens and non-U.S. citizens. There was a drop of 111 new doctorates from 1997–1998 to

Table 2A: 2001–2002 U.S. Doctoral Recipients: Field of Thesis by Fall 2002 Employment Status, Updated April 2003

TYPE OF EMPLOYER	FIELD OF THESIS												TOTAL	
	Algebra Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/Topology	Discr. Math./Combin./Logic/Comp. Sci.	Probability	Statistics/Biostat.	Applied Math.	Numerical Analysis/Approximations	Linear Nonlinear Optim./Control	Differential, Integral, & Difference Equations	Math. Educ.	Other/Unknown		
Group I (Public)	16	9	15	9	3	0	3	4	1	13	0	0	73	
Group I (Private)	12	8	13	5	0	1	9	5	1	8	0	0	62	
Group II	19	11	6	3	4	2	5	7	1	6	1	0	65	
Group III	4	0	2	2	0	4	1	4	1	2	2	0	22	
Group IV	0	0	0	0	4	41	0	0	0	0	0	0	45	
Group Va	1	0	0	0	2	1	3	1	0	2	0	0	10	
Master's	6	3	4	8	2	6	7	3	1	0	2	1	43	
Bachelor's	27	19	8	13	1	10	10	1	1	9	5	1	105	
Two-Year College	3	2	4	1	0	1	1	0	0	1	1	0	14	
Other Academic Dept.	6	4	2	7	3	38	9	7	2	8	4	0	90	
Research Institute/Other Nonprofit	5	1	2	0	0	9	1	2	2	2	0	0	24	
Government	1	2	3	3	0	11	11	6	2	4	0	0	43	
Business and Industry	5	3	8	9	9	71	17	6	2	4	1	1	136	
Non-U.S. Academic	12	11	13	6	3	15	7	4	3	10	0	2	86	
Non-U.S. Nonacademic	0	3	1	0	0	4	2	0	1	0	0	0	11	
Not Seeking Employment	2	1	1	1	1	3	2	0	0	1	0	0	12	
Still Seeking Employment	2	3	1	1	0	7	4	4	0	3	0	0	25	
Unknown (U.S.)	6	5	7	5	4	21	5	7	0	1	1	0	62	
Unknown (non-U.S.) ¹	4	0	4	2	2	8	4	2	2	3	0	1	32	
TOTAL	131	85	94	75	38	253	101	63	20	77	17	6	960	
Column Subtotals	Male	101	61	69	52	30	146	78	49	18	47	8	5	664
	Female	30	24	25	23	8	107	23	14	2	30	9	1	296

¹ Includes those whose status is reported as "unknown" or "still seeking employment".

Table 2B: 2001–2002 U.S. Doctoral Recipients: Type of Degree-Granting Department by Fall 2002 Employment Status, Updated April 2003

TYPE OF EMPLOYER	TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT							TOTAL	Row Subtotals	
	Group I (Public) Math.	Group I (Private) Math.	Group II Math.	Group III Math.	Group IV Statistics	Group Va Applied Math.	Male		Female	
Group I (Public)	37	19	12	0	0	5	73	57	16	
Group I (Private)	18	32	5	5	0	2	62	44	18	
Group II	27	11	16	9	0	2	65	46	19	
Group III	6	3	2	9	2	0	22	12	10	
Group IV	0	1	0	3	40	1	45	29	16	
Group Va	1	0	1	1	1	6	10	9	1	
Master's	7	1	15	9	6	5	43	25	18	
Bachelor's	18	7	34	37	7	2	105	69	36	
Two-Year College	2	0	6	5	1	0	14	11	3	
Other Academic Dept.	12	6	13	13	36	10	90	52	38	
Research Institute/Other Nonprofit	5	6	3	0	9	1	24	15	9	
Government	7	8	8	4	7	9	43	29	14	
Business and Industry	18	12	19	7	65	15	136	97	39	
Non-U.S. Academic	30	18	10	10	12	6	86	63	23	
Non-U.S. Nonacademic	2	3	1	1	2	2	11	9	2	
Not Seeking Employment	2	2	3	2	3	0	12	7	5	
Still Seeking Employment	5	1	8	1	7	3	25	20	5	
Unknown (U.S.)	12	7	13	7	17	6	62	47	15	
Unknown (non-U.S.) ¹	9	3	4	1	9	6	32	23	9	
TOTAL	218	140	173	124	224	81	960	664	296	
Column Subtotals	Male	171	100	120	78	130	65	664		
	Female	47	40	53	46	94	16	296		

¹ Includes those whose status is reported as "unknown" or "still seeking employment".

Table 2C: 2001–2002 U.S. Doctoral Recipients: Field of Thesis by Type of Degree-Granting Department, Updated April 2003

TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT	FIELD OF THESIS											TOTAL	
	Algebra Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/Topology	Discr. Math./Combin./Logic/Comp. Sci.	Probability	Statistics/Biostat.	Applied Math.	Numerical Analysis/Approximations	Linear Nonlinear Optim./Control	Differential, Integral, & Difference Equations	Math. Educ.		Other/Unknown
Group I (Public)	44	29	40	22	10	3	21	17	3	27	2	0	218
Group I (Private)	31	14	32	13	5	8	17	3	3	11	0	3	140
Group II	40	27	11	11	7	8	23	20	3	18	3	2	173
Group III	14	14	10	20	3	15	17	7	1	11	12	0	124
Group IV	0	0	0	0	7	215	1	1	0	0	0	0	224
Group Va	2	1	1	9	6	4	22	15	10	10	0	1	81
TOTAL	131	85	94	75	38	253	101	63	20	77	17	6	960

Table 2D: Percentage of Total Employed New Doctoral Recipients by Type of Employer, Fall 1998 to Fall 2002

%	U.S. Employed		Non-U.S. Employed		TOTAL NUMBER
	Academic	Nonacademic	Academic	Nonacademic	
Fall 1998	57	29	12	2	965
Fall 1999	64	23	11	2	955
Fall 2000	62	28	10	1	957
Fall 2001	63	27	9	2	914
Fall 2002	67	22	10	1	829

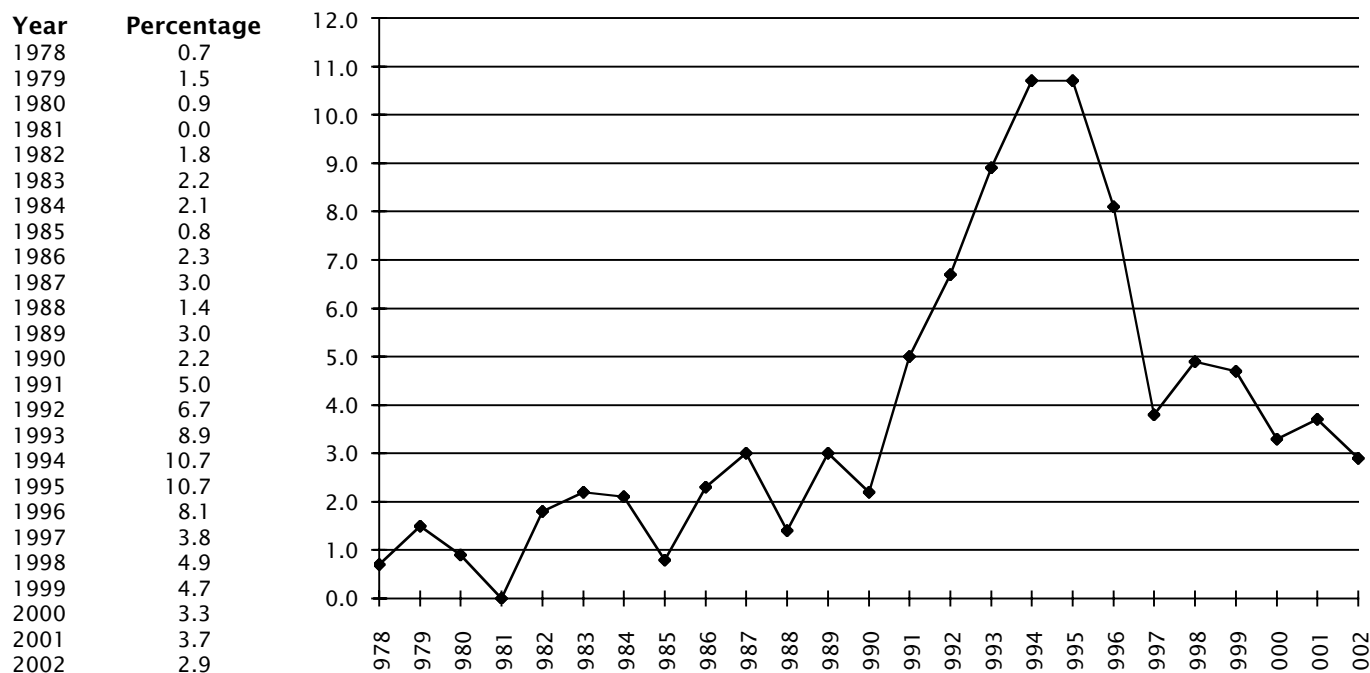
2000–2001, mostly explained by a drop of 106 non-U.S. citizen new doctoral recipients. This year the total number of new doctoral recipients was down from the previous year by 105, with a drop of 104 in U.S. citizens. The count of 428 U.S. citizens is the

lowest figure reported since 1989–1990. The all-time high number of non-U.S. citizen new doctoral recipients was 679 in 1992–1993. These trends bear watching in the future.

Table 1C gives a breakdown of the 960 doctoral degrees awarded in the mathematical sciences between July 1, 2001, and June 30, 2002, by type of degree-granting department.

Tables 2A, 2B, and 2C display updates of employment data, found in these same tables in the First Report, for the fall count of 2001–2002 doctoral recipients plus twelve additional doctoral recipients reported late. These tables are partitioned by field of thesis research, by the survey group of their degree department, and by type of employer. At the time of this Second Report, the fall 2002 employment status of 866 of the 960 doctoral recipients was known.

Figure 1: Percentage of New Doctoral Recipients Unemployed, As Reported in the Respective Annual Survey Second Reports, 1978 to 2002



The fall 2002 unemployment rate for new doctoral recipients, based on information gathered by the time of the Second Report, was 2.9%. The unemployment rate rose steadily in the early 1990s and reached its all-time high of 10.7% in both 1994 and 1995. Since then the rate has fluctuated between 3.3% and 4.9%, until this year's figure of 2.9%, the lowest rate reported since 1990. Figure 1 presents the fall 1978 through fall 2002 trend in the final unemployment rate of new doctoral recipients. 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. Note that prior to 1999 the new doctoral recipients from Group Vb are included in the total unemployment rate for each year.

Of the 866 new doctoral recipients whose employment is known, 732 were employed in the U.S., 97 were employed outside the U.S., 25 were still seeking employment, and 12 were not seeking employment.

Table 2D presents the trend in the percentage of employed new doctoral recipients by type of employer for the last five years. Academic employment includes those employed by research institutes and other nonprofits. The percentage of the total employed new doctoral recipients that are in U.S. academic positions is at a five-year high, while the percentage of the total employed in U.S. nonacademic positions is at a five-year low.

Among new doctoral recipients who are employed, the percentage taking nonacademic employment (U.S. government, U.S. business and industry, and non-U.S. nonacademic) varied significantly by field of thesis. For those whose field of thesis is in the first three columns in Table 2A, this percentage is the lowest at 9%, while the percentage for those with theses in probability or statistics is the highest at 39%.

Table 3A: Number of New Doctoral Recipients Taking Positions in Business and Industry in the U.S. by Type of Degree-Granting Department, Fall 1998 to Fall 2002

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
Fall 2000	33	28	37	24	83	18	223
Fall 2001	28	15	27	26	75	23	194
Fall 2002	18	12	19	7	65	15	136

Tables 3A through 3D first appeared in the First Report for 2000–2001, 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 who responded to a follow-up questionnaire. The next few paragraphs

discuss some of the information presented in these tables.

The fall 2002 numbers in Table 3A are down from last year in each category, and over five years the total shows a 42% decrease. The trend

Table 3B: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 1998 to Fall 2002

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
Fall 2000	144	82	126	79	131	28	590
Fall 2001	159	71	126	80	108	30	574
Fall 2002	133	86	107	91	102	34	553

away from jobs in business and industry most likely reflects problems in the economy.

Table 3C shows that the number of new doctoral recipients hired by Groups M and B has been dropping each of the past five years, and there has been a 27% decrease in the number of new doctoral recipients hired by master's and bachelor's depart-

Table 3C: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Hiring Department, Fall 1998 to Fall 2002

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
Fall 2000	216	51	11	180	132	590
Fall 2001	214	49	11	178	122	574
Fall 2002	222	45	10	148	128	553

ments from fall 1998 to fall 2002. This decline may reflect more hiring at these institutions of individuals completing a postdoctoral appointment.

Table 3D gives information about the production and hiring of female new doctoral recipients in the doctoral-granting departments of this survey. From Table 2B we see that 42% of the new doctoral re-

Table 3D: Females as a Percentage of 2001–2002 U.S. Doctoral Recipients Produced by and Hired by Doctoral-Granting Groups, Fall 2002

%	I (Pu)	I (Pr)	II	III	IV	Va	TOTAL
Produced	22	29	31	37	42	20	31
Hired	22	29	29	45	36	10	29

cipients hired by Group M departments were female, while 34% of those hired by Group B departments were female.

Table 3E: 2001–2002 Male U.S. Doctoral Recipients: Type of Citizenship by Fall 2002 Employment Status

TYPE OF EMPLOYER	CITIZENSHIP				TOTAL MALE DOCTORAL RECIPIENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
U.S. Employer	245	20	228	2	495
U.S. Academic	184	12	172	1	369
Groups I, II, III, and Va	77	6	85	0	168
Group IV	10	1	17	1	29
Non-Ph.D. Department	92	5	60	0	157
Research Institute/Other Nonprofit	5	0	10	0	15
U.S. Nonacademic	61	8	56	1	126
Non-U.S. Employer	13	1	58	0	72
Non-U.S. Academic	13	1	49	0	63
Non-U.S. Nonacademic	0	0	9	0	9
Not Seeking Employment	2	0	5	0	7
Still Seeking Employment	10	2	8	0	20
Subtotal	270	23	299	2	594
Unknown (U.S.)	28	2	16	1	47
Unknown (non-U.S.) ¹	0	0	20	3	23
TOTAL	298	25	335	6	664

¹ Includes those whose status is reported as "unknown"

Table 3F: 2001–2002 Female U.S. Doctoral Recipients: Type of Citizenship by Fall 2002 Employment Status

TYPE OF EMPLOYER	CITIZENSHIP				TOTAL FEMALE DOCTORAL RECIPIENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
U.S. Employer	117	15	101	4	237
U.S. Academic	95	8	77	4	184
Groups I, II, III, and Va	30	1	33	0	64
Group IV	4	0	11	1	16
Non-Ph.D. Department	58	7	27	3	95
Research Institute/Other Nonprofit	3	0	6	0	9
U.S. Nonacademic	22	7	24	0	53
Non-U.S. Employer	1	1	22	1	25
Non-U.S. Academic	1	1	20	1	23
Non-U.S. Nonacademic	0	0	2	0	2
Not Seeking Employment	1	0	4	0	5
Still Seeking Employment	2	1	2	0	5
Subtotal	121	17	129	5	272
Unknown (U.S.)	9	0	5	1	15
Unknown (non-U.S.) ¹	0	2	6	1	9
TOTAL	130	19	140	7	296

¹ Includes those whose status is reported as "unknown" or "still seeking employment".

Updated Information about 2001–2002 U.S. Doctoral Recipients by Sex and Citizenship

Tables 3E and 3F show the sex and citizenship of the 960 new doctoral recipients and the fact that 732 new doctoral recipients found jobs in the U.S. this year. This is 88% of the 829 new doctoral recipients known to have jobs in fall 2002. Last year this percentage was 89%.

Sex and citizenship is known for all of the 960 new doctoral recipients. The final count of new doctoral recipients who are U.S. citizens is 428 (45%). For the previous three years, this figure remained very close to 50%, the largest percentages reported by the Annual Survey since the mid-1980s.

Pages 243–6 of the First Report present further information related to the citizenship of the 2001–2002 new doctoral recipients.

Of the 428 U.S. citizen new doctoral recipients, 130 are female and 298 are male. The 130 female new doctoral recipients comprise 30% of the U.S. citizen total for 2001–2002, a decrease from last year's count of 166 (down 22%); last year female new doctoral recipients were 31% of the U.S. citizen new doctoral recipients. The number of U.S. citizen males, 298, is down 68 (19%) from 366 last year.

Table 3G shows that while U.S. academic doctoral departments, Groups I through Va, hired 44% U.S.

Table 3G: Number of 2001–2002 New Doctoral Recipients Employed in the U.S. by Citizenship and Type of Employer

U.S. EMPLOYER	CITIZENSHIP		TOTAL
	U.S.	Non-U.S.	
Academic, Groups I–Va	121	156	277
Academic, Other	158	118	276
Nonacademic	83	96	179
TOTAL	362	370	732

citizens, U.S. academic positions other than in the doctoral departments hired 57% U.S. citizens. Those hired for nonacademic positions in the U.S. who are U.S. citizens was 46%. Among those 732 2001–2002 doctoral recipients taking employment in the U.S., 24% took nonacademic employment (government or business and industry). This is down from 30% in 2000–2001 and from 31% in 1999–2000.

New Information from the EENDR Survey

Of the 948 new doctoral recipients reported in the First Report, the 890 whose addresses were known were sent the Employment Experiences of New Doctoral Recipients (EENDR) survey in October 2002, and 572 (64%) responded. The response rates varied considerably among the various subgroups of new doctoral recipients defined by their employment status as reported by departments. Among those who were employed, the highest response rate, 75%, was from those in academia in the U.S., while the lowest, 10%, was from those in foreign nonacademia.

The EENDR gathered details on employment experiences not available through departments. The rest of this section presents additional information available on this subset of the 2001–2002 doctoral recipients.

Table 4A provides the trend in EENDR respondents taking permanent and temporary positions in the U.S. for fall 1998 through fall 2002. This year we see that among the 510 employed in the U.S., 264 reported obtaining a permanent position and 245 a temporary position (one individual did not answer this question). Of the 245 in temporary positions, 110 (45%) reported taking temporary employment because a suitable permanent position was not available and 234 (96%) classified their position as postdoctoral. Furthermore,

Table 4A: Number (and Percentage) of Annual EENDR Respondents Taking U.S. Positions by Job Status, Fall 1998 to Fall 2002

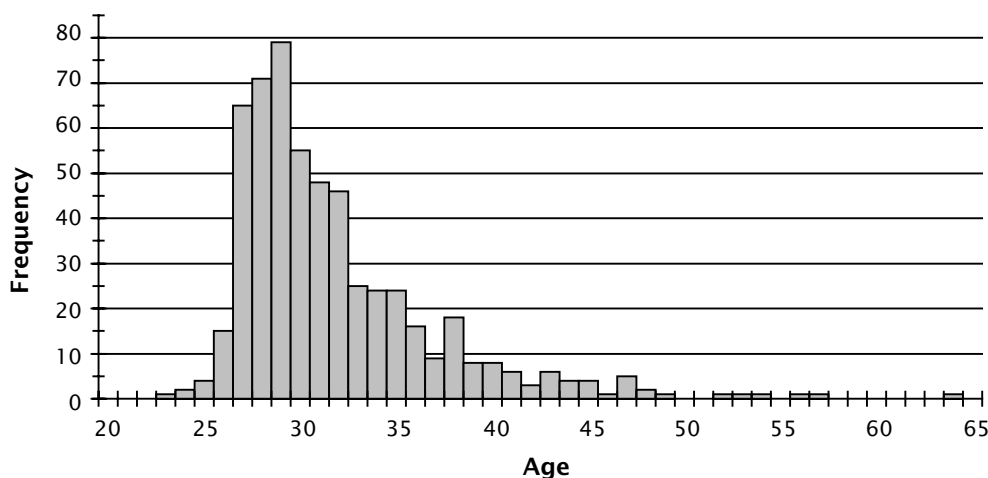
U.S. Employed	Fall 1998	Fall 1999	Fall 2000	Fall 2001	Fall 2002
TOTAL	539	512	536	473	510
Permanent	313 (58)	273 (53)	317 (59)	266 (56)	264 (52)
Temporary	225 (42)	237 (46)	218 (41)	205 (43)	245 (48)
Perm not avail.	127 (56)	101 (43)	92 (42)	93 (45)	110 (45)
Postdoctorate	129 (57)	155 (65)	157 (72)	163 (80)	234 (96)
Perm not avail.	56 (43)	58 (37)	55 (35)	50 (31)	86 (37)
Unknown	1	2	1	2	1

Table 4B: Percentage of Annual EENDR Respondents Taking U.S. Positions by Employment Sector within Job Status, Fall 1998 to Fall 2002

U.S. Employed	Fall 1998	Fall 1999	Fall 2000	Fall 2001	Fall 2002
Permanent					
Academia	55	59	59	62	70
Government	4	4	4	6	6
Business/Ind.	41	37	36	32	23
Temporary					
Academia	90	94	95	95	93
Government	7	5	2	4	6
Business/Ind.	4	0	2	0	1

among those in postdoctoral positions, 37% responded that they took the position because a suitable permanent position was not available. Of particular note in Table 4A is the steady increase in the percentage of temporarily employed respondents who reported taking a postdoctoral position.

Table 4B shows the employment trends of permanent and temporary positions broken down by sector for the last five years. There has been a

Figure 2: Age Distribution of 2001–2002 EENDR Respondents

continuing increase in the proportion of EENDR respondents taking permanent employment in academia and an offsetting decline in the proportion taking permanent positions in business and industry.

Among the 264 who reported obtaining a permanent position in the U.S. in fall 2002, 70% were employed in academia (including 3% in research institutes and other nonprofits), 6% in government, and 23% in business or industry. Women held 36% of the permanent positions.

Among the 245 individuals with temporary employment in the U.S. this year, 93% were employed in academia (including 5% in research institutes and other nonprofits), 6% in government, and 1% in business or industry.

Figure 2 gives the age distribution of the 556 new doctoral recipients who responded to this question. The median age of new doctoral recipients was 30 years, while the mean age was 32 years. The first and third quartiles were 28 and 34 years, respectively. These figures are very similar to those reported in previous years.

Previous Annual Survey Reports

The 2002 First Annual Survey Report was published in the *Notices of the AMS* in the February 2003 issue. For the last full year of reports, the 2001 First, Second, and Third Annual Survey Reports were published in the *Notices of the AMS* in the February, August, and September 2002 issues respectively. These reports and earlier reports, as well as a wealth of other information from these surveys, are available on the AMS website at www.ams.org/employment/surveyreports.html.

Starting Salary Survey of the 2001–2002 U.S. Doctoral Recipients

The starting salary figures for 2002 were compiled from information gathered on the EENDR questionnaires sent to individuals who received doctoral degrees in the mathematical sciences during the 2001–2002 academic year from universities in the United States (see previous section for more details).

The questionnaires were distributed to 890 recipients of degrees using addresses provided by the departments granting the degrees; 572 individuals responded between late October and April. Responses with insufficient data or from individuals who indicated they had part-time or

non-U.S. 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.

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, so those who had "one year or less experience" were analyzed separately from the total. Male and female figures are not provided when the number of salaries available for analysis in a particular category was five or fewer. Also, quartile figures are not available for 1965 through 1980. All categories of "Teaching/Teaching and Research" and "Research Only" contain those recipients employed at academic institutions only. The "Academic Research Only, 9–10-Month Salaries" category was dropped from the published analyses in 1998 because so few recipients respond in this category that the data were not considered meaningful. Starting salaries for those reporting a 9–10-month salary postdoctoral position are available for a sixth year. These salaries are also included within the "Academic Teaching/Teaching and Research, 9–10-Month Salaries" table and boxplot on page 809.

Graphs. The graphs show standard boxplots summarizing salary distribution information for the years 1994 through 2002. Values plotted for 1994 through 2001 are converted to 2002 dollars using the implicit price deflator prepared annually by the Bureau of Economic Analysis, U.S. Department of Commerce.

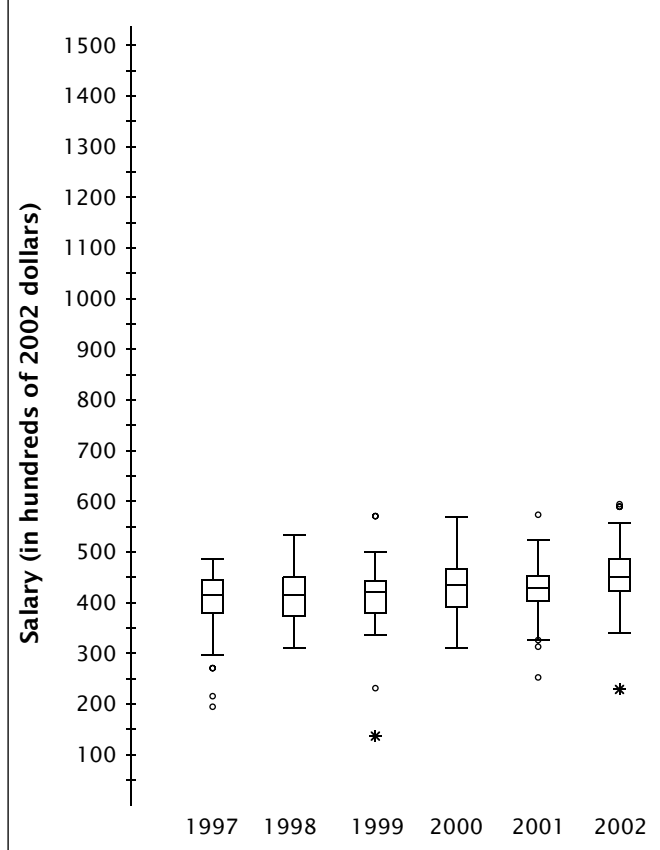
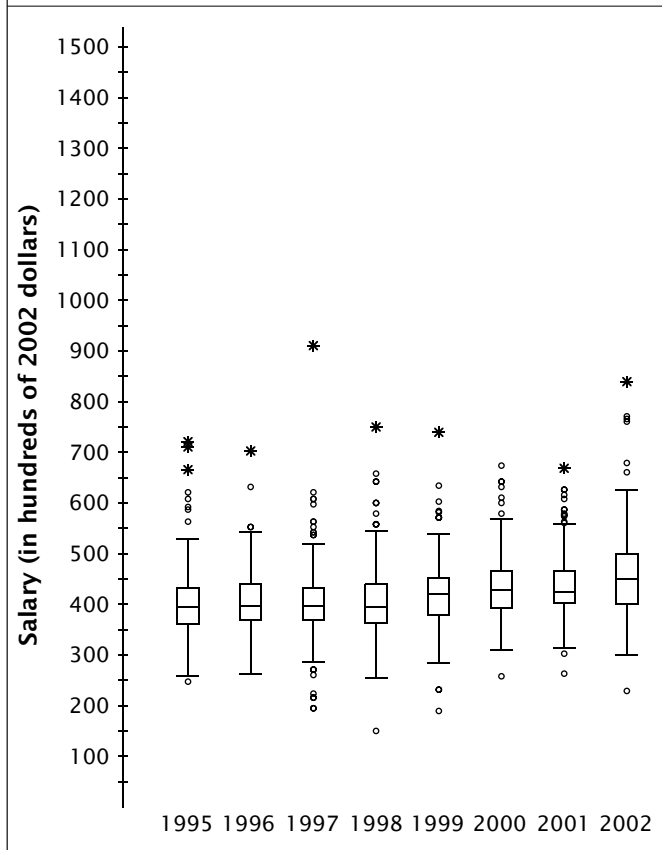
For each boxplot the box shows the first quartile (Q1), the median (M), and the third quartile (Q3). The interquartile range (IQR) is defined as $Q3 - Q1$. Think of constructing invisible fences $1.5 \times \text{IQR}$ below Q1 and $1.5 \times \text{IQR}$ above Q3. Whiskers are drawn from Q3 to the largest 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 $1.5 \times \text{IQR}$ 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 \circ 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 Teaching/Teaching and Research
9-10-Month Salaries
(in hundreds of dollars)**

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

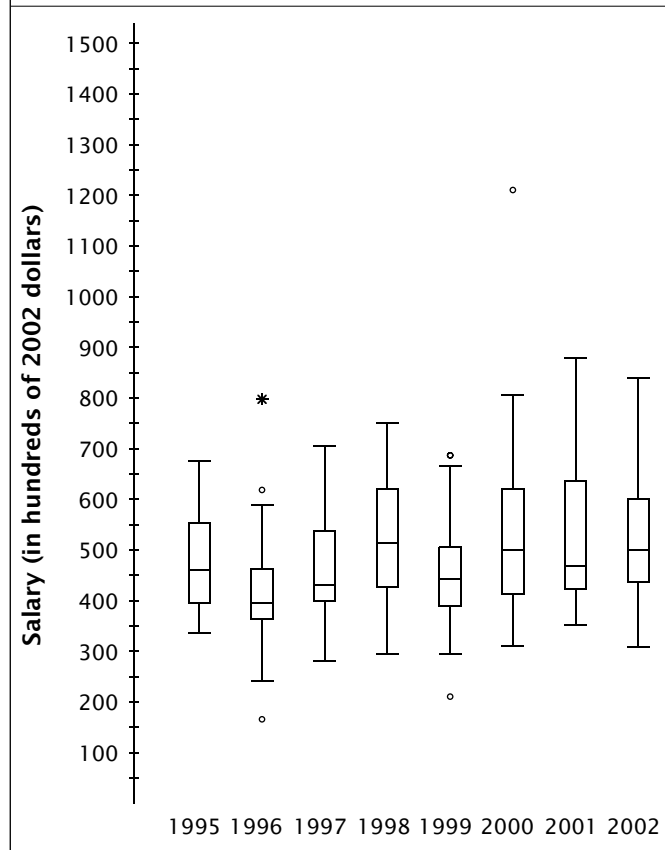
Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1965	70	---	80	---	105	372
1970	85	---	110	---	195	419
1975	90	120	128	135	173	354
1980	105	155	171	185	250	332
1985	170	230	250	270	380	375
1990	230	305	320	350	710	409
1995	220	320	350	382	640	395
1996	240	333	360	400	636	398
1997	180	340	366	400	840	397
1998	140	340	370	410	700	397
1999	180	360	400	430	700	423
2000	250	380	415	450	650	430
2001	259	400	420	461	660	425
2002	230	400	450	500	840	450
1998 M	140	340	370	411	700	
1998 F	250	350	377	409	600	
1999 M	220	370	400	430	700	
1999 F	180	350	390	420	540	
2000 M	250	380	415	450	650	
2000 F	321	380	413	450	620	
2001 M	259	400	430	475	660	
2001 F	310	390	413	443	620	
Total (154 male/78 female)						
2002 M	230	420	450	500	840	
2002 F	300	400	441	498	610	
One year or less experience (128 male/66 female)						
2002 M	230	420	450	500	840	
2002 F	335	400	441	488	610	

Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1997	180	350	385	410	450	418
1998	290	350	390	420	500	418
1999	130	365	400	418	540	423
2000	300	385	420	450	550	435
2001	250	400	425	450	566	430
2002	230	425	450	487	595	450
1998 M	290	340	390	430	500	
1998 F	310	361	375	390	436	
1999 M	220	373	400	428	540	
1999 F	130	350	390	410	475	
2000 M	300	390	420	450	550	
2000 F	360	389	448	458	544	
2001 M	250	400	430	454	566	
2001 F	310	395	421	438	490	
Total (76 male/25 female)						
2002 M	230	425	450	488	595	
2002 F	380	430	450	485	589	



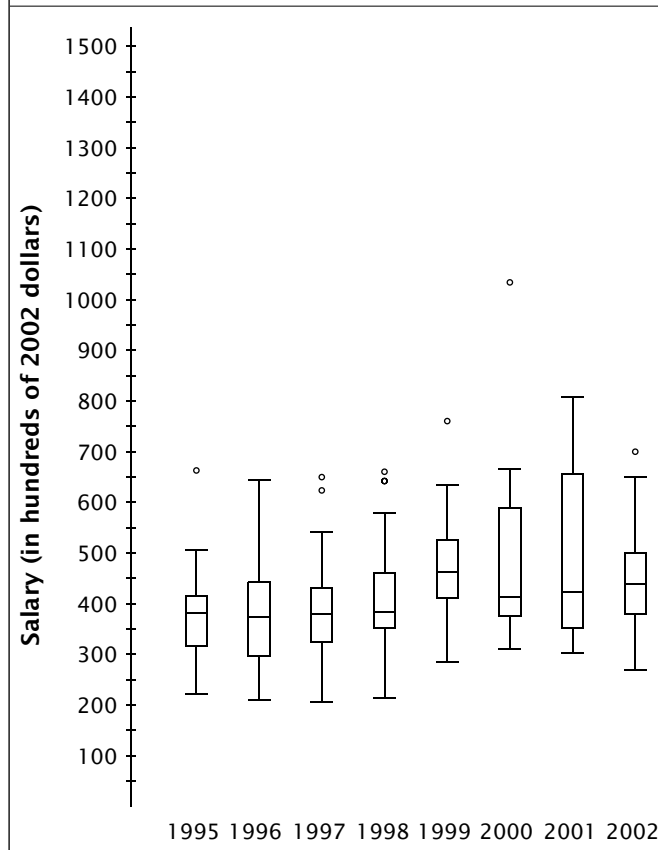
**Academic Teaching/Teaching and Research
11-12-Month Salaries
(in hundreds of dollars)**

Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1965	78	---	104	---	121	484
1970	95	---	128	---	200	487
1975	87	---	145	---	204	401
1980	143	---	195	---	350	378
1985	220	230	273	300	470	410
1990	225	318	365	404	670	467
1995	300	354	410	478	600	462
1996	150	302	340	390	720	376
1997	260	370	400	497	650	434
1998	275	403	480	578	700	515
1999	200	374	420	469	650	444
2000	300	400	485	600	1170	502
2001	350	420	465	615	870	470
2002	310	439	500	597	840	500
1998 M	275	410	495	573	700	
1998 F	300	395	464	575	630	
1999 M	280	370	420	458	650	
1999 F	200	393	435	590	630	
2000 M	300	390	460	650	1170	
2000 F	395	465	500	570	750	
2001 M	350	420	443	498	870	
2001 F	380	465	588	658	750	
Total (36 male/11 female)						
2002 M	310	420	485	595	840	
2002 F	400	453	500	558	700	
One year or less experience (34 male/9 female)						
2002 M	310	420	480	579	840	
2002 F	440	460	500	515	700	



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

Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1965	81	---	93	---	107	433
1970	90	---	120	---	205	457
1975	90	---	119	---	180	329
1980	120	---	180	---	321	349
1985	190	295	342	400	520	514
1990	180	280	300	365	546	384
1995	196	280	340	370	587	384
1996	192	270	330	400	585	365
1997	190	300	350	400	600	380
1998	200	333	360	428	617	386
1999	270	390	440	500	720	465
2000	300	384	400	555	1000	414
2001	300	367	420	625	800	425
2002	270	380	440	500	700	440
1998 M	200	340	360	400	600	
1998 F	285	330	360	540	617	
1999 M	270	383	400	493	600	
1999 F	340	468	530	581	720	
2000 M	300	390	400	486	1000	
2000 F	300	360	410	580	630	
2001 M	300	348	425	655	800	
2001 F	342	400	420	588	700	
Total (39 male/15 female)						
2002 M	270	388	440	500	650	
2002 F	310	350	440	505	700	
One year or less experience (35 male/12 female)						
2002 M	270	388	440	500	630	
2002 F	310	350	425	465	640	

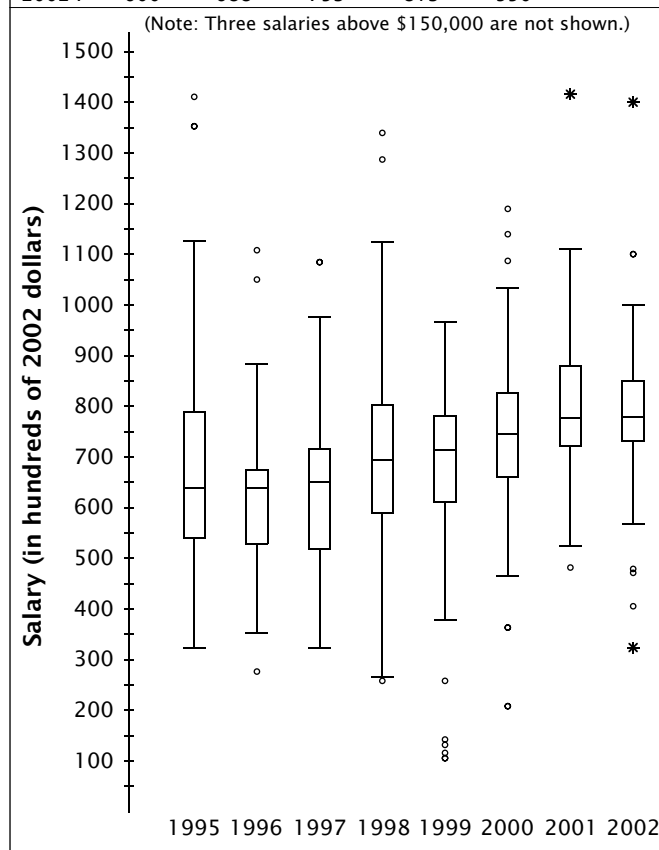
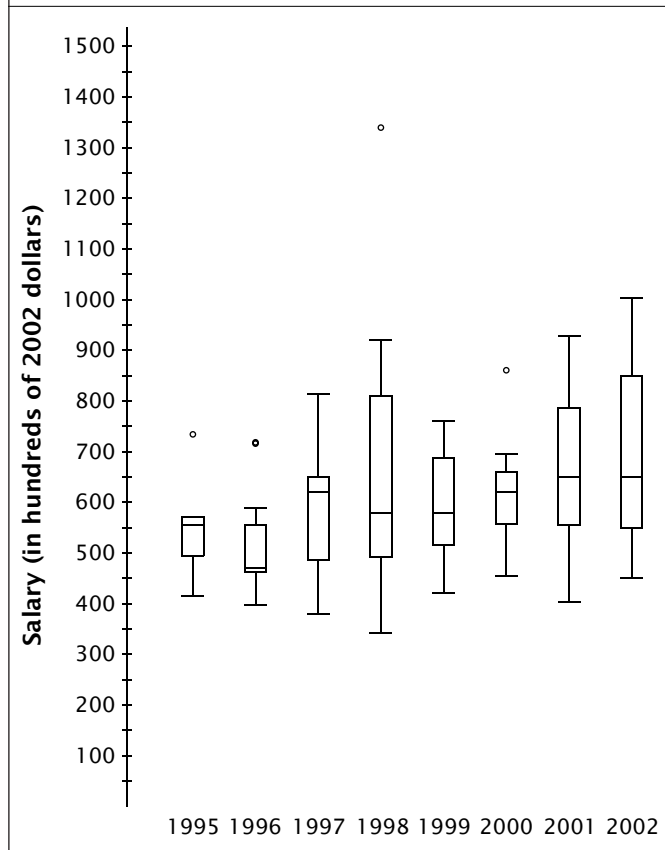


**Government
11-12-Month Salaries
(in hundreds of dollars)**

Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1965	70	---	126	---	160	586
1970	100	---	150	---	223	571
1975	78	---	182	---	247	503
1980	156	---	244	---	501	473
1985	263	294	325	381	440	488
1990	320	345	378	430	587	484
1995	370	440	494	507	650	557
1996	360	420	427	504	650	473
1997	350	454	573	600	750	622
1998	320	475	540	736	1250	579
1999	400	495	550	651	720	581
2000	440	540	600	640	830	621
2001	400	580	644	758	920	650
2002	450	551	650	775	1005	650
1998 M	320	500	568	756	1250	
1998 F	---	---	---	---	---	
1999 M	400	495	540	587	720	
1999 F	---	---	---	---	---	
2000 M	440	563	620	649	830	
2000 F	530	545	566	593	650	
2001 M	400	590	647	780	920	
2001 F	450	550	630	670	896	
Total (19 male/9 female)						
2002 M	450	551	642	725	1005	
2002 F	540	600	700	850	880	
One year or less experience (17 male/7 female)						
2002 M	450	550	642	701	1005	
2002 F	540	650	713	850	880	

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

Ph.D. Year	Min	Q ₁	Median	Q ₃	Max	Reported Median in 2002 \$
1965	100	---	136	---	180	633
1970	96	---	170	---	235	647
1975	114	---	187	---	240	517
1980	190	---	284	---	400	551
1985	260	360	400	420	493	601
1990	320	438	495	533	700	633
1995	288	480	568	690	1250	641
1996	250	510	580	610	1000	642
1997	300	483	600	658	1000	651
1998	240	550	650	750	2250	697
1999	360	600	680	761	2450	719
2000	200	640	720	800	1500	745
2001	475	716	770	865	1850	779
2002	325	734	780	850	1400	780
1998 M	240	550	650	750	1250	
1998 F	305	565	662	765	2250	
1999 M	360	626	700	763	2450	
1999 F	440	580	644	676	1100	
2000 M	200	640	730	800	1500	
2000 F	200	645	690	788	980	
2001 M	520	717	788	875	1700	
2001 F	475	710	750	850	1850	
Total (40 male/14 female)						
2002 M	325	738	782	858	1100	
2002 F	600	713	768	838	1400	
One year or less experience (26 male/12 female)						
2002 M	406	737	782	846	1100	
2002 F	600	688	753	813	950	



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 number of the 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 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 Website at www.ams.org/employment/surveyreports.html.

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

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

Acknowledgments

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

Other Data Sources

American Association of University Professors, *Unequal Progress: The Annual Report on the Economic Status of the Profession 2002–2003*, Academe: Bull. AAUP (March/April 2003), Washington, DC.

American Statistical Association, *2002–2003 Salary Report of Academic Statisticians*, AmStat News (December 2002), Alexandria, VA.

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_____, *Science and Engineering Degrees: 1966-2000* (NSF 02-327), Detailed Statistical Tables, Arlington, VA, 2002.

_____, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1991-2000* (NSF 02-329), Detailed Statistical Tables, Arlington, VA, 2002.

_____, *Science and Engineering Doctorate Awards: 2001* (NSF 03-300), Detailed Statistical Tables, Arlington, VA, 2002.

_____, *Women, Minorities, and Persons with Disabilities in Science and Engineering: 2000* (NSF 00-327), Arlington, VA, 2000.

_____, *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.

Doctoral Degrees Conferred 2001-2002

Supplementary List

The following list supplements the list of thesis titles published in the February 2003 *Notices*, pages 264-80.

ARIZONA

Arizona State University (6)

MATHEMATICS

Archibald, Richard, Boundary detection and reconstruction in magnetic resonance imaging.

Dunn, Charles, Extensions of a simple competitive graph coloring algorithm.

Kuo, Yu-Ju, Interior point algorithms for second order cone problems with applications.

Loladze, Irakli, The importance of being stoichiometric: Population dynamics from the perspective of chemical elements.

Marthaler, Daniel, Two problems from nonlinear dynamical systems.

Zela, Dritan, A continuum spine model for the horizontal cell-to-cone feedback in cat outer retina.

COLORADO

University of Colorado (3)

MATHEMATICS

Caravone, Curtis, On the convergence of model-free policy iteration algorithms for reinforcement learning: Stochastic approximation under discontinuous mean dynamics.

Caulk, Suzanne, Explicit action of Hecke operators on Hilbert-Siegel modular forms.

Kornelson, Keri, Local solvability of Laplacian difference operators arising from the discrete Heisenberg group.

GEORGIA

University of Georgia (2)

MATHEMATICS

Bindner, Donald, On the space spanned by the powers of an operator and its adjoint.

Liu, Ruihua, Hierarchical control and filtering of stochastic markovian system.

NORTH CAROLINA

Duke University (1)

MATHEMATICS

Collins, Anne D., Configuration spaces in robotic manipulation and motion planning.

PENNSYLVANIA

Carnegie Mellon University (2)

STATISTICS

Ghiuvea, Cristian, Pricing of generalized American options with applications to energy derivatives.

Ianus, Iuliana, Approximate robust Bayesian inference with applications to sample size calculation.