Update on the 2001 New 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 814 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 2001 Annual Survey. First, we update information about new doctoral recipients reported earlier in the February 2002 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 for the 2001–2002 academic year. Starting with the 2000 survey, we chose to present this data in a separate report that will be published in the September issue of the *Notices of the AMS*.

The names of the 2000–2001 doctoral recipients and their thesis titles were published in "Doctoral Degrees Conferred" (*Notices of the AMS*, February 2002, pages 241–57). This list has been supplemented by 57 additional new doctorates that have been reported since the original list was published. The supplemental listing appears at the end of this report on pages 815-16. The response rate from doctoral-granting departments was lower than normal at the time the First Report was published. An aggressive follow-up for nonresponding departments resulted in the reporting of 57 more new doctoral recipients for 2000–2001, a much higher increase than most previous Second Reports.

Information about recipients of doctoral degrees awarded between July 1, 2000, and June 30, 2001, was collected from doctorate-granting departments beginning in late spring 2001 and from a follow-up census of individual degree recipients beginning in October. The "2001 Annual Survey First Report" (*Notices of the AMS*, February 2002, pages 217-31) presented survey results obtained about new doctoral 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 2001 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 U.S. New Doctoral Recipients, 2000–2001

Table 1A shows the fall and final counts of new doctoral recipients in the mathematical sciences awarded by U.S. institutions from 1992 through 2001. Final counts include those new doctoral recipients reported from departments who missed the deadline for inclusion in the First Report. Numbers in this table have been revised from previous reports to exclude new doctorates data from Group Vb departments, which are no longer surveyed.

Table 1A: U.S. New Doctoral Recipients, Fall and Final Counts, 1992 to 2001

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

Table 1B shows trends in the number of new doctoral recipients for the past four years broken down by U.S. citizens and non-U.S. citizens.

Table 1B: Citizenship of New Doctoral Recipients, 1998-2001

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

There has been a drop of 111 new doctorates during those four years, and nearly all of this drop can be explained by a drop of 106 non-U.S. citizen new doctoral recipients. These trends bear watching in the future. The all-time high number of non-U.S. citizen new doctoral recipients is 679 in 1992–1993.

Table 1C: 2000-2001 U.S. New Doctoral Recipients by Type of Degree-Granting Department

	l (Pu)	I (Pr)	П	Ш	IV	Va
Number	235	132	207	138	272	81
%	22.1	12.4	19.4	13.0	25.5	7.6

							FIELD OF	THESIS						
TYPE OF EMPLOY	YER	Algebra Number Theory	Real, Comp. Funct., & Harmonic Analysis	, Geometry/ Topology	Discr. Math./ Combin./ Logic/ Comp. Sci.	Probability	Statistics	Applied Math.	Numerical Analysis/ Approxi- mations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math. Education	Other/ Unknown	TOTAL
Group I (Publi	c)	16	15	9	10	4	1	4	3	1	12	1	2	78
Group I (Priva	te)	13	6	17	5	2	2	2	6	2	5	0	1	61
Group II		10	8	9	6	0	2	5	3	1	7	2	0	53
Group III		9	2	1	1	0	3	2	0	0	4	0	0	22
Group IV		0	1	0	0	7	39	0	0	0	0	0	2	49
Group Va		0	1	1	1	0	0	4	1	1	2	0	0	11
Master's		9	6	6	4	4	10	3	2	4	11	3	1	63
Bachelor's		24	16	14	19	4	6	7	6	3	7	6	3	115
Two-Year Coll	ege	6	1	2	2	0	1	0	0	1	2	2	0	17
Other Academ	nic Dept.	4	1	1	4	4	37	13	4	2	4	4	1	79
Research Insti Other Nonp	tute/ rofit	3	1	1	3	1	11	2	2	1	1	0	0	26
Government		4	1	2	1	1	24	5	5	2	5	0	0	50
Business and	Industry	11	9	7	12	9	87	25	15	5	12	0	2	194
Non-U.S. Acad	lemic	11	9	14	6	2	18	6	0	3	9	2	0	80
Non-U.S. Nona	academic	2	2	0	0	1	7	1	1	1	1	0	0	16
Not Seeking E	mployment	2	1	1	4	0	5	2	0	0	1	1	0	17
Still Seeking E	mployment	6	2	2	2	2	10	7	0	1	4	0	0	36
Unknown (U.S	.)	5	2	3	7	0	24	9	4	0	3	4	1	62
Unknown (noi	n-U.S.) ¹	7	1	7	2	2	8	0	3	1	5	0	0	36
COLUMN TO	ΓAL	142	85	97	89	43	295	97	55	29	95	25	13	1065
COLUMN	Male	109	72	69	63	35	174	75	43	22	70	15	7	754
SUBTOTALS	Female	33	13	28	26	8	121	22	12	7	25	10	6	311

Table 2A: 2000-2001 U.S. Doctoral Recipients: Field of Thesis by Fall 2001 Employment Status, April 2002

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

Table 2B: 2000-2001 U.S. Doctoral Recipients: Type of Degree-Granting Department by
Fall 2001 Employment Status, April 2002

			TYPE C	OF DOCTORAL D	DEGREE-GRANTII	NG DEPARTMEN	Т			
TYPE OF EMPLO	YER	Group I (Public) Math	Group I (Private) Math	Group II Math	Group III Math	Group IV Statistics	Group Va Applied Math	ROW TOTAL	RO SUBTC Male	W DTAL Female
Group I (Publi	c)	45	11	13	5	1	3	78	59	19
Group I (Privat	te)	27	27	1	0	3	3	61	51	10
Group II	,	18	5	18	8	3	1	53	37	16
Group III		11	1	3	4	2	1	22	18	4
Group IV		1	2	1	0	45	0	49	32	17
Group Va		5	1	0	0	0	5	11	9	2
Master's		4	3	26	19	8	3	63	46	17
Bachelor's		28	8	43	30	5	1	115	76	39
Two-Year Coll	ege	6	1	6	4	0	0	17	11	6
Other Academ	nic Dept.	10	6	14	8	31	10	79	52	27
Research Insti Other Nonpr	tute/ ofit	4	6	1	2	10	3	26	17	9
Government		3	4	13	5	21	4	50	28	22
Business and	Industry	28	15	27	26	75	23	194	150	44
Non-U.S. Acad	lemic	20	15	18	5	16	6	80	61	19
Non-U.S. Nona	academic	2	3	2	0	6	3	16	14	2
Not Seeking E	mployment	3	4	2	3	5	0	17	9	8
Still Seeking E	mployment	7	5	4	5	10	5	36	19	17
Unknown (U.S	.)	10	4	12	9	23	4	62	42	20
Unknown (nor	n-U.S.) ¹	3	11	3	5	8	6	36	23	13
COLUMN TO	TAL	235	132	207	138	272	81	1065	754	311
COLUMN	Male	174	110	150	101	160	59	754		
SUBTOTALS	Female	61	22	57	37	112	22	311		

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

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						FIELD OF	THESIS						
TYPE OF DOCTORAL DEGREE- GRANTING DEPARTMENT	Algebra Number Theory	Real, Comp. Funct., & Harmonic Analysis	, Geometry/ Topology	Discr. Math./ Combin./ Logic/ Comp. Sci.	Probability	Statistics	Applied Math.	Numerical Analysis/ Approxi- mations	Linear Nonlinear Optim./ Control	Differential, Integral, & Difference Equations	Math. Education	Other/ Unknown	TOTAL
Group I (Public)	60	30	39	27	8	7	15	8	5	29	0	7	235
Group I (Private)	33	8	30	14	6	2	13	5	4	17	0	0	132
Group II	39	30	18	20	10	8	24	18	11	20	8	1	207
Group III	8	14	9	13	4	25	13	12	4	19	17	0	138
Group IV	0	1	0	0	14	244	8	0	0	0	0	5	272
Group Va	2	2	1	15	1	9	24	12	5	10	0	0	81
Total	142	85	97	89	43	295	97	55	29	95	25	13	1065

Table 2C: 2000-2001 New Doctoral Recipients: Field of Thesis byType of Degree-Granting Department, April 2002

Table 1C gives a breakdown of the 1,065 doctoral degrees awarded in the mathematical sciences between July 1, 2000, and June 30, 2001, 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 2000-2001 doctoral recipients plus 57 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 2001 employment status of 967 of the 1,065 doctoral recipients was known.

The fall 2001 unemployment rate for new doctoral recipients, based on information gathered by the time of the Second Report, was 3.7%. The

Table 2D: Percentage of Total Employed New Doctoral Recipients by General Employment Sector, Fall 1998 to Fall 2001

	U.	.S.	Non	-U.S.	Total
%	Academic	Nonacademic	Academic	Nonacademic	Number
Fall 1998	56.7	29.3	11.9	2.1	965
Fall 1999	63.9	23.5	10.7	2.0	955
Fall 2000	61.7	27.8	9.6	0.9	957
Fall 2001	62.8	26.7	8.8	1.8	914

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, reaching 3.3% for 2000, the lowest it has been in the past ten years. Figure

Figure 1: Percentage of New Doctoral Recipients Unemployed, As Reported in the Respective Annual Survey Second Reports, 1978-2001



1 presents the fall 1978 through fall 2001 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 967 new doctoral recipients whose employment is known, 818 were employed in the U.S., 96 were employed outside the U.S., 36 were still seeking employment, and 17 were not seeking employment.

Table 2D presents the trend in the percentage of employed new doctoral recipients by general employment sector for the last four

Table 3A: Number of New Doctoral Recipients Taking Positions in U.S. Business and Industry by Type of Degree-Granting Department, Fall 1998 to Fall 2001

Group	l (Pu)	l (Pr)	П	111	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

years. Academic employment includes those employed by research institutes and other non-profits.

Among new doctoral recipients who are employed, the percentage taking nonacademic employment (U.S. government, U.S. business and in-

Table 3B: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 1998 to Fall 2001

Group	l (Pu)	l (Pr)	П	Ш	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

dustry, 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 13.3%, while the percentage for those with theses in probability or statistics is the highest at 44.9%.

Tables 3A through 3E 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

Table 3C: U.S. Academic Positions Filled by New Doctoral Recipients by Type of Hiring Department, Fall 1998 to Fall 2001

Group	1–111	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

responded to a follow-up questionnaire. The next few paragraphs discuss some of the information presented in these tables.

Table 3A shows that 29 fewer new doctoral recipients accepted jobs in U.S. business and

Table 3D: Females as a Percentage of New Doctoral Recipients Produced and Hired by Doctoral-Granting Departments, Fall 2001

%	l (Pu)	I (Pr)	Ш	Ш	IV	Va	Total
Produced	26.0	16.7	27.5	26.8	41.2	27.2	29.2
Hired	24.4	16.4	30.2	18.2	34.7	18.2	24.8

industry compared to last year, a decrease of 13.0%.

From Table 3B we see that 16 fewer new doctoral recipients were hired in U.S. academic institutions than last year, a decrease of 2.7%.

Table 3C shows that Groups I–III, IV, Va, and M&B all hired approximately the same number

Table 3E: Percentage of Unemployed New Doctoral Recipients by Type of Degree-Granting Department, Fall 1998 to Fall 2001

%	l (Pu)	I (Pr)	II	111	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
Fall 2000	5.2	4.3	2.1	1.8	2.3	5.5	3.3
Fall 2001	3.2	4.3	2.1	4.0	4.1	7.0	3.7

of new doctoral recipients as they did last year, while "Other" hired 10 fewer.

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 27.0% of the new doctoral recipients hired by Group M departments were female, while 33.9% of those hired by Group B departments were female.

Table 3E shows that the new doctoral recipients from Group Va departments have the highest unemployment rate this year at 7.0%, while

Table 3F: 2000-2001 Male New Doctoral Recipients: Type of Citizenship by Fall 2001 Employment Status

	CITIZENSHIP				MALE
		NON-U.S. CITIZENS			
TYPE OF EMPLOYER	U.S. CITIZENS	Permanent Visa	Temporary Visa	Unknown Visa	RECIPIENTS
U.S. Employer	317	49	206	14	586
U.S. Academic	231	30	141	6	408
Groups I, II, III, and Va	92	14	65	3	174
Group IV	7	5	18	2	32
Non-Ph.D. Department	121	11	52	1	185
Research Institute/Other Nonprofit	11	0	6	0	17
U.S. Nonacademic	86	19	65	8	178
Non-U.S. Employer	8	1	60	6	75
Non-U.S. Academic	7	0	50	4	61
Non-U.S. Nonacademic	1	1	10	2	14
Not Seeking Employment	5	1	2	1	9
Still Seeking Employment	15	2	2	0	19
SUBTOTAL	345	53	270	21	689
Unknown (U.S.)	20	4	16	2	42
Unknown (non-U.S.)	1	0	19	3	23
TOTAL	366	57	305	26	754

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

Table 3G: 2000-2001 Female New Doctoral Recipients: Type of Citizenship by Fall 2001 Employment Status

	CITIZENSHIP				FEMALE	
	NON-U.S. CITIZENS				DOCTORAL	
TYPE OF EMPLOYER	U.S. CITIZENS	Permanent Visa	Temporary Visa	Unknown Visa	RECIPIENTS	
U.S. Employer	140	26	59	7	232	
U.S. Academic	104	17	42	3	166	
Groups I, II, III, and Va	26	6	19	0	51	
Group IV	8	3	4	2	17	
Non-Ph.D. Department	65	7	16	1	89	
Research Institute/Other Nonprofit	5	1	3	0	9	
U.S. Nonacademic	36	9	17	4	66	
Non-U.S. Employer	3	0	18	0	21	
Non-U.S. Academic	3	0	16	0	19	
Non-U.S. Nonacademic	0	0	2	0	2	
Not Seeking Employment	8	0	0	0	8	
Still Seeking Employment	4	3	10	0	17	
SUBTOTAL	155	29	87	7	278	
Unknown (U.S.)	11	3	5	1	20	
Unknown (non-U.S.)	0	0	12	1	13	
TOTAL	166	32	104	9	311	

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

those from Group II departments have the lowest unemployment rate at 2.1%. Overall, 3.7% of the new doctoral recipients were unemployed.

Table 3H: 2000-2001 New Doctoral Recipients Having Fall 2001 Employment in the U.S. by Citizenship and Type of Employer

Employer	U.S.	Non-U.S.	Total
U.S. Academic, Groups I-Va	133	141	274
U.S. Academic, Other	202	98	300
U.S. Nonacademic	122	122	244
Total	457	361	818

Updated Information about 2000–2001 New Doctoral Recipients by Sex and Citizenship

Tables 3F and 3G show the sex and citizenship of the 1,065 new doctoral recipients and the fact that 818 new doctoral recipients found jobs in the U.S. this year. This is 89.5% of the 914 new doctoral recipients known to have jobs in October 2001.

Sex and citizenship is known for all of the 1,065 new doctoral recipients. The final count of new doctoral recipients who are U.S. citizens is 532 (50.0%). For the past three years, this figure has remained very close to 50%, the largest percentages reported by the Annual Survey since the mid-1980s. Pages 222–5 of the First Report present further information related to the citi-



Figure 2: Age Distribution of 2000-2001 EENDR Respondents

zenship of the 2000–2001 new doctoral recipients.

Of the 532 U.S. citizen new doctoral recipients, 166 are female and 366 are male. The 166 female new doctoral recipients comprise 31.2% of the U.S. citizen total for 2000–2001, an increase from last year's count of 164, or 29.0% of the U.S. citizen new doctoral recipients. The number of U.S. citizen males, 366, is down 36 (9.0%) from 402 last year.

Table 3H shows that while U.S. academic doctoral departments, Groups I through Va, hired 48.5% U.S. citizens, U.S. academic positions other than in the doctoral departments hired 67.3% U.S. citizens. The percentage of U.S. citizens hired for nonacademic positions in the U.S. was 50.0%. Among those 818 2000–2001 doctoral recipients taking employment in the U.S., 29.8% took nonacademic employment (government or business and industry). This is down from 31.1% in 1999–2000.

New Information from the EENDR Survey

Of the 1,008 new doctoral recipients reported in the First Report, the 939 whose addresses were known were sent the Employment Experiences of New Doctoral Recipients (EENDR) survey in October 2001, and 530 (56.4%) 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, 68.1%, was from those in academia

in the U.S., while the lowest, 46.2%, was from those in foreign nonacademia.

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 2000–2001 doctoral recipients.

Table 4 shows the citizenship of the 530 new doctoral recipients who responded to the EENDR.

Of the 530 total respondents to the EENDR, 473 were employed in the U.S., 42 were employed outside the U.S., 7 were still seeking employment, and 8 were not seeking employment, as of the week of October 10, 2001. The unemployment rate for those responding to the EENDR is 1.3%. Among those employed in the U.S., 456 were employed full-time and 16 were employed part-time (one individual did not answer this question). Of the 16 reporting part-time em-

	CITIZENSHIP				TOTAL
		NON-U.S. CITIZENS			
TYPE OF EMPLOYER	U.S. CITIZENS	Permanent Visa	Temporary Visa	Unknown Visa	RESPONDENTS
U.S. Employer	290	34	149	0	473
U.S. Academic	224	22	114	0	360
Groups I, II, III, and Va	75	7	54	0	136
Group IV	10	5	15	0	30
Non-Ph.D. Department	127	10	40	0	177
Research Institute/Other Nonprofit	12	0	5	0	17
U.S. Nonacademic	66	12	35	0	113
Non-U.S. Employer	6	0	35	1	42
Non-U.S. Academic	6	0	30	0	36
Non-U.S. Nonacademic	0	0	5	1	6
Not Seeking Employment	7	0	1	0	8
Still Seeking Employment	4	2	1	0	7
SUBTOTAL	307	36	186	1	530
Unknown (U.S.)	0	0	0	0	0
Unknown (non-U.S.) ¹	0	0	0	0	0
TOTAL	307	36	186	1	530

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

ployment, 8 reported that they were working part-time because a suitable full-time job was not available, while 4 reported they were working part-time while they pursued additional education.

Among the 473 employed in the U.S., 266 reported obtaining a permanent position and 205 a temporary position (two individuals did not answer this question). Of the 205 in temporary positions, 93 (45.4%) reported taking temporary employment because a suitable permanent position was not available and 163 (79.5%) classified their position as postdoctoral. Furthermore, among those in postdoctoral positions, 30.7% responded that they took the position because a suitable permanent position was not available.

Among the 266 who reported obtaining a permanent position in the U.S., 61.7% were employed in academia (including 3.8% in research institutes and other nonprofits), 32.3% in business or industry, and 6.0% in government. Women held 32.0% of the permanent positions.

Among the 205 individuals with temporary employment in the U.S., 95.1% were employed in academia (including 3.4% in research institutes and other nonprofits), 0.5% in business or industry, and 4.4% in government.

Among the 42 individuals employed outside the U.S., 85.7% were employed in academia (including 9.5% in research institutes and other nonprofits) and the other 14.3% were in business or industry. None were employed in government. Six of those employed outside the U.S. were U.S. citizens, 5 of which were in temporary positions, while none were U.S. permanent residents.

Figure 2 gives the age distribution of the 522 new doctoral recipients who responded to this question. The median age of new doctoral recipients was 31.0, while the mean age was 32.4. The first and third quartiles were 28 and 35 respectively. These figures are very similar to those reported in previous years.