

Update on the 2000 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 719 of this report. For the second year, departments in Group Vb (operations research and management science) are no longer being surveyed. More discussion of this can be found in the 2000 First Report in the February 2001 *Notices of the AMS*, pp. 195-208.

This Second Report includes data from two parts of the 2000 Annual Survey. First, we update information about new doctoral recipients reported earlier in the February 2001 issue. Second, we present the starting salaries of the new doctoral recipients who responded to a follow-up survey. In past years this report would contain a third part presenting information about the faculties and instructional programs at the undergraduate and graduate levels in these departments for the 2000-2001 academic year. Starting with the 2000 survey, we have chosen to present this data in a separate report which is expected to be published in the September issue of the *Notices of the AMS*.

The names of the 1999-2000 doctoral recipients and their thesis titles were published in "Doctoral Degrees Conferred" (*Notices of the AMS*, February 2001, pages 219-237).

Information about recipients of doctoral degrees awarded between July 1, 1999, and June 30, 2000, was collected from doctorate-granting departments beginning in late spring 2000 and from a follow-up census of individual degree recipients beginning in October. The "2000 Annual Survey First Report" (*Notices of the AMS*, February 2001, pages 195-208) presents the survey results obtained about new doctoral recipients from the departments. Here we update information for new doctoral recipients since the First Report, using data gathered from a questionnaire, Employment Experiences of New Doctoral Recipients (EENDR), which was sent in early October 2000 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. This questionnaire has a number of questions on it that are the same as those on a questionnaire used by several other scientific disciplines, so that results from

this questionnaire can be compared with those in other fields.

Updated Employment Status of U.S. New Doctoral Recipients, 1999-2000

Table 1A shows the fall and final counts of new doctoral recipients in the mathematical sciences awarded by U.S. institutions from 1992 through 2000. 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

Table 1A: U.S. New Doctoral Recipients, Fall and Final Counts, 1992 to 2000

Year	Fall	Final
1992-93	1104	1116
1993-94	1025	1034
1994-95	1148	1157
1995-96	1098	1099
1996-97	1123	1130
1997-98	1163	1176
1998-99	1133	1135
1999-00	1119	1127

revised from previous reports to exclude new doctorates data from Group Vb departments, which are no longer surveyed.

Table 1B gives a breakdown of the 1,127 doctoral degrees awarded in the mathematical sciences between July 1, 1999, and June 30, 2000, by type of degree-granting department.

Table 1B: U.S. New Doctoral Recipients by Type of Degree-Granting Department, 1999-2000

	I (Pu)	I (Pr)	II	III	IV	Va
Number	257	157	222	134	290	67
%	22.8	13.9	19.7	11.9	25.7	5.9

Tables 2A, 2B, and 2C display updates of employment data, found in these same tables in the First Report, for the fall count of 1999-2000 doctoral recipients plus eight additional doctoral recipients reported late. These tables are partitioned by field of thesis research and by the survey group of their degree department. At the time of this Second Report, the fall 2000 employment status of 1,000 of the 1,127 doctoral recipients was known.

The fall 2000 unemployment rate for new doctoral recipients, based on information gathered by the time of the Second Report, was 3.3%. The unemployment rate rose steadily in the early 1990s and reached its all-time high of 10.7% in 1994 and held that rate through 1995. It began

Table 2A: Fall 2000 Employment Status of 1999–2000 U.S. Doctoral Recipients in the Mathematical Sciences, Updated April 2001

TYPE OF EMPLOYER	FIELD OF THESIS												TOTAL	
	Algebra Number Theory	Real, Comp., Funct., & Harmonic Analysis	Geometry/Topology	Discr. Math./Combin./Logic/Comp. Sci.	Probability	Statistics	Applied Math.	Numerical Analysis/Approximations	Linear Nonlinear Optim./Control	Differential, Integral, & Difference Equations	Math. Education	Other/Unknown		
Group I (Public)	16	13	12	12	1	1	6	5	0	9	0	0	75	
Group I (Private)	14	6	18	4	4	0	3	3	0	5	0	0	57	
Group II	9	12	7	5	2	2	2	2	2	7	0	0	50	
Group III	9	3	2	1	2	9	1	1	1	3	2	0	34	
Group IV	0	0	0	0	0	49	0	2	0	0	0	0	51	
Group Va	0	0	0	1	2	0	5	0	3	0	0	0	11	
Master's	17	6	10	7	0	4	3	2	1	7	3	0	60	
Bachelor's	35	16	11	10	1	9	9	5	1	16	6	1	120	
Two-Year College	3	1	2	2	0	2	2	1	0	0	0	1	14	
Other Academic Dept.	2	4	1	3	0	45	11	2	3	5	2	1	79	
Research Institute/ Other Nonprofit	12	2	1	3	1	15	0	3	0	2	0	0	39	
Government	2	0	0	3	1	22	8	3	1	3	0	0	43	
Business and Industry	22	10	8	14	15	94	27	16	5	12	0	0	223	
Non-U.S. Academic	15	9	17	10	5	19	7	1	1	8	0	0	92	
Non-U.S. Nonacademic	1	1	2	1	0	1	1	2	0	0	0	0	9	
Not Seeking Employment	2	0	1	1	1	0	5	0	0	0	0	0	10	
Still Seeking Employment	5	1	5	2	2	6	2	4	2	4	0	0	33	
Unknown (U.S.)	6	7	7	8	2	22	7	3	2	5	0	0	69	
Unknown (non-U.S.) ¹	8	4	6	0	3	11	6	4	5	8	3	0	58	
COLUMN TOTAL	178	95	110	87	42	311	105	59	27	94	16	3	1127	
COLUMN	Male	139	81	89	68	35	187	78	42	22	72	8	2	823
SUBTOTALS	Female	39	14	21	19	7	124	27	17	5	22	8	1	304

¹ Includes those whose status is reported as "unknown" or "still seeking employment".**Table 2B: Fall 2000 Employment Status of 1999–2000 U.S. Doctoral Recipients by Type of Degree-Granting Department, Updated April 2001**

TYPE OF EMPLOYER	TYPE OF DOCTORAL DEGREE-GRANTING DEPARTMENT							ROW TOTAL	ROW SUBTOTAL	
	Group I (Public) Math	Group I (Private) Math	Group II Math	Group III Math	Group IV Statistics	Group Va Applied Math	Male		Female	
Group I (Public)	38	21	11	4	1	0	75	65	10	
Group I (Private)	24	27	3	0	1	2	57	48	9	
Group II	21	9	15	2	1	2	50	41	9	
Group III	8	1	8	8	8	1	34	25	9	
Group IV	0	0	0	0	50	1	51	23	28	
Group Va	0	1	0	1	1	8	11	9	2	
Master's	9	2	29	15	3	2	60	40	20	
Bachelor's	26	9	44	32	7	2	120	76	44	
Two-Year College	5	0	2	5	2	0	14	10	4	
Other Academic Dept.	5	3	8	10	45	8	79	53	26	
Research Institute/ Other Nonprofit	8	9	6	2	12	2	39	23	16	
Government	4	7	6	2	22	2	43	29	14	
Business and Industry	33	28	37	24	83	18	223	180	43	
Non-U.S. Academic	35	16	16	4	18	3	92	73	19	
Non-U.S. Nonacademic	1	1	4	1	1	1	9	6	3	
Not Seeking Employment	1	1	5	1	1	1	10	5	5	
Still Seeking Employment	12	6	4	2	6	3	33	23	10	
Unknown (U.S.)	14	6	13	14	16	6	69	48	21	
Unknown (non-U.S.) ¹	13	10	11	7	12	5	58	46	12	
COLUMN TOTAL	257	157	222	134	290	67	1127	823	304	
COLUMN	Male	197	139	156	102	178	51	823		
SUBTOTALS	Female	60	18	66	32	112	16	304		

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

Table 2C: 1999–2000 New Doctoral Recipients: Field of Thesis by Type of Degree-Granting Department, Updated April 2001

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	Applied Math.	Numerical Analysis/Approximations	Linear Nonlinear Optim./Control	Differential, Integral, & Difference Equations	Math. Education	Other/Unknown	
Group I (Public)	74	32	46	26	9	4	18	16	5	25	0	2	257
Group I (Private)	42	18	33	16	9	2	14	9	0	14	0	0	157
Group II	48	32	20	20	7	4	31	18	7	31	4	0	222
Group III	13	12	10	17	4	24	11	10	1	19	12	1	134
Group IV	1	0	0	0	9	272	6	1	1	0	0	0	290
Group Va	0	1	1	8	4	5	25	5	13	5	0	0	67
Total	178	95	110	87	42	311	105	59	27	94	16	3	1127

to decrease in 1996, reaching 3.3% for 2000, the lowest it has been in the past ten years. Figure 3 presents the fall 1978 through fall 2000 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 1,000 new doctoral recipients whose employment is known, 856 were employed in the U.S., 101 were employed outside the U.S., 33 were still seeking employment, and 10 were not seeking employment.

Table 2D presents the trend in the percentage of employed new doctoral recipients by general employment sector for the last three years. Academic employment includes those employed

by research institutes and other nonprofits. The total number of new doctoral recipients known to be employed at the time of the Second Report

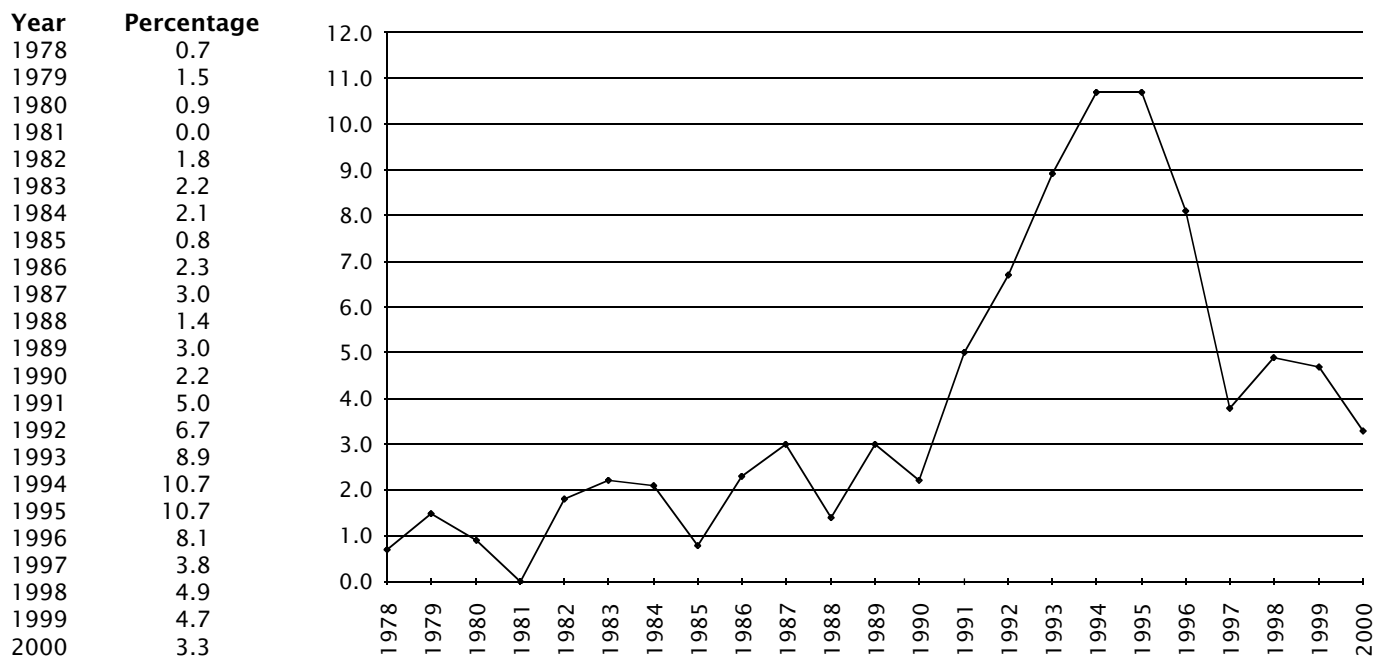
Table 2D: Percentage of Total Employed New Doctoral Recipients by General Employment Sector, Fall 1998 to Fall 2000

%	U.S.		Non-U.S.	
	Academic	Nonacademic	Academic	Nonacademic
Fall 1998	56.7	29.3	11.9	2.1
Fall 1999	63.9	23.5	10.7	2.0
Fall 2000	61.7	27.8	9.6	0.9

was 965, 955, and 957, for 1998, 1999, and 2000 respectively.

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

Figure 3: Percentage of New Doctoral Recipients Unemployed, As Reported in the Respective Annual Survey Second Reports, 1978–2000



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 4A: Number of New Doctoral Recipients Taking Positions in U.S. Business and Industry by Type of Degree-Granting Department, Fall 1998 to Fall 2000

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

Table 2A, this percentage is the lowest at 13.9%, while the percentage for those with theses in probability or statistics is the highest at 43.5%.

Table 4B: Number of New Doctoral Recipients Taking U.S. Academic Positions by Type of Degree-Granting Department, Fall 1998 to Fall 2000

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

Tables 4A through 4E first appeared in the First Report for 1999–2000, 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 recip-

Table 4C: U.S. Academic Positions Filled by New Doctoral Recipients by Type of Hiring Department, Fall 1998 to Fall 2000

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

ients who responded to a follow-up questionnaire. The next few paragraphs give a few things we can glean from these tables.

Table 4D: Females as a Percentage of New Doctoral Recipients Produced and Hired by Doctoral-Granting Departments, Fall 2000

%	I (Pu)	I (Pr)	II	III	IV	Va	Total
Produced	23.3	11.5	29.7	23.9	38.6	23.9	27.0
Hired	13.3	15.8	18.0	26.5	54.9	18.2	24.1

Table 4A shows that 38 more new doctoral recipients accepted jobs in business and industry compared to last year, an increase of 20.5%.

Table 4E: Percentage of Unemployed New Doctoral Recipients by Type of Degree-Granting Department, Fall 1998 to Fall 2000

%	I (Pu)	I (Pr)	II	III	IV	Va	Total
Fall 1998	5.4	3.7	7.0	8.9	3.1	1.4	4.9
Fall 1999	5.7	2.8	5.5	4.2	4.3	4.5	4.7
Fall 2000	5.2	4.3	2.1	1.8	2.3	5.5	3.3

From Table 4B we see that 20 fewer new doctoral recipients were hired in U.S. academic institutions than last year, a decrease of 3.3%.

Table 4C shows that Group I, II, and III departments combined hired 17 fewer new doctoral recipients this year than they did last year, a decrease of 7.3%, while the number of new doctoral recipients hired by Group M and B departments is down by 13 (6.7%) compared to last year.

Table 4D gives information about the production and hiring of female new doctoral recipients in the doctoral-granting departments of this survey.

Table 4E shows that the new doctoral recipients from Group Va departments have the highest unemployment rate this year at 5.5%, while those from Group III departments have the lowest unemployment rate at 1.8%.

Updated Information about New Doctoral Recipients by Sex and Citizenship

Tables 4F and 4G show the sex and citizenship of the 1,127 new doctoral recipients and the fact that 856 new doctoral recipients found jobs in the U.S. this year. This is 89.4% of the 957 new doctoral recipients known to have jobs in October 2000.

Sex and citizenship is known for all of the 1,127 new doctoral recipients. The final count of new doctoral recipients who are U.S. citizens is 566. At 50.2%, up slightly from 49.3% last year, this is the largest percentage reported by the Annual Survey since 1986–87. The final count of new doctoral recipients who are non-U.S. citizens decreased from 575 last year to 561 this year and remains well below the record high of 679 reported in the final count for 1992–93. Pages 200–202 of the First Report present further information related to the citizenship of the 1999–2000 new doctoral recipients.

Of the 566 U.S. citizen new doctoral recipients, 164 are female and 402 are male. The 164 female new doctoral recipients comprise 29.0%

Table 4F: Employment Status of 1999–2000 Male U.S. New Doctoral Recipients by Type of Citizenship

TYPE OF EMPLOYER	CITIZENSHIP				MALE DOCTORAL RECIPIENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
U.S. Employer	344	48	210	20	622
U.S. Academic	247	29	123	15	414
Groups I, II, III, and Va	95	16	68	9	188
Group IV	17	1	5	1	24
Non-Ph.D. Department	125	11	39	4	179
Research Institute/Other Nonprofit	10	1	11	1	23
U.S. Nonacademic	97	19	87	5	208
Non-U.S. Employer	21	1	47	10	79
Non-U.S. Academic	20	1	44	8	73
Non-U.S. Nonacademic	1	0	3	2	6
Not Seeking Employment	2	1	2	0	5
Still Seeking Employment	8	3	11	1	23
SUBTOTAL	375	53	270	31	729
Unknown (U.S.)	27	8	11	2	48
Unknown (non-U.S.)¹	0	2	35	9	46
TOTAL	402	63	316	42	823

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

Table 4G: Employment Status of 1999–2000 Female U.S. New Doctoral Recipients by Type of Citizenship

TYPE OF EMPLOYER	CITIZENSHIP				FEMALE DOCTORAL RECIPIENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
U.S. Employer	137	24	65	8	234
U.S. Academic	111	13	47	5	176
Groups I, II, III, and Va	19	3	16	1	39
Group IV	11	3	11	2	27
Non-Ph.D. Department	71	6	15	2	94
Research Institute/Other Nonprofit	10	1	5	0	16
U.S. Nonacademic	26	11	18	3	58
Non-U.S. Employer	4	1	15	2	22
Non-U.S. Academic	4	1	12	2	19
Non-U.S. Nonacademic	0	0	3	0	3
Not Seeking Employment	3	1	1	0	5
Still Seeking Employment	5	0	5	0	10
SUBTOTAL	149	26	86	10	271
Unknown (U.S.)	14	4	3	0	21
Unknown (non-U.S.)¹	1	1	8	2	12
TOTAL	164	31	97	12	304

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

of the U.S. citizen total for 1999–2000, a decrease from last year's count of 188, which was 33.6% of the U.S. citizen new doctoral recipients. The number of U.S. citizen males, 402, increased by 30 (8.1%) from 372 last year.

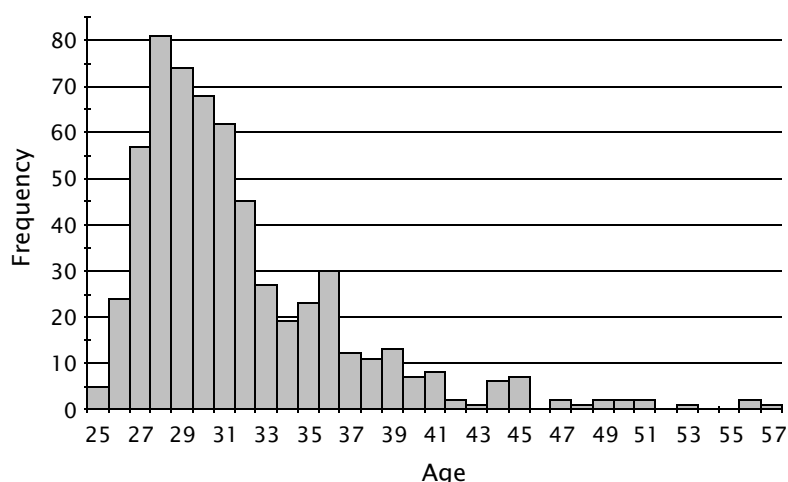
Table 4H: New Doctoral Recipients Having Employment in the U.S by Type of Employer and Citizenship, Fall 2000

Employer	U.S.	Non-U.S.	Total
U.S. Academic, Groups I–Va	142	136	278
U.S. Academic, Other	216	96	312
U.S. Nonacademic	123	143	266
Total	481	375	856

Table 4H shows that while U.S. academic doctoral departments, Groups I through Va, hired 51.1% U.S. citizens, U.S. academic positions other than in the doctoral departments hired 69.2% U.S. citizens. The percentage of U.S. citizens hired for nonacademic positions in the U.S. was 46.2%. Among those 856 1999–2000 doctoral recipients taking employment in the U.S., 31.1% took nonacademic employment (government or business and industry). This is up from 26.9% in 1998–99.

New Information from the EENDR Survey

Of the 1,127 new doctoral recipients reported in the First Report, the 1,046 whose addresses were known were sent the Employment Experi-

Figure 6: Age Distribution of 1999–2000 New Doctoral Recipients

ences of New Doctoral Recipients (EENDR) survey in October 2000, and 603 (57.6%) 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, 69.0%, was from those in academia in the U.S., while the lowest, 50.0%, was from those in foreign academia.

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 1999–2000 doctoral recipients.

Table 5 shows the citizenship of the 603 new doctoral recipients who responded to the EENDR.

Of the 603 total respondents to the EENDR, 536 were employed in the U.S., 49 were employed outside the U.S., 9 were still seeking em-

ployment, 5 were not seeking employment, and 4 were unknown (non-U.S.) as of the week of October 10, 2000. The unemployment rate for those responding to the EENDR is 1.5%. Among those employed in the U.S., 519 were employed full-time and 16 were employed part-time (one individual did not answer this question). Of the 16 reporting part-time employment, 6 reported that they were working part-time because a suitable full-time job was not available, while 9 also reported they were working part-time while they pursued additional education.

Among the 536 employed in the U.S., 317 reported obtaining a permanent position and 218 a temporary position (one individual did not answer this question). Of the 218 in temporary positions, 92 (42.2%) reported taking temporary employment because a suitable permanent position was not available and 157 (72.0%) classified their position as postdoctoral. Furthermore, among those in postdoctoral positions, 35.0% responded that they took the position because a suitable permanent position was not available.

Among the 317 who reported obtaining a permanent position in the U.S., 59.3% were employed in academia (including 2.2% in research institutes and other nonprofits), 36.3% in business or industry, and 4.4% in government. Women held 31.5% of the permanent positions.

Among the 218 individuals with temporary employment in the U.S., 95.4% were employed in academia (including 8.3% in research institutes and other nonprofits), 2.3% in business or industry, and 2.3% in government.

Among the 49 individuals employed outside the U.S., 87.8% were employed in academia (including 12.2% in research institutes and other

Table 5: Employment Status of 1999–2000 EENDR Respondents by Type of Citizenship

TYPE OF EMPLOYER	CITIZENSHIP				TOTAL EENDR RESPONDENTS
	U.S. CITIZENS	NON-U.S. CITIZENS			
		Permanent Visa	Temporary Visa	Unknown Visa	
U.S. Employer	337	37	155	7	536
U.S. Academic	267	22	103	5	397
Groups I, II, III, and Va	80	7	58	3	148
Group IV	24	2	4	0	30
Non-Ph.D. Department	148	12	32	2	194
Research Institute/Other Nonprofit	15	1	9	0	25
U.S. Nonacademic	70	15	52	2	139
Non-U.S. Employer	21	0	21	7	49
Non-U.S. Academic	20	0	18	5	43
Non-U.S. Nonacademic	1	0	3	2	6
Not Seeking Employment	2	2	1	0	5
Still Seeking Employment	4	0	5	0	9
SUBTOTAL	364	39	182	14	599
Unknown (U.S.)	0	0	0	0	0
Unknown (non-U.S.) ¹	1	0	3	0	4
TOTAL	365	39	185	14	603

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

nonprofits) and the other 12.2% were in business or industry. None were employed in government. Twenty-one of those employed outside the U.S. were U.S. citizens, 15 of which were in temporary positions, while none were U.S. permanent residents.

Figure 6 gives the age distribution of the 595 new doctoral recipients who responded to this question. The median age of new doctoral recipients was 30.0, while the mean age was 31.7. The first and third quartiles were 28 and 34 respectively. These figures are almost identical to those reported last year.