NOTICES
OF THE
AMERICAN MATHEMATICAL SOCIETY

1991 Annual AMS-MAA Survey

(First Report)

Report on the 1991 Survey of New Doctorates
Donald E. McClure
Salary Survey for New Doctorates
Faculty Salary Survey

Reprinted from *Notices*, November 1991

1991 Annual AMS-MAA Survey

(*First Report*)

Report on the 1991 Survey of New Doctorates, *Donald E. McClure*
Salary Survey for New Doctorates
Faculty Salary Survey
Doctoral Degrees Conferred, 1990-1991

This first report on the 1991 Survey includes a report on the 1991 survey of new doctorates, a report on salaries of new doctorates, salary data on faculty members in four-year colleges and universities, and a list of names and thesis titles for members of the 1990–1991 Ph.D. class. The report is based on information collected from questionnaires distributed in May to departments in the mathematical sciences in colleges and universities in the United States and Canada, and later to the recipients of doctoral degrees granted by these departments between July 1990 and June 1991, inclusive. A further questionnaire was distributed in September, concerned with data on fall enrollments, majors, and departmental size. These data will appear in the second report on the 1991 Survey, in a spring 1992 issue of *Notices*.

The 1991 Annual AMS-MAA Survey represents the thirty-fifth in an annual series begun in 1957 by the Society. The 1991 Survey is under the direction of the AMS-MAA Data Committee whose members are Edward A. Connors, Lincoln K. Durst (consultant), John D. Fulton, James F. Hurley, Charlotte Lin, Don O. Loftsgaarden, David J. Lutzer, James W. Maxwell (ex officio), Donald E. McClure (chair), and Donald C. Rung. Comments or suggestions regarding this Survey may be directed to the committee.

For these reports, departments are divided into groups according to the highest degree offered in the mathematical sciences:

Groups I and II include the leading departments of mathematics in the U.S. according to the 1982 assessment of Research-Doctorate Programs conducted by the Conference Board of Associated Research Councils in which departments were rated according to the quality of their graduate faculty.[1]
Group I is composed of 39 departments with scores in the 3.0–5.0 range.
Group II is composed of 43 departments with scores in the 2.0–2.9 range.
Group III contains the remaining U.S. departments reporting a doctoral program.
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** is operations research and management science.
Group VI contains doctorate-granting departments (or programs) in the mathematical sciences in Canadian universities.
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.

[1]These findings were published in *An Assessment of Research-Doctorate Programs in the United States: Mathematical and Physical Sciences*, edited by Lyle V. Jones, Gardner Lindzey, and Porter E. Coggeshall, National Academy Press, Washington, D.C., 1982. The information on mathematics, statistics and computer science was presented in digest form in the April 1983 issue of *Notices*, pages 257-267, and an analysis of the above classifications was given in the June 1983 *Notices*, pages 392-393. For a listing of departments in Groups I and II see April 1988 *Notices*, pages 532-533.

Highlights

- U.S. institutions awarded 1074 doctorates in the mathematical sciences from July 1, 1990 to June 30, 1991, an increase of 15 percent over last year's fall count and 26 percent more than the average of the fall counts for the last four years.
- The number of U.S. citizens reported to have received doctorates in the mathematical sciences is 461, which is 15 percent higher than the number earning doctorates last year and 27 percent higher than the record lows recorded in 1986–87 and 1987–88.
- The number of non-U.S. citizens receiving doctorates in the mathematical sciences reached a new high of 600, well over twice the number of noncitizens earning doctorates in the U.S. ten years ago.
- Of the 461 U.S. citizen doctorates 10 are black. In 1989–90 only 4 of the U.S. citizen doctorates were black.
- Total employment of new doctorates in the U.S. increased from last year, but employment in some sectors decreased and the percentage of unemployed increased substantially. As of late September 1991, approximately 12 percent of the new doctorates were reported to be still seeking employment. The percentage unemployed is over twice the corresponding percentage reported last fall.
- The total number and the percentage of women among U.S. citizen new doctorates reached new highs in 1990–91. A total of 112 U.S. citizen women earned doctorates from U.S. universities, accounting for 24 percent of the doctorates awarded to U.S. citizens.
- The median starting salary of new doctorates reporting teaching (or teaching and research) was $33,000 for men and $33,200 for women.
- In almost all cases, the mean salary by faculty rank reported for 1991–92 increased less than five percent over that reported for 1990–91. Major exceptions were the 1991–92 mean salaries reported for associate and full professors in doctorate-granting departments of applied mathematics and operations research (Group V), which increased 9% and 7% respectively.

Report on the 1991 Survey of New Doctorates

Donald E. McClure

This report presents a statistical profile of new doctorates in the mathematical sciences awarded by universities in the United States and Canada during the period July 1, 1990 through June 30, 1991. It includes the employment status of recipients of 1990–91 doctorates in the mathematical sciences (as of September 20), an analysis of the data by sex, racial/ethnic group and citizenship, and reports trends in the number of doctoral degrees for each of Groups I through V (see box on preceding page for description of groups). Table 1 provides the response rates for the 1991 Survey of New Doctorates.

TABLE 1: Response Rates

Group I	39 of 39
Group II	42 of 43 including 3 with 0 degrees
Group III	80 of 86 including 27 with 0 degrees
Group IV	53 of 75 including 5 with 0 degrees
Group Va	12 of 16
Group Vb	18 of 33
Group VI	27 of 31 including 8 with 0 degrees

Doctorates Granted

The number of new doctorates reported in 1990–91 by U.S. and Canadian mathematical sciences departments is 1142. Table 2A gives the fall counts for the past five Annual Surveys. This year's fall count will be updated in the Second Report of the 1991 Survey, to appear in a spring 1992 issue of *Notices*. Table 2B reports for comparison the fall and spring counts in the years 1986–87 through 1989–90.

The total number of new doctorates increased substantially this year. The total count has been increasing steadily since 1984–85. This year's increase is the largest in absolute numbers (151) and in percentage (+15 percent) during this six-year period. Cumulatively, the total number of new doctorates has increased 49 percent since 1984–85.

Table 2A: New Doctorates, Fall Counts

	86–87	87–88	88–89	89–90	90–91
U.S.	779	804	905	933	1074
Canada	66	52	53	58	68
Total	845	856	958	991	1142

Table 2B: New Doctorates, Fall and Spring Counts

	86–87 Fall/Spring		87–88 Fall/Spring		88–89 Fall/Spring		89–90 Fall/Spring		90–91 Fall/Spring	
U.S.	779	808	804	828	905	919	933	950	1074	*
Canada	66	66	52	55	53	62	58	59	68	*
Total	845	874	856	883	958	981	991	1009	1142	*

* To appear in a spring 1992 issue of *Notices*.

Table 2C records the number of new doctorates in the mathematical sciences in the U.S. from the years 1986–87, exclusive of Group Vb. The response rate for Group Vb, which includes departments in engineering and management science, is the lowest of all groups.

Groups I and II account for the largest part of the increase shown in Table 2C. The count for Group I increased by 72 (20 percent) and the count for Group II increased by 46 (33 percent) over the corresponding fall counts in the 1990 Annual Survey. There was virtually no change in the fall counts for Group III. The fall count for Group IV (statistics) showed a modest decrease, though that finding must be interpreted cautiously in view of the lower response rate for Group IV.

Table 2C: New Doctorates Awarded by Groups I–Va

	86–87	87–88	88–89	89–90	90–91
I-Va	743	760	854	881	990**

** This is a fall count. The other entries in Table 2C are spring counts. Table 2C will be updated to include a spring count for 1990–91 in a spring 1992 issue of *Notices*.

Employment Status of New Doctorates, 1990–1991

In 1990, the Annual Survey started adding new questions to monitor the changing employment market. At the time, the AMS-MAA Data Committee was interested in collecting baseline data against which the future shortages of Ph.D.s projected in the science press could be compared. In the past two years, however, changing economic conditions and other perturbations of the employment market have refocused the interest of the mathematics community on a difficult job market. In this report, we shall present a broader analysis than is customary to illuminate patterns of employment for new doctorates.

Table 3A shows the employment status, by type of employer and field of degree, of the 1142 recipients of doctoral degrees conferred by the mathematical sciences departments in the U.S. and Canada between July 1, 1990, and June 30, 1991. The names of these individuals are listed with their thesis titles in a later section of this First Report of the 1991 Annual Survey. Again this year we present the employment status of the 227 women new doctorates in Table 3B. The employment information was obtained initially from the departments granting the degrees and subsequently from data provided by the degree recipients themselves.

The first five rows of Table 3A give the numbers of new doctorates who have accepted appointments in U.S. doctorate-granting mathematical sciences departments (Groups I–V). The next two rows give the numbers who have accepted appointments in mathematical sciences departments granting masters and bachelors as the highest degrees.

Table 3A: Employment Status of 1990–1991 New Doctorates in the Mathematical Sciences

Type of Employer	Algebra or Number Theory	Real or Complex Analysis	Geometry or Topology	Logic	Probability or Statistics	Applied Mathematics	Discrete Math or Combinatorics	Numerical Analysis	Linear or Nonlinear Optimization	Other	TOTAL
Group I	21	18	31	3	5	14	1	2	1	4	100
Group II	5	8	5		2	10	1	4	1	1	37
Group III	9	8	11		9	9	4	1	1	2	54
Group IV					37	2					39
Group V					5	7	1	2	1	1	17
Masters	18	12	7		15	9	7	3	2	6	79
Bachelors	17	17	27	2	14	18	6	5	1	18	125
Two-year Colleges	4	2	1		1	7				3	18
Other Academic Departments	3	1	1	3	17	14	2	2	2	17	62
Research Institutes	5	3	4		9	4			1	7	33
Government		2			7	10	2	1		2	24
Business and Industry	5	3	6	2	55	10	4	4	13	14	116
Canada, Academic	11	3	8		6	11	4	1	1	8	53
Canada, Nonacademic											
Foreign, Academic	14	20	10	3	28	11	1	2	4	11	104
Foreign, Nonacademic		1			4	1	1			3	10
Not seeking employment		1	1		4		1	3		3	13
Not yet employed	14	17	17	3	25	23	11	4	1	10	125
Unknown (U.S.)	3	4	2		4	8		2	2	7	32
Unknown (non-U.S.)*	19	16	21	4	14	11	4	4	3	5	101
Total	148	136	152	20	261	179	50	40	34	122	1142

*Non-U.S. citizens who returned to their country of citizenship and whose status is reported as "unknown" or "still seeking employment".

Table 3B: Employment Status of 1990–1991 New Doctorates in the Mathematical Sciences Females Only

Type of Employer	Algebra or Number Theory	Real or Complex Analysis	Geometry or Topology	Logic	Probability or Statistics	Applied Mathematics	Discrete Math or Combinatorics	Numerical Analysis	Linear or Nonlinear Optimization	Other	TOTAL
Group I	3	4	3	1	1	2				1	15
Group II		3	1		1	2		1	1		9
Group III	2		1		2	3					8
Group IV					9						9
Group V					3						3
Masters	6	1	1		4	1	2				15
Bachelors	8	5	12		3	3	1	2		3	37
Two-year Colleges	1					2					3
Other Academic Departments	1	1			5	2	1	1	1	6	18
Research Institutes					2					3	5
Government					2		1			1	4
Business and Industry		1			16	3		1	3	2	26
Canada, Academic					1		1		1	1	4
Canada, Nonacademic											
Foreign, Academic	2	3		1	9	2		1		3	21
Foreign, Nonacademic											
Not seeking employment					1			1			2
Not yet employed	2		4	1	7	6	2				22
Unknown (U.S.)					1					3	4
Unknown (non-U.S.)*	3	3	6	1	3	3	1			2	22
Total	28	21	28	4	70	29	9	7	6	25	227

*Non-U.S. citizens who returned to their country of citizenship and whose status is reported as "unknown" or "still seeking employment".

Most new doctorates accept academic positions. Of the 704 new doctorates employed in the U.S., a total of 564 (80 percent) hold jobs in academia. For comparison, last year's First Report showed 678 new doctorates employed in the U.S., including 571 in academic positions. The 564 academic positions this year include a total of 247 in U.S. doctorate-granting departments (Groups I–V). This number is only slightly smaller than last year (259 positions in Groups I–V) and remains above the corresponding numbers in the previous two years (240 in 1988–89 and 207 in 1987–88). Among these Groups, the number hired by Group I has been essentially constant for three years. The numbers hired by Group II and Group III both declined by nine (-20 percent and -14 percent, respectively). The number of new doctorates employed by bachelor's degree-granting colleges and universities increased by 20 (19 percent) from 1989–90.

Excluding those whose employment status is unknown, 22 percent of the women and 25 percent of the men accepted appointments in Groups I–V departments.

The number of new doctorates taking jobs in U.S. nonacademic positions increased significantly this year. The 140 positions in government, business and industry in the U.S. account for 20 percent of total U.S. employment. Last year at this time, the total of 107 U.S. nonacademic positions represented 16 percent of the U.S. total.

A striking change has occurred in the numbers shown as "not yet employed" in Tables 3A and 3B. Of those whose employment status is known, over 12 percent are unemployed. At the same time last year, 5.7 percent of the 1989–90 new doctorates were reported as "not yet employed". The data in Table 3A were obtained in many instances early in the summer of 1991 and do not reflect subsequent hiring. Nonetheless, the year-to-year comparision shows compelling evidence of the difficult job market faced by this year's new doctorates. An update of Table 3A is planned for the Second Report in a spring 1992 issue of *Notices*. In a similar update last year, the percentage of 1989–90 new doctorates who had reported not finding employment was two percent (see *Notices*, November 1990, page 1219, and May/June 1991, page 413).

The 1991 Survey sent to individual new doctorates asked for information about the type of academic position held. Based on an early response from 377 individuals who provided information about their contract terms, 50 percent reported that their position is not tenure-eligible and 50 percent reported that their position is tenured or tenure-eligible. The respondents include holders of academic positions everywhere, not exclusively within the U.S.

Table 3C shows employment status, by type of employer and Group of the department granting the degree, of the 1142 new doctorates. The results document patterns generally recognized anecdotally. For example, Table 3C shows that 85 percent of the new doctorates obtaining academic positions in Group I departments obtained their degree from a Group I department. Similarly, 85 percent of the new doctorates taking a position in a Group IV department obtained their degree from a Group IV department. New doctorates from a Group IV or a

TABLE 3C: Employment Status of 1990–1991 New Doctorates by type of granting department

TYPE OF EMPLOYER	TYPE OF DOCTORATE-GRANTING DEPARTMENT						TOTAL EMPLOYED BY TYPE OF EMPLOYER
	Group I Math	Group II Math	Group III Math	Group IV Statistics	Group V Applied Math/OR	Group VI Canada	
Group I	85	7	1	2	3	2	100
Group II	18	9	3	1	6		37
Group III	29	8	10	6	1		54
Group IV		2	3	33	1		39
Group V	1	2	1		13		17
Masters	24	22	16	12	5		79
Bachelors	39	37	38	4	7		125
Two-year Colleges	3	4	9	1	1		18
Other Academic Departments	20	5	3	14	20		62
Research Institutes	14	2	1	9	6	1	33
Government	5	3	3	4	8	1	24
Business and Industry	15	15	11	39	36		116
Canada, Academic	16	4	2	2		29	53
Canada, Nonacademic							
Foreign, Academic	47	16	6	21	7	7	104
Foreign, Nonacademic	2	2		3	3		10
Not seeking employment	3	6	1	3			13
Not yet employed	39	30	19	10	11	16	125
Unknown (U.S.)	10	3	3		16		32
Unknown (non-U.S.)*	56	8	6	6	13	12	101
TOTALS	426	185	136	170	157	68	1142

*Non-U.S. citizens who returned to their country of citizenship and whose status is reported as "unknown" or "still seeking employment".

Group V department assume U.S. nonacademic positions in greater proportion than new doctorates from Groups I–V overall. The unemployment rates are different for each group. Excluding those whose employment status is unknown, the percentages who are reported to be still seeking employment are 10.8 percent for Group I, 17.2 percent for Group II, 15.0 percent for Group III, 6.0 percent from Group IV, 8.6 percent for Group V and 28.6 percent for Group VI (Canadian departments).

Table 3D shows the pattern of employment within broad job categories broken down by citizenship status for those new doctorates earned from U.S. universities (Groups I–V). The citizenship status is known for 1029 of 1074 recipients of doctorates from U.S. institutions. The rate of unemployment is slightly higher for non-U.S. citizens (12.2 percent of those whose job status is known) than it is for U.S. citizens (10.4 percent). Understandably, a much higher percentage of the noncitizens are found in foreign academic positions. The percentage of U.S. citizens in U.S. nonacademic jobs is much higher than the percentage of noncitizens in the same category (18.2 percent of citizens versus 11.3 percent of noncitizens whose job status is known). U.S. citizens hold positions in U.S. academic doctorate-granting departments in lower proportion than do noncitizens (22.7 percent of citizens compared to 28.4 percent of noncitizens), while citizens hold positions in non doctorate-granting U.S. departments in substantially higher proportion than do noncitizens (41.0 percent of citizens compared to 20.6 percent of noncitizens); here all percentages exclude new doctorates whose job status is unknown.

TABLE 3D: Employment Status of 1990–1991 U. S. New Doctorates (Groups I–V) by citizenship status*

TYPE OF EMPLOYER	TYPE OF CITIZENSHIP				TOTAL DOCTORATES WHOSE CITIZENSHIP IS KNOWN*	
	U.S. Citizens		Non-U.S. Citizens			
	Number	Percent	Number	Percent	Number	Percent
U.S. Academic, Ph.D. Department	96	21	149	26	245	24
U.S. Academic, non-Ph.D. Department	173	38	108	19	281	27
U.S. Research Institute	16	4	16	3	32	3
U.S. Nonacademic	77	17	59	10	136	13
Foreign Academic	12	3	109	19	121	12
Foreign Nonacademic			10	2	10	1
Not seeking employment	4	1	9	2	13	1
Unemployed and seeking employment	44	10	64	11	108	10
Unknown status (U.S. address)	28	6	4	1	32	3
Unknown status (foreign address)			51	9	51	5
TOTALS	450	100%	579	100%**	1029	100%**

* The adjusted total varies from that on Table 5 because the data are gathered on different surveys.
** Column percents are rounded to the nearest whole percent.

Acknowledgments

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

Several people have made essential contributions to the preparation of the reports on the 1991 Annual AMS-MAA Survey. I express special thanks to Monica Foulkes for her constant support and initiatives on all aspects of the Annual Survey. Jim Maxwell regularly offers insight and direction for the work of the Data Committee. Monica and Jim share credit for the companion articles on starting salaries of new doctorates and on faculty salaries. Don Loftsgaarden and Ed Connors contributed to the data analysis and bibliography.

Table 3E and the accompanying chart show how employment patterns have varied over time for the major categories of employment of new doctorates. See also Table 5 and the graph accompanying it for the corresponding longitudinal pattern of doctorate production by U.S. universities. (Table 3E includes doctorates granted by Canadian universities and Table 5 does not.) Note that all years prior to 1982–83 include doctorates granted by computer science departments.

Table 3E: Employment of New Doctorates in the Mathematical Sciences, 1977–78 to 1990–91

TYPE OF EMPLOYMENT	1977–1978	1978–1979	1979–1980	1980–1981	1981–1982	1982–1983	1983–1984	1984–1985	1985–1986	1986–1987	1987–1988	1988–1989	1989–1990	1990–1991*
U.S. academic	524	508	489	509	497	454	470	435	441	456	478	554	595	564
U.S. nonacademic	210	202	204	197	170	129	134	122	136	123	110	119	122	140
Canadian	62	47	44	41	36	30	27	30	29	37	46	37	53	53
Foreign	120	98	93	131	115	141	126	157	156	164	177	177	137	114
Total known employed	916	855	830	878	818	754	754	744	762	780	811	887	907	871
Total doctorates granted (fall counts)	952	889	858	904	860	792	792	769	801	845	856	958	991	1142

*1990–1991 employment status figures are fall counts; the entries for previous years are spring counts. 1990–1991 figures will be updated in the Second Report in a spring 1992 issue of *Notices*.

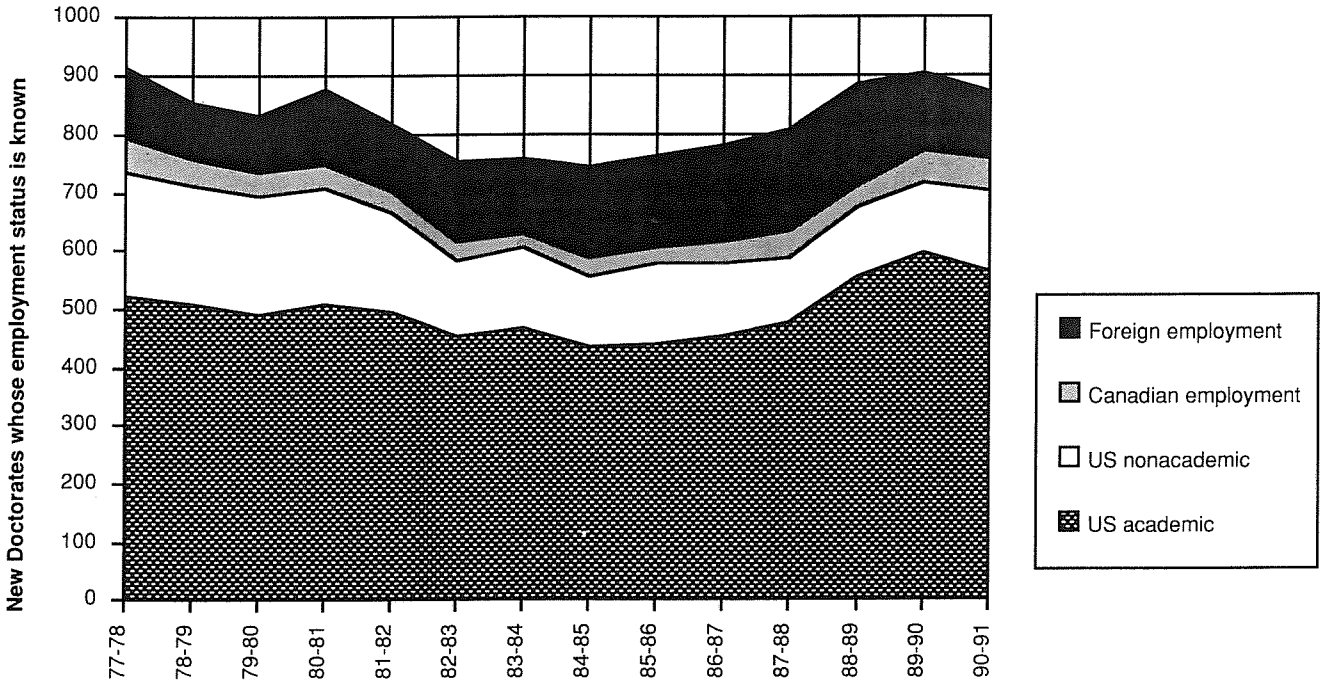


TABLE 4: Sex, Racial/Ethnic Group, and Citizenship of New Doctorates

July 1, 1990 — June 30, 1991

U.S. DEGREES	MEN					WOMEN					TOTAL
RACIAL/ETHNIC GROUP	CITIZENSHIP				Total Men	CITIZENSHIP				Total Women	
	U.S.	Canada	Other	Not Known		U.S.	Canada	Other	Not Known		
Asian, Pacific Islander	17	2	306	5	330	14		64	1	79	409
Black	7		5		12	3		1		4	16
American Indian, Eskimo, Aleut	1				1	1				1	2
Mexican American, Puerto Rican, or other Hispanic	2		28		30	4		7		11	41
None of those above	299	12	120	2	433	85	1	32	1	119	552
Unknown	23	1	20	4	48	5		1		6	54
Total	349	15	479	11	854	112	1	105	2	220	1074

CANADIAN DEGREES	MEN					WOMEN					TOTAL
RACIAL/ETHNIC GROUP	CITIZENSHIP				Total Men	CITIZENSHIP				Total Women	
	U.S.	Canada	Other	Not Known		U.S.	Canada	Other	Not Known		
Asian, Pacific Islander		4	18	2	24		1	3		4	28
Black			3		3						3
American Indian, Eskimo, Aleut											
Mexican American, Puerto Rican, or other Hispanic											
None of those above	1	24	7	1	33		3			3	36
Unknown				1	1						1
Total	1	28	28	4	61		4	3		7	68

Sex, Minority Group, and Citizenship of New Doctorates, 1990–1991

Table 4 presents a breakdown according to sex, racial/ethnic group, and citizenship of the new doctorates. The information reported in this table was obtained from departments granting the degrees and in some cases from the recipients themselves.

Of the 1074 doctorates awarded by U.S. universities, the citizenship is reported as known for 1061 recipients, with 461 reporting U.S. citizenship. The number of U.S. citizen new doctorates is 15 percent greater than in 1989–90 and is the highest count since 1981–82. Still, the number of U.S. citizens is substantially lower than it was throughout the 1970s. See Table 5 and the accompanying graphs.

At the same time that the number of U.S. citizens has increased, so has the number of noncitizen new doctorates. A total of 600 noncitizens were granted doctorates by U.S. universities in 1990–91. This represents an increase of 14 percent from the number in 1989–90. The number of noncitizen new doctorates has risen every year since 1978–79. The 1990–91 count is 121 percent greater than the number awarded by U.S. institutions ten years ago (272 in 1980–81).

The percentage increases in the numbers of U.S. citizen and noncitizen new doctorates parallel each other. As a consequence, the percentage that U.S. citizens represent of the total doctorates given by U.S. universities remains at the all-time low of 43 percent attained in 1989–90. Data for the period 1973–74 through 1990–91 are shown in Table 5.

Among the U.S. citizens receiving doctorates in the mathematical sciences, 10 were black (7 men, 3 women) and 6 were Mexican American, Puerto Rican or other Hispanic (2 men, 4 women).

Women account for 24 percent of the U.S. citizens receiving doctorates in the mathematical sciences from U.S. universities. This is equal to the highest percentage ever reported. In absolute numbers, the count of 112 U.S. citizen women earning doctorates is the highest number since the data on sex were first reported in 1973–74. See Table 6.

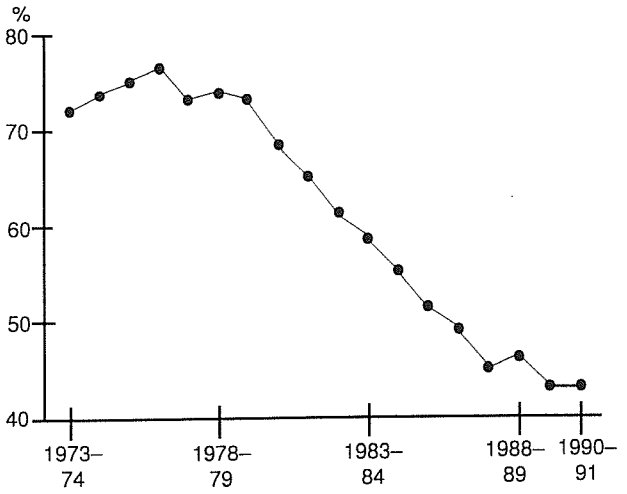
Note that in Table 5 and Table 6 all years prior to 1982–83 include doctorates granted by computer science departments.

TABLE 5: U.S. Citizen Doctorates

	Adjusted Total* of Doctorates given by U.S. universities	Total of Doctorates who are U.S. citizens	%
1973–1974	938	677	72
1974–1975	999	741	74
1975–1976	965	722	75
1976–1977	901	689	76
1977–1978	868	634	73
1978–1979	806	596	74
1979–1980	791	578	73
1980–1981	839	567	68
1981–1982	798	519	65
1982–1983	744	455	61
1983–1984	738	433	59
1984–1985	726	396	55
1985–1986	755	386	51
1986–1987	739	362	49
1987–1988	798	363	45
1988–1989	884	411	46
1989–1990	929	401	43
1990–1991	1061	461	43

*Number of doctorates whose citizenship is known. Total will vary from that on Table 3D because the data are gathered on different surveys.

Graph for Table 5: U.S. Citizen Doctorates
Total of Doctorates by Percent



Graph for Table 5: U.S. Citizen Doctorates

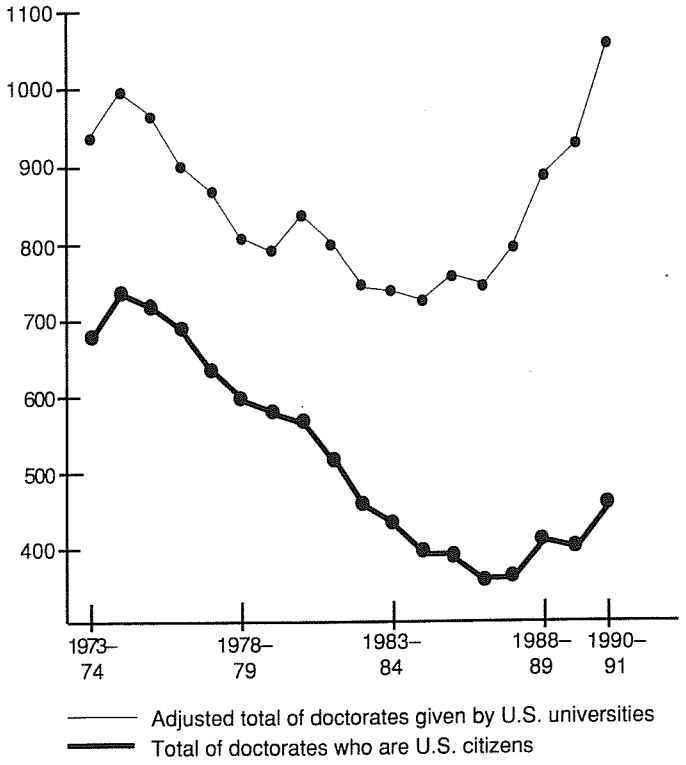


TABLE 6: U.S. Citizen Doctorates, Male and Female

	Doctorates who are U.S. citizens	Male	Female	% Female
1973–1974	677	618	59	9
1974–1975	741	658	83	11
1975–1976	722	636	86	12
1976–1977	689	602	87	13
1977–1978	634	545	89	14
1978–1979	596	503	93	16
1979–1980	578	491	87	15
1980–1981	567	465	102	18
1981–1982	519	431	88	17
1982–1983	455	366	89	20
1983–1984	433	346	87	20
1984–1985	396	315	81	20
1985–1986	386	304	82	21
1986–1987	362	289	73	20
1987–1988	363	287	76	21
1988–1989	411	313	98	24
1989–1990	401	312	89	22
1990–1991	461	349	112	24

Bibliography

[1] *Plans and Expectations for Retirement: Survey of TIAA-CREF Participants Ages* 55–70, Research Dialogues, Issue No. 25, April 1990, Teachers Insurance and Annuity Association, New York, NY.

[2] National Science Foundation. *Science and Technology Data Book,* National Science Foundation, Washington, DC, 1989.

[3] Rand Publication Series. Reports on teaching and education. *Beyond the Commission Reports: The Coming Crisis in Teaching.* R-3177-RC, July 1984. *Steady Work: Policy, Practice and the Reform of American Education.* R-3574-NIE/RC, February 1988. *The Evolution of Teacher Policy.* JRE-01, March 1988. *Assessing Teacher Supply and Demand.* R-3633-ED/CSTP, May 1988.

[4] D. J. Albers, R. D. Anderson, and D. O. Loftsgaarden, *Undergraduate Programs in the Mathematical and Computer Sciences. The* 1985-1986 *Survey,* MAA Notes No. 7.

[5] *The Annual Report on the Economic Status of the Profession* 1990–1991, Academe: Bulletin of the American Association of University Professors, March-April 1991, Washington, DC.

[6] *The Underachieving Curriculum:Assessing U.S. School Mathematics from an International Perspective,* Stipes Publishing Co., Champaign, Illinois, January 1987.

[7] *Competition for Human Resources in the* 1990s, Proceedings of a Symposium, Commission on Professionals in Science and Technology, May 1988.

[8] National Science Foundation, *Science and Engineering Degrees*: 1966–89, NSF 91–314, Washington, DC, 1991.

[9] National Science Foundation, *Selected Data on Science and Engineering Doctorate Awards*: 1990, NSF 91–310, Washington, DC, 1991.

[10] *Educating Scientists and Engineers: Grade School to Grad School.* U.S. Congress, Office of Technology Assessment, OTA-SET-377, Washington, DC, June 1988.

[11] National Research Council. *Summary Report* 1989, *Doctorate Recipients from U. S. Universities,* National Academy Press, Washington, DC , 1990.

[12] Edward A. Connors, *A Decline in Mathematics Threatens Science—and the U.S.,* The Scientist, November 28, 1988.

[13] Edward A. Connors, *America's Scientific Future is Threatened by the Decline in Mathematical Education,* The Chronicle of Higher Education, January 11, 1989.

[14] National Research Council. *Everybody Counts: A Report to the Nation on the Future of Mathematics Education,* National Academy Press, Washington, DC, 1989.

[15] *Higher Education for Science and Engineering: A Background Paper.* U.S. Congress, Office of Technology Assessment, OTA-BP-SET-52. Washington, DC, March 1989.

[16] Commission on Professionals in Science and Technology. Occasional Papers, prepared by Betty M. Vetter. *Look Who's Coming to School* (89-0), December 1988. *Women in Science. Progress and Problems* (89–1), February 1989. *Recruiting Doctoral Scientists and Engineers* (89–2), February 1989. *American Minorities in Science and Engineering* (89–3), September 1989. *Replacing Science and Engineering Faculty in the* 1990s (89–4), December 1989. *Supply and Demand for Engineers in the* 1990s (90–1), April 1990. *Who is in the Pipeline? Science, Math and Engineering Education* (90–2), July 1990. *Recruiting Doctoral Scientists and Engineers for the Twenty-first Century* (90–3), October 1990. *Women in Science and Engineering, An Illustrated Progress Report* (90-4) December 1990. *Recruiting and Retaining a Diverse, Quality Technical Workforce* (91-1) April 1991. *By the Year* 2000: *Myths and Facts* (91-2) July 1991. CPST, Washington, DC.

[17] *Meeting the Needs of a Growing Economy: The CORETECH Agenda for the Scientific and Technical Workforce.* CORETECH, Washington, DC, 1988.

[18] *Measuring National Needs for Scientists to the Year* 2000. Report to the National Science Foundation. Commission on Professionals in Science and Technology, Washington, DC, July 1989.

[19] Bernard L. Madison and Therese A. Hart, *A Challenge of Numbers: People in the Mathematical Sciences.* National Academy Press, Washington, DC, 1990.

[20] National Research Council. *Renewing U.S. Mathematics: A Plan for the* 1990s. National Academy Press, Washington, DC, 1990.

[21] National Science Board. *Science and Engineering Indicators*—1989. U.S. Government Printing Office, Washington, DC, 1989 (NSB 89-1).

[22] Commission on Professionals in Science and Technology. *Salaries of Scientists, Engineers and Technicians: A Summary of Salary Surveys,* 15th Ed., Washington, DC, 1991.

[23] Commission on Professionals in Science and Technology. *Professional Women and Minorities*—1991. Washington, DC, 1991.

[24] 1990–1991 *Faculty Salary Survey by Discipline.* Office of Institutional Research, Oklahoma State University, Stillwater, OK, 1991.

[25] *Report on the National Science Foundation Disciplinary Workshops on Undergraduate Education.* Recommendations of the disciplinary taskforces concerning critical issues in U.S. undergraduate education in the Sciences, Mathematics and Engineering. National Science Foundation, Washington, DC, April 1989.

[26] Mathematical Sciences Education Board. *Mathematics Education: Wellspring of U.S. Industrial Strength.* Report of a Symposium held December 1988. National Research Council, 1990.

[27] David Blackwell and Leon Henkin, *Mathematics: Report of the Project* 2061. *Phase* I *Mathematics Panel.* American Association for the Advancement of Science, Washington, DC, 1989 (AAAS Pub 89-03S).

[28] National Academy of Sciences. *Engineering Personnel Data Needs for the* 1990s. National Academy Press, Washington, DC, 1988.

[29] Commission on Professionals in Science and Technology. *Proceedings of a symposium "Human Resources in Science and Technology: Improving U.S. Competitiveness"* held March 1990. CPST, Washington, DC, July 1990.

[30] Roman Czujko and David Bernstein, *Who Takes Science? A Report on Student Coursework in High School Science and Mathematics.* American Inst. of Physics, New York, NY, December 1989 (AIP Pub No. R-345).

[31] *A Guide to NSF Science/Engineering Resources Data.* National Science Foundation, Washington, DC, 1987.

[32] Christine M. Matthews, Congressional Research Service Issue Brief, *Science, Engineering and Mathematics Precollege and College Education.* Library of Congress, Washington, DC, 1991.

[33] *Recruitment, Retention and Utilization of Federal Scientists and Engineers.* A report to the Carnegie Commission on Science, Technology & Governnment. National Academy Press, Washington, DC, 1990.

[34] National Research Council. *Moving Beyond Myths: Revitalizing Undergraduate Mathematics.* National Academy Press, Washington, DC, 1991.

[35] Richard C. Atkinson, *Supply and Demand for Scientists and Engineers: A National Crisis in the Making,* Science, April 27, 1990, 425–432.

[36] Robert Pool, *Who will do Science in the* 1990s?, Science, April 27, 1990, 433–435.

[37] *Survey of Mathematics and Statistics Departments at Higher Education Institutions.* Higher Education Surveys Report, Survey Number 5, December 1990. Sponsored by the National Science Foundation.

[38] Board on Mathematical Sciences. *Action for Renewing U.S. Mathematical Sciences Departments.* National Research Council, Washington, DC, 1990.

[39] Board on Mathematical Sciences. *Chairing the Mathematical Sciences Departments of the* 1990s. Proceedings of a Colloquium, October 27–28, 1989. National Academy Press, Washington, DC, 1990.

[40] Board on Mathematical Sciences. *Mathematical Sciences, Technology and Economic Competitiveness,* ed. James G. Glimm. National Academy Press, Washington, DC, 1990.

[41] Allyn Jackson, *Top Producers of Women Mathematics Doctorates, Notices of the AMS,* September 1991.

Salary Survey for New Recipients of Doctorates, 1990–1991

The figures for 1991 were compiled from questionnaires sent to individuals who received a doctorate in the mathematical sciences during the 1990–91 academic year from universities in the United States and Canada.

Questionnaires requesting information on salaries and professional experience were distributed to 1124 recipients of degrees using addresses provided by the departments granting the degrees. 523 individuals returned forms between late June and mid-September. Responses with insufficient data, or from individuals who indicated they had part-time employment, were not yet employed, or were not seeking employment, were considered unusable. Numbers of usable responses for each salary category are reported on 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. For more comprehensive information on the recipients of new doctorates granted last year in the mathematical sciences in the U.S. and Canada, see the preceding article by D. McClure.

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 refer to the academic year in which the doctorate was received. *M* and *F* are Male and Female respectively. *One year or less experience* means that the persons had experience limited to one year or less in the same position or a position similar to the one reported; some persons receiving a doctorate had been employed in their present position for several years. Quartile figures are given only in cases where the number of responses is large enough to make them meaningful.

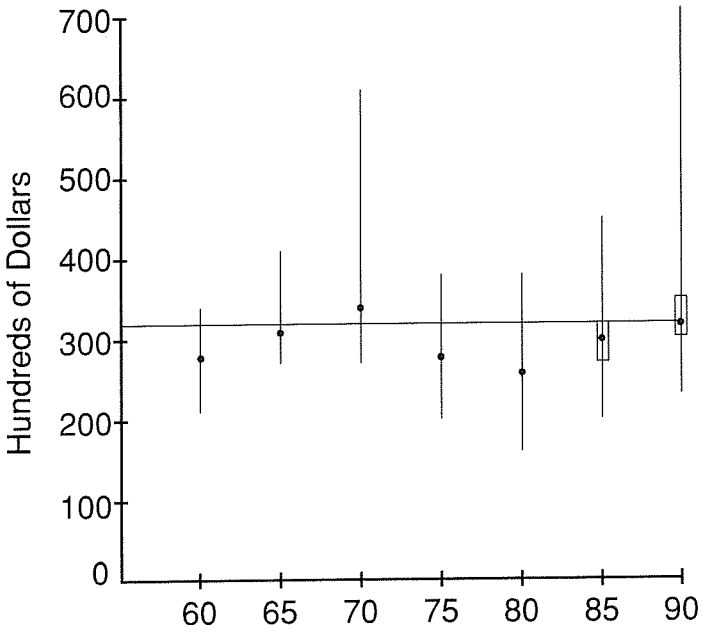
Graphs. The horizontal line represents the median salary for 1990 in hundreds of dollars. The points plotted are the median salaries for each year converted to 1990 dollars using the implicit price deflator prepared annually by the Bureau of Economic Analysis, U.S. Department of Commerce. (Because the deflator is not yet available for this year, the 1991 figures do not appear on the graphs.) The boxes show the middle half of the population, where the quartile data are available.

Note that salaries for teaching, or teaching and research, have yet to return to their high point of 1970, although steady progress has been made since 1980. (For further details, see Donald Rung's article, "A Fifteen Year Retrospective on Academic Salaries of U.S. Doctorate Holding Faculty," in the November 1985 issue of *Notices*, pages 772–773.)

Nine-Month Salaries

Ph.D. Year	Min	Q_1	Median	Q_3	Max	Reported Median in 1990 $
TEACHING OR TEACHING AND RESEARCH (188 men + 54 women)						
1960	49		65		80	276
1965	70		80		105	311
1970	85		110		195	344
1975	90	120	128	135	173	284
1980	105	155	171	185	250	262
1985	170	230	250	270	380	296
1988	200	275	293	314	575	318
1989	200	290	310	330	478	323
1990	230	305	320	350	710	320
1991	150	310	330	360	610	—
1988M	200	274	290	315	520	
1988F	216	275	299	314	575	
1989M	200	290	305	330	478	
1989F	220	295	310	330	470	
1990M	230	306	320	350	710	
1990F	250	300	325	360	493	
1991M	150	310	330	360	610	
1991F	260	310	332	360	550	
One year or less experience (129 men + 43 women)						
1991M	150	315	333	360	578	
1991F	260	314	325	349	475	

Nine-Month Teaching or Teaching and Research



Nine-Month Salaries

Ph.D. Year	Min	Median	Max	Reported Median in 1990 $
		RESEARCH (7 men + 1 woman)		
1960	52	65	80	277
1965	71	81	90	315
1970	78	105	160	329
1975	100	—	110	—
1980	125	137	180	210
1985	205	235	250	279
1988	260	280	385	304
1989	235	270	330	281
1990	230	300	404	300
1991	260	295	470	—
1988M	260	280	385	
1988F	—	—	—	
1989M	235	270	330	
1989F	—	—	—	
1990M	230	300	404	
1990F	—	—	—	
1991M	260	290	360	
1991F	—	—	—	
One year or less experience (6 men + 1 woman)				
1991M	260	280	300	
1991F	—	—	—	

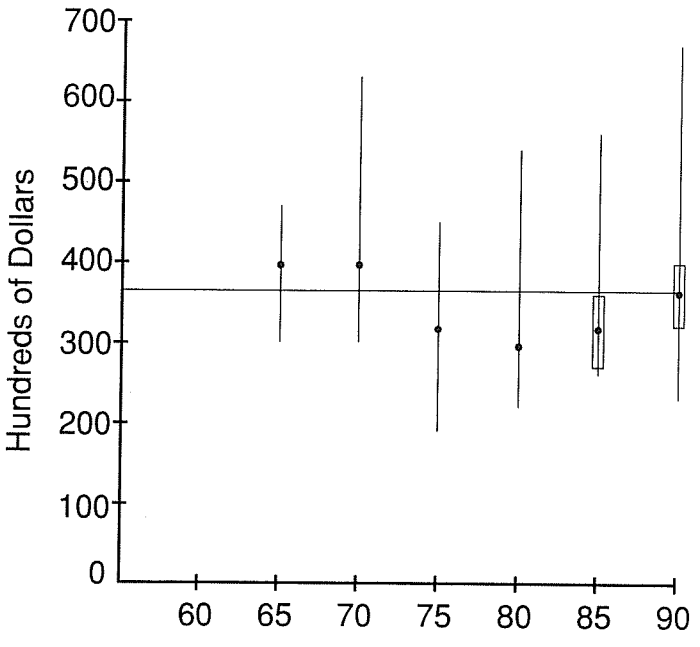
Nine-Month Research

Graph omitted because sample size too small.

Twelve-Month Salaries

Ph.D. Year	Min	Q_1	Median	Q_3	Max	Reported Median in 1990 $
			TEACHING OR TEACHING AND RESEARCH (20 men + 5 women)			
1960	.....		No data		.....	
1965	78		104		121	405
1970	95		128		200	401
1975	87		145		204	322
1980	143		195		350	299
1985	220	230	273	300	470	324
1988	220	313	330	360	480	358
1989	238	290	315	370	620	328
1990	225	318	365	404	670	365
1991	290	310	350	408	758	—
1988M	220	308	330	355	480	
1988F	329	335	350	365	441	
1989M	238	295	315	370	620	
1989F	275	290	314	380	434	
1990M	225	316	360	400	670	
1990F	250	320	383	420	425	
1991M	290	310	350	400	530	
1991F	300	310	472	530	758	
One year or less experience (18 men + 2 women)						
1991M	290	320	350	400	505	
1991F	—	—	—	—	—	

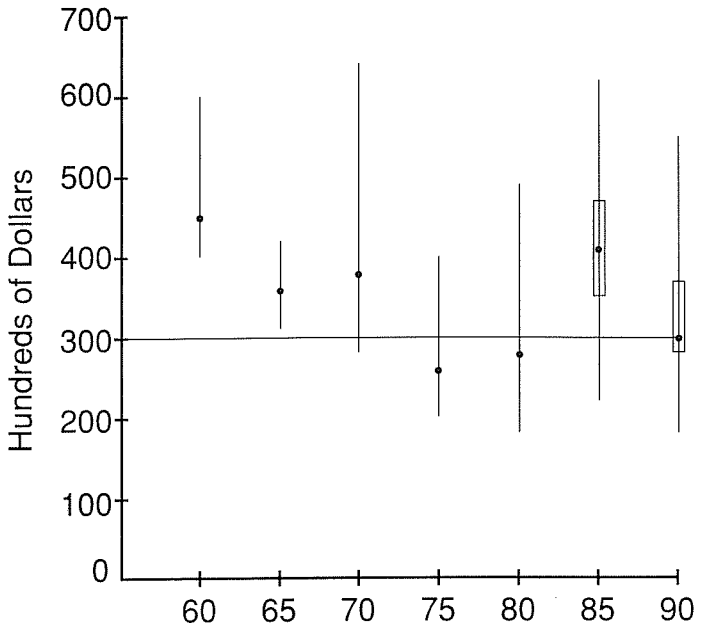
Twelve-Month Teaching or Teaching and Research



Twelve-Month Salaries

Ph.D. Year	Min	Q_1	Median	Q_3	Max	Reported Median in 1990 $
RESEARCH (25 men + 11 women)						
1960	97		105		140	447
1965	81		93		107	362
1970	90		120		205	376
1975	90		119		180	264
1980	120		180		321	276
1985	190	295	342	400	520	406
1988	200	245	295	331	505	320
1989	180	250	317	385	623	330
1990	180	280	300	365	546	300
1991	190	277	320	380	480	—
1988M	200	240	280	330	505	
1988F	280	320	330	350	360	
1989M	180	250	300	393	623	
1989F	200	295	350	373	400	
1990M	180	280	300	360	546	
1990F	330	330	365	400	400	
1991M	190	290	310	360	480	
1991F	240	272	340	405	450	
One year or less experience (22 men + 6 women)						
1991M	250	300	310	360	480	
1991F	264	270	307	380	400	

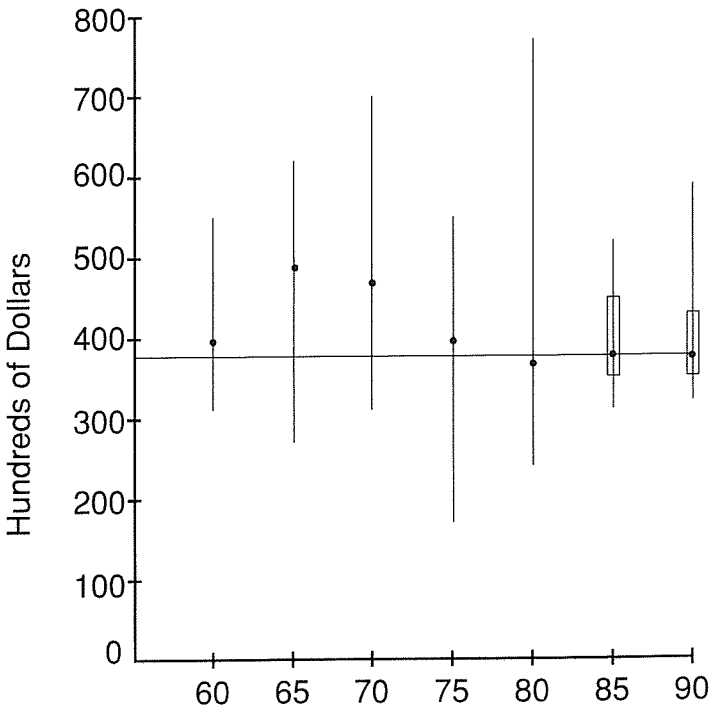
Twelve-Month Research



Twelve-Month Salaries

Ph.D. Year	Min	Q_1	Median	Q_3	Max	Reported Median in 1990 $
GOVERNMENT (16 men + 4 women)						
1960	72		93		130	396
1965	70		126		160	490
1970	100		150		223	470
1975	78		182		247	404
1980	156		244		501	374
1985	263	294	325	381	440	385
1988	240	298	343	405	436	372
1989	330	363	378	438	540	394
1990	320	345	378	430	587	378
1991	230	365	423	497	630	—
1988M	240	290	332	360	436	
1988F	380	380	405	430	430	
1989M	330	363	378	438	540	
1989F	—	—	—	—	—	
1990M	320	345	375	430	587	
1990F	330	354	378	429	480	
1991M	230	345	424	497	630	
1991F	—	—	—	—	—	
One year or less experience (13 men + 2 women)						
1991M	230	330	373	450	630	
1991F	—	—	—	—	—	

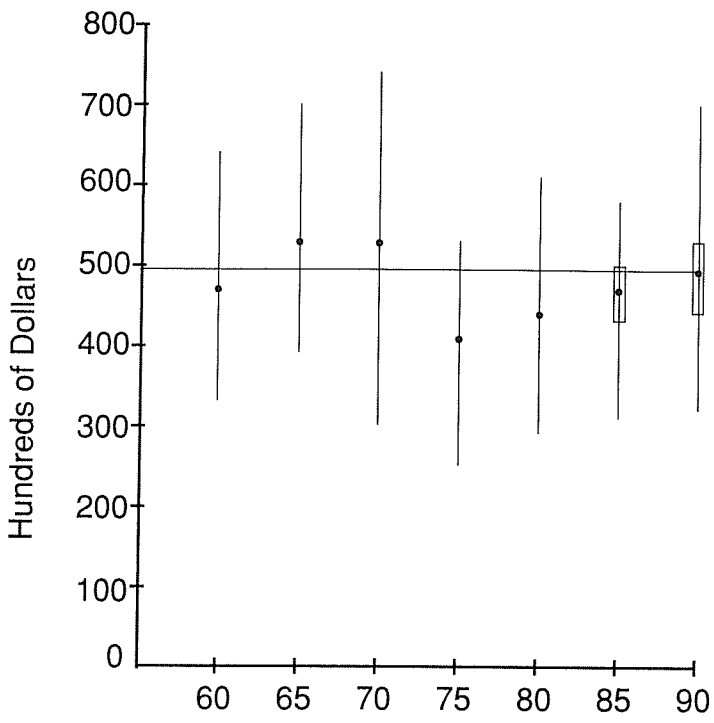
Twelve-Month Government



Twelve-Month Salaries

Ph.D. Year	Min	Q_1	Median	Q_3	Max	Reported Median in 1990 $
	BUSINESS AND INDUSTRY (43 men + 10 women)					
1960	78		110		150	468
1965	100		136		180	529
1970	96		170		235	532
1975	114		187		240	415
1980	190		284		400	436
1985	260	360	400	420	493	474
1988	300	400	440	490	1100	477
1989	250	420	464	505	5250	483
1990	320	438	495	533	700	495
1991	235	480	510	573	830	—
1988M	300	400	431	490	1100	
1988F	375	437	454	495	660	
1989M	250	420	464	513	5250	
1989F	375	430	470	500	516	
1990M	320	443	490	533	630	
1990F	390	440	500	525	700	
1991M	330	500	520	587	830	
1991F	235	420	481	554	720	
One year or less experience (24 men + 6 women)						
1991M	380	495	505	550	715	
1991F	235	420	471	510	570	

Twelve-Month Business and Industry



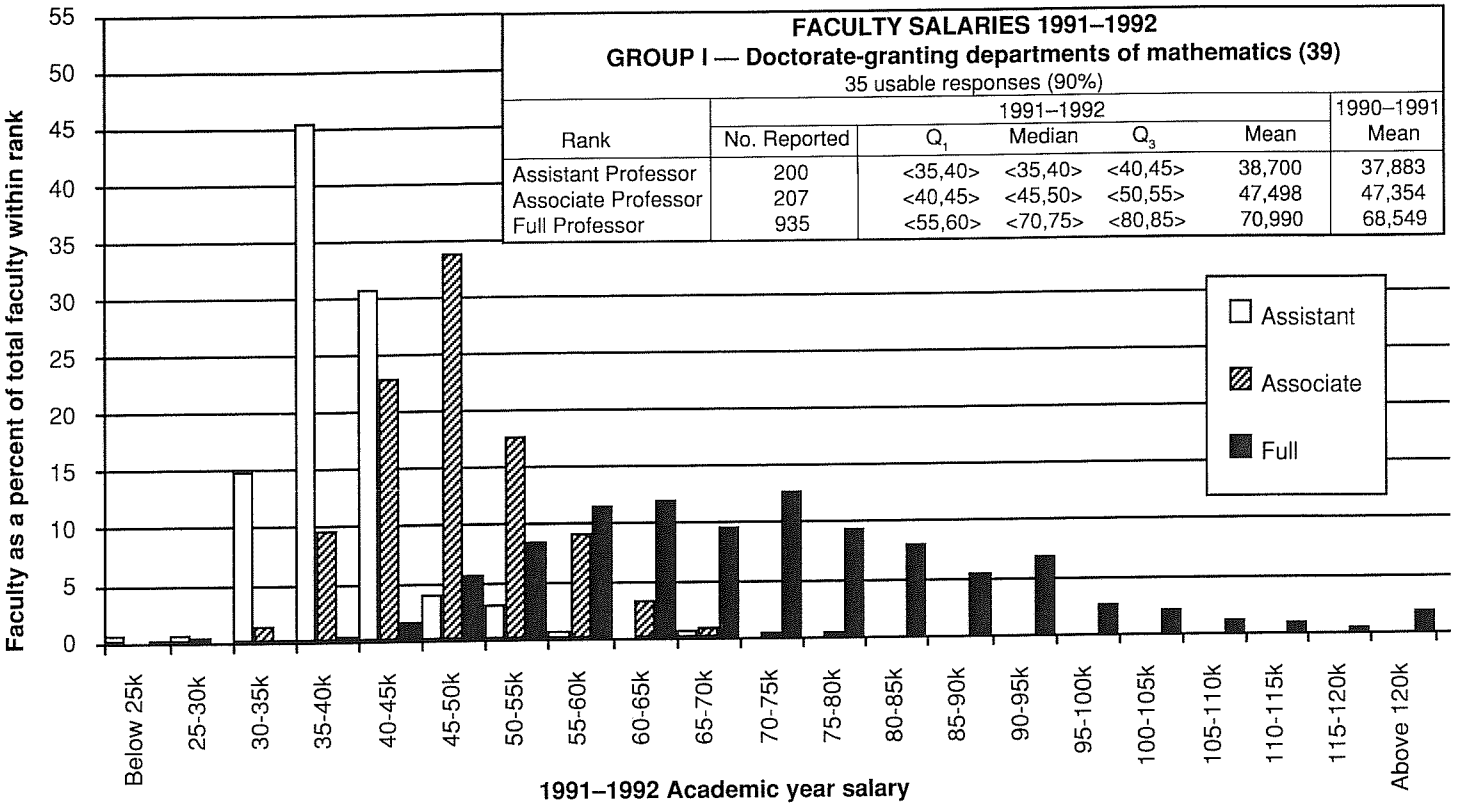
Faculty Salary Survey 1991–1992 Salaries

The charts on the following pages display faculty salary data for Groups I–VI, M and B: faculty salary distribution by rank, mean salaries by rank, information on quartiles by rank, and the number of usable returns for the group.

Departments were asked to report the number of faculty whose 1991–92 academic-year salaries fell within given salary intervals. Reporting salary data in this fashion eliminates some of the concerns about confidentiality, but does not permit determination of actual quartiles. What can be determined is the salary interval in which the quartiles occur, and this information has been added to this year's report. The salary intervals containing the quartiles are denoted by <n,n>.

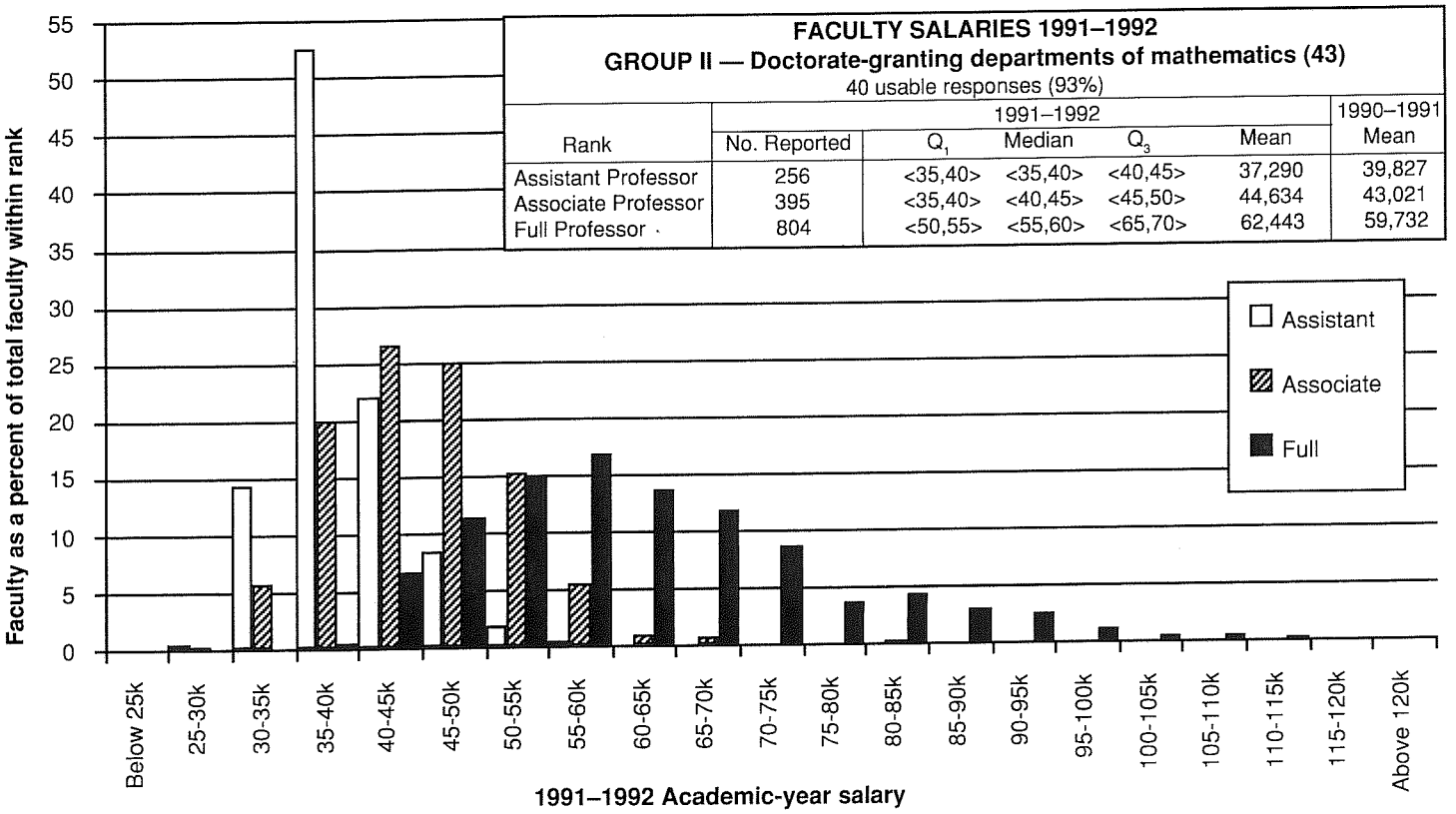
FACULTY SALARIES 1991–1992
GROUP I — Doctorate-granting departments of mathematics (39)
35 usable responses (90%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	200	<35,40>	<35,40>	<40,45>	38,700	37,883
Associate Professor	207	<40,45>	<45,50>	<50,55>	47,498	47,354
Full Professor	935	<55,60>	<70,75>	<80,85>	70,990	68,549



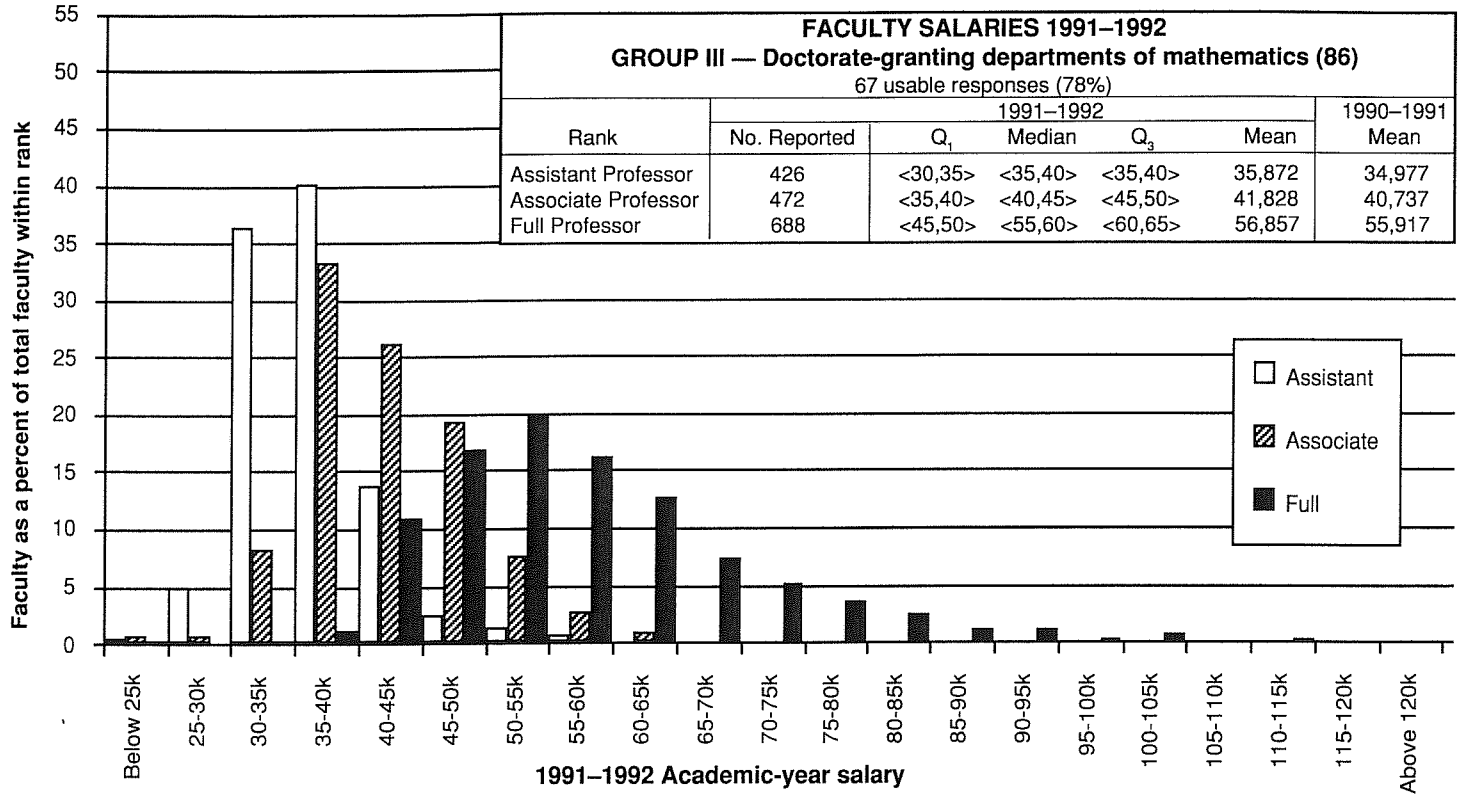
FACULTY SALARIES 1991–1992
GROUP II — Doctorate-granting departments of mathematics (43)
40 usable responses (93%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	256	<35,40>	<35,40>	<40,45>	37,290	39,827
Associate Professor	395	<35,40>	<40,45>	<45,50>	44,634	43,021
Full Professor	804	<50,55>	<55,60>	<65,70>	62,443	59,732



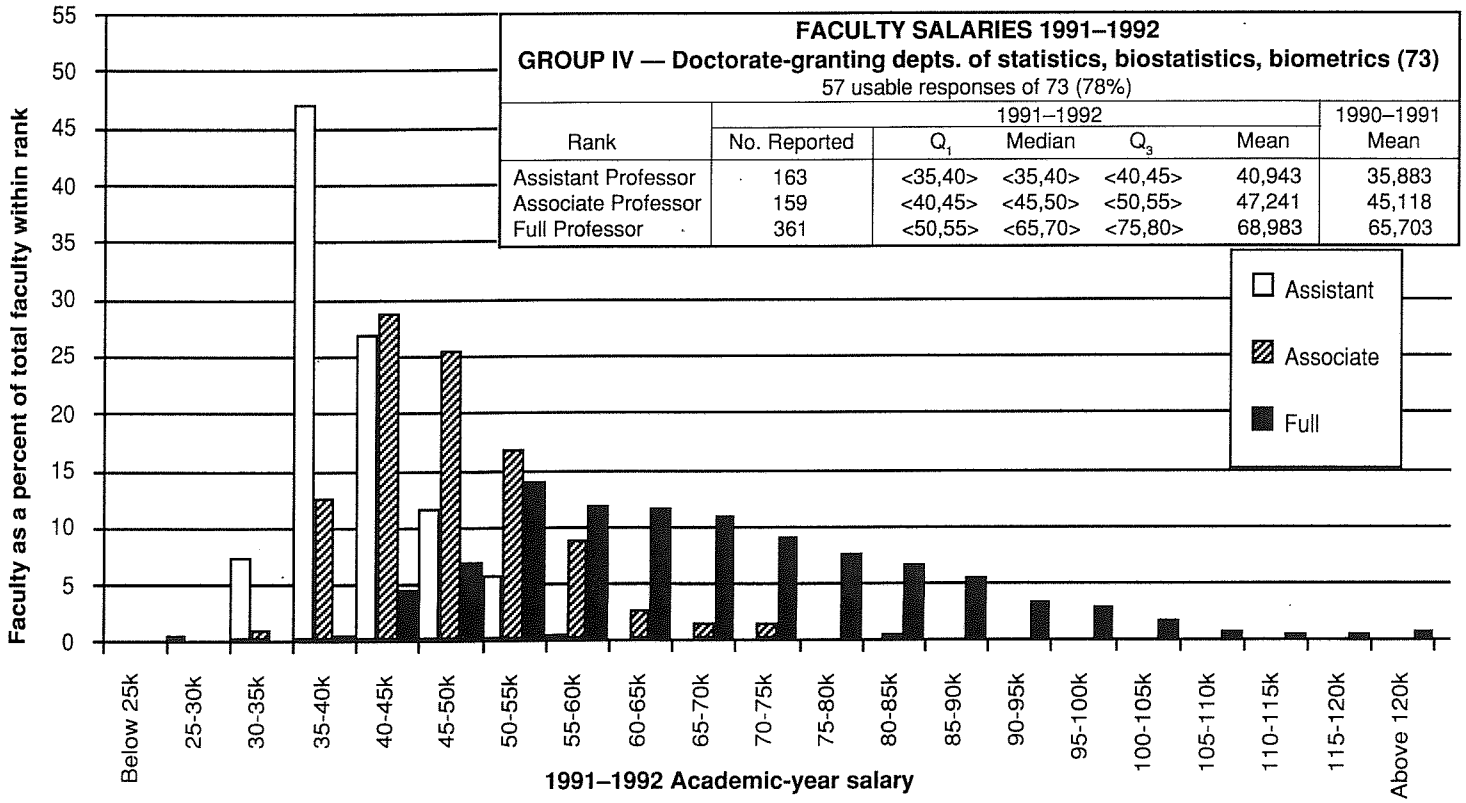
FACULTY SALARIES 1991–1992
GROUP III — Doctorate-granting departments of mathematics (86)
67 usable responses (78%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	426	<30,35>	<35,40>	<35,40>	35,872	34,977
Associate Professor	472	<35,40>	<40,45>	<45,50>	41,828	40,737
Full Professor	688	<45,50>	<55,60>	<60,65>	56,857	55,917



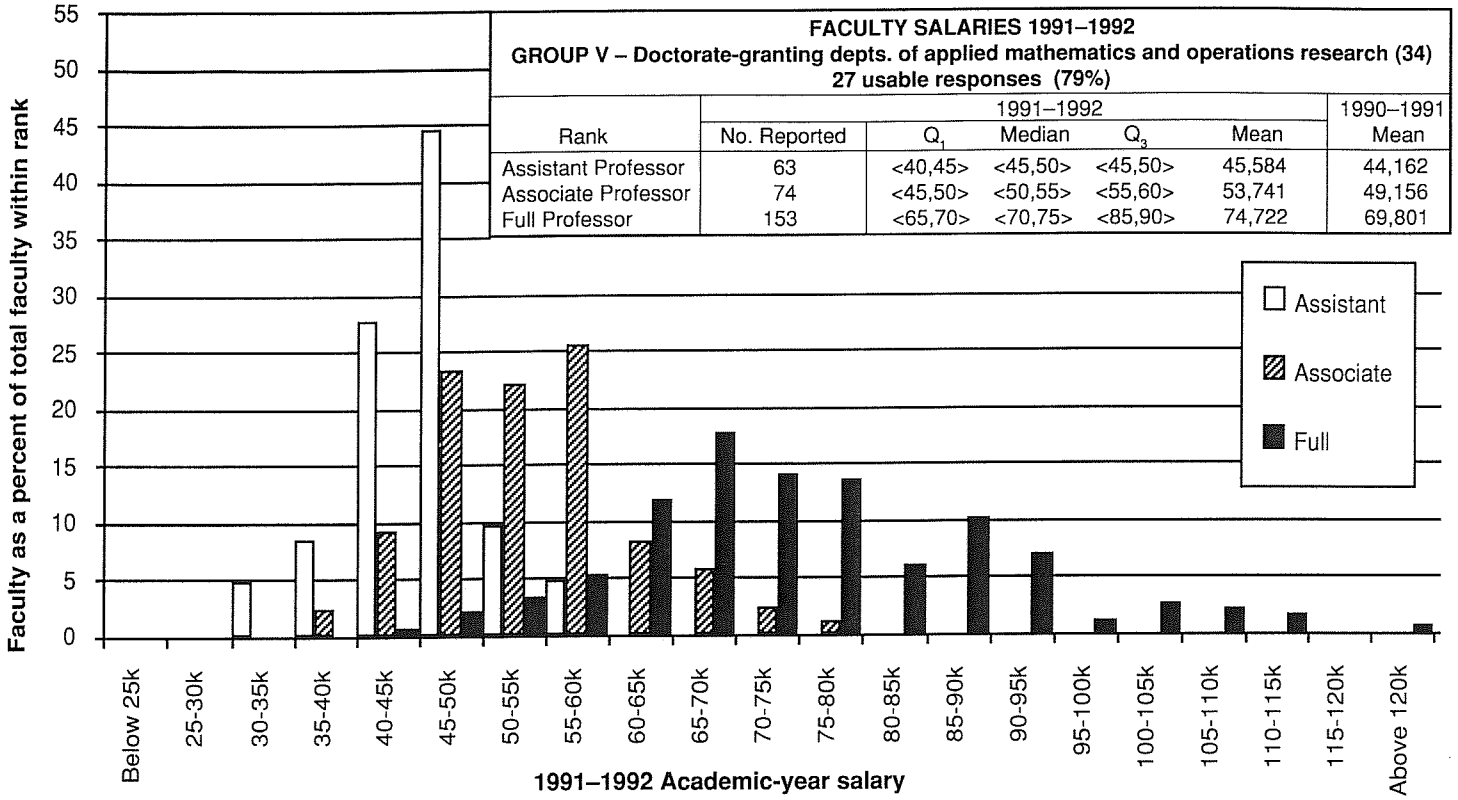
FACULTY SALARIES 1991–1992
GROUP IV — Doctorate-granting depts. of statistics, biostatistics, biometrics (73)
57 usable responses of 73 (78%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	163	<35,40>	<35,40>	<40,45>	40,943	35,883
Associate Professor	159	<40,45>	<45,50>	<50,55>	47,241	45,118
Full Professor	361	<50,55>	<65,70>	<75,80>	68,983	65,703



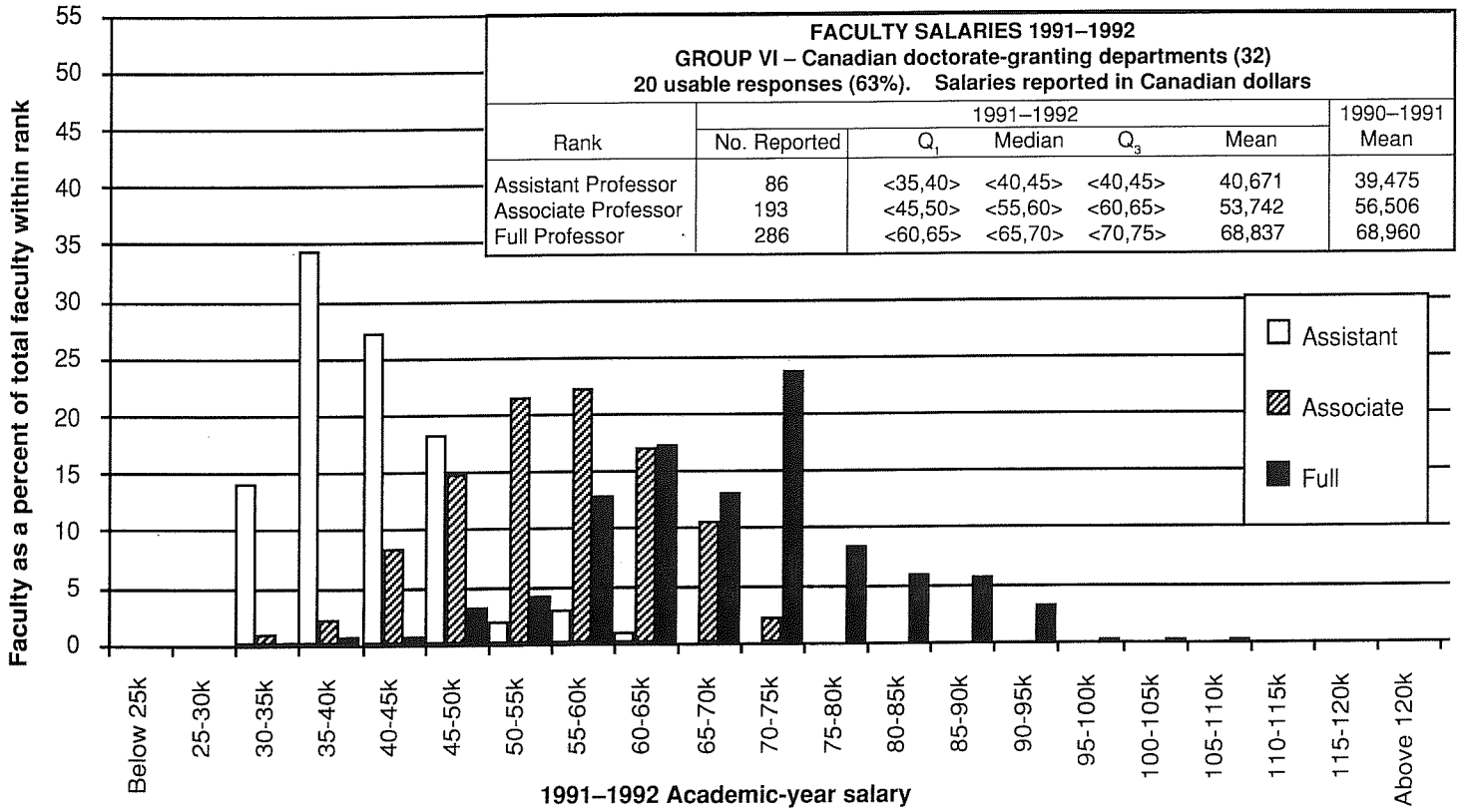
FACULTY SALARIES 1991–1992
GROUP V – Doctorate-granting depts. of applied mathematics and operations research (34)
27 usable responses (79%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	63	<40,45>	<45,50>	<45,50>	45,584	44,162
Associate Professor	74	<45,50>	<50,55>	<55,60>	53,741	49,156
Full Professor	153	<65,70>	<70,75>	<85,90>	74,722	69,801



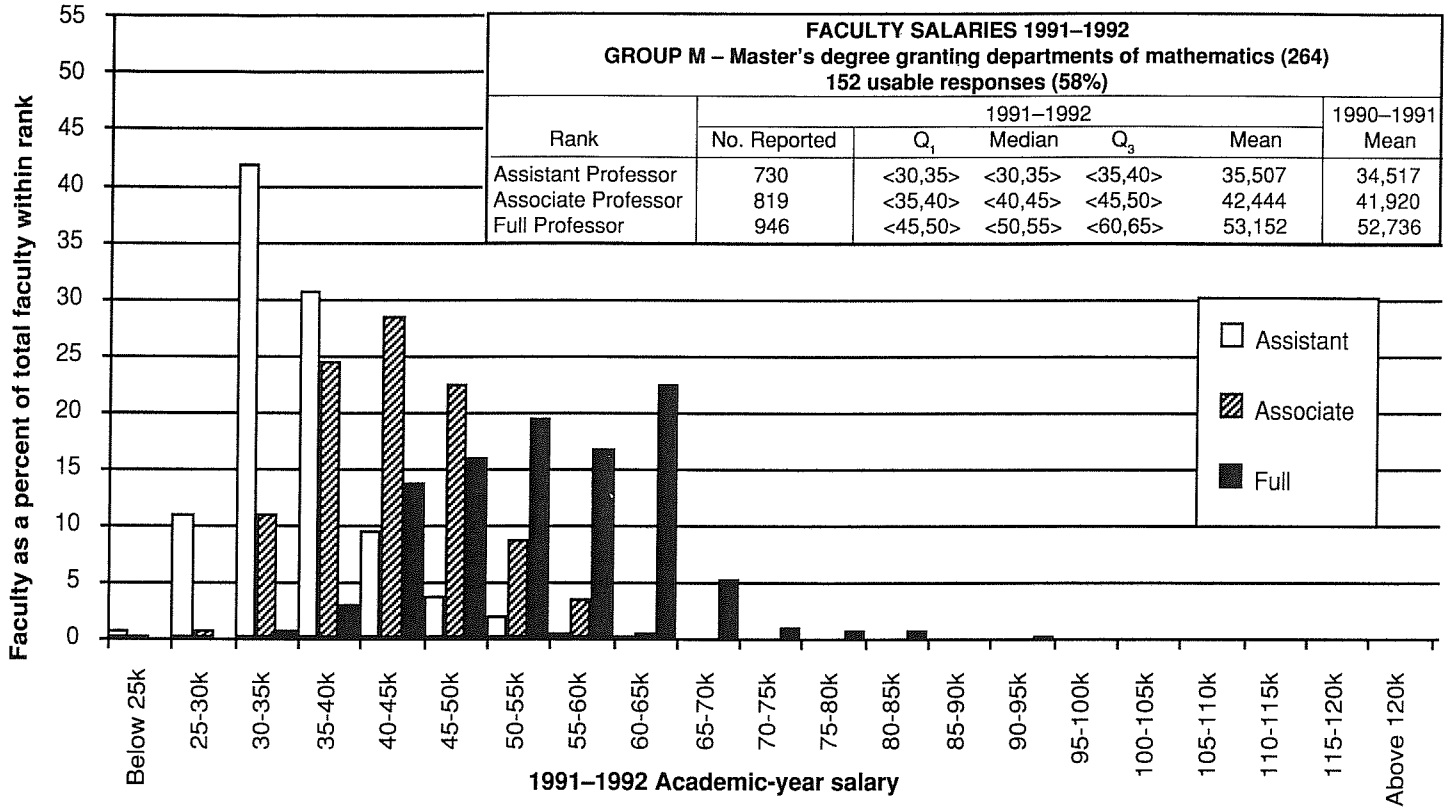
FACULTY SALARIES 1991–1992
GROUP VI – Canadian doctorate-granting departments (32)
20 usable responses (63%). Salaries reported in Canadian dollars

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	86	<35,40>	<40,45>	<40,45>	40,671	39,475
Associate Professor	193	<45,50>	<55,60>	<60,65>	53,742	56,506
Full Professor	286	<60,65>	<65,70>	<70,75>	68,837	68,960



FACULTY SALARIES 1991–1992
GROUP M – Master's degree granting departments of mathematics (264)
152 usable responses (58%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	730	<30,35>	<30,35>	<35,40>	35,507	34,517
Associate Professor	819	<35,40>	<40,45>	<45,50>	42,444	41,920
Full Professor	946	<45,50>	<50,55>	<60,65>	53,152	52,736



FACULTY SALARIES 1991–1992
GROUP B – Bachelor's degree granting departments of mathematics (1012)
477 usable responses (47%)

Rank	1991–1992 No. Reported	Q_1	Median	Q_3	Mean	1990–1991 Mean
Assistant Professor	1079	<25,30>	<30,35>	<35,40>	32,889	31,579
Associate Professor	974	<35,40>	<35,40>	<40,45>	39,967	38,066
Full Professor	868	<40,45>	<45,50>	<55,60>	49,057	46,405