

2006-2007 Taulbee Survey

Ph.D. Production Exceeds 1,700; Undergraduate Enrollment Trends Still Unclear

By Stuart Zweben

This article and the accompanying figures and tables present the results of the 37th annual CRA Taulbee Survey¹ of Ph.D.-granting departments of computer science (CS) and computer engineering (CE) in the United States and Canada. This survey is conducted annually by the Computing Research Association to document trends in student enrollment, employment of graduates, and faculty salaries.

Information is gathered during the fall. Responses received by February 8, 2008 are included in the analysis. The period covered by the data varies from table to table. Degree production and enrollment (Ph.D., Master's, and Bachelor's) refer to the previous academic year (2006-2007). Data for new students in all categories refer to the current academic year (2007-2008). Projected student production and information on faculty salaries and demographics also refer to the current academic year. Faculty salaries are those effective January 1, 2008.

The data were collected from Ph.D.-granting departments only. We surveyed a total of 234 departments, one fewer than last year. Of these, 186 departments returned their survey forms, for a response rate of 79%. This is down slightly from last year's 80%, but is still quite comprehensive (see Figure 1). The return rate of 10 out of 30 (33%) for CE programs is, as usual, very low. Many CE programs are part of an Electrical and Computer Engineering (ECE) department and do not keep separate statistics for CE vs. EE. In addition, many of these departments may not be aware of the Taulbee Survey or its importance. We again had a very good response rate from U.S. CS departments (155 of 176, or 88%), and a reasonable response rate (21 of 28, or 75%) from Canadian departments.

The set of departments responding varies slightly from year to year, even when the total numbers are about the same; thus, we must approach any trend analysis with caution. We must be especially cautious in using the data about CE departments because of the low response rate. Nevertheless, we continue to report CE departments separately because there are some significant differences between CS and CE departments.

Figure 1. Number of Respondents to the Taulbee Survey

Year	US CS Depts.	US CE Depts.	Canadian	Total
1995	110/133 (83%)	9/13 (69%)	11/16 (69%)	130/162 (80%)
1996	98/131 (75%)	8/13 (62%)	9/16 (56%)	115/160 (72%)
1997	111/133 (83%)	6/13 (46%)	13/17 (76%)	130/163 (80%)
1998	122/145 (84%)	7/19 (37%)	12/18 (67%)	141/182 (77%)
1999	132/156 (85%)	5/24 (21%)	19/23 (83%)	156/203 (77%)
2000	148/163 (91%)	6/28 (21%)	19/23 (83%)	173/214 (81%)
2001	142/164 (87%)	8/28 (29%)	23/23 (100%)	173/215 (80%)
2002	150/170 (88%)	10/28 (36%)	22/27 (82%)	182/225 (80%)
2003	148/170 (87%)	6/28 (21%)	19/27 (70%)	173/225 (77%)
2004	158/172 (92%)	10/30 (33%)	21/27 (78%)	189/229 (83%)
2005	156/174 (90%)	10/31 (32%)	22/27 (81%)	188/232 (81%)
2006	156/175 (89%)	12/33 (36%)	20/28 (71%)	188/235 (80%)
2007	155/176 (88%)	10/30 (33%)	21/28 (75%)	186/234 (79%)

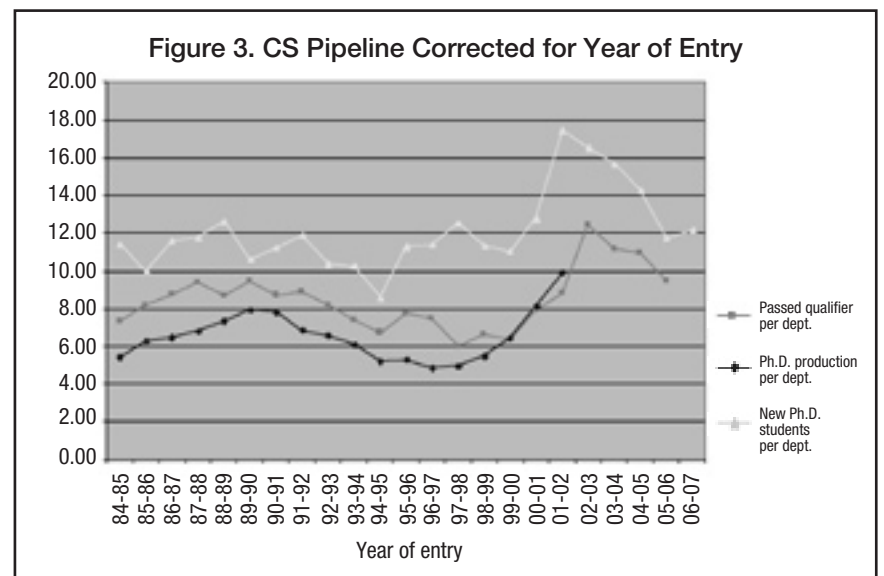
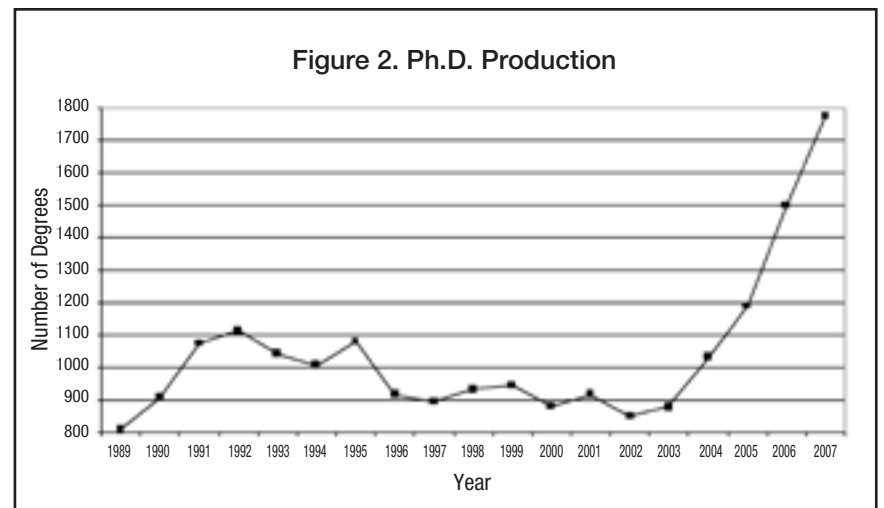
The survey form itself is modified slightly each year to ensure a high rate of return (e.g., by simplifying and clarifying), while continuing to capture the data necessary to understand trends in the discipline and also reflect changing concerns of the computing research community. This year's salary survey reports contain more information within the senior faculty ranks, as we can report many of the salaries based on number of years in rank.

Departments that responded to the survey were sent preliminary results for faculty salaries in December 2007; these results included additional distributional information not contained in this report. The CRA Board views this as a benefit of participating in the survey.

We thank all respondents who completed this year's questionnaire. Departments that participated are listed at the end of this article.

Ph.D. Degree Production and Enrollments (Tables 1-8)

Ph.D. production continues to climb. A total of 1,775 new Ph.D.s were awarded between July 2006 and June 2007 (Table 1). This represents an increase of 18% over last year, and follows last year's 26% increase over the previous year. This year's production of more than 1,700 was predicted last year, and for the second straight year tracks the departments'



own estimates reasonably well. The "optimism ratio," defined as the actual number divided by the predicted number, was 0.95, similar to last

year's 0.94. If this year's optimism ratio holds again next year, there will be approximately 1,900 new Ph.D.s produced in 2007-2008. However, the

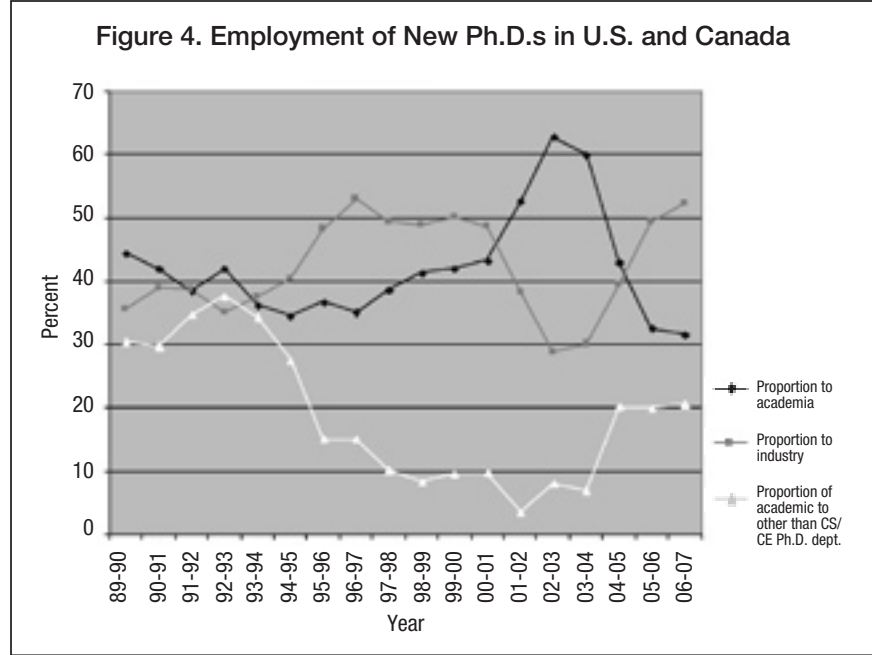
Table 1. Ph.D. Production by Type of Department and Rank

Department, Rank	Ph.D.s Produced	Avg. per Dept.	Ph.D.s Next Year	Avg. per Dept.	Passed Qualifier	Avg. per Dept.	Passed Thesis Ex. (# Depts)	Avg. per Dept.
US CS 1-12	288	24.0	335	27.9	257	21.4	146 (7)	20.9
US CS 13-24	264	22.0	240	20.0	216	18.0	232 (12)	19.3
US CS 25-36	182	15.2	213	17.8	151	12.6	89 (10)	8.9
US CS Other	835	7.7	926	8.6	839	7.8	614 (88)	7.0
Canadian	119	6.3	163	8.6	149	7.8	183 (17)	10.8
US CE	87	9.7	120	13.3	106	11.8	50 (6)	8.3
Total	1,775	10.3	1,997	11.6	1,718	10.0	1,314 (140)	9.4

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	CS		CE		CS&CE	
Male	1,279	80.7%	145	82.4%	1,424	80.9%
Female	306	19.3%	31	17.6%	337	19.1%
Total have Gender Data for	1,585		176		1,761	
Unknown	14		0		14	
Total	1,599		176		1,775	

	CS		CE		CS&CE	
Nonresident Alien	826	53.2%	127	79.4%	953	55.6%
African-American, Non-Hispanic	19	1.2%	1	0.6%	20	1.2%
Native American/Alaskan Native	4	0.3%	0	0.0%	4	0.2%
Asian/Pacific Islander	207	13.3%	7	4.4%	214	12.5%
Hispanic	20	1.3%	0	0.0%	20	1.2%
White, Non-Hispanic	430	27.7%	24	15.0%	454	26.5%
Other/Not Listed	48	3.1%	1	0.6%	49	2.9%
Total have Ethnicity Data for	1,554		160		1,714	
Ethnicity/Residency Unknown	45		16		61	
Total	1,599		176		1,775	



rate of increase would be less than half this year's rate.

The number of new students passing thesis candidacy exams (most, but not all, departments have such exams) declined 11%, although fewer departments reported such exams this year. However, even accounting for this smaller set of departments, the numbers are down. The number of students passing the qualifier also declined significantly (12%). This is an indication that Ph.D. production

should begin declining in the next couple of years.

Longer term, Ph.D. production trends are less clear. The total number of new CS Ph.D. students (Table 5) rose by 4%, following four straight years of a decline in the number of new students. Most of this increase was due to existing Master's level students becoming Ph.D. students, rather than the admission of a larger class of new students. Figure 3 shows a graphical view of the pipeline for computer

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Table 4. Employment of New Ph.D. Recipients By Specialty

	Artificial Intelligence/ Robotics	Hardware/ Architecture	Numerical Analysis/ Scientific Computing	Programming Languages/ Compilers	OS/Networks	Software Engineering	Theory/ Algorithms	Graphics/ Human Interfaces	Databases/ Information Systems	Other/ Unknown	Total	
North American Ph.D. Granting Depts.												
Tenure-track	21	13	3	10	29	20	13	22	14	21	166	11.4%
Researcher	9	4	6	1	7	2	2	5	5	6	47	3.2%
Postdoc	23	2	9	4	11	7	18	13	10	22	119	8.2%
Teaching Faculty	4	0	3	2	5	3	3	3	4	7	34	2.3%
											366	25.1%
North American, Other Categories												
Other CS/CE Dept.	12	4	1	3	9	7	7	5	12	9	69	4.7%
Non-CS/CE Dept.	4	0	1	0	6	2	3	2	6	2	26	1.8%
Industry	75	79	16	50	178	68	36	69	86	105	762	52.3%
Government	3	2	4	1	6	4	6	3	2	13	44	3.0%
Self-Employed	2	0	0	1	1	1	0	1	0	4	10	0.7%
Unemployed	1	0	0	0	1	1	1	1	0	7	12	0.8%
Other	3	1	1	0	2	1	1	1	0	11	21	1.4%
											944	64.8%
Outside North America												
Tenure-Track in Ph.D. Granting	7	5	0	0	18	3	3	5	7	7	55	3.8%
Researcher in Ph.D.	0	0	0	2	4	0	1	0	1	2	10	0.7%
Postdoc in Ph.D.	3	0	1	4	1	0	2	2	2	5	20	1.4%
Teaching in Ph.D.	2	0	0	0	0	1	0	0	0	1	4	0.3%
Other Academic	2	0	0	0	1	0	0	1	0	1	5	0.3%
Industry	6	3	1	3	13	1	4	1	3	7	42	2.9%
Government	0	1	0	0	2	1	1	0	0	1	6	0.4%
Other	1	0	0	1	0	0	0	0	0	2	4	0.3%
											146	10.0%
Total in North America	157	105	44	72	255	116	90	125	139	207	1,310	90.0%
Total Outside North America	21	9	2	10	39	6	11	9	13	26	146	10.0%
Total have Employment Data for	178	114	46	82	294	122	101	134	152	233	1,456	100.0%
Unknown	23	10	9	9	26	14	11	16	12	189	319	
Total	201	124	55	91	320	136	112	150	164	422	1,775	

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Table 5. New Ph.D. Students in Fall 2007 by Department Type and Rank

Department, Rank	CS				CE				CS&CE	
	New Admit	MS to Ph.D.	Total	Avg. per Dept.	New Admit	MS to Ph.D.	Total	Avg. per Dept.	Total	Avg. per Dept.
US CS 1-12	367	46	413	34.4	0	0	0	0.0	413	34.4
US CS 13-24	277	24	301	25.1	7	1	8	0.7	309	25.8
US CS 25-36	253	27	280	23.3	6	0	6	0.5	286	23.8
US CS Other	996	192	1,188	10.5	117	25	142	1.3	1,330	11.8
Canadian	178	19	197	9.4	0	0	0	0.0	197	9.4
US CE	0	0	0	0.0	89	6	95	10.6	95	10.6
Total	2,071	308	2,379	13.3	219	32	251	1.4	2,630	14.7

Table 5a. New Ph.D. Students from Outside North America

Department, Rank	CS	CE	CS&CE	Total New	% Outside North America
US CS 1-12	202	0	202	413	48.9%
US CS 13-24	170	0	170	309	55.0%
US CS 25-36	169	0	169	286	59.1%
US CS Other	650	95	745	1,330	56.0%
Canadian	85	0	85	197	43.1%
US CE	0	71	71	95	74.7%
Total	1,276	166	1,442	2,630	54.8%
Total New	2,379	251	2,630		
% Outside	53.6%	66.1%	54.8%		

Table 6. Ph.D. Degree Total Enrollment by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	2,190	18.0%	0	0.0%	2,190	16.2%
US CS 13-24	1,539	12.7%	23	1.7%	1,562	11.6%
US CS 25-36	1,415	11.6%	14	1.0%	1,429	10.6%
US CS Other	5,753	47.3%	761	56.7%	6,514	48.2%
Canadian	1,268	10.4%	0	0.0%	1,268	9.4%
US CE	0	0.0%	543	40.5%	543	4.0%
Total	12,165		1,341		13,506	

science programs. The data in this graph are normalized by the number of departments reporting. The graph offsets the qualifier data by one year from the data for new students, and offsets the graduation data by five years from the data for new students. These data have been useful in estimating the

timing of changes in production rates. Table 5a reports the fall 2007 data for new students from outside North America. Top-ranked U.S. departments continue to have a somewhat higher fraction of domestic students than do lower-ranked departments, and Canadian departments have a

lower percentage of Ph.D. students from outside North America than do their U.S. counterparts. However, this year, the distribution of new Ph.D. students who are not North American is more uniform across the ranks, ranging from 49% to 59% in U.S. programs. Among top-ranked U.S. programs, the fraction of new Ph.D. students from outside North America increased considerably. In Canadian programs, the fraction of new students who were not North American also rose. Overall, the fraction of new Ph.D. students who were not from North America rose from 53.1% in fall 2006 to 54.8% in fall 2007.

The trend toward employment in industry over academia continues for the 2006-07 Ph.D. graduates (Table 4). Of those who reported employment, 32% chose academic employment in North America (compared to 33%, 43% and 60%, respectively, in the previous three years). There also is a continued decline in the percentage who went to tenure-track positions in Ph.D.-granting programs (11.4% vs 12.8%, 17.5% and 27.5% in the previous three years) and to non-Ph.D.-granting CS/CE departments (4.7% vs. 5.2% and 7.0% in the past

two years). Nevertheless, the number of persons going into both types of positions stayed about the same. There were about the same number of new Ph.D.s going to postdoctoral positions as last year, although this also represents a somewhat smaller percentage of the total number of graduates. Industry hired 52.3% of new Ph.D. graduates, compared to 49.4% and 39.6% in the previous two years. Figure 4 shows the employment trend of new Ph.D.s in academia and industry, and the proportion of those going to academia who took positions in departments other than Ph.D.-granting CS/CE departments.

Despite the continued record Ph.D. production, unemployment of new Ph.D.s remains less than 1%. Perhaps surprisingly, the proportion of Ph.D. graduates who were reported taking positions outside of North America, among those whose employment is known, decreased this year from 13.1% to 10.0%.

Table 4 also indicates the areas of specialty of new CS/CE Ph.D.s. Year-to-year fluctuations among these data are common and multi-year trends are difficult to discern. This year, there was an increase in the software engineering area after a decline last year. There also was an increase in the graphics area and a more significant increase in the "unknown/other" category. It is not clear if departments are not tracking the areas in which graduates receive their degrees as carefully as they did previously, or if our survey is missing significant emerging areas.

For the second straight year, the proportion of women among new Ph.D.s rose to 19.1% in 2007 from 18.1% the previous year. Ethnicity characteristics of new Ph.D.s are similar to those reported last year

Figure 5. Nonresident Aliens as Fraction of Ph.D. Enrollments

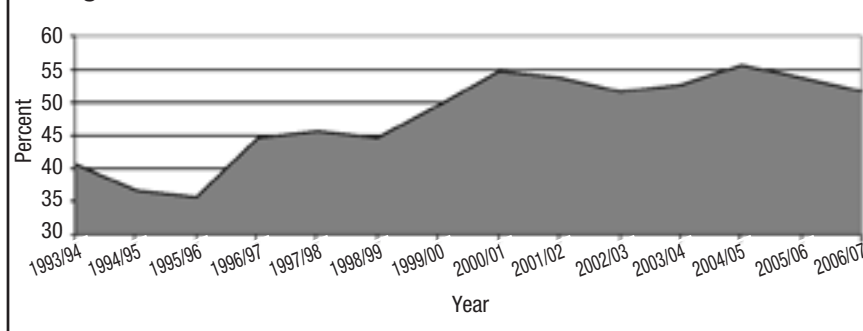


Figure 6. BS Production

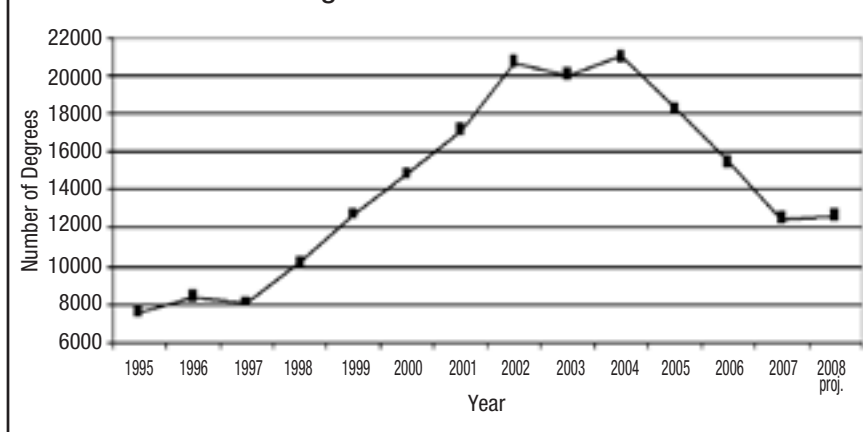
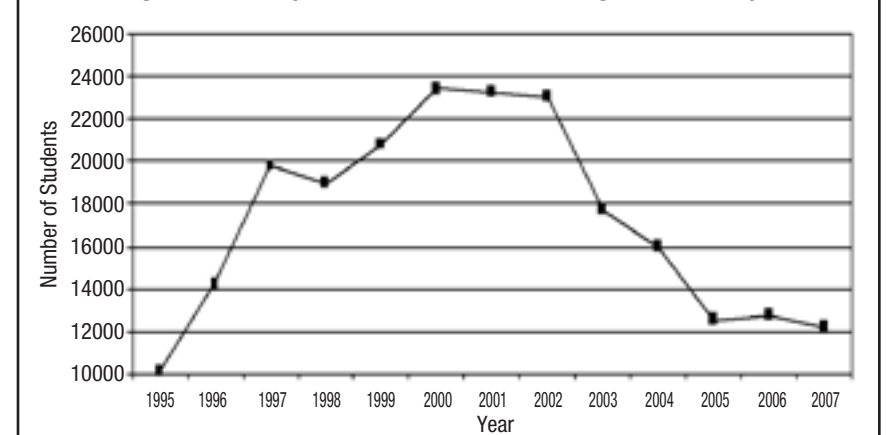


Figure 7. Newly Declared CS/CE Undergraduate Majors



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	CS		CE		CS&CE	
	Count	%	Count	%	Count	%
Male	9,511	80.4%	986	81.5%	10,497	80.5%
Female	2,314	19.6%	224	18.5%	2,538	19.5%
Total have Gender Data for	11,825		1,210		13,035	
Unknown	340		131		471	
Total	12,165		1,341		13,506	

	CS		CE		CS&CE	
	Count	%	Count	%	Count	%
Nonresident Alien	5,376	50.3%	792	71.0%	6,168	52.2%
African-American, Non-Hispanic	200	1.9%	21	1.9%	221	1.9%
Native American/ Alaskan Native	9	0.1%	4	0.4%	13	0.1%
Asian/Pacific Islander	1,204	11.3%	48	4.3%	1,252	10.6%
Hispanic	181	1.7%	10	0.9%	191	1.6%
White, Non-Hispanic	3,541	33.1%	223	20.0%	3,764	31.9%
Other/Not Listed	179	1.7%	18	1.6%	197	1.7%
Total have Ethnicity Data for	10,690		1,116		11,806	
Ethnicity/Residency Unknown	1,475		225		1,700	
Total	12,165		1,341		13,506	

(Table 3). There was an increase in the number of Hispanics, but this just offsets declines from last year. Collectively, African-American, Native-American/Alaskan Native, and Hispanics continue to account for less than 3% of the total.

Current Ph.D. enrollment proportions show similar gender and ethnicity breakdowns as they did last year (Tables 7 and 8). However, this year the number of students in the "Unknown" category increased markedly for both gender and ethnicity because a few departments did not report this information for any of their students.

Master's and Bachelor's Degree Production and Enrollments (Tables 9-16)

Master's degree production rose slightly this year, by 2%, following a 13% decline last year (Tables 9, 10). Predictions of the change in Master's degrees in one year parallel the change in the number of Master's students in the previous year. This year, enrollment in Master's programs by new students (Table 13) is 2.6% higher than it was a year ago, suggesting another fairly small change in graduates next year. In contrast, the number of Master's students was much higher than the number predicted last year by the departments themselves. Table 12 shows these predictions for this year.

Once again, there was very little difference in gender characteristics

of Master's recipients compared to last year's survey. Consistent with the ethnicity changes in new Master's students reported last year, the fraction of Master's recipients this year who were Nonresident Aliens rose (from 47.3% to 52.5%). The fraction of Master's recipients who were White, non-Hispanic dropped from 32.5% to 28.3%. These one-year "trends" are the reverse of those observed last year. The overall fraction of new Master's students from outside North America remained about the same this year (56.5%), though increases were observed at U.S. departments ranked 13-36.

Bachelor's degree production (Tables 9 and 10) again was down significantly, by nearly 20% this year. This year's decline is in line with the 16% decline estimated by the departments last year, and follows the declining trends in the number of new

Bachelor's students that have been reported widely in recent years.

Perhaps even more alarming is the drop in the fraction of Bachelor's degrees awarded to women, from 14.2% last year to 11.8% this year (Table 9). The fraction of new female students is reported now to be less than 10% in many Bachelor's programs. Ethnicity is also less diverse, with the proportion of White, non-Hispanics receiving Bachelor's degrees rising to 66.0% from 59.6% just two years ago (Table 10). These are serious problems in achieving our field's diversity goals.

Actual Bachelor's degree production in departments reporting this year again was within 4% of the projection from last year's reporting departments. From this year's estimates (Table 11), it would appear that the number of Bachelor's graduates in academic year 2007-08 will be about the same as we report for 2006-07.

The number of new undergraduate majors fell by more than 4% this year, a disappointment following last year's slight rise (Table 14 and Figure 7). However, new majors in U.S. CS departments held steady; the decline is in the Canadian programs. In fact, the U.S. CS programs showed slight increases except for departments ranked 25-36.

Total enrollment in Bachelor's programs (Table 16) continues its downward trend. This suggests additional declines in the number of Bachelor's graduates, despite the mildly encouraging news each of the past two years in the number of new Bachelor's students and despite departmental predictions of a similar number of Bachelor's graduates for 2007-08 as we had in 2006-07. Enrollment today is more than 50% lower than it was five years ago.

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	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Male	8,733	87.8%	1,922	90.1%	10,655	88.2%	5,526	77.3%	505	77.6%	6,031	77.4%
Female	1,208	12.2%	212	9.9%	1,420	11.8%	1,620	22.7%	146	22.4%	1,766	22.6%
Total have Gender Data for	9,941		2,134		12,075		7,146		651		7,797	
Unknown	343		80		423		415		46		461	
Total	10,284		2,214		12,498		7,561		697		8,258	

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Nonresident Aliens	496	6.5%	202	10.5%	698	7.3%	3,470	52.4%	329	53.5%	3,799	52.5%
African-American, Non-Hispanic	261	3.4%	82	4.3%	343	3.6%	132	2.0%	16	2.6%	148	2.0%
Native American/ Alaskan Native	30	0.4%	5	0.3%	35	0.4%	8	0.1%	0	0.0%	8	0.1%
Asian/Pacific Islander	1,115	14.6%	339	17.6%	1,454	15.2%	918	13.9%	59	9.6%	977	13.5%
Hispanic	412	5.4%	101	5.2%	513	5.3%	109	1.6%	12	2.0%	121	1.7%
White, Non-Hispanic	5,158	67.3%	1,170	60.7%	6,328	66.0%	1,851	28.0%	196	31.9%	2,047	28.3%
Other/Not Listed	191	2.5%	30	1.6%	221	2.3%	132	2.0%	3	0.5%	135	1.9%
Total have Ethnicity Data for	7,663		1,929		9,592		6,620		615		7,235	
Ethnicity/Residency Unknown	2,621		285		2,906		941		82		1,023	
Total	10,284		2,214		12,498		7,561		697		8,258	

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Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,016	9.6%	203	9.8%	1,219	9.6%
US CS 13-24	774	7.3%	197	9.5%	971	7.7%
US CS 25-36	1,053	10.0%	9	0.4%	1,062	8.4%
US CS Other	4,834	45.8%	1,145	55.3%	5,979	47.3%
Canadian	2,751	26.0%	77	3.7%	2,828	22.4%
US CE	135	1.3%	440	21.2%	575	4.6%
Total	10,563		2,071		12,634	

Department, Rank	CS		CE		CS&CE	
US CS 1-12	747	12.7%	81	11.2%	828	12.5%
US CS 13-24	1,249	21.2%	1	0.1%	1,250	18.9%
US CS 25-36	455	7.7%	0	0.0%	455	6.9%
US CS Other	2,889	49.1%	450	62.4%	3,339	50.6%
Canadian	543	9.2%	0	0.0%	543	8.2%
US CE	0	0.0%	189	26.2%	189	2.9%
Total	5,883		721		6,604	

Department, Rank	CS		CE		CS & CE		Outside North America	
	Total	Avg. per Dept.	Total	Avg. per Dept.	Total		Total	%
US CS 1-12	574	47.8	67	5.6	641	53.4	255	39.8%
US CS 13-24	920	76.7	2	0.2	922	76.8	655	71.0%
US CS 25-36	519	43.3	0	0.0	519	43.3	400	77.1%
US CS Other	2,930	24.8	429	3.6	3,359	28.5	1,897	56.5%
Canadian	535	25.5	0	0.0	535	25.5	226	42.2%
US CE	0	0.0	183	20.3	183	20.3	46	25.1%
Total	5,478		681		6,159	33.5	3,479	56.5%

Department, Rank	CS			CE			CS&CE Majors	
	Pre-Major	Major	Avg. Major per Dept.	Pre-Major	Major	Avg. Major per Dept.	Major	Avg. Major per Dept.
US CS 1-12	186	844	84.4	0	178	89.0	1,022	102.2
US CS 13-24	21	576	52.4	0	232	46.4	808	73.5
US CS 25-36	255	763	76.3	0	54	27.0	817	81.7
US CS Other	2,483	5,732	60.3	784	1,546	42.9	7,278	76.6
Canadian	351	1,844	102.4	0	56	28.0	1,900	105.6
US CE	0	51	51.0	53	319	35.4	370	370.0
Total	3,296	9,810		837	2,385		12,195	84.1

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,070	7.2%	80	4.4%	1,150	6.9%
US CS 13-24	1,914	13.0%	4	0.2%	1,918	11.6%
US CS 25-36	821	5.6%	0	0.0%	821	4.9%
US CS Other	9,299	63.0%	1,216	66.9%	10,515	63.4%
Canadian	1,667	11.3%	0	0.0%	1,667	10.0%
US CE	0	0.0%	517	28.5%	517	3.1%
Total	14,771		1,817		16,588	

Department, Rank	CS			CE			CS&CE Majors	
	Pre-Major	Major	Avg. Major per Dept.	Pre-Major	Major	Avg. Major per Dept.	Total	Avg. Major per Dept.
US CS 1-12	326	3,203	266.9	0	671	55.9	3,874	322.8
US CS 13-24	253	2,786	232.2	5	800	66.7	3,586	298.8
US CS 25-36	500	3,062	255.2	0	186	15.5	3,248	270.7
US CS Other	4,469	19,624	173.7	1,263	5,272	46.7	24,896	220.3
Canadian	309	8,366	398.4	0	273	13.0	8,639	411.4
US CE	0	336	37.3	81	1,648	183.1	1,984	220.4
Total	5,857	37,377	208.8	1,349	8,850	49.4	46,227	258.3

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Faculty Demographics (Tables 17-23)

Total faculty sizes held steady during the past year. Tenure-track faculty size is within 1% of last year's value. Significant increases were observed in the number of researchers and post-docs, while there was a sharp decline in the number of teaching faculty. Coupled with the data in Table 4, it appears that postdocs may be staying longer in these positions than they have in the past.

The fraction of women hired into tenure-track positions rose from 19.5% last year to 23.9% this year. This is a higher fraction than the 19.1% of female Ph.D.s produced (Table 2). The fraction of White, non-Hispanics hired into tenure-track positions rose from 43.0% last year to 48.3% this year. There also was an increase in Asian/Pacific Islanders, offset by a decrease in Nonresident Aliens. Disappointingly, only five tenure-track hires were reported among African Americans, Native Americans and Hispanics combined. Gender and ethnicity characteristics of current faculty are similar to those of last year (Tables 21 and 22).

Last year, the reporting departments predicted a 4% increase in faculty size. This year's reporting departments forecast a 5% growth next year. Table 17 shows these predictions by category of faculty, Table 18 by ranking strata, and Table 18a by both (the latter for U.S. CS programs only). It is clear that expected faculty growth rates are modest these days.

Table 18b shows the recruiting results from last year's hiring cycle. As was the case last year, the data indicate that roughly one of every three open tenure-track positions went unfilled last year. However, the top 24 U.S. CS departments and Canadian departments filled a smaller fraction of their vacant positions than did lower-ranked U.S. CS departments.

There appears to be more movement of faculty to new academic positions than in recent years. This year's

Table 17. Actual and Anticipated Faculty Size by Position

	Actual		Projected		Expected Two-Year Growth	
	2007-2008	2008-2009	2009-2010			
Tenure-Track	4,390	4,575	4,774	384	8.7%	
Researcher	633	642	660	27	4.3%	
Postdoc	400	436	483	83	20.8%	
Teaching Faculty	353	421	467	114	32.3%	
Other/Not Listed	131	138	139	8	6.1%	
Total	5,907	6,212	6,523	616	10.4%	

Table 18. Actual and Anticipated Faculty Size by Department Type and Rank

	Actual		Projected		Expected Two-Year Growth	
	2007-2008	2008-2009	2009-2010			
US CS 1-12	730	776	802	72	9.9%	
US CS 13-24	571	611	644	73	12.8%	
US CS 25-36	572	614	651	79	13.8%	
US CS Other	2,929	3,088	3,266	337	11.5%	
Canadian	895	912	931	36	4.0%	
US CE	210	211	229	19	9.0%	
Total	5,907	6,212	6,523	616	10.4%	

survey reported 103 such changes (Table 23), while the past two years reported 74 and 61, respectively. Other categories of faculty losses showed little change from last year.

Research Expenditures and Graduate Student Support (Tables 24-26)

Table 24-1 shows the department's total expenditure (including indirect costs or "overhead" as stated on project budgets) from external sources of support. Table 24-2 shows the per capita expenditure, where capitation is computed two ways. The first is relative to the number of tenured and tenure-track faculty members. The second is relative to researchers and postdocs, as well as tenured and tenure-track faculty. Canadian levels are shown in Canadian dollars. The data indicate that the higher the department's ranking, the more external

funding it receives (both in total and per capita).

Mean total expenditures declined slightly this year in all CS ranking strata except U.S. departments ranked greater than 36. Median total expenditures increased in U.S. departments ranked 1-12 and decreased in departments ranked 13-36. U.S. departments ranked 1-12 also improved with respect to per capita expenditures, as did Canadian departments, while U.S. departments ranked 25-36 declined. Other CS ranking strata showed mixed results with respect to per capita expenditures.

Table 25 shows the number of graduate students supported as full-time students as of fall 2007, further categorized as teaching assistants (TAs), research assistants (RAs), fellows, or computer systems supporters, and split between those on institutional vs. external funds. The number of TAs held steady again this year, with

U.S. departments ranked 1-12 showing a strong increase and Canadian departments a correspondingly strong decrease. There are about the same number of RAs this year as there were last year, but there are significant differences among the ranking strata compared to last year. Among U.S. departments: those ranked 1-12 show considerable gains in both total and externally supported RAs and fewer RAs supported on institutional funds; departments ranked 13-24 show losses in total and externally supported RAs and gains in institutionally supported RAs; departments ranked 25-36 show a shift from externally supported to institutionally supported RAs, with little change in the total; and departments ranked greater than 36 show little change from last year in either externally or institutionally supported RAs. Canadian departments showed little change in externally supported RAs, but a significant decline in

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Table 18a. Actual and Anticipated CS Faculty Size by Position and Department Rank

	Actual		Projected				Expect 2-Yr Growth	
	2007-2008		2008-2009		2009-2010		#	%
US CS 1-12	Total	Average	Total	Average	Total	Average		
TenureTrack	486	40.5	504	42.0	518	43.2	32	6.6%
Research	56	4.7	64	5.3	66	5.5	10	17.9%
Postdoc	64	5.3	71	5.9	75	6.3	11	17.2%
Teaching	86	7.2	98	8.2	103	8.6	17	19.8%
Other	38	3.2	39	3.3	40	3.3	2	5.3%
US CS 13-24	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	392	32.7	415	34.6	433	36.1	41	10.5%
Research	40	3.3	42	3.5	43	3.6	3	7.5%
Postdoc	83	6.9	90	7.5	98	8.2	15	18.1%
Teaching	53	4.4	60	5.0	66	5.5	13	24.5%
Other	3	0.3	4	0.3	4	0.3	1	33.3%
US CS 25-36	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	386	32.2	409	34.1	426	35.5	40	10.4%
Research	39	3.3	39	3.3	40	3.3	1	2.6%
Postdoc	59	4.9	66	5.5	73	6.1	14	23.7%
Teaching	44	3.7	56	4.7	68	5.7	24	54.5%
Other	44	3.7	44	3.7	44	3.7	0	0.0%
US CS Other	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	2,239	19.6	2,345	20.6	2,471	21.7	232	10.4%
Research	423	3.7	426	3.7	437	3.8	14	3.3%
Postdoc	138	1.2	153	1.3	174	1.5	36	26.1%
Teaching	106	0.9	138	1.2	158	1.4	52	49.1%
Other	23	0.2	26	0.2	26	0.2	3	13.0%

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Table 18b. Vacant Positions 2006-2007 by Position and Department Rank and Type

	Vacant Positions 2006-2007			
	Tried to fill	Filled	Unfilled	% Unfilled
US CS 1-12				
TenureTrack	20	12	8	40.0%
Research	3	3	0	0.0%
Postdoc	6	6	0	0.0%
Teaching	28	28	0	0.0%
Other	0	0	0	0.0%
US CS 13-24				
TenureTrack	26	15	11	42.3%
Research	1	1	0	0.0%
Postdoc	6	4	2	33.3%
Teaching	21	15	6	28.6%
Other	0	0	0	0.0%
US CS 25-36				
TenureTrack	41	31	10	24.4%
Research	17	16	1	5.9%
Postdoc	14	12	2	14.3%
Teaching	22	21	1	4.5%
Other	1	1	0	0.0%
US CS Other				
TenureTrack	158	118	40	25.3%
Research	76	72	4	5.3%
Postdoc	23	23	0	0.0%
Teaching	65	63	2	3.1%
Other	0	0	0	0.0%
Canadian				
TenureTrack	30	15	15	50.0%
Research	5	4	1	20.0%
Postdoc	34	33	1	2.9%
Teaching	20	20	0	0.0%
Other	1	1	0	0.0%
US CE				
TenureTrack	19	11	8	42.1%
Research	9	9	0	0.0%
Postdoc	24	24	0	0.0%
Teaching	20	20	0	0.0%
Other	0	0	0	0.0%
Total				
TenureTrack	294	202	92	31.3%
Research	111	105	6	5.4%
Postdoc	107	102	5	4.7%
Teaching	176	167	9	5.1%
Other	2	2	0	0.0%

institutionally supported RAs. These changes generally are consistent with the changes in external research expenditures noted above.

The number of externally supported, full-support fellows is down considerably this year in U.S. departments ranked 1-12 and 25-36, and in Canadian departments. Some compensating gains in U.S. departments ranked 1-12 are observed in fellows supported institutionally.

Respondents were asked to "provide the net amount (as of fall 2007) of an academic-year stipend for a first-year doctoral student (not including tuition or fees)." The results are shown in Table 26. Canadian stipends are shown in Canadian dollars. The data show healthy stipend increases for TAs in U.S. departments ranked 1-12, slight increases in departments ranked greater than 36, decreases for TAs in departments ranked 13-24, and essentially no change in departments ranked 25-36. Canadian departments also showed an increase in stipends. There also are mixed results for RA stipends. Fellow stipends were fairly steady compared to last year, with U.S. departments ranked 25-36 showing the greatest increases.

Faculty Salaries (Tables 27-34)

Each department was asked to report individual (but anonymous) faculty salaries if possible; otherwise, the department was requested to provide the minimum, median, mean, and maximum salaries for each rank (full, associate, and assistant professors and non-tenure-track teaching faculty), and the number of persons at each rank. The salaries are those in effect on January 1, 2008. For U.S. departments, nine-month salaries are reported in U.S. dollars. For Canadian departments, twelve-month salaries are reported in Canadian dollars.

Respondents were asked to include salary supplements such as salary monies from endowed positions.

The tables contain data about ranges and measures of central tendency only. Departments reporting individual salaries were provided more comprehensive distributional information in December 2007. A total of 148 departments (85% of those reporting salary data) provided salaries at the individual level.

It is well known that, particularly at the associate professor level, time in rank is an important element when trying to draw comparisons in salaries. Therefore, this year we obtained information about time in rank for associate and full professors. Thus the salary tables this year are more comprehensive than those of prior years.

The minimum and maximum of the reported salary minima (and maxima) are self-explanatory. The range of salaries in a given rank among departments that reported data for that rank is the interval ["minimum of the minima," "maximum of the maxima"]. The mean of the reported salary minima (maxima) in a given rank is computed by summing the departmental reported minimum (maximum) and dividing by the number of departments reporting data at that rank.

The median salary at each rank is the average of the median salaries reported at that rank by each of the departments. Thus, it is not a true median of all the salaries. The average salary at each rank is computed by summing the individual means reported at each rank and dividing by the number of departments reporting at that rank. Thus, it is not a true average of all the salaries.

Overall U.S. CS average salaries (Table 27) increased between 3.6% and 4.6%, depending on tenure-track rank, and 6.8% for non-tenure-track teaching faculty. These increases are somewhat similar to the levels experienced in the past two years for tenure-track faculty, and exceed the 4.2% and 4.8% levels for non-tenure-track teaching faculty from these two years. Full professors received larger average increases this year than did faculty of lower rank at lower-ranked departments, with associate professors receiving the highest average salary increases at rank 1-24 departments. Canadian salaries (Table 33) rose 1.5% to 4.7%, with the greater increase at the full professor rank and the smaller at the assistant professor rank. Non-tenure-track teaching faculty salaries

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Table 19. Gender of Newly Hired Faculty

	Tenure-track		Researcher		Postdoc		Teaching Faculty		Total	
Male	137	72.9%	42	85.7%	84	78.5%	31	73.8%	294	76.2%
Female	45	23.9%	7	14.3%	21	19.6%	11	26.2%	84	21.8%
	6		0		2		0		8	
Total	188		49		107		42		386	

Table 20. Ethnicity of Newly Hired Faculty

	Tenure-Track		Researcher		Postdoc		Teaching Faculty		Total
Nonresident Alien	30	17.4%	13	31.7%	32	37.2%	2	4.8%	77
African-American, Non-Hispanic	1	0.6%	1	2.4%	0	0.0%	2	4.8%	4
Native American/Alaskan Native	2	1.2%	0	0.0%	0	0.0%	0	0.0%	2
Asian/Pacific Islander	47	27.3%	7	17.1%	21	24.4%	5	11.9%	80
Hispanic	2	1.2%	0	0.0%	2	2.3%	1	2.4%	5
White, Non-Hispanic	83	48.3%	20	48.8%	31	36.0%	32	76.2%	166
Other/Not Listed	7	4.1%	0	0.0%	0	0.0%	0	0.0%	7
Total have Ethnicity Data for	172		41		86		42		341
Ethnicity/Residency Unknown	16		8		21		0		45
Total	188		49		107		42		386

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	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Male	1,738	89.1%	1,172	86.6%	904	80.4%	537	73.7%	340	83.7%	277	82.0%	4,968	84.2%
Female	212	10.9%	181	13.4%	221	19.6%	192	26.3%	66	16.3%	61	18.0%	933	15.8%
Total gender known	1,950		1,353		1,125		729		406		338		5,901	
Gender unknown	0		0		0		0		0		8		8	
Total	1,950		1,353		1,125		729		406		346		5,909	

	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Nonresident Alien	11	0.6%	24	2.0%	167	16.6%	13	2.3%	47	12.8%	130	43.8%	392	7.6%
African-American, Non-Hispanic	8	0.5%	11	0.9%	21	2.1%	15	2.6%	5	1.4%	2	0.7%	62	1.2%
Native American/Alaskan Native	0	0.0%	1	0.1%	2	0.2%	0	0.0%	0	0.0%	0	0.0%	3	0.1%
Asian/Pacific Islander	383	22.0%	265	22.4%	290	28.8%	46	8.1%	65	17.8%	54	18.2%	1,103	21.4%
Hispanic	28	1.6%	31	2.6%	19	1.9%	9	1.6%	1	0.3%	6	2.0%	94	1.8%
White, Non-Hispanic	1298	74.4%	838	71.0%	494	49.0%	481	84.4%	246	67.2%	103	34.7%	3,460	67.0%
Other/Not Listed	16	0.9%	11	0.9%	15	1.5%	6	1.1%	2	0.5%	2	0.67%	52	1.0%
Total Have Ethnicity Data For	1,744		1,181		1,008		570		366		297		5,166	
Ethnicity/Residency Unknown	206		172		117		159		40		49		743	
Total	1,950		1,353		1,125		729		406		346		5,909	

	Total
Full Professor	98
Associate Professor	42
Assistant Professor	46
Teaching Faculty	176
Research Faculty	60
Postdoctorate	20
Total	442

	Total
Died	7
Retired	60
Took Academic Position Elsewhere	103
Took Nonacademic Position	42
Remained, but Changed to Part-Time	17
Other	25
Unknown	5
Total	259

Department, Rank	Total Expenditure			
	Minimum	Mean	Median	Maximum
US CS 1-12	\$3,600,000	\$19,732,686	\$14,860,365	\$82,819,390
US CS 13-24	\$3,333,717	\$10,530,722	\$8,291,594	\$23,471,792
US CS 25-36	\$461,840	\$5,746,572	\$4,294,663	\$19,398,076
US CS Other	\$24,000	\$2,706,095	\$1,738,518	\$24,699,463
Canadian	\$158,081	\$3,155,678	\$2,316,978	\$10,799,100
US CE	\$1,000,000	\$2,873,088	\$2,175,000	\$9,017,611

Department, Rank	Per Capita Expenditure (Tenure-Track Faculty Only)				Per Capita Expenditure (Tenure-Track, Research, and Postdoctorate Faculty)			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$112,441	\$406,520	\$372,103	\$985,945	\$99,467	\$318,942	\$315,755	\$583,235
US CS 13-24	\$138,235	\$321,224	\$273,021	\$847,833	\$123,684	\$227,478	\$237,124	\$322,984
US CS 25-36	\$24,307	\$168,346	\$160,935	\$304,723	\$24,307	\$129,946	\$136,231	\$221,617
US CS Other	\$1,791	\$127,750	\$96,653	\$833,123	\$1,791	\$107,091	\$85,195	\$714,105
Canadian	\$3,856	\$85,320	\$79,549	\$229,768	\$3,764	\$72,392	\$75,269	\$196,347
US CE	\$62,052	\$133,756	\$115,382	\$250,000	\$50,561	\$121,647	\$103,571	\$214,286

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Table 25. Graduate Students Supported as Full-Time Students by Department Type and Rank

Department, Rank	Number on Institutional Funds					Number on External Funds														
	Teaching Assistants	Research Assistants	Full-Support Fellows	Graduate Assistants for Computer Systems Support	Other	Teaching Assistants	Research Assistants	Full-Support Fellows	Graduate Assistants for Computer Systems Support	Other										
US CS 1-12	488	20.6%	96	4.0%	127	5.4%	0	0.0%	2	0.1%	0	0.0%	1,480	62.4%	180	7.6%	0	0.0%	0	0.0%
US CS 13-24	285	20.6%	128	9.3%	124	9.0%	0	0.0%	2	0.1%	12	0.9%	749	54.2%	81	5.9%	0	0.0%	0	0.0%
US CS 25-36	332	29.7%	144	12.9%	59	5.3%	19	1.7%	1	0.1%	0	0.0%	474	42.5%	40	3.6%	40	3.6%	7	0.6%
US CS Other	1,817	36.1%	547	10.9%	188	3.7%	67	1.3%	69	1.4%	4	0.1%	2,018	40.1%	116	2.3%	1	0.0%	204	4.1%
Canadian	276	24.3%	172	15.2%	216	19.0%	2	0.2%	160	14.9%	2	0.2%	158	13.9%	102	9.0%	0	0.0%	46	4.1%
US CE	94	22.4%	8	1.9%	20	4.8%	0	0.0%	0	0.0%	34	8.1%	241	57.7%	20	4.8%	0	0.0%	1	0.2%
Total	3,291	28.7%	1,095	9.6%	734	6.4%	88	0.8%	234	2.0%	52	0.5%	5,120	44.7%	539	4.7%	41	0.4%	258	2.3%

Table 26-1. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Teaching Assistantships				Research Assistantships			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$10,000	\$17,334	\$18,212	\$22,061	\$15,570	\$19,315	\$19,400	\$27,600
US CS 13-24	\$4,640	\$14,727	\$15,418	\$26,100	\$9,288	\$18,324	\$18,372	\$26,100
US CS 25-36	\$6,138	\$15,143	\$15,078	\$19,547	\$7,500	\$15,334	\$15,696	\$19,547
US CS Other	\$1,100	\$14,228	\$14,486	\$38,800	\$1,200	\$14,582	\$15,000	\$24,502
Canadian	\$1,214	\$9,875	\$9,794	\$19,000	\$3,405	\$13,816	\$12,872	\$24,300
US CE	\$1,345	\$12,006	\$14,500	\$16,400	\$1,250	\$12,230	\$14,500	\$16,740

Table 26-2. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Full-Support Fellows				Assistantships for Computer Systems Support			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	\$16,245	\$20,207	\$19,927	\$27,600	*	*	*	*
US CS 13-24	\$9,288	\$19,718	\$20,000	\$26,100	*	*	*	*
US CS 25-36	\$12,000	\$18,528	\$18,191	\$25,000	\$5,500	\$14,438	\$15,782	\$18,756
US CS Other	\$1,750	\$18,515	\$18,000	\$52,500	\$2,400	\$13,187	\$14,000	\$24,637
Canadian	\$8,783	\$19,424	\$16,725	\$40,000	*	*	*	*
US CE	\$13,500	\$19,333	\$19,000	\$27,500	*	*	*	*

*Numbers not reported due to low number of respondents

Table 26-3. Fall 2007 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Other Assistantships			
	Minimum	Mean	Median	Maximum
US CS 1-12	\$20,025	\$24,008	\$25,000	\$27,000
US CS 13-24	*	*	*	*
US CS 25-36	\$2,000	\$12,752	\$17,500	\$18,756
US CS Other	\$1,000	\$14,301	\$15,056	\$30,000
Canadian	\$5,500	\$10,832	\$12,041	\$14,955
US CE	*	*	*	*

*Numbers not reported due to low number of respondents

for Canadian departments rose 6.8%, the same increase as was observed for U.S. CS programs.

Average salaries for new Ph.D.s (those who received their Ph.D. last year and then joined departments as tenure-track faculty) increased 3% from those reported in last year's survey (Table 34). This is the same level of increase observed last year for new Ph.D.s and, as has been the case in recent years, is somewhat smaller than the average increases for continuing faculty. New Ph.D. salaries in Canadian departments rose 1.5%, to \$83,043 for twelve months in tenure-track positions, which is the same level of increase as for Canadian assistant professors overall. However, this is based on only six data points, so we do not show a separate table for new Ph.D.s in the Canadian departments.

Concluding Observations

We have not yet reached the peak of Ph.D. production, although we appear to be getting close. Most of the Ph.D. graduates continue to go to industry, with the number of available academic positions changing little in the past three years.

Undergraduate degree production continues its downward trend, although this trend should cease within the next two years, at least in U.S. CS departments. However, signs of recovery from the sharp decline that has lasted several years have yet to materialize.

Rankings

For tables that group computer science departments by rank, the rankings are based on information collected in the 1995 assessment of research and doctorate programs in

the United States conducted by the National Research Council (NRC) [see <http://www.cra.org/statistics/nrcstudy2/home.html>]. New NRC rankings are anticipated later in 2008, and future Taulbee reports may be modified as a result.

The top twelve schools in this ranking are: Stanford, Massachusetts Institute of Technology, University of California (Berkeley), Carnegie Mellon, Cornell, Princeton, University of Texas (Austin), University of Illinois (Urbana-Champaign), University of Washington, University of Wisconsin (Madison), Harvard, and California Institute of Technology. All schools in this ranking participated in the survey this year.

CS departments ranked 13-24 are: Brown, Yale, University of California (Los Angeles), University of Maryland (College Park), New York University, University of Massachusetts (Amherst), Rice, University of Southern California, University of Michigan, University of California (San Diego), Columbia, and University of Pennsylvania.² All schools in this ranking participated in the survey this year.

CS departments ranked 25-36 are: University of Chicago, Purdue, Rutgers, Duke, University of North Carolina (Chapel Hill), University of Rochester, State University of New York (Stony Brook), Georgia Institute of Technology, University of Arizona, University of California (Irvine), University of Virginia, and Indiana. All schools in this ranking participated in the survey this year.

CS departments that are ranked above 36 or that are unranked that responded to the survey include: Arizona State University, Auburn, Boston University, Brandeis, Case Western Reserve, City University of New York Graduate Center, Clemson, College of William and Mary, Colorado School of Mines, Colorado State, Dartmouth, DePaul, Drexel, Florida Institute of Technology, Florida International, Florida State, George Mason, George Washington, Georgia State, Illinois Institute of Technology, Iowa State, Johns Hopkins, Kansas State, Kent State, Lehigh, Louisiana State, Michigan State, Michigan Technological, Mississippi State, Missouri University of Science and Technology, Montana State, Naval Postgraduate School, New Mexico State, North Carolina State, North Dakota State, Northeastern, Northwestern, Nova Southeastern, Oakland, Ohio State, Oklahoma State, Old Dominion, Oregon State, Pace, Pennsylvania State, Polytechnic, Portland State, Rensselaer Polytechnic, Southern Methodist University, Stevens Institute of Technology, Syracuse, Temple, Texas A&M, Texas Tech, Toyota Technological Institute (Chicago), Tufts, Vanderbilt, Virginia Tech, Washington State, Washington (St. Louis), Wayne State, Western Michigan, Worcester Polytechnic, and Wright State.

University of: Alabama (Birmingham, Huntsville, and Tuscaloosa), Albany, Arkansas (Fayetteville and Little Rock), Buffalo-SUNY, California (at Davis,

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Table 27. Nine-month Salaries, 147 Responses of 176 US Computer Science Departments

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	404	*	\$129,349	\$233,062	\$139,656	\$138,006	*	\$149,457	\$255,900
Full, in rank 16-20 years	299	\$74,189	\$125,205	\$197,037	\$134,854	\$134,454	\$94,860	\$146,936	\$213,421
Full, in rank 11-15 years	224	\$80,808	\$122,318	*	\$133,130	\$132,749	\$90,399	\$146,722	*
Full, in rank 6-10 years	167	*	\$116,554	\$190,000	\$127,698	\$126,101	*	\$142,203	\$281,779
Full, in rank 0-5 years	150	\$80,595	\$111,456	\$201,798	\$124,416	\$122,363	\$93,670	\$141,574	\$294,975
Full, yrs in rank not given	234	\$85,900	\$111,321	*	\$133,782	\$132,271	\$107,808	\$164,757	*
Full Professor: total	1,478	\$72,983			\$129,617				\$294,975
Assoc, in rank 21 years +	40	\$67,769	\$92,910	*	\$94,994	\$95,055	\$68,964	\$96,161	*
Assoc, in rank 16-20 years	73	*	\$90,635	*	\$92,257	\$91,777	*	\$93,927	*
Assoc, in rank 11-15 years	91	*	\$95,859	\$141,848	\$97,277	\$97,899	*	\$100,838	\$159,902
Assoc, in rank 6-10 years	125	\$65,263	\$97,165	\$136,000	\$100,016	\$100,000	\$69,316	\$102,224	\$137,749
Assoc, in rank 0-5 years	478	*	\$94,673	\$129,945	\$100,207	\$99,622	*	\$107,003	\$158,004
Assoc yrs in rank not given	178	\$50,667	\$88,237	\$109,000	\$96,928	\$96,941	\$86,200	\$107,353	\$132,150
Associate Professor: total	985	\$50,667			\$98,299				\$159,902
Assistant Professor	898	\$67,300	\$83,437	\$121,217	\$87,703	\$87,512	\$73,411	\$92,092	\$122,104
Non-Tenure-Track									
Teaching Faculty	433	\$30,024	\$60,215	*	\$67,796	\$67,158	\$36,609	\$76,937	*
Research Faculty	228	\$20,862	\$72,241	\$156,000	\$83,851	\$83,216	\$50,000	\$98,691	\$219,050
Postdoctrates	269	*	\$39,909	\$60,000	\$45,455	\$45,211	*	\$51,350	\$121,092

Table 28. Nine-month Salaries, 10 Responses of 12 US Computer Science Departments Ranked 1-12

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	29	\$112,095	\$143,295	\$175,700	\$171,830	\$167,177	\$151,950	\$207,033	\$255,900
Full, in rank 16-20 years	18	\$102,369	\$135,410	*	\$147,580	\$143,867	\$134,149	\$166,478	*
Full, in rank 11-15 years	40	\$104,894	\$126,200	\$176,325	\$150,395	\$148,957	\$145,059	\$188,322	\$215,000
Full, in rank 6-10 years	51	\$100,400	\$129,205	\$190,000	\$147,874	\$146,416	\$130,351	\$177,404	\$213,900
Full, in rank 0-5 years	54	\$83,176	\$110,436	\$149,200	\$125,664	\$124,479	\$116,000	\$144,718	\$170,900
Full, yrs in rank not given	55	\$112,800	\$114,200	\$115,600	\$141,666	\$138,675	\$163,500	\$203,850	\$244,200
Full Professor: total	247	\$83,176			\$144,481				\$255,900
Assoc, in rank 21 years +	1	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	2	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	0	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 0-5 years	61	\$93,976	\$101,451	\$121,800	\$108,507	\$108,468	\$97,671	\$115,421	\$131,600
Assoc yrs in rank not given	21	\$93,000	\$100,500	\$108,500	\$105,633	\$105,800	\$100,000	\$112,200	\$118,600
Associate Professor: total	90	\$83,077			\$107,905				\$131,600
Assistant Professor	89	\$76,900	\$86,917	\$92,700	\$92,613	\$92,912	\$90,000	\$97,361	\$108,425
Non-Tenure-Track									
Teaching Faculty	52	\$36,421	\$73,735	*	\$87,886	\$88,995	\$74,135	\$101,776	*
Research Faculty	57	\$51,900	\$65,924	\$82,503	\$92,128	\$87,937	\$86,850	\$131,669	\$219,050
Postdoctrates	92	\$23,138	\$39,520	\$60,000	\$49,774	\$49,891	\$48,750	\$61,978	\$75,700

Table 29. Nine-month Salaries, 12 Responses of 12 US Computer Science Departments Ranked 13-24

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	28	\$111,411	\$156,948	\$210,800	\$171,050	\$170,402	\$139,605	\$185,136	\$254,700
Full, in rank 16-20 years	27	\$88,750	\$136,881	*	\$158,903	\$163,996	\$139,600	\$175,729	*
Full, in rank 11-15 years	25	\$80,808	\$151,726	*	\$170,761	\$173,561	\$140,740	\$188,474	*
Full, in rank 6-10 years	55	*	\$126,508	\$183,300	\$148,504	\$146,645	*	\$175,656	\$229,400
Full, in rank 0-5 years	64	\$88,457	\$123,925	\$156,804	\$143,275	\$140,565	\$131,148	\$168,563	\$260,000
Full, yrs in rank not given	19	*	\$97,500	*	\$145,589	\$140,000	*	\$201,000	*
Full Professor: total	218	\$80,808			\$153,456				\$290,667
Assoc, in rank 21 years +	0	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	7	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	17	\$73,013	\$106,547	\$129,252	\$111,115	\$111,973	\$99,000	\$114,663	\$137,749
Assoc, in rank 0-5 years	50	\$82,100	\$103,001	\$129,945	\$114,660	\$112,167	\$113,661	\$128,769	\$158,004
Assoc yrs in rank not given	5	*	*	*	*	*	*	*	*
Associate Professor: total	84	\$73,013			\$112,626				\$158,004
Assistant Professor	86	\$84,500	\$91,765	\$121,217	\$95,981	\$95,896	\$89,720	\$101,440	\$122,104
Non-Tenure-Track									
Teaching Faculty	39	\$54,600	\$73,454	\$91,608	\$81,372	\$80,092	\$55,000	\$92,470	\$120,000
Research Faculty	40	\$20,862	\$70,443	\$101,887	\$81,533	\$83,715	\$60,000	\$99,007	\$154,999
Postdoctrates	52	\$32,304	\$43,499	\$53,748	\$53,584	\$51,732	\$55,000	\$69,584	\$121,092

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Table 30. Nine-month Salaries, 12 Responses of 12 US Computer Science Departments Ranked 25-36

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	12	\$103,598	\$128,525	*	\$138,054	\$138,507	\$111,400	\$147,273	*
Full, in rank 16-20 years	23	\$97,008	\$122,154	\$161,475	\$137,041	\$136,868	\$102,948	\$152,833	\$203,292
Full, in rank 11-15 years	38	\$97,442	\$125,598	\$165,726	\$140,744	\$140,548	\$110,000	\$157,700	\$198,264
Full, in rank 6-10 years	25	\$100,194	\$114,694	\$131,625	\$134,753	\$132,979	\$113,099	\$158,670	\$281,779
Full, in rank 0-5 years	59	\$95,600	\$111,220	\$121,387	\$133,080	\$125,653	\$117,900	\$174,585	\$294,975
Full, yrs in rank not given	27	\$101,160	\$113,037	\$122,000	\$140,017	\$142,761	\$107,808	\$185,090	\$242,063
Full Professor: total	184	\$95,600			\$139,881				\$294,975
Assoc, in rank 21 years +	2	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	4	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	12	\$68,462	\$92,092	\$119,154	\$99,053	\$95,347	\$87,755	\$115,000	\$159,902
Assoc, in rank 6-10 years	12	\$92,103	\$104,110	*	\$106,420	\$106,409	\$95,500	\$108,006	*
Assoc, in rank 0-5 years	58	\$88,849	\$98,522	\$121,000	\$103,388	\$102,996	\$94,900	\$111,113	\$142,749
Assoc yrs in rank not given	11	\$92,500	\$96,228	\$99,500	\$104,438	\$105,050	\$104,736	\$111,295	\$119,150
Associate Professor: total	99	\$68,462			\$102,649				\$159,902
Assistant Professor	96	\$77,741	\$85,480	\$90,683	\$89,913	\$89,330	\$87,156	\$95,199	\$108,426
Non-Tenure-Track									
Teaching Faculty	37	\$44,454	\$63,619	\$85,729	\$73,360	\$70,786	\$58,000	\$85,828	\$122,500
Research Faculty	43	\$50,000	\$60,336	\$67,782	\$79,041	\$76,913	\$63,850	\$104,950	\$148,950
Postdoctrates	31	\$28,786	\$38,497	\$52,000	\$46,642	\$46,700	\$30,195	\$53,148	\$81,600

Table 31. Nine-month Salaries, 113 Responses of 140 US Computer Science Departments Ranked Higher than 36 or Unranked

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	81	\$72,983	\$122,662	*	\$129,490	\$128,031	\$72,983	\$135,515	*
Full, in rank 16-20 years	99	\$74,189	\$122,556	\$197,037	\$128,991	\$128,270	\$94,860	\$139,119	\$213,421
Full, in rank 11-15 years	121	\$84,785	\$117,165	*	\$124,052	\$123,437	\$90,399	\$134,193	*
Full, in rank 6-10 years	168	\$90,321	\$114,045	\$173,900	\$121,690	\$120,223	\$93,168	\$131,981	\$201,000
Full, in rank 0-5 years	227	\$80,595	\$109,820	\$201,798	\$120,724	\$119,256	\$93,670	\$134,234	\$258,180
Full, yrs in rank not given	133	\$85,900	\$111,454	*	\$131,678	\$129,906	\$114,582	\$156,783	*
Full Professor: total	829	\$72,983			\$124,499				\$266,667
Assoc, in rank 21 years +	37	\$67,769	\$92,794	*	\$95,097	\$95,164	\$68,964	\$96,381	*
Assoc, in rank 16-20 years	60	*	\$89,587	*	\$91,318	\$90,701	*	\$93,108	*
Assoc, in rank 11-15 years	74	*	\$94,133	*	\$95,149	\$96,250	*	\$98,137	*
Assoc, in rank 6-10 years	91	\$65,263	\$94,165	*	\$96,726	\$96,618	\$69,316	\$98,984	*
Assoc, in rank 0-5 years	309	*	\$92,794	\$127,271	\$97,487	\$97,090	*	\$103,440	\$152,431
Assoc yrs in rank not given	141	\$50,667	\$83,709	\$108,219	\$93,088	\$92,943	\$86,200	\$104,741	\$132,150
Associate Professor: total	712	\$58,852			\$95,369				\$122,435
Assistant Professor	627	\$67,300	\$82,040	\$108,160	\$86,115	\$85,926	\$73,411	\$90,306	\$119,975
Non-Tenure-Track									
Teaching Faculty	305	\$30,024	\$56,829	\$117,165	\$63,412	\$62,896	\$36,609	\$71,506	\$130,000
Research Faculty	88	\$38,004	\$75,987	\$156,000	\$84,227	\$83,674	\$50,000	\$92,647	\$208,000
Postdoctrates	94	*	\$39,489	\$60,000	\$43,027	\$42,996	*	\$46,007	\$108,466

Table 32. Nine-month Salaries, 9 Responses of 30 US Computer Engineering Departments

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	5	*	*	*	*	*	*	*	*
Full, in rank 16-20 years	5	*	*	*	*	*	*	*	*
Full, in rank 11-15 years	5	*	*	*	*	*	*	*	*
Full, in rank 6-10 years	18	*	\$128,190	\$226,204	\$122,596	\$120,010	*	\$134,501	\$173,300
Full, in rank 0-5 years	24	\$94,488	\$102,040	\$116,000	\$110,598	\$108,850	\$98,400	\$125,129	\$214,348
Full, yrs in rank not given	12	\$95,600	\$96,300	\$97,000	\$111,239	\$115,250	\$111,100	\$126,550	\$142,000
Full Professor: total	69	\$88,100			\$118,866				\$214,348
Assoc, in rank 21 years +	1	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	2	*	*	*	*	*	*	*	*
Assoc, in rank 11-15 years	4	*	*	*	*	*	*	*	*
Assoc, in rank 6-10 years	5	*	*	*	*	*	*	*	*
Assoc, in rank 0-5 years	27	\$80,000	\$92,002	*	\$94,950	\$94,884	\$83,257	\$98,340	*
Assoc yrs in rank not given	17	\$53,000	\$79,248	\$92,400	\$90,652	\$87,640	\$89,165	\$95,766	\$106,600
Associate Professor: total	56	\$53,000			\$95,082				\$113,800
Assistant Professor	55	\$77,438	\$81,754	\$88,300	\$85,328	\$85,643	\$81,900	\$89,544	\$94,725
Non-Tenure-Track									
Teaching Faculty	16	*	\$61,701	\$85,950	\$64,844	\$64,358	*	\$69,794	\$89,000
Research Faculty	2	*	*	*	*	*	*	*	*
Postdoctrates	9	*	*	*	*	*	*	*	*

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Table 33. Twelve-month Salaries, 19 Responses of 28 Canadian Computer Science Departments (Canadian Dollars)

Faculty Rank Tenured and Tenure-Track	Number of Faculty	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Full, in rank 21 years +	19	\$105,744	\$138,464	*	\$140,703	\$140,581	\$106,306	\$143,145	*
Full, in rank 16-20 years	26	\$115,748	\$137,268	\$177,929	\$144,289	\$142,064	\$128,647	\$153,645	\$180,886
Full, in rank 11-15 years	31	*	\$129,579	*	\$134,614	\$133,297	*	\$141,120	*
Full, in rank 6-10 years	50	\$112,316	\$128,165	\$153,696	\$140,300	\$138,298	\$115,294	\$154,797	\$212,448
Full, in rank 0-5 years	55	\$99,100	\$119,140	\$145,397	\$129,544	\$127,175	\$113,597	\$148,056	\$209,600
Full, yrs in rank not given	101	\$94,668	\$114,581	\$154,802	\$134,785	\$128,124	\$130,358	\$174,492	\$232,731
Full Professor: total	282	\$94,668			\$135,415				\$232,731
Assoc, in rank 21 years +	8	*	*	*	*	*	*	*	*
Assoc, in rank 16-20 years	12	*	\$110,406	\$126,387	\$116,819	\$116,512	*	\$123,848	\$153,762
Assoc, in rank 11-15 years	17	*	\$110,337	\$120,511	\$113,677	\$113,653	*	\$115,952	\$143,163
Assoc, in rank 6-10 years	28	*	\$106,523	\$119,695	\$111,686	\$112,599	*	\$116,442	\$137,878
Assoc, in rank 0-5 years	114	\$81,630	\$98,360	\$117,805	\$106,218	\$105,204	\$95,816	\$116,581	\$141,213
Assoc yrs in rank not given	66	\$76,010	\$91,393	\$124,020	\$105,536	\$105,014	\$102,448	\$118,005	\$154,676
Associate Professor: total	245	\$76,010			\$106,434				\$154,676
Assistant Professor	152	\$62,648	\$83,964	\$110,000	\$92,233	\$92,506	\$79,654	\$101,391	\$133,665
Non-Tenure-Track									
Teaching Faculty	67	\$43,143	\$67,913	\$94,068	\$78,539	\$78,715	\$52,896	\$88,383	\$136,501
Research Faculty	17	\$36,000	\$57,409	\$82,812	\$66,702	\$66,088	\$50,000	\$77,718	\$100,992
Postdoctrates	23	\$24,600	\$32,120	\$45,000	\$42,098	\$43,400	\$35,000	\$50,489	\$65,000

Table 34. Nine-month Salaries for New Ph.D.s, Responding US CS and CE Departments

Faculty Rank	Number of New Ph.D.s	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track	78	\$70,000	\$84,796	\$100,000	\$85,044	\$84,999	\$70,000	\$85,306	\$100,000
Non-Tenure-Track									
Teaching Faculty	18	\$40,000	\$57,108	\$75,000	\$57,720	\$57,877	\$40,000	\$57,163	\$80,000
Research Faculty	18	\$38,004	\$65,338	\$98,325	\$65,915	\$65,915	\$38,004	\$66,492	\$98,325
Postdoctrates	68	\$24,000	\$44,687	\$65,000	\$47,113	\$47,152	\$30,000	\$49,565	\$70,000

Table 34a. Twelve-month Salaries for New Ph.D.s, Responding Canadian Departments

Faculty Rank	Number of New Ph.D.s	Reported Salary Minimum			Mean of all Salaries	Median of all Salaries	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track	6	*	*	*	*	*	*	*	*
Teaching Faculty	0	*	*	*	*	*	*	*	*
Research Faculty	0	*	*	*	*	*	*	*	*
Postdoctrates	2	*	*	*	*	*	*	*	*

Riverside, Santa Barbara, and Santa Cruz), Cincinnati, Colorado (Boulder), Connecticut, Delaware, Denver, Florida, Georgia, Illinois (Chicago), Iowa, Kansas, Kentucky, Louisiana (Lafayette), Louisville, Maine, Maryland (Baltimore Co.), Massachusetts (at Boston and Lowell), Minnesota, Mississippi, Missouri (at Columbia and Kansas City), Nebraska (Lincoln and Omaha), Nevada (Las Vegas and Reno), New Hampshire, New Mexico, North Carolina (Charlotte), North Texas, Notre Dame, Oklahoma, Oregon, Pittsburgh, South Carolina, South Florida, Tennessee (Knoxville), Texas (at Arlington, Dallas, El Paso, and San Antonio), Tulsa, Utah, and Wisconsin (Milwaukee).

Computer Engineering departments participating in the survey this year include: Boston University, Iowa State, Northeastern, Princeton, Purdue,

Rensselaer Polytechnic, Virginia Tech, and the Universities of California (Santa Barbara and Santa Cruz) and New Mexico.

Canadian departments participating in the survey include: Concordia, Dalhousie, McGill, Memorial, Queen's, Simon Fraser, and York universities. University of: Alberta, British Columbia, Calgary, Manitoba, Montreal, New Brunswick, Ottawa, Regina, Saskatchewan, Toronto, Victoria, Waterloo, Western Ontario, and Université Laval.

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Endnotes

1. The title of the survey honors the late Orrin E. Taulbee of the University of Pittsburgh, who conducted these surveys for the Computer Science Board until 1984, with retrospective annual data going back to 1970.
2. Although the University of Pennsylvania and the University of Chicago were tied in the National Research Council rankings, CRA made the arbitrary decision to place Pennsylvania in the second tier of schools.

3. All tables with rankings: Statistics sometimes are given according to departmental rank. Schools are ranked only if they offer a CS degree and according to the quality of their CS program as determined by reputation. Those that only offer CE degrees are not ranked, and statistics are given on a separate line, apart from the rankings.
4. All ethnicity tables: Ethnic breakdowns are drawn from guidelines set forth by the U.S. Department of Education.
5. All faculty tables: The survey makes no distinction between faculty specializing in CS vs. CE programs. Every effort is made to minimize the inclusion of faculty in electrical engineering who are not computer engineers. ■