2003-2004 Taulbee Survey
Record Ph.D. Production on the Horizon; Undergraduate Enrollments Continue in Decline

By Stuart Zweben

This article and the accompanying figures and tables present the results of the 34th annual CRA Taulbee Survey[1] 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.

The information was collected in the fall of 2004. Responses received by January 17, 2005 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 (2003-04). Data for new students in all categories refer to the current academic year (2004-05). Projected student production and information on faculty salaries and demographics also refer to the current academic year. Faculty salaries are those effective January 1, 2005.

The data were collected from Ph.D.-granting departments only. A total of 229 departments were surveyed, four more than last year. As shown in Figure 1, 189 departments submitted their survey forms, for a response rate of 83% (the highest in the past ten years). The return rate of 10 out of 30 (33%) for Computer Engineering (CE) programs is very low, as has been customary. Many CE programs are part of an ECE department, and they do not keep separate statistics for CE vs. EE. In addition, many of these departments are unaware of the Taulbee Survey or its importance. The response rate for US CS departments (158 of 172, or 92%) was very good, while the 78% response rate for Canadian programs was moderately good.

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. However, we have reported CE departments separately because there

are some significant differences between CS and CE departments.

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 the changing concerns of the computing research community. In December 2004, preliminary survey results about faculty salaries were provided to departments that had responded. The CRA Board views this as a benefit of participating in the survey. This practice began last year and is expected to continue.

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

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

As shown in Table 1, a total of 1,032 Ph.D. degrees were awarded in 2004 by the 189 responding departments. This is an increase of more than 17% over last year, and represents the highest number of Ph.D.s produced in almost a decade. In previous Taulbee reports, we foresaw a large increase in Ph.D. production based on the growing number of students passing qualifier exams. It appears that this was the year the significantly increased degree production really materialized, even allowing for the increased number of departments reporting.

As in previous years, the prediction from last year's survey that 1,350 Ph.D. degrees would be awarded in 2004 was overly optimistic. The "optimism ratio," defined as the actual over the predicted, was 0.76, a slight increase over last year. Based on previous experiences, next year's prediction of 1,480 graduates (Table 1) is likely to yield an actual production in the 1,100 range, and production may exceed the 1992 all-time annual Taulbee Survey record of 1,113 (see Figure 2).

The number entering Ph.D. programs (Table 5) decreased from 3,131 to 2,887 (8%), following a 5% decrease last year. This year, the

Table 2. Gender of Ph.D. Recipients by Type of Degree

	CS		CE		CS&CE	
Male	731	81.5%	92	86.0%	823	82.0%
Female	166	18.5%	15	14.0%	181	18.0%
Total have Gender Data for	**897**		**107**		**1,004**	
Unknown	26		2		28	
Total	**923**		**109**		**1,032**	

Table 3. Ethnicity of Ph.D. Recipients by Type of Degree

	CS		CE		CS&CE	
Nonresident Alien	362	45.9%	60	69.0%	422	48.2%
African-American, Non-Hispanic	12	1.5%	1	1.1%	13	1.5%
Native American/ Alaskan Native	0	0.0%	0	0.0%	0	0.0%
Asian/Pacific Islander	100	12.7%	12	13.8%	112	12.8%
Hispanic	10	1.3%	0	0.0%	10	1.1%
White, Non-Hispanic	290	36.8%	14	16.1%	304	34.7%
Other/Not Listed	15	1.9%	0	0.0%	15	1.7%
Total have Ethnicity Data for	**789**		**87**		**876**	
Ethnicity/Residency Unknown	134		22		156	
Total	**923**		**109**		**1,032**	

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	151/169 (89%)	7/29 (24%)	19/27 (70%)	177/225 (79%)
2004	158/172 (92%)	10/30 (33%)	21/27 (78%)	189/229 (83%)

Figure 2. Ph.D. Production
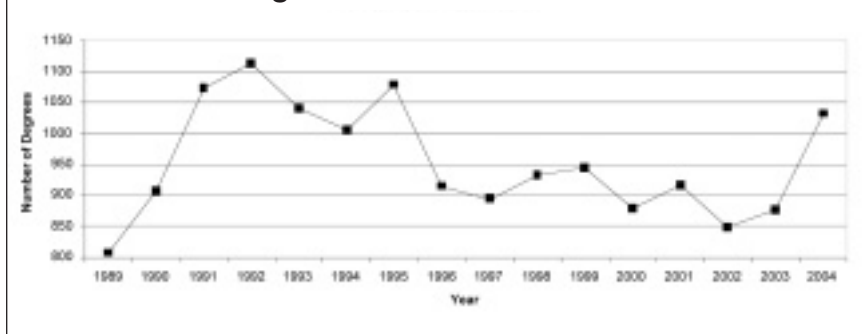
Table 1. Ph.D. Production by Type of Department and Rank

Department, Rank	Ph.D.s Produced	Avg. per Dept.	Ph.D.s Next Year	Avg. per Dept.	Passed Qualifier	Avg. per Dept.	Passed Thesis Exam	Avg. per Dept.
US CS 1-12	196	16.3	265	22.1	330	27.5	164	13.7
US CS 13-24	142	11.8	147	12.2	257	21.4	155	12.9
US CS 25-36	91	7.6	179	14.9	275	22.9	72	6.0
US CS Other	435	3.6	677	5.5	1,192	9.8	522	4.3
Canadian	115	5.5	119	5.7	145	6.9	79	3.8
US CE	53	5.3	93	10.3	119	11.9	33	3.3
Total	**1,032**	**5.5**	**1,480**	**7.8**	**2,318**	**12.3**	**1,025**	**5.4**

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decrease is entirely in the U.S. programs, which exhibited no change in the size of the entering class last year. Canadian departments actually reported a 20% increase in new Ph.D. students after a drop last year, though Canadian numbers are more greatly affected by the specific departments responding to the survey than are the U.S. CS numbers. There were reports of a large drop in applications from international students last year, and this apparently also affected eventual admissions to the graduate programs. However, the

number who passed qualifiers (Table 1) increased tremendously, from 1,545 to 2,318 (50%). On a per-department basis, the number passing qualifiers has risen from 6.5 to 12.3 (89%) in four years. The number who passed thesis proposal exams (Table 1) rose 16% this year to 1,025 after being flat last year. Total Ph.D. enrollment (Table 6) increased from 12,007 to 14,234 (19%), on the heels of a similar (20%) increase last year. While there are fewer new students entering the programs, those who are entering appear to be staying in much larger numbers than was the case several years ago. Economic

conditions no doubt have a lot to do with this.

Figure 3 shows a longer-term trend of the number of CS Ph.D. graduates, normalized by the number of departments reporting to the Taulbee Survey. The figure also indicates the number of new students entering Ph.D. programs and the number of students who passed qualifiers. These also are normalized for 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, to approximate the lag between student entrance into the pipeline and the qualifier and exit timeframe for the same cohort. The figure suggests that a much larger fraction of those entering the program are now passing qualifiers; the most recent data look more like the pre-dot-com boom years. Unless a larger fraction of those passing qualifiers do not complete the program, record levels of Ph.D. production can be expected soon.

Table 4 shows employment for new Ph.D. recipients. Of those who reported employment domestically, 60% took academic employment

(compared to 63% last year and 53% the year before). Most of these academic positions were in Ph.D.-granting departments, but a smaller percentage went into tenure-track positions (27.5% vs. 34.2% last year). Only 31 were in other CS/CE departments. This is identical to the number reported last year as having gone to non-Ph.D.-granting CS/CE departments. It still appears quite low relative to meeting the needs of those departments. There was a considerable increase (from 89 to 122) in the number of postdoctoral positions taken by new Ph.D.s (up from 56 three years ago), although the total number of postdocs in the academic departments (295, see Table 17) actually fell slightly (from 312 last year). Figure 4 shows the trend of employment of new Ph.D.s to academia and industry, and the proportion of those going to academia who took positions other than in Ph.D-granting CS/CE departments. The trend in favor of academic jobs during the most recent three years is in sharp contrast to that of the dot-com boom years, though this year there was a slight narrowing of the gap.

Figure 3. Ph.D. Pipeline corrected for year of entry
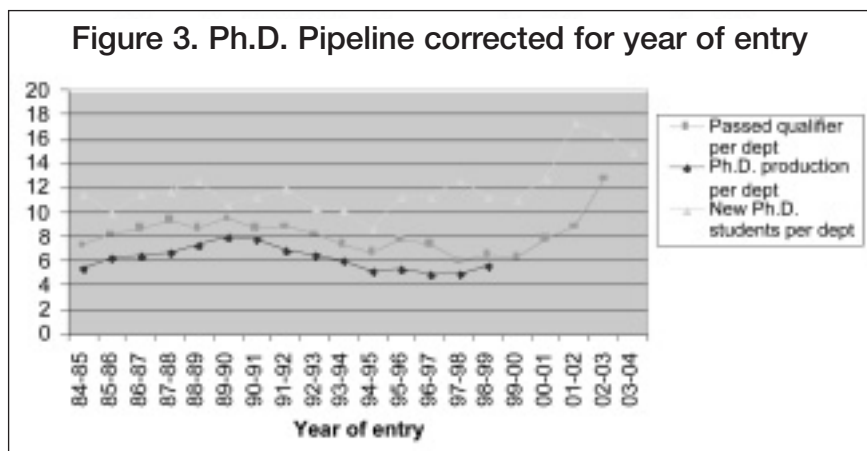
Table 4. Employment of New Ph.D. Recipients by Specialty												
	Artificial Intelligence/ Robotics	Hardware/ Architecture	Numerical Analysis/ Scientific Computing	Programming Languages/ Compilers	OS/Networks	Software Engineering	Theory/ Algorithms	Graphics/ Human Interfaces	Databases/ Information Systems	Other/ Unknown	Total	
New Ph.D.s in Ph.D.- Granting Depts.												
Tenure-track	32	28	3	20	44	27	19	20	22	12	**227**	27.5%
Researcher	23	7	3	6	8	6	6	10	5	6	**80**	9.7%
Postdoc	35	7	7	6	14	3	21	8	5	16	**122**	14.8%
Teaching Faculty	2	2	2	3	5	1	4	4	3	6	**32**	3.9%
											55.8%	**Total**
New Ph.D.s, Other Categories												
Other CS/CE Dept.	2	2	2	2	5	3	4	4	3	4	**31**	3.8%
Non-CS/CE Dept.	1	0	0	0	2	1	0	0	0	0	**4**	0.5%
Industry	29	24	4	12	64	30	9	27	22	28	**249**	30.1%
Government	5	2	2	1	2	5	2	2	3	4	**28**	3.4%
Self-Employed	0	0	0	2	2	1	0	2	1	0	**8**	1.0%
Employed Abroad	6	5	0	2	5	6	1	3	5	4	**37**	4.5%
Unemployed	3	0	0	0	1	0	0	1	1	2	**8**	1.0%
											44.2%	**Total**
Total have Employment Data for	**138**	**77**	**23**	**54**	**152**	**83**	**66**	**81**	**70**	**82**	**826**	**100.0%**
Unknown	27	5	4	2	16	4	7	27	7	107	**206**	
Total	165	82	27	56	168	87	73	108	77	189	1,032	

Table 5. New Ph.D. Students in Fall 2004 by Department Type and Rank										
	CS				CE				CS&CE	
Department, Rank	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	374	34	408	34.0	0	0	0	0.0	408	34.0
US CS 13-24	275	40	315	26.3	6	0	6	0.5	321	26.8
US CS 25-36	232	19	251	22.8	8	0	8	0.7	259	23.5
US CS Other	1,165	289	1,454	11.9	98	24	122	1.0	1,576	12.9
Canadian	184	27	211	10.0	21	0	21	1.0	232	11.0
US CE	19	0	19	2.4	66	6	72	9.0	91	11
Total	**2,249**	**409**	**2,658**	**14.3**	**199**	**30**	**229**	**1.2**	**2,887**	**15.5**

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

Department, Rank	CS		CE		CS&CE	
US CS 1-12	2,172	17.4%	0	0.0%	2,172	15.3%
US CS 13-24	1,618	12.9%	14	0.8%	1,632	11.5%
US CS 25-36	1,423	11.4%	3	0.2%	1,426	10.0%
US CS Other	6,260	50.0%	563	32.8%	6,823	47.9%
Canadian	965	7.7%	108	6.3%	1,073	7.5%
US CE	77	0.6%	1,031	59.98%	1,108	7.8%
Total	**12,515**		**1,719**		**14,234**	

Table 7. Ph.D. Program Total Enrollment by Gender

	CS		CE		CS&CE	
Male	9,769	79.5%	1,436	84.6%	11,205	80.1%
Female	2,525	20.5%	261	15.4%	2,786	19.9%
Total have Gender Data for	**12,294**		**1,697**		**13,991**	
Unknown	221		22		243	
Total	**12,515**		**1,719**		**14,234**	

Table 8. Ph.D. Program Total Enrollment by Ethnicity

	CS		CE		CS&CE	
Nonresident Alien	5,946	53.8%	706	45.4%	6,652	52.8%
African-American, Non-Hispanic	173	1.6%	49	3.2%	222	1.8%
Native American/ Alaskan Native	22	0.2%	2	0.1%	24	0.2%
Asian/Pacific Islander	1,212	11.0%	405	26.0%	1,617	12.8%
Hispanic	131	1.2%	27	1.7%	158	1.3%
White, Non-Hispanic	3,337	30.2%	349	22.4%	3,686	29.2%
Other/Not Listed	226	2.0%	17	1.1%	243	1.9%
Total have Ethnicity Data for	**11,047**		**1,555**		**12,602**	
Ethnicity/Residency Unknown	1,468		164		1,632	
Total	**12,515**		**1,719**		**14,234**	

Figure 4. Employment of New Ph.D.s in U.S. and Canada

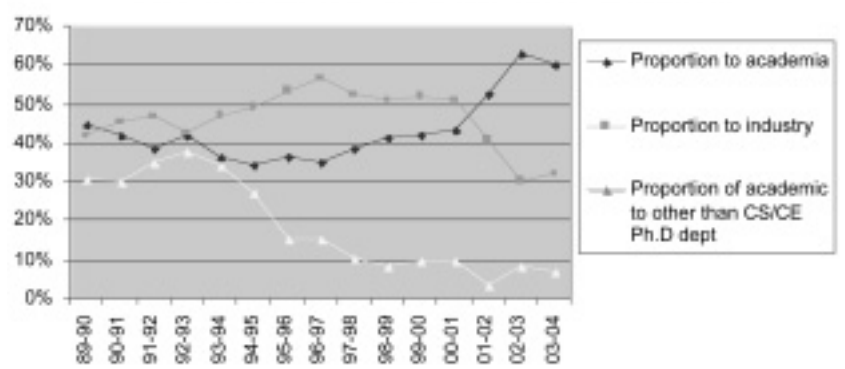### Figure 5. Nonresident Aliens as Fraction of Ph.D. Enrollments

The proportion (4.5%) of Ph.D. graduates who were reported as having taken positions abroad, among those whose employment is known, is similar to that of the previous three years (4.1, 4.5, and 4.1%, respectively). Unless there really is a change hidden in the much larger number of those in the "employment unknown" category (206 this year vs. 126 last year), this lack of a trend may surprise those who feel that the offshoring of jobs is taking many more graduates of our Ph.D. programs away from North America.

The data in Table 4 also indicate increases over last year in the proportion of new CS/CE Ph.D.s in the AI/robotics, OS/networks, and software engineering areas, while the programming languages/compilers, theory/algorithms, numerical analysis/scientific computing, and database/information systems areas each experienced a decreased proportion of Ph.D.s. Multi-year trends are less clear, with only the graphics/HCI area showing any reasonably consistent trend (increasing) during the past five years.

Most statistics on gender and ethnicity for Ph.D. students (Tables 2, 3, 7, 8) again show little change from the last several years. White and nonresident-alien men continue to account for a very large fraction of our Ph.D. production and enrollments. The proportion of female Ph.D. graduates (18.0%) is up from the 16.5% figure last year. However, with women representing only about 20% of the overall Ph.D. enrollments, the proportion of female graduates is unlikely to climb considerably in the near future. All other underrepresented groups are very small minorities. The proportion of enrolled Ph.D. students who are nonresident aliens (more than 50%) is similar to last year. Thus, the reported decreases in Ph.D. applications from abroad and the decline in the total number of new Ph.D. students does not seem to have affected the overall demographics of the Ph.D. programs, at least not yet.

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

The statistics on Master's and Bachelor's degrees awarded show mixed trends. Master's degrees were awarded to 9,879 students, an increase of 8% (following an increase of 15% the previous year). As was noted last year, this increase may be

a byproduct of the increased enrollment trends in Ph.D. programs, since in many schools students obtain the M.S. on the way to the Ph.D. No doubt it is influenced also by the increase of 6% in the number of departments reporting this year. Actual masters degrees awarded exceeded last year's projections by 21%. This year's expected Master's production (Table 12) exceeds the projection from last year's survey by 4%, but this also happened last year. In any case, next year's production level may well exceed 10,000.

Bachelor's degrees numbered 20,971 (Table 9), a 5% increase over last year (following a 3% decrease the year before). There still appears to be residual influence of the high level of undergraduate program enrollment that began in the late 1990s and remained strong until the early 2000s. There also is the effect of the larger number of programs reporting this year. On a per-department basis, the number of Bachelor's graduates is about the same as last year. Actual Bachelor's production in departments reporting this year exceeded the projection from last year's reporting departments by 11%. Projected Bachelor's production for this year shows a decrease from this year's actuals of 6%, but this represents an increase over last year's projections of 5%, probably again due in large part to the increased number of departments reporting (see Figure 6).

The number of new undergraduate majors dropped 10%, from 17,706 to 15,950, (see Figure 7). This follows last year's 23% drop in new majors. The number of pre-majors in both computer science and computer engineering also is down considerably from last year (20% in CS and 17% in CE) so we likely have not yet seen the end of the decreased undergraduate enrollments. Also note that the larger number of departments reporting this year softens the impact on the totals, so the percentage declines in new majors and pre-majors likely are even greater. As Table 14 shows, per-department numbers are holding steady in CS departments ranked 1-12, but are down for all others. This trend has been reported extensively in the media during the past year.

New Master's students (Table 13) decreased by 17% after having decreased by 8% last year. This continues, and accelerates the trend from the dot-com crash, as fewer students seek degree programs designed mainly to prepare them for

Table 9. Gender of Bachelor's and Master's Recipients

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Male	13,854	82.3%	2,559	86.9%	16,413	83.0%	6,341	74.6%	896	78.3%	7,237	75.1%
Female	2,972	17.7%	387	13.1%	3,359	17.0%	2,155	25.4%	248	21.7%	2,403	24.9%
Total have Gender Data for	**16,826**		**2,946**		**19,772**		**8,496**		**1,144**		**9,640**	
Unknown	1,050		149		1,199		239		0		239	
Total	**17,876**		**3,095**		**20,971**		**8,735**		**1,144**		**9,879**	

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Table 10. Ethnicity of Bachelor's and Master's Recipients

|	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Nonresident Aliens	1,309	10.1%	252	10.4%	1,561	10.2%	3,974	51.9%	346	39.5%	4,320	50.6%
African-American, Non-Hispanic	399	3.1%	116	4.8%	515	3.4%	113	1.5%	23	2.6%	136	1.6%
Native American/ Alaskan Native	47	0.4%	9	0.4%	56	0.34%	17	0.2%	17	1.9%	34	0.4%
Asian/Pacific Islander	2,977	23.1%	527	21.8%	3,504	22.9%	1,266	16.5%	174	19.8%	1,440	16.9%
Hispanic	500	3.9%	95	3.9%	595	3.9%	87	1.1%	21	2.4%	108	1.3%
White, Non-Hispanic	7,027	54.5%	1,308	54.1%	8,335	54.4%	1,954	25.5%	295	33.6%	2,249	26.3%
Other/Not Listed	642	5.0%	109	4.5%	751	4.9%	248	3.2%	1	0.1%	249	2.9%
Total have Ethnicity Data for	**12,901**		**2,416**		**15,317**		**7,659**		**877**		**8,536**	
Ethnicity/ Residency Unknown	4,975		679		5,654		1,076		267		1,343	
Total	**17,876**		**3,095**		**20,971**		**8,735**		**1,144**		**9,879**	

Figure 6. BS Production
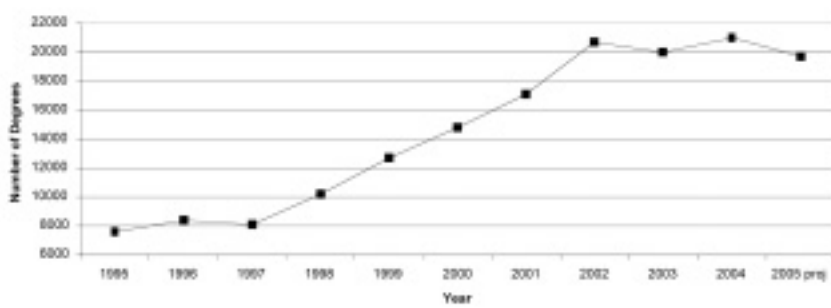
Figure 7. Newly Declared CS/CE Undergraduate Majors
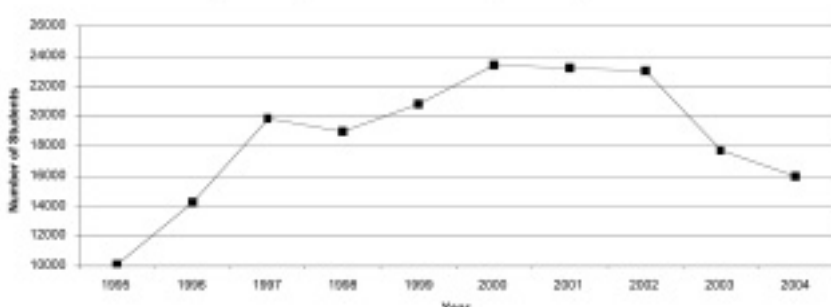
Table 11. Bachelor's Degree Candidates for 2004-2005 by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,687	10.1%	243	7.9%	1,930	9.8%
US CS 13-24	1,256	7.5%	415	13.5%	1,671	8.5%
US CS 25-36	1,626	9.8%	41	1.3%	1,667	8.4%
US CS Other	8,129	48.8%	1,478	48.3%	9,607	48.7%
Canadian	3,864	23.2%	182	5.9%	4,046	20.5%
US CE	105	0.6%	704	23.0%	809	4.1%
Total	**16,667**		**3,063**		**19,730**	

Table 12. Master's Degree Candidates for 2004-2005 by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	781	10.4%	80	8.7%	861	10.2%
US CS 13-24	837	11.1%	1	0.1%	838	9.9%
US CS 25-36	566	7.5%	0	0.0%	566	6.7%
US CS Other	4,618	61.3%	370	40.2%	4,988	59.0%
Canadian	717	9.5%	45	4.9%	762	9.0%
US CE	11	0.1%	425	46.1%	436	5.2%
Total	**7,530**		**921**		**8,451**	

industry employment. Total enrollment in Bachelor's programs (Table 16) is approximately the same as it was last year (having dropped last year by 19% from the previous year). However, the U.S. CS total enrollment is down by 7%; this represents an increased number of reporting departments, so the downward trend appears to be continuing, as one might predict from the new student enrollment trends. Total enrollments in Master's programs (Table 15) increased by about 3% (having dropped by 4% last year), but the larger number of departments reporting probably counters this increase in numbers.

Most demographics regarding gender and ethnicity for Bachelor's and Master's students continue to be similar to those of previous years. The proportion of Master's degree recipients who are nonresident aliens (50.6%) is down from 55.8% the previous year, while there are slight gains in the fractions of White, non-Hispanic and Asian/Pacific Islanders (Table 10).

Faculty Demographics (Tables 17-23)

Over the past year, the total number of faculty increased by only 1.5% to a total of 5,919. Increases of 4% in tenure-track faculty and 5% in teaching faculty were offset by decreases in other categories, and also should be viewed in terms of the increased number of departments reporting this year.

Ph.D. production shows 461 graduates known to have taken faculty positions at CS/CE Ph.D-granting departments (Table 4). Tables 19 and 20 indicate that a total of 608 persons were hired during the past year. Thus, more than 75% of the faculty hires made this past year by Ph.D.-granting CS/CE departments appear to have been new Ph.D.s, with the rest consisting of a combination of faculty who changed academic positions, persons joining academia from government and industry, new Ph.D.s from outside of North America and from disciplines outside of CS/CE, and non-Ph.D. holders (e.g., taking a teaching faculty appointment). The fraction of tenure-track hires who were new Ph.D.s appears to be more than 80% (227 new Ph.D.s taking tenure-track faculty positions at Ph.D.-granting

programs, and 279 new tenure-track faculty hired by these programs).

This year's total faculty size of 5,919 is very close to the prediction of 5,928 from last year's survey. This is the second year in a row that departments collectively did a good job predicting their faculty growth. Planned growth for this year is 6% and an additional 5% is predicted for the following year. This apparent increased opportunity for faculty jobs over the past year is good news for the larger number of Ph.D.s we are producing.

Table 23 on faculty "losses" shows that only 75 people (which is less than 2% of all faculty) actually left academia this past year through death, retirement, or taking nonacademic positions. The amount of "churn," the number of professors moving from one academic position to another, went from 74 to 87. This reflects an increase over last year, even after accounting for the number of departments reporting, but is 20% less than that observed just two years ago.

The percentage of newly hired women faculty dropped from 19% to 17%. The gender split of new faculty (83% male, 17% female) again is close to the split for new Ph.D. recipients (Table 2). The percentage

of newly hired postdoctoral students who are women decreased from 21% last year to only 15% this year.

In examining the ethnicity data for new faculty (Table 20), we note that the percentage of newly hired tenure-track faculty who are Asian/Pacific Islanders increased slightly. The fraction of new postdocs who were nonresident aliens increased from 33% to 45%. The fraction of new teaching faculty who were nonresident aliens decreased, while the fraction who were White, non-Hispanic increased.

As we observed last year, it appears that once again disproportionately fewer foreign students are being hired into faculty positions at North American universities. Approximately 49% of the newly hired tenure-track faculty in PhD-granting departments and 78% of the newly hired teaching faculty are White, non-Hispanic, even though only 35% of the Ph.D. recipients are in this category (Table 3). In contrast, only 27% of the new faculty (all employment categories combined, where ethnicity is known) are nonresident aliens, while 48% of the degree recipients are in that category.

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Table 13. New Master's Students in Fall 2004 by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
	Total	Avg. per Dept.	Total	Avg. per Dept.	Total	Avg. per Dept.
US CS 1-12	572	52.0	55	9.2	627	57.0
US CS 13-24	695	57.9	3	0.6	698	58.2
US CS 25-36	270	22.5	3	0.5	273	22.8
US CS Other	3,156	27.4	193	2.8	3,349	28.9
Canadian	678	32.3	71	14.2	749	35.7
US CE	18	6.0	89	10.5	107	11.9
Total	**5,389**		**414**		**5,803**	**32.1**

Table 15. Master's Degree Total Enrollment by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,326	6.6%	88	4.3%	1,414	6.4%
US CS 13-24	1,933	9.6%	6	0.3%	1,939	8.8%
US CS 25-36	857	4.3%	2	0.1%	859	3.9%
US CS Other	13,580	67.5%	986	48.7%	14,566	65.7%
Canadian	2,389	11.9%	354	17.5%	2,743	12.4%
US CE	44	0.2%	589	29.1%	633	2.9%
Total	**20,129**		**2,025**		**22,154**	

Table 14. New Undergraduate Students in Fall 2004 by Department Type and Rank

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	274	776	64.7	0	165	18.3	941	78.4
US CS 13-24	147	737	61.4	0	389	48.6	1,126	93.8
US CS 25-36	246	1,296	108.0	0	0	0.0	1,296	108.0
US CS Other	3,033	6,942	61.4	904	1,670	24.9	8,612	75.5
Canadian	433	3,026	144.1	0	290	48.3	3,316	157.9
US CE	60	27	9.0	108	632	70.2	659	73.2
Total	**4,193**	**12,804**		**1,012**	**3,146**		**15,950**	**89.1**

Table 16. Bachelor's Degree Program Total Enrollment by Department Type and Rank

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	386	4,959	413.3	0	701	77.9	5,660	471.7
US CS 13-24	233	4,097	341.4	0	1,757	219.6	5,854	487.8
US CS 25-36	771	5,500	458.3	0	122	15.3	5,622	468.5
US CS Other	6,544	35,102	302.1	1,486	5,844	85.4	40,946	350.0
Canadian	444	15,007	714.6	0	797	159.4	15,804	752.6
US CE	137	255	85.0	284	2,655	298.8	2,910	323.3
Total	**8,515**	**64,920**	**354.8**	**1,770**	**11,876**	**64.9**	**76,796**	**419.7**

Table 17. Actual and Anticipated Faculty Size by Position

	Actual	Projected		Expected Two-Year Growth	
	2004-2005	2005-2006	2006-2007		
Tenure-Track	4,360	4,583	4,814	454	10.4%
Researcher	427	478	521	94	22.0%
Postdoc	295	361	407	112	38.0%
Teaching Faculty	737	753	764	27	3.7%
Other/Not Listed	100	102	106	6	6.0%
Total	**5,919**	**6,277**	**6,612**	**693**	**11.7%**

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, which also was the method used in previous years. The second is relative to researchers and postdocs, as well as tenured and tenure-track faculty. As is typical, the higher the ranking, the more external funding the department receives (both in

total and per capita). Canadian levels are shown in Canadian dollars.

The median per capita amount of support compared to the median reported in last year's survey varied widely (here we only compare relative to the first capitation method, since only that method was used last year). In ranks 1-12 and 25-36 there was double-digit growth, while in ranks 13-24 and greater than 36 there actually was a decline in the medians. The 3.6% decline among those ranked greater than 36 may be attributable to the larger number of departments reporting this year. In ranking stratum 13-24, the median total expenditure actually rose 9.5%, though the minimum and maximum values both declined.

Canadian departments show an increase of 12% over last year in

median per capita expenditure, but the funding model in Canada results in a lower level of expenditures from external sources than every US ranking band. It is difficult to draw meaning for the numbers for computer engineering because of the small number of departments reporting; the median per capita expenditure for computer engineering departments rose 78% but the median total expenditure declined.

Table 25 shows the number of doctoral students supported as full-time students as of fall 2004, further categorized as teaching assistants, research assistants, fellows, or computer systems supporters, and split between those on institutional vs. external funds. Departments ranked 25-36 showed a decline (17%)

in the number of teaching assistants. Other U.S. ranking strata showed increases in teaching assistants.

Respondents were asked to "provide the net amount (as of fall 2004) 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. As was reported last year, the higher the ranking band, the higher the median level of support for teaching assistants. Median amounts of support for research assistants at the top 24 schools also are much higher than those for the lower-ranked bands. Actual stipend levels at U.S. departments showed no noticeable pattern this year. Some median

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

	Actual	Projected		Expected Two-Year Growth	
	2004-2005	2005-2006	2006-2007		
US CS 1-12	731	758	784	53	7.3%
US CS 13-24	564	621	659	95	16.8%
US CS 25-36	485	530	567	82	16.9%
US CS Other	3,114	3,301	3,511	397	12.7%
Canadian	860	889	902	42	4.9%
US CE	165	179	189	24	14.5%
Total	**5,919**	**6,278**	**6,612**	**693**	**11.7%**

Table 19. Gender of Newly Hired Faculty

	Tenure-track		Researcher		Postdoc		Teaching Faculty		Other		Total	
Male	229	82.1%	48	88.9%	143	85.1%	68	77.3%	15	78.9%	503	82.7%
Female	50	17.9%	6	11.1%	25	14.9%	20	22.7%	4	21.1%	105	17.3%
Total	**279**		**54**		**168**		**88**		**19**		**608**	

Table 20. Ethnicity of Newly Hired Faculty

	Tenure-track		Researcher		Postdoc		Teaching Faculty		Other		Total
Nonresident Alien	54	22.3%	9	17.0%	63	45.3%	9	11.0%	10	52.6%	**145**
African-American, Non-Hispanic	2	0.8%	1	1.9%	0	0.0%	2	2.4%	0	0.0%	**5**
Native American/ Alaskan Native	1	0.4%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**1**
Asian/Pacific Islander	57	23.6%	5	9.4%	21	15.1%	5	6.1%	0	0.0%	**88**
Hispanic	3	1.2%	0	0.0%	1	0.7%	1	1.2%	0	0.0%	**5**
White, Non-Hispanic	118	48.8%	36	67.9%	51	36.7%	64	78.0%	9	47.4%	**278**
Other/Not Listed	7	2.9%	2	3.8%	3	2.2%	1	1.2%	0	0.0%	**13**
Total have Ethnicity Data for	**242**		**53**		**139**		**82**		**19**		**535**
Ethnicity/ Residency Unknown	37		1		29		6		0		**73**
Total	**279**		**54**		**168**		**88**		**19**		**608**

Table 21. Gender of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Total	
Male	1,648	90.4%	1,077	88.1%	1,148	83.9%	558	73.1%	4,431	85.6%
Female	176	9.6%	146	11.9%	221	16.1%	205	26.9%	748	14.4%
Total have Gender Data for	**1,824**		**1,223**		**1,369**		**763**		**5,179**	

Table 22. Ethnicity of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Total	
Nonresident Alien	15	0.9%	34	3.1%	219	17.9%	24	3.4%	292	6.3%
African-American, Non-Hispanic	9	0.6%	8	0.7%	24	2.0%	12	1.7%	53	1.1%
Native American/ Alaskan Native	4	0.2%	3	0.3%	6	0.5%	2	0.3%	15	0.3%
Asian/Pacific Islander	341	20.9%	221	20.4%	287	23.5%	52	7.4%	901	19.4%
Hispanic	20	1.2%	27	2.5%	23	1.9%	22	3.1%	92	2.0%
White, Non-Hispanic	1,214	74.5%	764	70.5%	640	52.3%	579	82.7%	3,197	68.9%
Other/Not Listed	27	1.7%	27	2.5%	24	2.0%	9	1.3%	87	1.9%
Total have Ethnicity Data for	**1,630**		**1,084**		**1,223**		**700**		**4,637**	
Ethnicity/ Residency Unknown	194		139		146		63		542	
Total	**1,824**		**1,223**		**1,369**		**763**		**5,179**	

values increased while others decreased. Maximum values went down considerably in some strata; it appears that special assistantships or incentives are less prevalent than in previous years, as was suggested by the more extensive 'Profiles' data collected in last year's survey.

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, 2005. 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.

Here we report tables comparable to those used in previous Taulbee surveys. The tables contain data about ranges and measures of central

tendency only. Departments that reported individual salaries were provided more comprehensive distributional information in December 2004. A total of 147 departments (78% of those responding to the survey) provided salaries at the individual level.

The minimum and maximum of the reported salary minima (and maxima) are self-explanatory. The range of salaries in a given rank

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Table 23. Faculty Losses

	Total
Died	4
Retired	45
Took Academic Position Elsewhere	87
Took Nonacademic Position	26
Remained, but Changed to Part-Time	21
Other	39
Unknown	5
Total	**227**

Table 24-1. Total Expenditure from External Sources for CS/CE Research

Department, Rank	Total Expenditure			
	Minimum	Mean	Median	Maximum
US CS 1-12	$2,100,000	$24,119,225	$15,063,300	$75,557,138
US CS 13-24	$4,752,325	$8,300,568	$8,119,672	$12,946,329
US CS 25-36	$334,416	$5,982,787	$5,233,342	$15,827,632
US CS Other	$33,502	$2,342,622	$1,500,000	$16,007,946
Canadian	$66,980	$2,198,134	$1,052,775	$12,187,974
US CE	$238,266	$5,696,186	$2,500,000	$34,736,794

Table 24-2. Total Expenditure from External Sources for CS/CE Research by Department Rank and Type

Department, Rank	Per Capita Expenditure (Tenure-Track Faculty Only)				Per Capita Expenditure (Tenure-Track, Research, and Postdoc Faculty)			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	$102,439	$510,249	$366,407	$1,623,912	$89,362	$427,051	$310,526	$1,623,912
US CS 13-24	$103,311	$281,425	$250,832	$595,026	$97,986	$207,395	$199,229	$366,170
US CS 25-36	$16,720	$209,315	$211,312	$427,154	$15,201	$176,497	$173,989	$326,647
US CS Other	$2,083	$126,992	$84,500	$1,227,800	$1,961	$113,176	$80,355	$1,181,991
Canadian	$2,030	$58,554	$39,535	$259,319	$2,030	$53,899	$37,778	$259,319
US CE	$19,699	$283,435	$208,333	$964,911	$19,699	$248,115	$131,579	$964,911

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	477	20.8%	335	14.6%	128	5.6%	1	0.0%	33	1.4%	0	0.0%	1,071	46.6%	214	9.3%	0	0.0%	37	1.6%
US CS 13-24	364	24.6%	168	11.4%	94	6.4%	7	0.5%	5	0.3%	0	0.0%	811	54.8%	24	1.6%	0	0.0%	6	0.4%
US CS 25-36	332	29.6%	74	6.6%	51	4.5%	10	0.9%	9	0.8%	1	0.1%	570	50.8%	40	3.6%	0	0.0%	34	3.0%
US CS Other	1,976	39.0%	556	11.0%	169	3.3%	70	1.4%	81	1.6%	39	0.8%	2,036	40.2%	125	2.5%	5	0.1%	13	0.3%
Canadian	480	43.7%	318	28.9%	0	0.0%	0	0.0%	9	0.8%	2	0.2%	262	23.8%	28	2.5%	0	0.0%	0	0.0%
US CE	200	20.0%	29	2.9%	22	2.2%	10	1.0%	0	0.0%	0	0.0%	722	72.3%	12	1.2%	0	0.0%	3	0.3%
Total	**3,829**	**31.7%**	**1,480**	**12.3%**	**464**	**3.8%**	**98**	**0.8%**	**137**	**1.1%**	**42**	**0.3%**	**5,472**	**45.4%**	**443**	**3.7%**	**5**	**0.0%**	**93**	**0.8%**

Table 26-1. Fall 2004 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	$9,400	$15,925	$16,569	$19,800	$14,238	$17,676	$17,820	$25,200
US CS 13-24	$3,580	$17,063	$16,500	$28,712	$14,717	$20,344	$17,649	$43,908
US CS 25-36	$11,655	$14,970	$14,659	$20,303	$13,455	$15,256	$14,659	$21,523
US CS Other	$1,450	$12,849	$13,025	$25,000	$1,500	$14,210	$14,150	$25,000
Canadian	$2,525	$10,915	$12,539	$18,000	$4,000	$12,399	$10,940	$22,000
US CE	$10,560	$14,514	$14,278	$19,464	$14,400	$17,608	$17,396	$20,280

Table 26-2. Fall 2004 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	$11,855	$18,625	$18,625	$25,200	*	*	*	*
US CS 13-24	$10,143	$19,466	$17,798	$30,000	*	*	*	*
US CS 25-36	$9,090	$17,724	$16,500	$29,492	*	*	*	*
US CS Other	$1,000	$16,360	$16,065	$30,000	$7,200	$12,416	$12,150	$22,000
Canadian	$14,666	$24,925	$18,000	$54,000	*	*	*	*
US CE	$13,788	$18,906	$18,200	$28,080	*	*	*	*

*Numbers not reported due to low number of respondents

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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 middle of the list if you order its members' mean salaries at that rank from lowest to highest, or the average of the middle two numbers if there is an even number of items in the set. 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. We recognize that these means and medians are only approximations to the true means and medians for their rank.

U.S. average salaries increased between 2.5% and 3.3%, depending on tenure-track rank, and 4.0% for non-tenure-track teaching faculty. These increases are higher than the 1.9% to 2.5% levels experienced last year for tenure-track faculty and the 1.4% level for non-tenure-track teaching faculty. Top-ranked departments were more likely to give larger increases to senior faculty this past year, while departments ranked 25 and higher were more likely to favor junior faculty. Canadian salaries (shown as 12-month salaries in Canadian dollars) were 8% to 9%

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higher than last year, after showing a slight drop last year. The Canadian figures are influenced much more by the specific departments reporting in a given year than are the U.S. figures.

Median salaries for new Ph.D.s (those who received their Ph.D. last year and then joined departments as tenure-track faculty) increased 1.7% from those reported in last year's survey (Table 34). This small increase follows a year when the median was unchanged, giving departments two consecutive years with some opportunity to adjust salaries of continuing faculty in order to reduce compression and inversion problems.

Concluding Observations

For the second straight year, we see significant reductions in average enrollments in the computer science major among U.S. departments. Particularly noticeable is the continued drop in new majors. This trend is observed in both the United States and Canada. While current enrollment levels still are higher than before the dot-com boom years, the decreased number of pre-majors in those departments that report pre-majors suggests that we still have not bottomed out in the current decline of majors.

While undergraduate enrollment is in decline, Ph.D. production is approaching an all-time high. With an improved economy and the drop in undergraduate enrollments, there should be an increase in the fraction of new Ph.D.s going to industry, but it is not clear how easily the large number of new Ph.D.s will be absorbed into the new economic environment. For example, we have not yet seen any trend toward new Ph.D.s going abroad.

Our field has enjoyed an abundance of job opportunities

Table 26-3. Fall 2004 Academic-Year Graduate Stipends by Department Type and Rank

Department, Rank	Other Assistantships			
	Minimum	Mean	Median	Maximum
US CS 1-12	*	*	*	*
US CS 13-24	*	*	*	*
US CS 25-36	*	*	*	*
US CS Other	$6,000	$10,842	$9,400	$16,532
Canadian	$1,875	$7,378	$7,050	$13,538
US CE	*	*	*	*

*Numbers not reported due to low number of respondents

Table 27. Nine-month Salaries, 153 Responses of 173 US Computer Science Departments

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	452	$ 24,000	$ 49,721	$ 108,033	$ 58,075	$ 57,403	$ 35,000	$ 67,669	$ 137,850
Assistant Professor	1,069	$ 42,000	$ 74,026	$ 91,500	$ 79,079	$ 79,080	$ 65,935	$ 83,981	$ 110,250
Associate Professor	978	$ 42,887	$ 78,761	$ 124,750	$ 87,918	$ 87,829	$ 66,272	$ 97,186	$ 132,700
Full Professor	1,416	$ 63,360	$ 92,753	$ 126,000	$ 114,188	$ 111,272	$ 86,348	$ 148,570	$ 295,000

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

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	36	$ 33,494	$ 36,837	$ 39,564	$ 65,057	$ 67,353	$ 57,100	$ 86,488	$ 114,164
Assistant Professor	119	$ 56,000	$ 79,402	$ 91,500	$ 85,693	$ 85,155	$ 86,388	$ 93,649	$ 110,250
Associate Professor	80	$ 69,268	$ 89,187	$ 112,100	$ 98,775	$ 98,846	$ 88,344	$ 108,820	$ 132,500
Full Professor	217	$ 85,500	$ 98,471	$ 117,600	$ 130,993	$ 126,117	$ 145,154	$ 187,273	$ 225,000

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

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	36	$ 48,755	$ 63,373	$ 83,748	$ 71,672	$ 70,359	$ 63,931	$ 82,799	$ 102,912
Assistant Professor	100	$ 64,700	$ 80,000	$ 84,000	$ 86,050	$ 85,622	$ 85,614	$ 93,863	$ 104,272
Associate Professor	77	$ 68,667	$ 91,093	$ 103,400	$ 99,731	$ 99,457	$ 94,925	$ 109,142	$ 127,400
Full Professor	208	$ 76,402	$ 96,656	$ 115,250	$ 135,382	$ 129,000	$ 166,400	$ 198,733	$ 295,000

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

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	44	$ 40,400	$ 53,748	$ 78,458	$ 66,107	$ 64,417	$ 62,000	$ 82,091	$ 137,850
Assistant Professor	101	$ 68,000	$ 76,813	$ 81,600	$ 81,570	$ 81,500	$ 79,379	$ 85,784	$ 90,249
Associate Professor	91	$ 64,757	$ 83,841	$ 124,750	$ 92,964	$ 93,632	$ 83,950	$ 100,919	$ 124,750
Full Professor	166	$ 69,199	$ 95,296	$ 120,000	$ 124,878	$ 123,249	$ 121,000	$ 175,860	$ 252,000

Table 31. Nine-month Salaries, 119 Responses of 137 US Computer Science Departments Ranked Higher than 36 or Unranked

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	336	$ 24,000	$ 48,045	$ 108,033	$ 55,210	$ 54,622	$ 35,000	$ 63,449	$ 110,030
Assistant Professor	749	$ 42,000	$ 72,691	$ 88,400	$ 77,569	$ 77,666	$ 65,935	$ 81,990	$ 106,000
Associate Professor	730	$ 42,887	$ 76,196	$ 104,340	$ 85,375	$ 85,216	$ 66,272	$ 94,703	$ 132,700
Full Professor	825	$ 63,360	$ 91,623	$ 126,000	$ 109,561	$ 107,030	$ 86,348	$ 137,507	$ 262,452

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Table 32. Nine-month Salaries, 10 Responses of 30 US Computer Engineering Departments

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	8	$ 25,719	$ 54,977	$ 80,000	$ 59,581	$ 56,996	$ 34,762	$ 66,722	$ 107,326
Assistant Professor	54	$ 55,462	$ 75,942	$ 91,800	$ 80,694	$ 80,474	$ 73,244	$ 84,336	$ 92,300
Associate Professor	26	$ 65,050	$ 80,187	$ 97,100	$ 85,679	$ 83,954	$ 71,697	$ 91,344	$ 115,000
Full Professor	73	$ 78,650	$ 93,918	$ 118,000	$ 111,846	$ 106,544	$ 94,132	$ 144,968	$ 187,500

Table 33. Twelve-month Salaries, 19 Responses of 27 Canadian Computer Science Departments (Canadian Dollars)

Faculty Rank	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Non-Tenure Teaching Faculty	76	$ 40,455	$ 60,667	$ 76,640	$ 69,106	$ 69,551	$ 53,470	$ 77,795	$ 107,378
Assistant Professor	212	$ 51,035	$ 76,202	$ 99,609	$ 84,579	$ 84,515	$ 70,454	$ 92,556	$ 122,637
Associate Professor	181	$ 68,421	$ 87,340	$ 120,982	$ 97,014	$ 96,697	$ 74,145	$ 108,016	$ 146,594
Full Professor	257	$ 61,854	$ 97,709	$ 126,921	$ 118,658	$ 116,153	$ 101,528	$ 146,343	$ 207,718

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

Employment Position	Number	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track Faculty	107	$ 66,000	$ 77,333	$ 87,500	$ 77,610	$ 77,585	$ 66,000	$ 77,873	$ 87,500
Researcher	9	$ 30,000	$ 53,638	$ 97,000	$ 55,566	$ 55,566	$ 30,000	$ 57,494	$ 97,000
Postdoc	44	$ 25,000	$ 43,989	$ 69,500	$ 48,476	$ 48,573	$ 35,568	$ 52,608	$ 69,500
Non-Tenure Teaching Faculty	5	$ 45,000	$ 54,250	$ 67,000	$ 56,125	$ 56,125	$ 50,000	$ 58,000	$ 67,000

awaiting graduates of its academic programs in most years. The trends observed in this survey reflect student reactions to the job environment observed during the past two to three years. Academic departments are managing in a much different environment than just a few years ago. At the same time, the field as a whole is trying to understand the longer-term effect of this change in meeting the needs of industry, needs that also are changing in the wake of the dot-com crash and the increasing use of outsourcing, both on-shore and off-shore.

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 [see http://www.cra.org/statistics/nrcstudy2/home.html].

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, Montana State, New Jersey Institute of Technology, New Mexico State, North Carolina State, North Dakota State, Northeastern, Northwestern, Nova Southeastern, Oakland, Ohio, Ohio State, Oklahoma State, Old Dominion, Oregon Health & Science, Oregon State, Pace, Pennsylvania State, Polytechnic, Portland State, Rensselaer Polytechnic, Southern Methodist, State* University of New York (Albany and Binghamton), Stevens Institute of Technology, Syracuse, Texas A&M, Texas Tech, Tufts, Utah State, Vanderbilt, Virginia Commonwealth, Virginia Polytechnic, Washington State, Washington (St. Louis), Wayne State, Western Michigan, Worcester Polytechnic, and Wright State.

University of: *Alabama (Birmingham, Huntsville, and Tuscaloosa), Arkansas, Buffalo, California (at Davis, Riverside, Santa Barbara, and Santa Cruz), Central Florida, Cincinnati, Colorado (at Boulder, Colorado Springs, and Denver), Connecticut, Delaware, Denver, Florida, Georgia, Hawaii, Houston, Idaho, Illinois (Chicago), Iowa, Kansas, Kentucky, Louisiana (Lafayette), Maine, Maryland (Baltimore Co.), Massachusetts (at Boston and Lowell), Minnesota, Mississippi, Missouri (at Columbia, Kansas City and Rolla), Nebraska (Lincoln and Omaha), Nevada (Las Vegas and Reno), New Hampshire, New Mexico, North Texas, Notre Dame, Oklahoma, Oregon, Pittsburgh, South Carolina, South Florida, Tennessee (Knoxville), Texas (at Arlington, Dallas, El Paso, and San Antonio), Tulsa, Utah, Wisconsin (Milwaukee) and Wyoming.*

Computer Engineering departments participating in the survey this year include: *Georgia Institute of Technology, Northwestern, Princeton, Purdue, Rensselaer Polytechnic, and the Universities of Tennessee (Knoxville), California (Santa Cruz), Central Florida, Houston, and Southern California.*

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

Acknowledgments

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.

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.

All ethnicity tables: Ethnic breakdowns are drawn from guidelines set forth by the U.S. Department of Education.

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. ∎