2005-2006 Taulbee Survey

Record Ph.D. Production Continues; Undergraduate Enrollments Turning the Corner

By Stuart Zweben

This article and the accompanying figures and tables present the results of the 36th 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.

Information is gathered during the fall. Responses received by January 22, 2007 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 (2005-2006). Data for new students in all categories refer to the current academic year (2006-2007). Projected student production and information on faculty salaries and demographics also refer to the current academic year. Faculty salaries are those effective January 1, 2007.

The data were collected from Ph.D.-granting departments only. A total of 235 departments were surveyed, three more than last year. As shown in Figure 1, 188 departments returned their survey forms, for a response rate of 80%. This is down slightly from last year's 81%, but is still quite comprehensive. The return rate of 12 out of 33 (36%) 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 are not aware of the Taulbee Survey or its importance. The response rate for US CS departments (156 of 175, or 89%) again was very good, and there was only a fair response rate (20 of 28, or 71%) 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.

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, the survey included questions about department space, sources of external funding, support staff, grad student recruiting methods, and teaching loads. These questions are added to the survey only every third year because the data in these areas change slowly.

There are some new reports generated this year in the area of faculty demographics. See that section for details.

Departments that responded to the survey were sent preliminary results about faculty salaries in December 2006; 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)*

Last year, we reported record Ph.D. production of 1,189. This year, another record crop of Ph.D.s was produced. The total Ph.D. production between July 2005 and June 2006 of 1,499 (Table 1) represents a phenomenal 26% increase. While last year's report anticipated a new record, the magnitude of the increase was not anticipated. Even with the 26% growth, departments last year overestimated the number of Ph.D.s that would be produced. But the "optimism ratio," defined as the actual number divided by the predicted number, was 0.94, well in excess of the 0.80 and 0.76 ratios from the past two years. If this year's optimism ratio holds again next year, there will be more than 1,700 new Ph.D.s produced in 2006-2007.

The number of new students passing thesis candidacy exams (most, but not all, departments have such exams) rose 19%. This is an indication that more record production is in store in the near term.

Longer term, Ph.D. production should ease. The number of students who passed the qualifier declined 5%, and the total number of new Ph.D. students (Table 5) declined more than 6% (the fourth straight year of a decline in number of new students). Figure 3 (see p. 11) shows a graphical view of the pipeline for the computer science programs. The data in this graph are normalized by the number of departments reporting to the survey. 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. As mentioned in previous reports, these data can be useful in estimating the timing of changes in production rates.

This is the second year we obtained information about the number of new students who come from outside North America. Table 5a (see p. 9) reports the data for the fall 2006 class. 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. In fact, each of these differences grew during the past year.

Table 4 shows employment for new Ph.D. recipients. Of those who reported employment, only one-third took academic employment in North America (compared to 43% last year and 60% the year before). Again, most of these academic positions were in Ph.D.-granting departments, and once more there was a decline in the percentage who went into tenure-track positions (12.8% vs. 17.5% last year and 27.5% the year before). There was a slight decline this year in

Table 2. Gender of PhD Recipients by Type of Degree

	CS		CE		CS&CE	
Male	1,068	81.5%	126	85.7%	1,194	81.9%
Female	243	18.5%	21	14.3%	264	18.1%
Total have Gender Data for	**1,311**		**147**		**1,458**	
Unknown	1		40		41	
Total	**1,312**		**187**		**1,499**	

Table 3. Ethnicity of PhD Recipients by Type of Degree

	CS		CE		CS&CE	
Nonresident Alien	720	56.0%	94	63.9%	814	56.8%
African-American, Non-Hispanic	18	1.4%	0	0.0%	18	1.3%
Native American/ Alaskan Native	8	0.6%	0	0.0%	8	0.6%
Asian/Pacific Islander	165	12.8%	26	17.7%	191	13.3%
Hispanic	10	0.8%	2	1.4%	12	0.8%
White, Non-Hispanic	351	27.3%	25	17.0%	376	26.2%
Other/Not Listed	14	1.1%	0	0.0%	14	1.0%
Total have Ethnicity Data for	**1,286**		**147**		**1,433**	
Ethnicity/ Residency Unknown	26		40		66	
Total	**1,312**		**187**		**1,499**	

Table 1. PhD Production by Type of Department and Rank

Department, Rank	PhDs Produced	Avg. per Dept.	PhDs Next Year	Avg. per Dept.	Passed Qualifier	Avg. per Dept.	Passed Thesis Ex. (# Depts)	Avg. per Dept.
US CS 1-12	272	27.2	293	24.4	287	23.9	170 (7)	24.3
US CS 13-24	220	18.3	247	22.0	242	20.2	203 (11)	18.4
US CS 25-36	151	12.6	187	15.6	204	17.0	120 (10)	12.0
US CS Other	667	6.4	875	7.5	949	8.1	769 (96)	8.0
Canadian	98	5.2	156	7.8	212	10.6	161 (16)	10.1
US CE	91	10.1	105	8.8	60	5.0	54 (8)	6.8
Total	**1,499**	**8.9**	**1,863**	**10.1**	**1,954**	**10.6**	**1,477 (148)**	**10.0**

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the number (66 vs. 72 last year) and percentage (5.2% vs. 7.0% last year) of those who went to other CS/CE departments. Nevertheless, the 66 figure still is more than twice that of just two years ago. The data on employment in postdoctoral positions were similar to last year.

There was a large increase (49.4% vs. 39.6% last year) in the fraction of new Ph.D.s going to industry. Figure 4 (see p. 11) 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 other than Ph.D.-granting CS/CE departments. As was the case during the dot-com boom years, industry is taking a much larger share of new Ph.D.s than is academia.

The continued record Ph.D. production has not resulted in higher unemployment among new Ph.D.s. In fact, the reported unemployment is even lower than

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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%)

Table 4. Employment of New PhD 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 PhD Granting Depts.												
Tenure-track	15	21	2	11	41	11	12	19	22	9	163	12.8%
Researcher	7	1	3	2	4	2	3	2	5	4	33	2.6%
Postdoc	32	2	5	7	10	4	19	9	6	20	114	8.9%
Teaching Faculty	2	2	0	1	4	2	2	2	2	5	22	1.7%
											332	26.0%
North American, Other Categories												
Other CS/CE Dept.	9	3	4	5	14	4	10	2	6	9	66	5.2%
Non-CS/CE Dept.	3	0	0	1	3	3	1	1	2	3	17	1.3%
Industry	84	67	25	44	157	47	34	45	70	57	630	49.4%
Government	10	2	4	0	3	1	0	3	1	8	32	2.5%
Self-Employed	2	0	0	1	1	0	1	1	1	0	7	0.5%
Unemployed	2	0	0	0	0	0	3	0	2	2	9	0.7%
Other	1	1	0	0	4	2	2	1	4	1	16	1.3%
											777	60.9%
Outside North America												
Tenure-Track in PhD Granting	3	0	2	2	10	7	3	5	4	3	39	3.1%
Researcher in PhD	2	0	0	0	2	0	0	2	1	1	8	0.6%
Postdoc in PhD	8	1	2	1	4	1	6	2	1	4	30	2.4%
Teaching in PhD	2	0	0	1	0	0	1	2	1	4	11	0.9%
Other Academic	0	1	0	0	1	2	3	0	1	1	9	0.7%
Industry	4	5	1	2	14	1	2	4	1	3	37	2.9%
Government	2	0	0	0	1	0	0	0	2	1	6	0.5%
Other	1	3	0	0	3	2	1	1	2	14	27	2.1%
											167	13.1%
Total in North America	**167**	**99**	**43**	**72**	**241**	**76**	**87**	**85**	**121**	**118**	**1,109**	86.9%
Total Outside North America	**22**	**10**	**5**	**6**	**35**	**13**	**16**	**16**	**13**	**31**	**167**	13.1%
Total have Employment Data for	189	109	48	78	276	89	103	101	134	149	1,276	100.0%
Unknown	13	11	5	2	29	9	7	13	7	127	223	
Total	**202**	**120**	**53**	**80**	**305**	**98**	**110**	**114**	**141**	**276**	**1,499**	

Table 5. New PhD Students in Fall 2006 by Department Type and Rank

	CS				CE				CS&CE	
Department, Rank	New Admit	MS to PhD	Total	Avg. per Dept.	New Admit	MS to PhD	Total	Avg. per Dept.	Total	Avg. per Dept.
US CS 1-12	334	28	362	30.2	0	0	0	0.0	362	30.2
US CS 13-24	278	19	297	24.8	3	0	3	0.3	300	25.0
US CS 25-36	268	26	294	24.5	20	2	22	1.8	316	26.3
US CS Other	976	159	1,135	9.7	145	28	173	1.5	1,308	11.2
Canadian	180	17	197	9.9	0	0	0	0.0	197	9.9
US CE	0	0	0	0.0	82	8	90	7.5	90	7.5
Total	**2,036**	**249**	**2,285**	12.4	**250**	**38**	**288**	1.6	**2,573**	**13.9**

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Table 5a. New PhD Students from Outside North America

Department, Rank	CS	CE	CS&CE	Total New	% Outside North America
US CS 1-12	143	0	143	362	39.5%
US CS 13-24	147	2	149	300	49.7%
US CS 25-36	172	5	177	316	56.0%
US CS Other	650	122	772	1,308	59.0%
Canadian	70	0	70	197	35.5%
US CE 0	0	55	55	90	61.1%
Total	**1,182**	**184**	**1,366**	**2,573**	**53.1%**
Total New	2,285	288	2,573		
% Outside	**51.7%**	**63.9%**	**53.1%**		

Table 6. PhD Degree Total Enrollment by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	2,283	18.3%	0	0.0%	2,283	16.6%
US CS 13-24	1,662	13.3%	21	1.7%	1,683	12.2%
US CS 25-36	1,323	10.6%	22	1.8%	1,345	9.8%
US CS Other	5,956	47.7%	735	58.6%	6,691	48.7%
Canadian	1,272	10.2%	0	0.0%	1,272	9.3%
US CE	0	0.0%	477	38.0%	477	3.5%
Total	**12,496**		**1,255**		**13,751**	

Table 7. PhD Program Total Enrollment by Gender

	CS		CE		CS&CE	
Male	9,942	79.8%	1,025	81.9%	10,967	80.0%
Female	2,522	20.2%	227	18.1%	2,749	20.0%
Total have Gender Data for	**12,464**		**1,252**		**13,716**	
Unknown	32		3		35	
Total	**12,496**		**1,255**		**13,751**	

Table 8. PhD Program Total Enrollment by Ethnicity

	CS		CE		CS&CE	
Nonresident Alien	5,965	51.9%	828	68.3%	6,793	53.5%
African-American, Non-Hispanic	203	1.8%	21	1.7%	224	1.8%
Native American/ Alaskan Native	26	0.2%	4	0.3%	30	0.2%
Asian/Pacific Islander	1,160	10.1%	90	7.4%	1,250	9.8%
Hispanic	158	1.4%	15	1.2%	173	1.4%
White, Non-Hispanic	3,784	32.9%	243	20.0%	4,027	31.7%
Other/Not Listed	201	1.7%	11	0.9%	212	1.7%
Total have Ethnicity Data for	**11,497**		**1,212**		**12,709**	
Ethnicity/Residency Unknown	999		43		1,042	
Total	**12,496**		**1,255**		**13,751**	

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

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Male	10,429	85.8%	1,824	85.8%	12,253	85.8%	5,353	77.1%	696	78.4%	6,049	77.3%
Female	1,725	14.2%	302	14.2%	2,027	14.2%	1,587	22.9%	192	21.6%	1,779	22.7%
Total have Gender Data for	**12,154**		**2,126**		**14,280**		**6,940**		**888**		**7,828**	
Unknown	775		368		1,143		177		69		246	
Total	**12,929**		**2,494**		**15,423**		**7,117**		**957**		**8,074**	

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

	Bachelor's						Master's					
	CS		CE		CS&CE		CS		CE		CS&CE	
Nonresident Aliens	794	8.7%	217	11.3%	1,011	9.2%	2,979	47.3%	397	46.7%	3,376	47.3%
African-American, Non-Hispanic	358	3.9%	102	5.3%	460	4.2%	124	2.0%	13	1.5%	137	1.9%
Native American/ Alaskan Native	25	0.3%	5	0.3%	30	0.3%	16	0.3%	2	0.2%	18	0.3%
Asian/Pacific Islander	1,587	17.4%	361	18.9%	1,948	17.7%	942	15.0%	141	16.6%	1,083	15.2%
Hispanic	421	4.6%	108	5.6%	529	4.8%	106	1.7%	21	2.5%	127	1.8%
White, Non-Hispanic	5,805	63.7%	1,089	56.9%	6,894	62.6%	2,052	32.6%	269	31.6%	2,321	32.5%
Other/Not Listed	118	1.3%	31	1.6%	149	1.4%	74	1.2%	7	0.8%	81	1.1%
Total have Ethnicity Data for	**9,108**		**1,913**		**11,021**		**6,293**		**850**		**7,143**	
Ethnicity/Residency Unknown	3,821		581		4,402		824		107		931	
Total	**12,929**		**2,494**		**15,423**		**7,117**		**957**		**8,074**	

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last year (0.7% vs. 1.5% last year). Among those whose employment is known, the proportion (13.1%) of Ph.D. graduates who were reported taking positions outside North America is higher than last year for the second year in a row.

The data in Table 4 also indicate 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 a huge increase in the OS/networks area and a decline in the software engineering area. There also was an increase in the "unknown/other" category. It may be necessary to examine the categories being used to see if they are missing significant emerging areas.

The proportion of women among new Ph.D.s rose to 18.1% in 2006 after falling to 14.7% in 2005 (Table 2). This year's proportion is about the same as it was two years ago. The proportion of nonresident alien Ph.D.s rose from 53.4% in 2005 to 56.8% in 2006 (Table 3). Just two years ago this fraction was only 48.2%. This increase comes mainly at the expense of White, non-Hispanics. African-American, Native-American/Alaskan Native, and Hispanics collectively accounted for only 2.7% of the total, about the same as two years ago and down slightly from last year.

Current Ph.D. enrollment proportions are similar this year to those of last year. This is true for both gender and ethnicity proportions (Tables 7 and 8).

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

While Ph.D. production was at a record high, Master's and Bachelor's degree production dropped significantly. Master's degree production was down 13%, from 9,286 in the year ending June 2005 to 8,074 in the year ending June 2006 (Tables 9, 10). This is reasonably consistent with the 17% drop in new Master's students reported two years ago.

There was very little difference in gender characteristics of Master's recipients compared to last year's survey. A slightly higher percentage of Master's recipients reported this year were White, non-Hispanic, while there was a corresponding decrease in the percentage of Nonresident Alien recipients. Actual Master's degrees awarded were within 2% of last year's projections. This year's projections by the departments would suggest another decline of nearly 10% in Master's production for the current academic year.

Enrollment in Master's programs by new students (Table 13) is about the same as last year, while total enrollment (Table 15) is down by more than 10% (all attributable to declines in computer science Master's programs). The proportion of new Master's students coming from outside North America rose from 46.5% last year to 56.7% this year. As was the case for new Ph.D. students, top departments have a greater proportion of new domestic Master's students than lower-ranked departments.

Bachelor's degree production was down more than 15%, following the 13% decrease reported last year. These decreases are predictable from the significantly decreased enrollments in undergraduate programs that have been observed in recent surveys and reported widely in the media. The proportion of Bachelor's degrees awarded to women was about the same as last year. There also was another increase in the proportion of White, non-Hispanics receiving Bachelor's degrees, from 59.6% to 62.6%, and another corresponding decrease in the proportion of Asian/Pacific Islanders receiving these degrees.

Actual Bachelor's degree production in departments reporting this year was only 3.1% lower than the projection from last year's reporting departments. From this year's estimates, it would appear that another 16% decline is looming. If this holds true, it would represent a drop of more than 40% over a three-year period.

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Figure 2. PhD **Production**

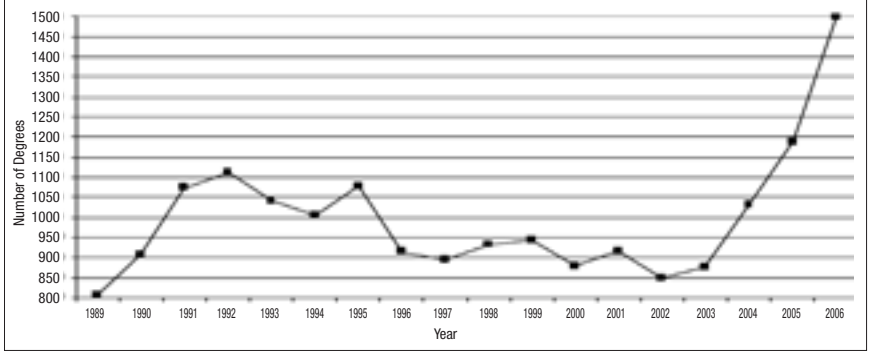

Table 11. Bachelor's Degree Candidates for 2006-2007 by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,172	11.0%	180	8.1%	1,352	10.5%
US CS 13-24	861	8.1%	140	6.3%	1,001	7.7%
US CS 25-36	936	8.8%	167	7.5%	1,103	8.5%
US CS Other	5,521	51.6%	1,147	51.4%	6,668	51.6%
Canadian	2,203	20.6%	20	0.9%	2,223	17.2%
US CE	0	0.0%	579	25.9%	579	4.5%
Total	**10,693**		**2,233**		**12,926**	

Table 12. Master's Degree Candidates for 2006-2007 by Department Type and Rank

Department, Rank	CS		CE		CS&CE	
US CS 1-12	733	11.4%	68	7.6%	801	11.0%
US CS 13-24	791	12.3%	2	0.2%	793	10.8%
US CS 25-36	437	6.8%	230	25.8%	667	9.1%
US CS Other	3,770	58.8%	360	40.4%	4,130	56.5%
Canadian	686	10.7%	0	0.0%	686	9.4%
US CE	0	0.0%	232	26.0%	232	3.2%
Total	**6,417**		**892**		**7,309**	

Table 13. New Master's Students in Fall 2006 by Department Type and Rank

Department, Rank	CS Total	CS Avg. per Dept.	CE Total	CE Avg. per Dept.	CS & CE		Outside North America Total	Outside North America %
US CS 1-12	503	41.9	66	5.5	569	47.4	222	39.0%
US CS 13-24	890	80.9	3	0.3	893	81.2	603	67.5%
US CS 25-36	299	24.9	25	2.1	324	27.0	217	67.0%
US CS Other	3,205	27.4	370	3.2	3,575	30.6	2,071	57.9%
Canadian	521	26.1	0	0.0	521	26.1	243	46.6%
US CE	0	0.0	119	9.2	119	9.2	49	41.2%
Total	**5,418**		**583**		**6,001**	**32.4**	3,405	56.7%

Table 14. New Undergraduate Students in Fall 2006 by Department Type and Rank

Department, Rank	CS Pre-Major	CS Major	CS Avg. Major per Dept.	CE Pre-Major	CE Major	CE Avg. Major per Dept.	CS&CE Majors Major	CS&CE Majors Avg. Major per Dept.
US CS 1-12	193	762	63.5	0	154	25.7	916	76.3
US CS 13-24	126	527	43.9	0	237	33.9	764	63.7
US CS 25-36	220	932	77.7	0	227	28.4	1,159	96.6
US CS Other	2,742	5,619	54.6	896	1,426	26.4	7,045	68.4
Canadian	206	2,335	129.7	0	17	2.4	2,352	130.7
US CE	0	0	0.0	71	547	60.8	547	60.8
Total	**3,487**	**10,175**		**967**	**2,608**		**12,783**	**77.0**

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

Department, Rank	CS		CE		CS&CE	
US CS 1-12	1,078	6.7%	99	6.1%	1,177	6.6%
US CS 13-24	1,701	10.5%	10	0.6%	1,711	9.6%
US CS 25-36	792	4.9%	51	3.1%	843	4.7%
US CS Other	10,530	65.1%	990	61.0%	11,520	64.7%
Canadian	2,084	12.9%	0	0.0%	2,084	11.7%
US CE	0	0.0%	474	29.2%	474	2.7%
Total	**16,185**		**1,624**		**17,809**	

CRA Academic Careers Workshop

Feb. 25-26 - **2008**

Check: http://www.cra.org in the fall for details

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The news is much better when looking at new Bachelor's degree students. For the first time in four years, the number of new undergraduate majors is slightly higher than the corresponding number last year (see Table 14 and Figure 7). This holds true when looking at only the more robust computer science numbers. The number of new computer science pre-majors is up nearly 10%. Perhaps these are signs of renewed interest in the undergraduate computer science major. One should not jump to conclusions based on one year's data, but the cessation of declining numbers of new students is welcomed by our computer science programs.

Total enrollment in Bachelor's programs (Table 16) is down 14% from last year, echoing the drop reported in last year's survey. Enrollment today is more than 40% lower than it was four years ago.

Faculty Demographics *(Tables 17-23)*

Total faculty sizes fell by 4% during the past year. All categories except postdocs experienced a decline. Tenure-track faculty, the dominant category, fell 3% to nearly the level of two years ago. In view of the record Ph.D. production, it appears the effects of reduced enrollments in our undergraduate programs have had an impact on faculty hiring. It should be noted, however, that departments ranked 13-36 did grow by more than 8% in aggregate.

Last year, the reporting departments predicted a 6% increase in faculty size, so the decline may have surprised many. Last year's predictions were unmet in all categories of faculty, although ranks 13-36 came very close. Departments reporting this year forecast a slightly more modest 4% growth for next year. If achieved, this will return sizes to last year's level. We'll see.

Table 18a is new this year. It shows the faculty demographics for each of the U.S. CS ranking strata. The table illustrates that higher ranked

Figure 3. CS Pipeline Corrected for Year of Entry

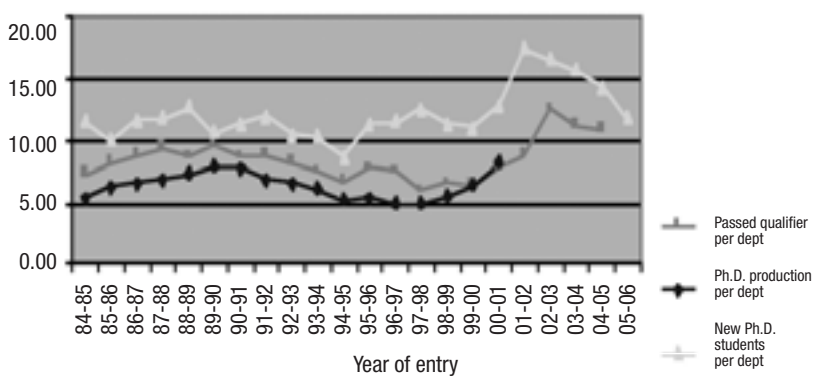

Figure 4. Employment of New Ph.D.s in U.S. and Canada

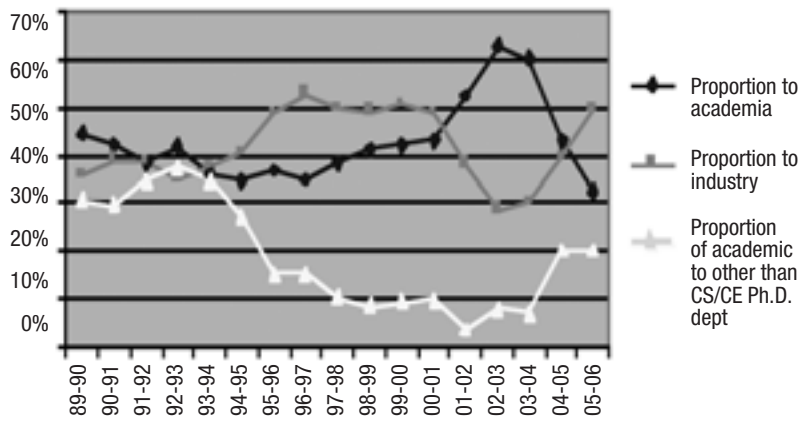

Figure 5. Nonresident Aliens as Fraction of Ph.D. Enrollments

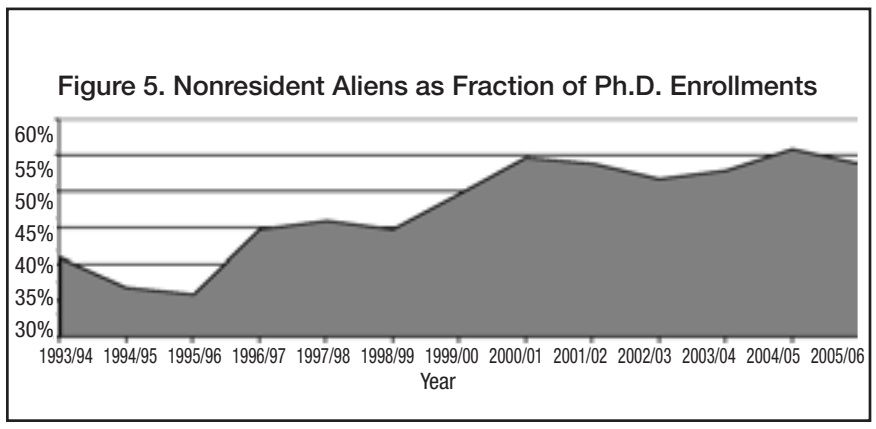

Figure 6. BS Production

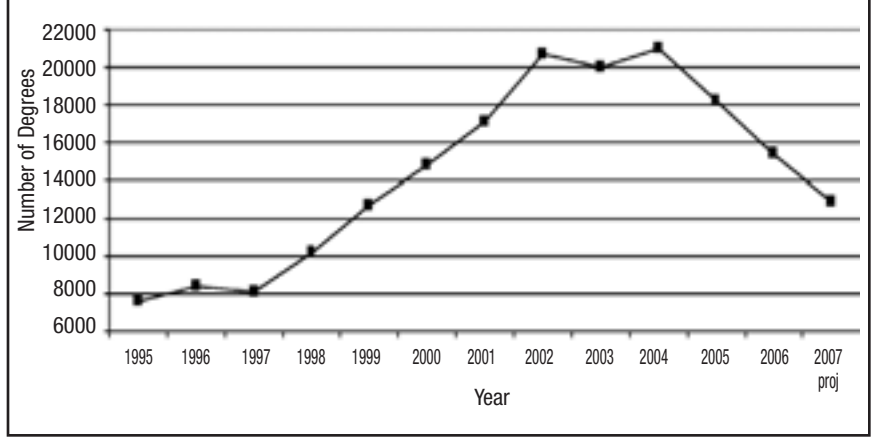

Table 16. Bachelor's Degree Program Total Enrollment by Department Type and Rank

	CS			CE			CS&CE Majors	
Department, Rank	Pre-Major	Major	Avg. Major per Dept.	Pre-Major	Major	Avg. Major per Dept.	Total	Avg. Major per Dept.
US CS 1-12	266	3,677	306.4	0	531	88.5	4,208	350.7
US CS 13-24	182	2,887	240.6	0	853	121.9	3,740	311.7
US CS 25-36	430	3,770	314.2	44	581	72.6	4,351	362.6
US CS Other	5,669	24,650	228.2	1,368	5,398	100.0	30,048	278.2
Canadian	153	12,977	648.9	0	97	13.9	13,074	653.7
US CE	0	0	0.0	138	1,958	195.8	1,958	195.8
Total	**6,700**	**47,961**	**275.6**	**1,550**	**9,418**	**54.1**	**57,379**	**329.8**

Table 17. Actual and Anticipated Faculty Size by Position

	Actual	Projected		Expected Two-Year Growth	
	2006-2007	2007-2008	2008-2009		
Tenure-Track	4,403	4,534	4,718	315	7.2%
Researcher	411	451	485	74	18.0%
Postdoc	316	381	420	104	32.9%
Teaching Faculty	635	641	656	21	3.3%
Other/Not Listed	94	96	102	8	8.5%
Total	**5,859**	**6,103**	**6,381**	**522**	**8.9%**

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

	Actual	Projected		Expected Two-Year Growth	
	2005-2006	2006-2007	2007-2008		
US CS 1-12	720	743	767	47	6.5%
US CS 13-24	603	652	688	85	14.1%
US CS 25-36	560	603	634	74	13.2%
US CS Other	2,956	3,045	3,194	238	8.1%
Canadian	829	862	877	48	5.8%
US CE	191	200	221	30	15.7%
Total	**5,859**	**6,105**	**6,381**	**522**	**8.9%**

Note: Totals differ in Tables 17 & 18 due to roundoff of FTEs.

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departments tend to have more tenure-track faculty members and more postdocs than do lower ranked departments. If the growth forecasts hold true, departments ranked 13-36 will be hiring more postdocs in the next two years than will the top 12 departments.

Table 18b also is new this year, and shows the recruiting results from last year's hiring cycle. The data indicate that roughly one of every three open tenure-track positions went unfilled last year. In future years, trends in these data will be of interest to our community.

Table 23 on faculty "losses" shows no change (100 vs. 103 last year) in the number who left academia this past year through death, retirement, or taking nonacademic positions. In particular, the retirement number stayed about the same. The amount of "churn," the number of professors moving from one academic position to another, rose somewhat from 61 to 74, but this is less than 2% of the total size of the tenure-track faculty.

The percentage of newly hired women faculty (Table 19) dropped slightly from 22% to 19.6%; the proportion of women hired into tenure-track positions mirrors that for all faculty positions. These proportions of new women faculty are similar to the 18.1% proportion of new female Ph.D.s shown in Table 2.

The proportion of White, non-Hispanic tenure-track hires stayed the same this year, while the proportion of nonresident aliens and African-Americans increased and the proportion of Asian/Pacific Islanders hired decreased. The trend of disproportionately fewer nonresident aliens being hired into tenure-track faculty positions (28.5%) compared to nonresident aliens' proportion of the new Ph.D.s produced (56.8%) continues. The increased proportion of newly hired African-Americans (3.3% of faculty hires with known ethnicity, compared to 1.3% last year) is welcome in addressing diversity concerns. Nevertheless, with African-Americans comprising only 1.8% of our current Ph.D. enrollments (Table 8), it is not likely that this is a sustainable increase.

Tables 21 and 22 show gender and ethnicity data for all categories of current faculty, including postdocs. The proportion of female tenured faculty rose slightly this year (10.4% full professors vs. 9.8% last year; 13.1% associate professors vs. 12.5% last year), and the proportion of female postdocs also rose (19.6% vs. 16.7% last year). There is a smaller proportion of non-resident aliens as assistant professors and as postdocs compared to last year, while the proportion of postdocs who are Asian/Pacific Islanders and White, Non-Hispanic rose.

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

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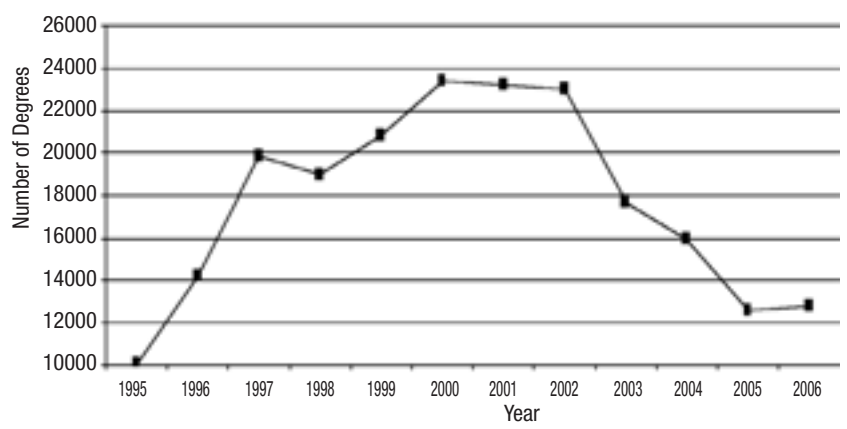
Table 18a. Actual and Anticipated CS Faculty Size by Position and Department Rank

	Actual		Projected				Expect 2-Yr Growth	
	2006-2007		2007-2008		2008-2009			
US CS 1-12	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	484	40.3	497	41.4	514	42.8	30	6.2%
Research	55	4.6	59	4.9	62	5.2	7	12.7%
Postdoc	77	6.4	81	6.8	83	6.9	6	7.8%
Teaching	62	5.2	63	5.3	64	5.3	2	3.2%
Other	42	3.5	43	3.6	44	3.7	2	4.8%
US CS 13-24	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	387	32.3	402	33.5	418	34.8	31	8.0%
Research	110	9.2	120	10.0	129	10.8	19	17.3%
Postdoc	57	4.8	74	6.2	85	7.1	28	49.1%
Teaching	47	3.9	51	4.3	53	4.4	6	12.8%
Other	3	0.3	3	0.3	3	0.3	0	0.0%
US CS 25-36	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	378	31.5	405	33.8	422	35.2	44	11.6%
Research	59	4.9	65	5.4	70	5.8	11	18.6%
Postdoc	39	3.3	48	4.0	56	4.7	17	43.6%
Teaching	59	4.9	60	5.0	60	5.0	1	1.7%
Other	25	2.1	25	2.1	25	2.1	0	0.0%
US CS Other	Total	Average	Total	Average	Total	Average	#	%
TenureTrack	2,304	19.5	2,354	19.9	2,462	20.9	158	6.9%
Research	148	1.3	162	1.4	174	1.5	26	17.6%
Postdoc	93	0.8	115	1.0	128	1.1	35	37.6%
Teaching	388	3.3	389	3.3	401	3.4	13	3.4%
Other	22	0.2	24	0.2	28	0.2	6	27.3%

Table 18b. Vacant Positions 2005-2006 by Position and Department Rank and Type

	Vacant Positions 2005-2006			
	Tried to fill	Filled	Unfilled	% Unfilled
US CS 1-12				
TenureTrack	30	20	10	33.3%
Research	9	9	0	0.0%
Postdoc	6	6	0	0.0%
Teaching	40	29	11	27.5%
Other	10	7	3	30.0%
US CS 13-24				
TenureTrack	25	14	11	44.0%
Research	2	2	0	0.0%
Postdoc	6	6	0	0.0%
Teaching	12	12	0	0.0%
Other	3	3	0	0.0%
US CS 25-36				
TenureTrack	36	22	14	38.9%
Research	10	8	2	20.0%
Postdoc	10	8	2	20.0%
Teaching	14	9	5	35.7%
Other	3	2	1	33.3%
US CS Other				
TenureTrack	187	134	53	28.3%
Research	44	42	2	4.5%
Postdoc	43	42	1	2.3%
Teaching	40	36	4	10.0%
Other	4	3	1	25.0%
Canadian				
TenureTrack	39	27	12	30.8%
Research	6	5	1	16.7%
Postdoc	22	21	1	4.5%
Teaching	19	16	3	15.8%
Other	0	0	0	
US CE				
TenureTrack	13	9	4	30.8%
Research	7	7	0	0.0%
Postdoc	19	19	0	0.0%
Teaching	8	8	0	0.0%
Other	1	1	0	0.0%

Figure 7. Newly Declared CS/CE Undergraduate Majors



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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 historically in the survey. The second is relative to researchers and postdocs, as well as tenured and tenure-track faculty. In general, the higher the ranking of the department, the higher the amount of external funding it receives (both in total and per capita). However, departments ranked 13-24 are close to the top 12 in median total funding and, in fact, are higher in median funding when the first capitation method is used. Canadian levels are shown in Canadian dollars.

Mean and median expenditures—both in total and on a per capita basis (no matter which capitation method is used)—declined for the top 12 U.S. departments for the second year in a row. Median expenditures for all U.S. CS department strata declined using the first capitation method, while other U.S. CS strata stayed about the same as last year using the second capitation method. Means and median expenditures for Canadian departments and computer engineering departments rose using either capitation method. While the details are somewhat different, the overall message stated in last year's report still holds: "These mixed reports suggest that it has become harder for faculty to obtain and/or sustain funding for computing research in the U.S. CRA has reported on the funding story extensively through the years, and these data are consistent with the declining state of research funding that has been noted recently."

Table 25 shows the number of graduate students supported as full-time students as of fall 2006, further categorized as teaching assistants, research assistants, fellows, or computer systems supporters, and split between those on institutional vs. external funds. The number of teaching assistants held steady this year, except in departments ranked 25-36 and computer engineering departments where it increased, and in Canadian departments where it declined. Total number of research assistants fell, although the number supported on external funds rose. This shift from institutional to external support is predominant in departments ranked 1-24.

After a decline of more than 10% last year, the number of full-support fellows is up substantially this year. Canadian departments explain the entire change at the institutional support level, but less than 25% of the change in fellows were supported on external funds.

Respondents were asked to "provide the net amount (as of fall 2006) 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. Because some departments report this information in some years and not others, the data within the various ranking strata may

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Table 19. Gender of Newly Hired Faculty

	Tenure-track		Researcher		Postdoc		Teaching Faculty		Total	
Male	161	80.5%	39	83.0%	71	78.9%	37	74.0%	308	79.6%
Female	39	19.5%	8	17.0%	16	17.8%	13	26.0%	76	19.6%
	0		0		3		0		3	
Total	**200**		**47**		**90**		**50**		**387**	

Table 20. Ethnicity of Newly Hired Faculty

	Tenure-Track		Researcher		Postdoc		Teaching Faculty		Total
Nonresident Alien	53	28.5%	14	31.8%	31	37.8%	4	8.3%	**102**
African-American, Non-Hispanic	8	4.3%	1	2.3%	2	2.4%	1	2.1%	**12**
Native American/Alaskan Native	0	0.0%	0	0.0%	0	0.0%	0	0.0%	**0**
Asian/Pacific Islander	36	19.4%	11	25.0%	21	25.6%	8	16.7%	**76**
Hispanic	3	1.6%	1	2.3%	0	0.0%	1	2.1%	**5**
White, Non-Hispanic	80	43.0%	17	38.6%	27	32.9%	34	70.8%	**158**
Other/Not Listed	6	3.2%	0	0.0%	1	1.2%	0	0.0%	**7**
Total have Ethnicity Data for	**186**		**44**		**82**		**48**		**360**
Ethnicity/Residency Unknown	14		3		8		2		**27**
Total	**200**		**47**		**90**		**50**		**387**

Table 21. Gender of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Male	1,692	89.6%	1,140	86.9%	1,010	81.5%	531	74.4%	345	84.4%	221	80.4%	**4,939**	**84.6%**
Female	196	10.4%	172	13.1%	229	18.5%	183	25.6%	64	15.6%	54	19.6%	**898**	**15.4%**
Total gender known	**1,888**		**1,312**		**1,239**		**714**		**409**		**275**		**5,837**	
Gender unknown	0		0		0		0		1		13		**14**	
Total	**1,888**		**1,312**		**1,239**		**714**		**410**		**288**		**5,851**	

Table 22. Ethnicity of Current Faculty

	Full		Associate		Assistant		Teaching Faculty		Research Faculty		Postdocs		Total	
Nonresident Alien	3	0.2%	19	1.6%	178	15.7%	10	1.5%	44	11.4%	83	31.8%	**337**	6.3%
African-American, Non-Hispanic	8	0.5%	11	0.9%	26	2.3%	15	2.2%	4	1.0%	4	1.5%	**68**	1.3%
Native American/ Alaskan Native	3	0.2%	4	0.3%	2	0.2%	1	0.1%	0	0.0%	0	0.0%	**10**	0.2%
Asian/Pacific Islander	369	21.8%	262	22.4%	323	28.5%	60	9.0%	64	16.5%	62	23.8%	**1,140**	21.4%
Hispanic	28	1.7%	29	2.5%	18	1.6%	12	1.8%	3	0.8%	3	1.1%	**93**	1.7%
White, Non-Hispanic	1,262	74.5%	831	71.0%	566	50.0%	564	84.2%	268	69.3%	98	37.5%	**3,589**	67.5%
Other/Not Listed	21	1.2%	14	1.2%	20	1.8%	8	1.2%	4	1.0%	11	4.21%	**78**	1.5%
Total Have Ethnicity Data For	**1,694**		**1,170**		**1,133**		**670**		**387**		**261**		**5,315**	
Ethnicity/Residency Unknown	194		142		106		44		23		27		**536**	
Total	**1,888**		**1,312**		**1,239**		**714**		**410**		**288**		**5,851**	

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Table 22a. Part-Time Faculty

	Total
Full Professor	71
Associate Professor	33
Assistant Professor	24
Teaching Faculty	301
Research Faculty	41
Postdoctorate	8
Total	**478**

Table 23. Faculty Losses

	Total
Died	7
Retired	55
Took Academic Position Elsewhere	74
Took Nonacademic Position	38
Remained, but Changed to Part-Time	11
Other	18
Unknown	4
Total	**207**

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

	Total Expenditure			
Department, Rank	**Minimum**	**Mean**	**Median**	**Maximum**
US CS 1-12	$3,200,000	$19,961,143	$11,042,484	$84,967,163
US CS 13-24	$4,486,612	$10,772,192	$10,082,630	$26,154,500
US CS 25-36	$1,288,031	$6,155,334	$5,794,512	$15,406,490
US CS Other	$20,572	$2,617,977	$1,705,995	$31,500,000
Canadian	$93,402	$3,099,463	$2,317,456	$10,887,598
US CE	$91,789	$2,352,773	$2,689,560	$5,199,187

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

	Per Capita Expenditure (Tenure-Track Faculty Only)				Per Capita Expenditure (Tenure-Track, Research, and Postdoctorate Faculty)			
Department, Rank	**Minimum**	**Mean**	**Median**	**Maximum**	**Minimum**	**Mean**	**Median**	**Maximum**
US CS 1-12	$125,164	$379,055	$265,001	$1,075,534	$104,918	$300,360	$241,688	$660,324
US CS 13-24	$165,273	$304,307	$297,244	$533,765	$142,009	$212,344	$214,745	$285,218
US CS 25-36	$84,461	$198,093	$182,786	$376,961	$83,343	$156,286	$139,339	$308,422
US CS Other	$1,591	$132,766	$91,781	$112,500	$1,591	$116,454	$89,413	$1,125,000
Canadian	$3,013	$80,863	$73,428	$226,825	$3,013	$71,498	$69,638	$194,421
US CE	$9,179	$199,603	$146,775	$611,669	$9,179	$168,160	$127,919	$452,103

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

	Number on Institutional Funds										Number on External Funds									
Department, Rank	**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	369	17.8%	141	6.8%	86	4.2%	1	0.0%	27	1.3%	0	0.0%	1,159	56.0%	253	12.2%	0	0.0%	34	1.6%
US CS 13-24	268	18.4%	86	5.9%	84	5.8%	0	0.0%	7	0.5%	6	0.4%	910	62.6%	90	6.2%	0	0.0%	2	0.1%
US CS 25-36	364	31.3%	97	8.3%	62	5.3%	6	0.5%	3	0.3%	21	1.8%	524	45.1%	76	6.5%	0	0.0%	10	0.9%
US CS Other	1,764	36.2%	532	10.9%	187	3.8%	86	1.8%	90	1.8%	51	1.0%	2,027	41.6%	98	2.0%	36	0.7%	6	0.1%
Canadian	372	29.5%	232	18.4%	228	18.1%	12	1.0%	71	5.6%	0	0.0%	155	12.3%	137	10.9%	0	0.0%	53	4.2%
US CE	99	22.7%	9	2.1%	25	5.7%	0	0.0%	0	0.0%	0	0.0%	293	67.0%	11	2.5%	0	0.0%	0	0.0%
Total	**3,236**	28.7%	**1,097**	9.7%	**672**	6.0%	**105**	0.9%	**198**	1.8%	**78**	0.7%	**5,068**	45.0%	**665**	5.9%	**36**	0.3%	**105**	0.9%

Table 26-1. Fall 2006 Academic-Year Graduate Stipends by Department Type and Rank

	Teaching Assistantships				Research Assistantships			
Department, Rank	**Minimum**	**Mean**	**Median**	**Maximum**	**Minimum**	**Mean**	**Median**	**Maximum**
US CS 1-12	$9,800	$16,296	$16,488	$20,203	$14,769	$18,290	$17,541	$26,640
US CS 13-24	$4,400	$15,792	$16,170	$24,500	$12,000	$18,766	$18,479	$24,500
US CS 25-36	$12,276	$15,428	$15,000	$19,547	$13,302	$15,624	$15,390	$19,547
US CS Other	$1,450	$13,827	$14,088	$26,550	$1,500	$15,436	$15,447	$60,000
Canadian	$2,500	$8,641	$9,600	$16,020	$5,100	$12,049	$11,750	$19,700
US CE	$6,300	$13,713	$14,500	$17,850	$10,000	$14,639	$14,922	$18,000

Table 26-2. Fall 2006 Academic-Year Graduate Stipends by Department Type and Rank

	Full-Support Fellows				Assistantships for Computer Systems Support			
Department, Rank	**Minimum**	**Mean**	**Median**	**Maximum**	**Minimum**	**Mean**	**Median**	**Maximum**
US CS 1-12	$16,900	$19,733	$19,300	$26,640	*	*	*	*
US CS 13-24	$12,000	$20,101	$20,000	$30,000	*	*	*	*
US CS 25-36	$12,000	$17,701	$16,366	$25,000	$10,000	$14,378	$14,909	$17,694
US CS Other	$1,800	$17,677	$18,000	$30,000	$1,000	$13,073	$13,124	$23,000
Canadian	$14,450	$19,273	$17,058	$28,855	*	*	*	*
US CE	$13,950	$21,429	$20,900	$30,000	*	*	*	*

*Numbers not reported due to low number of respondents

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only be a weak indicator of the actual stipend changes from one year to the next. The data show approximately a 5% to 6% increase in median teaching assistant (TA) salaries in all U.S. ranking strata except departments ranked 13-24, which showed a 9% decrease. Canadian departments showed a small decline in median TA stipends.

The effect on Research assistant (RA) stipends is similar to the teaching assistant stipends, according to reporting departments. Median salaries for RAs were flat for U.S. departments ranked 13-24, and rose about 2% to 8% in other U.S. ranking strata. Canadian median stipends dropped significantly, undoubtedly more seriously affected by the differences in departments that reported this information.

Table 26-3. Fall 2006 Academic-Year Graduate Stipends by Department Type and Rank

	Other Assistantships			
Department, Rank	**Minimum**	**Mean**	**Median**	**Maximum**
US CS 1-12	$17,100	$20,483	$19,350	$25,000
US CS 13-24	$15,077	$18,952	$17,332	$27,672
US CS 25-36	*	*	*	*
US CS Other	$1,000	$8,801	$8,220	$18,667
Canadian	$5,000	$17,000	$19,000	$27,000
US CE	*	*	*	*

*Numbers not reported due to low number of respondents

Table 27. Nine-month Salaries, 155 Responses of 175 US Computer Science Departments

		Reported Salary Minimum					Reported Salary Maximum		
Faculty Rank Tenured and Tenure-Track	**Number of Faculty**	**Minimum**	**Mean**	**Maximum**	**Overall Mean**	**Overall Median**	**Minimum**	**Mean**	**Maximum**
Full Professor	1,518	$71,250	$100,272	$176,872	$123,942	$120,521	$92,977	$163,294	$304,080
Associate Professor	1,036	$58,852	$85,105	$132,550	$94,712	$94,178	$71,017	$105,746	$178,990
Assistant Professor	1,016	$60,423	$79,947	$99,000	$84,642	$84,552	$72,000	$89,052	$150,000
Non-Tenure-Track									
Teaching Faculty	555	$25,000	$55,317	$128,500	$63,465	$62,523	$25,000	$74,178	$149,715
Research Faculty	380	$21,000	$68,954	$150,000	$82,685	$80,902	$50,000	$101,155	$283,593
Postdoctorates	185	$20,000	$41,516	$70,000	$46,920	$46,930	$24,000	$52,109	$103,301

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

		Reported Salary Minimum					Reported Salary Maximum		
Faculty Rank	**Number of Faculty**	**Minimum**	**Mean**	**Maximum**	**Overall Mean**	**Overall Median**	**Minimum**	**Mean**	**Maximum**
Full Professor	248	$88,900	$107,929	$144,400	$140,161	$134,815	$172,758	$209,953	$234,100
Associate Professor	84	$75,615	$92,428	$117,500	$102,578	$102,793	$94,169	$110,439	$124,250
Assistant Professor	104	$60,423	$82,363	$89,200	$89,434	$89,310	$88,400	$95,662	$104,600
Non-Tenure-Track									
Teaching Faculty	60	$35,189	$67,725	$128,500	$83,126	$84,054	$71,587	$99,345	$128,500
Research Faculty	100	$53,200	$81,104	$117,341	$109,483	$107,621	$108,000	$156,840	$283,593
Postdoctorates	138	$20,004	$39,319	$51,750	$50,728	$50,240	$54,600	$63,748	$75,700

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

		Reported Salary Minimum					Reported Salary Maximum		
Faculty Rank	**Number of Faculty**	**Minimum**	**Mean**	**Maximum**	**Overall Mean**	**Overall Median**	**Minimum**	**Mean**	**Maximum**
Full Professor	214	$84,600	$105,126	$135,200	$148,700	$140,934	$177,368	$216,022	$304,080
Associate Professor	85	$71,091	$94,303	$122,500	$108,502	$107,565	$104,446	$123,837	$155,200
Assistant Professor	89	$78,200	$86,433	$99,000	$92,665	$92,606	$86,975	$100,271	$150,000
Non-Tenure-Track									
Teaching Faculty	43	$53,000	$71,323	$95,000	$79,132	$77,451	$67,390	$91,030	$149,715
Research Faculty	90	$27,936	$71,534	$101,100	$92,398	$91,095	$78,400	$123,194	$203,250
Postdoctorates	53	$20,000	$40,170	$63,000	$50,061	$50,066	$50,923	$58,166	$65,780

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

		Reported Salary Minimum					Reported Salary Maximum		
Faculty Rank	**Number of Faculty**	**Minimum**	**Mean**	**Maximum**	**Overall Mean**	**Overall Median**	**Minimum**	**Mean**	**Maximum**
Full Professor	184	$89,500	$103,924	$119,000	$133,136	$129,747	$133,295	$184,303	$228,750
Associate Professor	103	$67,784	$87,646	$132,550	$98,902	$100,428	$93,007	$110,011	$132,550
Assistant Professor	95	$63,785	$81,360	$90,982	$87,254	$87,540	$82,752	$90,722	$98,752
Non-Tenure-Track									
Teaching Faculty	46	$43,622	$55,418	$76,200	$70,578	$65,601	$70,290	$91,091	$144,700
Research Faculty	54	$25,000	$62,407	$109,409	$82,905	$82,334	$58,800	$106,582	$171,900
Postdoctorates	34	$25,000	$42,594	$62,400	$46,812	$46,344	$35,568	$52,592	$77,600

Table 31. Nine-month Salaries, 121 Responses of 139 US Computer Science Departments Ranked Higher than 36 or Unranked

		Reported Salary Minimum					Reported Salary Maximum		
Faculty Rank	**Number of Faculty**	**Minimum**	**Mean**	**Maximum**	**Overall Mean**	**Overall Median**	**Minimum**	**Mean**	**Maximum**
Full Professor	872	$71,250	$98,771	$176,872	$119,156	$116,366	$92,977	$152,032	$287,877
Associate Professor	764	$58,852	$83,353	$117,567	$92,263	$91,479	$71,017	$103,114	$178,990
Assistant Professor	728	$63,300	$79,002	$96,361	$83,223	$83,107	$72,000	$87,290	$110,254
Non-Tenure-Track									
Teaching Faculty	406	$25,000	$52,452	$113,743	$59,413	$58,807	$25,000	$68,729	$125,000
Research Faculty	136	$24,000	$59,606	$112,356	$68,857	$66,253	$30,000	$83,481	$194,670
Postdoctorates	91	$20,000	$42,004	$70,000	$45,594	$45,748	$24,000	$48,654	$103,301

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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, 2007. 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. Those departments reporting individual salaries were provided more comprehensive distributional information in December 2006. A total of 152 departments (82% of those reporting salary data) 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 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.

Overall U.S. CS average salaries (Table 27) increased between 2.7% and 4.7%, depending on tenure-track rank, and 4.2% for non-tenure-track teaching faculty. These increases are somewhat similar to the 3.7% to

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Table 32. Nine-month Salaries, 12 Responses of 32 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
Full Professor	64	$90,800	$104,220	$120,908	$122,009	$120,377	$102,179	$145,750	$185,956
Associate Professor	42	$72,976	$87,185	$104,210	$90,428	$90,179	$72,796	$95,101	$112,316
Assistant Professor	52	$69,300	$80,762	$98,600	$84,099	$84,160	$77,721	$87,937	$99,100
Non-Tenure-Track									
Teaching Faculty	15	$47,853	$63,926	$85,000	$68,485	$67,236	$47,853	$75,398	$124,026
Research Faculty	8	*	*	*	*	*	*	*	*
Postdoctorates	7	*	*	*	*	*	*	*	*

*Numbers not reported due to low number of respondents

Table 33. Twelve-month Salaries, 19 Responses of 28 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
Full Professor	265	$56,727	$107,270	$139,154	$129,342	$126,698	$86,443	$156,692	$224,259
Associate Professor	221	$49,368	$86,498	$119,517	$102,615	$102,732	$94,308	$115,695	$149,281
Assistant Professor	173	$59,559	$80,881	$110,200	$90,873	$91,081	$67,474	$101,321	$134,988
Non-Tenure-Track									
Teaching Faculty	73	$24,600	$61,161	$80,383	$73,535	$73,740	$47,355	$85,613	$125,630
Research Faculty	9	*	*	*	*	*	*	*	*
Postdoctorates	19	$22,800	$33,260	$48,000	$38,694	$40,000	$35,000	$46,600	$65,000

*Numbers not reported due to low number of respondents

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

Employment Position	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track Faculty	94	$70,000	$82,433	$99,000	$82,626	$82,781	$70,000	$82,869	$99,000
Non-Tenure-Track									
Researcher	8	*	*	*	*	*	*	*	*
Postdoc	11	$60,000	$77,798	$95,000	$77,798	$80,255	$60,000	$77,798	$95,000
Non-Tenure Teaching Faculty	45	$20,000	$45,099	$70,000	$46,506	$46,462	$24,000	$47,767	$70,000

*Numbers not reported due to low number of respondents

Table 34a. Nine-month Salaries for New PhDs, Responding Canadian Departments

Employment Position	Number of Faculty	Reported Salary Minimum			Overall Mean	Overall Median	Reported Salary Maximum		
		Minimum	Mean	Maximum			Minimum	Mean	Maximum
Tenure-Track Faculty	5	$61,142	$81,587	$93,000	$81,814	$81,814	$64,308	$82,040	$93,000

Table 35. Official Teaching Load of Tenured and Tenure-Track Faculty

Department, Rank	Official Teaching Load*				Academic Calendar		
	Minimum	Mean	Median	Maximum	Semester	Quarter	Other
US CS 1-12	1.3	2.1	2.0	3.0	9	3	0
US CS 13-24	2.0	2.5	2.6	3.0	10	2	0
US CS 25-36	2.0	2.3	2.0	3.0	10	2	0
US CS Other	0.7	3.3	3.0	6.0	95	13	1
Canadian	1.0	3.1	3.0	4.0	19	0	1
US CE	2.0	3.4	3.0	4.0	10	2	0
Total	**0.7**	**3.1**	**3.0**	**6.0**	**153**	**22**	**2**

* Teaching load is given for a semester calendar. Loads for a quarter system were multiplied by 2/3. To convert back to quarter-system equivalent, multiply these values by 1.5.

CRA-W Career Mentoring Workshop

at FCRC '07 June 9-10

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4.1% levels experienced last year for tenure-track faculty and the 4.8% level for non-tenure-track teaching faculty. Tenure-track faculty of higher rank tended to get larger increases this year than did those of lower rank. Canadian salaries (shown as 12-month salaries in Canadian dollars) rose 2.3% to 4.4%, with the larger increase at the full professor rank and the smaller at the associate professor rank.

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 level of increase is somewhat smaller than the average increases for continuing faculty, for the third year out of the past four.

Additional Departmental Profiles Analysis

Every three years, CRA collects additional information about various aspects of departmental activities that are not expected to change much over a one-year period. The additional data include teaching loads, sources of external funding, methods of recruiting graduate students, departmental support staff, and space. The most recent data about these activities were collected in the 2003 Taulbee Survey, and reported in the May 2004 edition of *Computing Research News*.

Teaching Loads *(Tables 35-38)*

Average official teaching loads range from two to a little more than three semester courses per faculty member per year. The overall mean load of 3.1 courses is lower than the 3.5 value three years ago. Almost all departments report that there are factors that cause the load for an individual faculty member to vary. Compared with three years ago, a smaller percentage of departments report allowing reduction for administrative duties (75.9% vs. 84.1%) or the type or size of class being taught (18.2% vs 29.0%), while other factors show percentages this year similar to those reported three years ago. This year, 75.6% of departments reported that increases from the standard load take place for faculty members who shift their primary responsibility to teaching; this fraction was 70.3% three years ago.

Table 36. Faculty Load Reductions and Increases

	Faculty Load Reduction Possible		Faculty Load Increase Possible	
Department, Rank	**Yes**	**No**	**Yes**	**No**
US CS 1-12	100.0%	0.0%	75.0%	25.0%
US CS 13-24	91.7%	8.3%	75.0%	25.0%
US CS 25-36	91.7%	8.3%	75.0%	25.0%
US CS Other	97.2%	2.8%	75.2%	24.8%
Canadian	100.0%	0.0%	68.4%	31.6%
US CE	100.0%	0.0%	50.0%	50.0%
Total	**97.1%**	**2.9%**	**73.0%**	**27.0%**

Table 37. Type of Load Reductions Possible in Departments Offering Reductions

Department, Rank	Special Package for New Faculty	Administrative Duties	Type or Size of Class Taught	Buy-out Policy	Strong Research Involvement	Other
US CS 1-12	91.7%	75.0%	0.0%	41.7%	8.3%	16.7%
US CS 13-24	81.8%	90.9%	18.2%	81.8%	54.5%	18.2%
US CS 25-36	90.9%	90.9%	18.2%	63.6%	18.2%	9.1%
US CS Other	84.0%	77.4%	19.8%	83.0%	54.7%	11.3%
Canadian	85.0%	90.0%	5.0%	30.0%	75.0%	35.0%
US CE	90.0%	100.0%	50.0%	90.0%	60.0%	10.0%
Total	**85.3%**	**75.9%**	**18.2%**	**72.9%**	**51.8%**	**14.7%**

Table 38. Reasons for Increase in Teaching Load in Departments where Increase is Possible

Department, Rank	Shifting Primary Responsibilities to Teaching	Other
US CS 1-12	66.7%	33.3%
US CS 13-24	66.7%	33.3%
US CS 25-36	66.7%	33.3%
US CS Other	80.5%	19.5%
Canadian	53.8%	46.1%
US CE	100.0%	0.0%
Total	**75.6%**	**24.4%**

Table 39. Sources of External Funding, 9 of 12 US Computer Science Departments Ranked 1-12

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSF	$6,908,695	$5,700,000	100.0%	$6,908,695	$62,178,254	33.7%
DARPA	$4,431,371	$911,510	100.0%	$4,431,371	$39,882,340	21.6%
NIH	$548,682	$140,136	66.7%	$602,836	$4,938,136	2.7%
DOE	$527,203	$280,000	77.8%	$677,832	$4,744,824	2.6%
State agencies	$187,848	$0	33.3%	$563,545	$1,690,636	0.9%
Industrial sources	$2,512,392	$802,783	88.9%	$2,826,441	$22,611,526	12.2%
Other defense	$4,409,981	$698,975	77.8%	$5,669,975	$39,689,826	21.5%
Other federal	$698,975	$0	33.3%	$529,873	$6,290,772	3.4%
Private foundation	$239,715	$85,938	66.7%	$359,572	$2,157,435	1.2%
Other	$415,433	$233,399	66.7%	$623,150	$461,559	0.2%
Total					**$184,645,308**	

Table 40. Sources of External Funding, 11 of 12 US Computer Science Departments Ranked 13-24

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSF	$4,928,232	$4,939,000	100.0%	$4,928,232	$54,210,550	45.7%
DARPA	$792,083	$485,568	81.8%	$968,101	$8,712,909	7.4%
NIH	$382,878	$420,000	81.8%	$467,962	$4,211,660	3.6%
DOE	$519,113	$28,959	63.6%	$815,749	$5,710,246	4.8%
State agencies	$361,025	$213,458	63.6%	$567,326	$3,971,279	3.4%
Industrial sources	$797,210	$660,038	81.8%	$974,368	$8,769,308	7.4%
Other defense	$1,886,694	$554,704	90.9%	$2,075,364	$20,753,638	17.5%
Other federal	$546,978	$139,902	54.5%	$1,002,792	$6,016,755	5.1%
Private foundation	$276,600	$33,218	81.8%	$338,067	$3,042,599	2.6%
Other	$281,379	$20,000	72.7%	$386,896	$3,095,167	2.6%
Total					**$118,494,111**	

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Sources of External Funding *(Tables 39-44)*

NSF continues to be the dominant source of external funding for U.S. computer science programs. NSF's share of this funding, compared with three years ago, increased by about 3% in all ranking strata except 13-24, where it increased 7%. DARPA had a larger share of the funding for top 12 departments (21.6% vs 14.3% three years ago), while other U.S. ranking strata showed a decline in the fraction of support obtained from DARPA. NIH's share was higher in the top 36 departments, and slightly lower for other U.S. departments. DOE's share went up somewhat in all strata except 25-36. The funding share from other defense agencies was generally lower except for top 12 departments, while the funding share from industry was somewhat higher except for top 12 departments. Table_ 44a shows the aggregate comparisons among all U.S. CS departments for each source of funding.

Canadian departments continue to get just over 40% of their funding from NSERC. Provincial agencies' share of the external funding declined from about one-third to about one-quarter, while share of support from industry and other federal agencies rose.

This year, the tables report mean dollar amounts of funding from each source for all departments

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Table 41. Sources of External Funding, 12 of 12 US Computer Science Departments Ranked 25-36

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSF	$3,433,367	$2,843,690	100.0%	$3,433,367	$41,200,409	55.8%
DARPA	$419,850	$242,526	58.3%	$719,742	$5,038,196	6.8%
NIH	$683,628	$146,530	58.3%	$1,171,934	$8,203,537	11.1%
DOE	$149,302	$13,552	50.0%	$298,604	$1,791,626	2.4%
State agencies	$75,045	$14,780	50.0%	$150,090	$900,542	1.2%
Industrial sources	$356,496	$162,712	75.0%	$475,328	$4,277,950	5.8%
Other defense	$440,416	$366,110	75.0%	$587,222	$5,284,993	7.2%
Other federal	$177,670	$37,318	50.0%	$355,340	$2,132,037	2.9%
Private foundation	$330,469	$574	50.0%	$660,938	$3,965,625	5.4%
Other	$89,091	$11,272	50.0%	$178,182	$1,069,092	1.4%
Total					**$73,864,007**	

Table 42. Sources of External Funding, 94 of 139 US Computer Science Departments Ranked Higher than 36 or Unranked

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSF	$1,037,240	$659,238	96.8%	$1,070,435	$97,500,604	45.7%
DARPA	$112,316	$0	25.5%	$439,905	$10,557,705	5.0%
NIH	$80,072	$0	35.1%	$228,084	$7,526,780	3.5%
DOE	$129,198	$0	41.5%	$311,401	$12,144,633	5.7%
State agencies	$109,714	$0	44.7%	$245,550	$10,313,122	4.8%
Industrial sources	$156,109	$33,390	67.0%	$232,925	$14,674,255	6.9%
Other defense	$338,133	$73,752	64.9%	$521,057	$31,784,503	14.9%
Other federal	$190,948	$0	47.9%	$398,869	$17,949,100	8.4%
Private foundation	$17,670	$0	30.8%	$57,279	$1,660,997	0.8%
Other	$96,734	$0	44.7%	$1,886,501	$9,092,949	4.3%
Total					**$213,204,648**	

Table 43. Sources of External Funding, 16 of 28 Canadian, in Canadian Dollars

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSERC	$1,218,387	$1,149,813	100.0%	$1,218,387	$19,494,193	40.5%
State agencies	$777,893	$141,898	75.0%	$1,037,191	$12,446,288	25.8%
Industrial sources	$355,455	$122,328	75.0%	$473,940	$5,687,285	11.8%
Other defense	*	*	6.0%	*	*	
Other federal	$459,943	$0	43.8%	$1,051,298	$7,359,084	15.3%
Private foundation	$31,938	$0	18.8%	$170,334	$511,002	1.1%
Other	$165,922	$25,000	56.2%	$794,972	$2,654,746	5.5%
Total					**$48,152,598**	

Table 44. Sources of External Funding, 10 of 32 US Computer Engineering Departments

	Mean	Median	% Non-Zero	Mean Non-Zero	Total	% of Total External Funding
NSF	$1,001,659	$1,019,131	100.0%	$1,001,659	$10,016,588	42.6%
DARPA	$160,009	$0	40.0%	$400,023	$1,600,091	6.8%
NIH	$86,637	$0	40.0%	$216,593	$866,373	3.7%
DOE	$125,995	$0	40.0%	$314,986	$1,259,945	5.4%
State agencies	$207,293	$76,444	60.0%	$345,488	$2,072,927	8.8%
Industrial sources	$214,732	$187,485	80.0%	$268,415	$2,147,321	9.1%
Other defense	$219,852	$199,531	80.0%	$285,677	$2,198,517	9.3%
Other federal	$203,152	$25,670	50.0%	$406,303	$2,031,517	8.6%
Private foundation	$122,100	$2,044	50.0%	$244,200	$1,221,002	5.2%
Other	$11,345	$0	30.0%	$37,818	$113,453	0.5%
Total					**$23,527,734**	

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Table 44a. Comparison of US CS External Funding 2003-2006

	2003 (126 departments)		2006 (123 departments)	
	Total	% of Funding	Total	% of Funding
NSF	$354,451,309	40.7%	$255,089,816	43.0%
DARPA	$85,401,891	9.8%	$64,191,150	10.8%
NIH	$15,864,767	1.8%	$24,880,112	4.2%
DOE	$20,471,676	2.4%	$24,391,329	4.1%
State agencies	$24,438,483	2.8%	$16,875,578	2.8%
Industrial sources	$70,813,388	8.1%	$50,333,039	8.5%
Other defense	$177,357,598	20.4%	$97,512,961	16.4%
Other federal	$50,555,980	5.8%	$32,388,664	5.5%
Private foundation	$32,977,093	3.8%	$10,826,656	1.8%
Other	$37,995,002	4.4%	$16,996,108	2.9%
Total	**$870,327,187**		**$593,485,413**	

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that reported in the stratum and among those who reported non-zero values from the funding source. Also shown is the fraction of departments within the stratum that reported any funding from that source. The data about non-zero departments was not reported three years ago.

Methods of Recruiting Graduate Students *(Tables 45-47)*

Graduate student stipends continue to be affected more by advancement to the next stage of the graduate program than by factors such as years of service, GPA, recruitment enhancements, or differences in funding source. Nevertheless, the fraction of departments that reported using recruitment enhancements and differences among funding sources as the basis for stipends was markedly lower this year than three years ago (13.9% vs 24.4% for recruiting enhancements, and 28.3% vs 44.8% for funding source differences). Stipend enhancements appear to be used as a recruiting incentive at a greater fraction of departments this year (30.6% vs 20.3% three years ago). Mean stipend enhancements are now around $5,000 compared with $3,238 three years ago.

Table 45. Factors Affecting the Amount of a Graduate Student's Stipend

Department, Rank	Advancement to Next Stage of Program	Years of Service	GPA	Recruitment Enhancements	Differences Among Various Stipend Sources	Other
US CS 1-12	58.3%	8.3%	8.3%	50.0%	66.7%	33.3%
US CS 13-24	41.7%	25.0%	0.0%	33.3%	25.0%	50.0%
US CS 25-36	50.0%	8.3%	16.7%	16.7%	16.7%	25.0%
US CS Other	65.2%	23.2%	14.3%	25.0%	46.4%	17.0%
Canadian	25.0%	20.0%	25.0%	25.0%	35.0%	20.0%
US CE	83.3%	33.3%	8.3%	50.0%	75.0%	8.3%
Total	58.9%	21.7%	13.9%	28.3%	45.0%	20.6%

Table 46. Departments Using Selected Graduate Student Recruitment Incentives

Department, Rank	Upfront One-Time Signing Bonus	Stipend Enhancements	Guaranteed Multi-Year Support	Guaranteed Summer Support	Paid Visits to Campus	Other Recruitment Incentives
US CS 1-12	33.3%	33.3%	83.3%	8.3%	75.0%	50.0%
US CS 13-24	16.7%	41.7%	66.7%	50.0%	83.3%	41.7%
US CS 25-36	16.7%	50.0%	66.7%	16.7%	50.0%	25.0%
US CS Other	4.5%	26.8%	50.0%	36.6%	33.3%	11.6%
Canadian	10.0%	30.0%	70.0%	20.0%	25.0%	15.0%
US CE	8.3%	33.3%	50.0%	33.3%	58.3%	8.3%
Total	8.9%	30.6%	56.7%	32.2%	41.1%	17.2%

Table 47. Mean Amounts and Years of Selected Graduate Student Recruitment Incentives

Department, Rank	Upfront One-Time Signing Bonus	Stipend Enhancements	Guaranteed Years of Support	Guaranteed Summer Support	Paid Visits to Campus
US CS 1-12	$6,875	*	4.1	*	$667
US CS 13-24	*	$5,750	3.9	$3,899	$454
US CS 25-36	*	$2,717	3.6	*	$620
US CS Other	$3,000	$5,153	3.5	$4,421	$547
Canadian	*	$7,170	3.4	*	$289
US CE	*	*	3.2	*	$500
Total	**$3,964**	**$5,061**	**3.6**	**$4,482**	**$562**

*Numbers not reported due to low number of respondents

Table 48. Full-time Secretarial/Administrative Employees by Type of Support

	Institutional Support				External Support				Total			
Department, Rank	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	1.5	20.6	17.8	89.0	0.0	5.9	3.0	22.5	6.2	28.2	25.0	101.0
US CS 13-24	0.2	11.1	9.0	25.6	0.0	2.8	3.0	6.7	1.0	13.4	12.0	34.3
US CS 25-36	2.0	10.8	7.0	37.8	0.0	1.0	0.2	3.0	4.0	11.6	8.0	38.0
US CS Other	1.0	4.6	3.5	26.0	0.0	0.8	0.0	8.0	0.0	5.1	4.0	26.0
Canadian	3.0	8.5	7.8	16.0	0.0	0.5	0.0	4.0	3.0	8.8	7.5	16.0
US CE	1.0	6.7	5.4	17.0	0.0	0.5	0.5	1.2	1.0	7.2	5.4	18.0
Total	**0.0**	**7.1**	**5.0**	**89.0**	**0.0**	**1.3**	**0.0**	**22.5**	**0.0**	**8.1**	**5.0**	**101.0**

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Table 49. Full-time Computer Support Employees by Type of Support

Department, Rank	Institutional Support				External Support				Total			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	1.0	8.5	7.0	20.0	0.0	6.2	3.0	35.0	2.0	14.5	12.0	47.0
US CS 13-24	0.0	6.1	6.0	12.0	0.0	3.0	2.5	7.0	0.0	8.8	10.0	18.5
US CS 25-36	1.0	6.5	6.0	14.0	0.0	0.8	1.0	2.0	2.0	7.2	6.0	14.0
US CS Other	0.0	2.6	2.0	12.0	0.0	0.4	0.0	5.0	0.0	2.9	2.0	0.0
Canadian	1.5	7.7	5.0	19.0	0.0	0.5	0.0	2.0	1.5	8.2	6.0	19.0
US CE	0.0	2.5	3.0	4.5	0.0	0.4	0.0	3.0	0.0	2.8	3.0	4.5
Total	**0.0**	**4.1**	**3.0**	**20.0**	**0.0**	**1.1**	**0.0**	**35.0**	**0.0**	**4.9**	**3.0**	**47.0**

Table 50. Full-time Research Employees by Type of Support

Department, Rank	Institutional Support				External Support				Total			
	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum	Minimum	Mean	Median	Maximum
US CS 1-12	0.0	1.9	0.0	12.0	0.5	33.7	7.0	250.0	1.0	32.1	7.5	254.0
US CS 13-24	0.0	0.1	0.0	1.0	0.0	9.6	3.0	31.7	0.0	9.8	3.0	31.7
US CS 25-36	0.0	0.4	0.0	1.0	0.0	0.9	0.0	6.0	0.0	1.2	0.0	7.0
US CS Other	0.0	0.3	0.0	5.0	0.0	1.0	0.0	10.5	0.0	1.2	0.0	10.5
Canadian	0.0	5.6	0.0	53.0	0.0	0.8	0.0	3.0	0.0	4.7	0.0	53.0
US CE	0.0	0.4	0.0	1.0	0.0	1.4	1.0	3.0	0.0	1.7	2.0	3.5
Total	**0.0**	**0.9**	**0.0**	**53.0**	**0.0**	**4.1**	**0.0**	**250.0**	**0.0**	**4.6**	**1.0**	**254.0**

Table 51. Total Departmental Space (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	14,410	79,215	62,076	223,000	950,577
US CS 13-24	19,456	45,997	38,393	77,052	505,964
US CS 25-36	20,446	35,536	29,296	66,472	355,355
US CS Other	4,000	23,592	18,022	100,000	2,288,470
US CE	3,500	41,125	30,787	115,302	452,373
Total US	**3,500**	**32,289**	**23,516**	**223,000**	**4,552,739**
Canadian	1,531	3,737	3,331	7,592	59,796

Table 52. Departmental Space for Faculty, Staff, and Student Offices (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	6,270	42,444	32,390	131,000	508,333
US CS 13-24	10,867	27,298	22,738	52,331	300,281
US CS 25-36	11,824	18,690	17,466	36,416	186,900
US CS Other	2,000	10,625	8,110	52,500	1,030,630
US CE					
Total US	**2,000**	**15,609**	**10,535**	**131,000**	**2,200,834**
Canadian	576	1,597	1,253	3,435	25,544

Table 53. Departmental Space for Conference and Seminar Rooms (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	1,939	8,686	5,117	26,743	104,230
US CS 13-24	0	4,644	2,206	15,280	51,089
US CS 25-36	681	3,167	3,200	6,811	31,666
US CS Other	0	1,252	864	5,000	121,487
US CE	0	1,484	1,314	4,186	16,321
Total US	**0**	**2,203**	**1,243**	**26,743**	**324,793**
Canadian	0	196	182	418	3,141

Table 54. Departmental Space for Research Labs (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	4,570	17,244	10,013	62,000	189,685
US CS 13-24	2,010	9,680	8,230	25,677	106,476
US CS 25-36	0	9,042	6,579	25,928	90,418
US CS Other	0	6,611	5,096	35,058	628,015
US CE	1,160	17,028	10,776	54,953	187,304
Total US	**0**	**8,709**	**6,000**	**62,000**	**1,201,898**
Canadian	90	1,237	1,104	2,757	19,792

Departmental Support Staff *(Tables 48-50)*

Support staff has not changed much from the data reported three years ago. All categories (administrative, computer, and research) show mean values that are similar to those reported the last time these data were collected.

Space *(Tables 51-63)*

Higher ranked U.S. computer science departments have more total space than lower ranked departments (Table 51). Median space growth during the past three years is generally 5% to 6%, except that median space grew by 16% for top 12 departments. Most of the growth appears to have been in office space and research lab space. Median instructional lab space grew for lower ranked departments, while it declined for higher ranked departments.

While half of the departments planned to get additional space three years ago, only about one quarter plan for space growth now. Where new space is being planned, it generally is office space and research lab space.

Concluding Observations

Ph.D. production continues to set records, and the forecast is for this to continue for the next year or two. More Ph.D. graduates are going to industry than to academia, and more are taking positions outside of North America. Total faculty sizes and research funding levels have temporarily, at least, hit a plateau, and there is as yet no evidence of increasing rates of faculty retirement.

While total undergraduate enrollments and degree production continue to decline, the decline in the number of new students at the bachelor's level seems to have ended. If the enrollments of new

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Table 55. Departmental Space for Instructional Labs (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	571	8,788	5,890	24,296	105,462
US CS 13-24	0	3,742	2,164	11,627	41,159
US CS 25-36	879	4,637	3,696	11,451	46,371
US CS Other	0	4,456	3,416	19,654	418,865
US CE	0	7,506	6,088	24,018	75,058
Total US	**0**	**5,014**	**3,755**	**24,296**	**686,915**
Canadian	212	781	724	1,476	10,932

Table 56. Definite Departmental Plans to Gain or Lose Space

Department, Rank	Gain Space	No Change	Lose Space	No Answer
US CS 1-12	25.0%	66.7%	0.0%	8.3%
US CS 13-24	25.0%	75.0%	0.0%	0.0%
US CS 25-36	41.7%	58.3%	0.0%	0.0%
US CS Other	26.8%	63.4%	2.7%	7.1%
Canadian	10.0%	85.0%	5.0%	0.0%
US CE	33.3%	58.3%	0.0%	8.3%
Total	**26.1%**	**66.1%**	**2.2%**	**5.6%**

Table 57. Year Departments Plan to Add or Lose Space

2007		2008		2009		2010		2011	
No.	%	No.	%	No.	%	No.	%	No.	%
16	37.2%	9	20.9%	8	18.6%	3	7.0%	1	2.3%

Table 58. Total Expected Additional Space of Departments Adding Space (net sq. ft. US, net sq. meters Canadian)

Department, Rank	Minimum	Mean	Median	Maximum	Total
US CS 1-12	12,231	83,077	117,000	120,000	249,231
US CS 13-24	360	20,679	5,000	56,676	62,036
US CS 25-36	9,632	37,831	34,000	73,691	151,323
US CS Other	300	7,086	5,000	36,445	177,149
US CE	2,000	59,250	42,500	150,000	237,000
Total US	**300**	**22,480**	**6,171**	**150,000**	**876,739**
Canadian	*	*	*	*	*

Table 59. Total Expected Additional Office Space for Faculty, Staff, and Grad Students (net sq. ft. US, net sq. meters Canadian)**

	% Adding None***	Minimum	Mean	Median	Maximum	Total
US CS 1-12	0.0%	2,333	35,107	40,000	63,000	105,322
US CS 13-24	33.3%	*	*	*	*	*
US CS 25-36	0.0%	3,325	13,826	9,144	33,692	55,305
US CS Other	20.0%	-2,333	2,394	1,154	12,315	47,884
US CE	25.0%	320	14,280	17,520	25,000	42,840
Total US	**17.9%**	**-2,333**	**8,022**	**2,410**	**63,000**	**256,711**
Canadian		*	*	*	*	*

* Numbers not reported due to low number of respondents
** Numbers include only those departments adding additional office space
***Percentage is among all departments adding total space

Table 60. Total Expected Additional Conference and Seminar Space (net sq. ft. US, net sq. meters Canadian)**

Department, Rank	% Adding None***	Minimum	Mean	Median	Maximum	Total
US CS 1-12	0.0%	1,044	16,681	9,000	40,000	50,044
US CS 13-24	66.7%	*	*	*	*	*
US CS 25-36	0.0%	300	4,229	3448	9720	16916
US CS Other	28.0%	0	594	355	2640	10695
US CE	25.0%	0	15,567	5,000	41,700	46,700
Total US	**25.6%**	**0**	**4,288**	**662**	**41,700**	**124,355**
Canadian		*	*	*	*	*

*Numbers not reported due to low number of respondents
**Square footage numbers include only those departments adding additional conference and seminar space
***Percentage is among all departments adding total space

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undergraduate students in computer science programs do, in fact, trend upward, faculty growth again should be possible. In the near term, however, the market looks very good for those departments who are able to hire new Ph.D.s.

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, 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, Naval Postgraduate School, New Mexico State, New Mexico Technology, North Carolina State, North Dakota State, Northeastern, Northwestern, Nova Southeastern, Ohio State, Oklahoma State, Old Dominion, Oregon Health and Science, Oregon State, Pace, Pennsylvania State, Polytechnic, Portland State, Rensselaer Polytechnic, State University of New*

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York (Binghamton), Stevens Institute of Technology, Syracuse, Texas A&M, Texas Tech, Toyota Technological Institute (Chicago), Tufts, Vanderbilt, Virginia Tech, Washington State, Washington (St. Louis), Wayne State, West Virginia, Worcester Polytechnic, and Wright State.

University of: *Alabama (Birmingham, Huntsville, and Tuscaloosa), Albany, Arkansas (Little Rock), Buffalo, California (at Davis, Riverside, Santa Barbara, and Santa Cruz), Central Florida, Colorado (at Boulder and Denver), Connecticut, Delaware, Florida, Georgia, Hawaii, Illinois (Chicago), Iowa, Kansas, Kentucky, Louisiana (Lafayette), Louisville, 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 Carolina (Charlotte), North Texas, Notre Dame, Oklahoma, Oregon, Pittsburgh, South Carolina, South Florida, Tennessee (Knoxville), Texas (at Arlington, Dallas, El Paso, and San Antonio), Toledo, Tulsa, Utah, Wisconsin (Milwaukee) and Wyoming.*

Computer Engineering departments participating in the survey this year include: *Iowa State, Northeastern, Princeton, Purdue, Rensselaer Polytechnic, Santa Clara, Virginia Tech, and the Universities of California (Santa Cruz), Houston, New Mexico, Southern California, and Tennessee (Knoxville).*

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

Acknowledgments

Betsy Bizot once again provided valuable assistance with the data collection, tabulation, and analysis for this survey. Jean Smith and Moshe Vardi suggested many valuable improvements to the presentation of this report.

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. ■

Table 61. Total Expected Additional Research Laboratory Space (net sq. ft. US, net sq. meters Canadian)**

Department, Rank	% Adding None***	Minimum	Mean	Median	Maximum	Total
US CS 1-12	0.0%	2,473	17,491	20,000	30,000	52,473
US CS 13-24	33.3%	*	*	*	*	*
US CS 25-36	0.0%	2,448	19,776	23,188	30,279	79,102
US CS Other	16.0%	0	2,869	2,074	14,018	60,252
US CE	0.0%	680	18,258	6,175	60,000	73,030
Total US	**12.8%**	**0**	**7,810**	**2,496**	**60,000**	**265,537**
Canadian		*	*	*	*	*

*Numbers not reported due to low number of respondents
**Square footage numbers include only those departments adding research laboratory space
***Percentage is among all departments adding total space

Table 62. Total Expected Additional Instructional Laboratory Space (net sq. ft. US, net sq. meters Canadian)**

Department, Rank	% Adding None***	Minimum	Mean	Median	Maximum	Total
US CS 1-12	0.0%	6,392	13,797	15,000	20,000	41,392
US CS 13-24	66.7%	*	*	*	*	*
US CS 25-36	100.0%	*	*	*	*	*
US CS Other	12.0%	0	1,200	2,203	9,450	48,460
US CE	50.0%	1,000	18,608	6,715	60,000	74,430
Total US		**0**	**4,978**	**1,400**	**60,000**	**164,282**
Canadian		*	*	*	*	*

*Numbers not reported due to low number of respondents
**Square footage numbers include only those departments adding research laboratory space
***Percentage is among all departments adding total space

Table 63. Sources of Funding for Additional Space

	Percent** of Departments Using Funds from Source				
Department, Rank	Institutional	Federal	State/ Provincial	Industry	Private
US CS 1-12	100.0%	33.3%	33.3%	33.3%	100.0%
US CS 13-24	100.0%	0.0%	0.0%	0.0%	0.0%
US CS 25-36	100.0%	0.0%	80.0%	20.0%	0.0%
US CS Other	76.7%	10.0%	50.0%	10.0%	33.3%
US CE	50.0%	0.0%	75.0%	25.0%	100.0%
Total US	**73.3%**	**8.9%**	**51.1%**	**13.3%**	**37.8%**
Canadian	*	*	*	*	*

*Numbers not reported due to low number of respondents
**Percentage is among all departments adding total space

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federal science agencies, a process that will begin in late May or June as the first appropriations bills see introduction and consideration at the committee level. The Democratic leadership on the appropriations committee has already demonstrated its commitment to science funding by deeming increases at NSF, DOE, NIST and NIH "national priorities" that merited inclusion in an otherwise parsimonious final appropriations for FY 07 in February 2007 (see *CRN*, Vol. 19/No. 2, March 2007). The science advocacy community is already working hard to ensure that the same attitudes about the need for federal support of research persist throughout the FY 08 appropriations process.

House Approves HPC R&D Act

Members of the House approved a bill in March to amend the *High Performance Computing and Communications Act of 1991*, responsible for establishing what became the interagency Networking and Information Technology Research and Development (NITRD) program. The *High-Performance Computing Research and Development Act* (H.R. 1068) aims to provide sustained, transparent access for the research community to federal HPC assets, assure a balanced research portfolio, and beef up interagency planning. Various versions of the bill have been introduced over the last four Congresses without passing the Senate. The latest version contains two noteworthy provisions that would change the *status quo*. The first directs the Director of the White Houses Office of Science and Technology Policy to develop and maintain a research, development, and deployment roadmap for the provision of federal HPC systems. This requirement originally appeared as a recommendation of the Presidents Information Technology Advisory Committee (PITAC) in 2005, and is an attempt to get the agencies to work better together to facilitate technology transfer across the various R&D programs and a clear strategy for advancing the next-generation technologies.

The second noteworthy provision of the act is an explicit requirement that the Presidential advisory committee for IT (currently the Presidents Council of Advisors for Science and Technology [PCAST]) review the goals and funding levels of the NITRD program every two years and report back to Congress. This requirement is, in part, a response to frustration from the community over the lack of timely, independent reviews of the NITRD program, and the hope that an explicit requirement to review the funding will allow the community to assess whether the current federal investment is adequate.

The Senate is likely to consider its own version of the HPC R&D Act in the coming months. There appears to be bipartisan support for the action, so the computing community is cautiously optimistic that the act will find its way into law before the expiration of the 110th Congress.

For all the latest on the budget and the HPC R&D Act, check CRAs *Computing Research Policy Blog* (http://cra.org/blog). ■