

# 2017 CRA Taulbee Survey

## Another Year of Record Undergrad Enrollment; Doctoral Degree Production Steady While Master's Production Rises Again



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**This article and the accompanying figures and tables present the results from the 47th annual CRA Taulbee Survey<sup>1</sup>. The survey, conducted annually by the Computing Research Association, documents trends in student enrollment, degree production, employment of graduates, and faculty salaries in academic units in the United States and Canada that grant the Ph.D. in computer science (CS), computer engineering (CE), or information (I)<sup>2</sup>. Most of these academic units are departments, but some are colleges or schools of information or computing. In this report, we will use the term “department” to refer to the unit offering the program.**

CRA gathers survey data during the fall. Responses received by February 9, 2018 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 (2016-17). Data for new students in all categories refer to the current academic year (2017-18). Projected student production and information on faculty salaries are also for the current academic year; salaries are those effective January 1, 2018.

We surveyed a total of 281 Ph.D.-granting departments; we received salary responses from 171 and main survey responses from 168, for a total of 181 departments responding to one or both parts of the survey. This is similar to last year's 183 respondents, although the overall response rate of 64 percent is lower than last year's 68 percent. The response rates from CE and Canadian departments in particular continue to be low. The U.S. CS response rate of 77 percent is, as usual, the highest of all of the categories, although it also dropped from last year's 80 percent. Figure 1 shows the history of the survey's response rates. Response rates are inexact because some departments provide only partial data, and some institutions provide a single joint response for multiple departments. Thus, in some tables the number of departments shown as reporting will not equal the overall total number of respondents shown in Figure 1 for that category of department.

To account for the changes in response rate, we will comment not only on aggregate totals but also on averages per department reporting or data from those departments that responded to both 2016 and 2017 surveys. This is a more meaningful indication of the one-year changes affecting the data.

Departments that responded to the survey were sent preliminary results about faculty salaries in December 2017; these results included additional distributional information not contained in this report. The CRA Board views this as a benefit of participating in the survey.

Degree, enrollment, and faculty salary data for the U.S. CS departments are stratified according to: a) whether the institution is public or private; and b) the tenure-track faculty size of the reporting department. The faculty size strata deliberately overlap, so that data from most departments affect multiple strata. This may be especially useful to departments near the boundary of one stratum. Salary data is also stratified according to the population of the locale in which the institution is located<sup>3</sup>. These stratifications allow our readers to see multiple views of important data, and hopefully gain new insights from them. In addition to tabular presentations of data, we will use “box and whisker” diagrams to show medians, quartiles, and the range between the 10<sup>th</sup> and 90<sup>th</sup> percentile data points.

For the first time this year, we requested information about supported master's students. The information collected is comparable to that about supported doctoral students, which we have been collecting and reporting for many years. The results are reported in the section on Graduate Student Support. Also in this year's report, we provide a summary of course-level enrollment data. We began collecting this in last year's survey to monitor continuing changes after the publication of the Generation-CS report. This data helps us understand enrollment trends at a somewhat finer level of detail than the aggregated data we have been gathering previously.

We thank all of the respondents to this year's questionnaire. The participating departments are listed at the end of this article. CRA member respondents will again be given the opportunity to obtain certain survey information for a self-selected peer group. Instructions for doing this will be emailed to all such departments.

## 2017 CRA Taulbee Survey (continued)

**Figure 1. Number of Respondents to the Taulbee Survey**

Year	US CS Depts.	US CE Depts.	Canadian	US Information	Total
1995	110/133 (83%)	9/13 (69%)	11/16 (69%)		130/162 (80%)
1996	98/131 (75%)	8/13 (62%)	9/16 (56%)		115/160 (72%)
1997	111/133 (83%)	6/13 (46%)	13/17 (76%)		130/163 (80%)
1998	122/145 (84%)	7/19 (37%)	12/18 (67%)		141/182 (77%)
1999	132/156 (85%)	5/24 (21%)	19/23 (83%)		156/203 (77%)
2000	148/163 (91%)	6/28 (21%)	19/23 (83%)		173/214 (81%)
2001	142/164 (87%)	8/28 (29%)	23/23 (100%)		173/215 (80%)
2002	150/170 (88%)	10/28 (36%)	22/27 (82%)		182/225 (80%)
2003	148/170 (87%)	6/28 (21%)	19/27 (70%)		173/225 (77%)
2004	158/172 (92%)	10/30 (33%)	21/27 (78%)		189/229 (83%)
2005	156/174 (90%)	10/31 (32%)	22/27 (81%)		188/232 (81%)
2006	156/175 (89%)	12/33 (36%)	20/28 (71%)		188/235 (80%)
2007	155/176 (88%)	10/30 (33%)	21/28 (75%)		186/234 (79%)
2008	151/181 (83%)	12/32 (38%)	20/30 (67%)	9/19 (47%)	192/264 (73%)
2009	147/184 (80%)	13/31 (42%)	16/30 (53.3%)	12/20 (60%)	188/265 (71%)
2010	150/184 (82%)	12/30 (40%)	18/29 (62%)	15/22 (68%)	195/265 (74%)
2011	142/185 (77%)	13/31 (42%)	13/30 (43%)	16/21 (76%)	184/267 (69%)
2012	152/189 (80%)	11/32 (34%)	14/30 (47%)	16/26 (62%)	193/277 (70%)
2013	144/188 (77%)	10/30 (33%)	14/26 (54%)	11/22 (50%)	179/266 (67%)
2014	143/188 (76%)	13/31 (42%)	12/26 (46%)	13/19 (68%)	181/268 (68%)
2015	146/190 (77%)	8/32 (25%)	12/26 (46%)	12/18 (67%)	178/266 (67%)
2016	150/188 (80%)	8/33 (24%)	11/26 (42%)	14/21 (67%)	183/268 (68%)
2017	148/192 (77%)	8/35 (23%)	11/30 (37%)	14/24 (58%)	181/281 (64%)

### Doctoral Degree Production, Enrollment, and Employment

(Tables DI-D10; Figures DI-D6)

#### Degree Production

On a per department basis, doctoral degree production held steady in 2016-17. This year's respondents produced 13.1 degrees per U.S. CS department, and 12.4 degrees per department overall. This compares with 12.9 and 12.3, respectively, reported last year. Fewer departments reported their Ph.D. production this year, so Table DI shows 1,834 degrees produced in 2016-17 compared with 1,888 in 2015-16.

Among all departments reporting both this year and last year, the number of total doctoral degrees increased by 1.2 percent. Among U.S. CS departments reporting both years, the increase was 0.8 percent.

Women received 18.3 percent of CS doctoral degrees and 19.3 percent of all doctoral computing degrees (Table D2). Both values represent an increase from last year. The CS percentage is the same as it was two years ago. The ethnicity profile of CS doctoral graduates is similar to what it has been for the past two years, except that the proportion of resident Asians increased this year while the proportion of Non-resident Aliens decreased, each between one and two percentage points. The percentage of CS doctoral graduates who were American Indian or Alaska Native, Black or African American, Native Hawaiian/Pacific Islander, Hispanic, or Multiracial Non-Hispanic totaled less than 3 percent again this year. CE and I degree areas also reported a decreased percentage of Non-resident Alien doctoral graduates, following an increase last year. These areas each had a corresponding increase in the proportion of degrees going to resident Asians and Whites.

## 2017 CRA Taulbee Survey (continued)

As we have found in previous years, Non-resident Aliens again comprised a higher percentage of the CS female doctoral graduates than they did CS male graduates, while Whites comprised a lower percentage of the female graduates as compared with male graduates. However, this year the difference is only one percentage point for both Non-resident Aliens and Whites, so the distribution of CS doctoral graduates relative to ethnicity is virtually the same for men and women (Table D9).

### Doctoral Program Enrollment

Among programs that reported both years, total doctoral enrollment increased by 3.0 percent. If only U.S. computer science departments are considered, the increase was 3.7 percent (Table I). For the second straight year, total doctoral enrollment by gender is more diverse compared with last year in all department areas (CS, CE, and I). The overall fraction of current doctoral students who are women is 22.1 percent, versus 21.6 percent last year (Table D7). The fraction of doctoral

**Table D1. PhD Production and Pipeline by Department Type**

Department Type	# Depts	PhDs Awarded		PhDs Next Year		Passed Qualifier		Passed Thesis (if dept has)		
		#	Avg/ Dept	#	Avg/ Dept	#	Avg/ Dept	#	# Dept	Avg/ Dept
US CS Public	93	1,166	13.1	1,300	14.0	1,384	16.3	940	73	11.8
US CS Private	31	391	13.0	538	17.4	497	15.5	213	24	8.8
US CS Total	124	1,557	13.1	1,838	14.8	1,881	16.1	1,153	97	11.1
US CE	7	59	8.4	94	13.4	151	30.2	135	5	28.9
US Info	13	78	6.5	125	9.6	110	8.5	89	11	8.0
Canadian	11	140	14.0	155	14.1	82	10.3	89	7	12.8
Grand Total	93	1,834	12.4	2,212	14.3	2,224	15.6	1,466	120	12.0

**Table D2. PhDs Awarded by Gender**

	CS		CE		I		Total	
Male	1,298	81.7%	98	89.1%	78	60.9%	1,474	80.7%
Female	291	18.3%	12	10.9%	50	39.1%	353	19.3%
Total Known Gender	1,589		110		128		1,827	
Gender Unknown	3		0		4		7	
Grand Total	1,592		110		132		1,834	

**Table D3. PhDs Awarded by Ethnicity**

	CS		CE		I		Total	
Nonresident Alien	891	62.3%	54	55.7%	42	35.0%	987	59.9%
Amer Indian or Alaska Native	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Asian	130	9.1%	16	16.5%	12	10.0%	158	9.6%
Black or African-American	10	0.7%	0	0.0%	8	6.7%	18	1.1%
Native Hawaiian/Pac Islander	1	0.1%	0	0.0%	1	0.8%	2	0.1%
White	371	25.9%	24	24.7%	48	40.0%	443	26.9%
Multiracial, not Hispanic	4	0.3%	1	1.0%	2	1.7%	7	0.4%
Hispanic, any race	24	1.7%	2	2.1%	7	5.8%	33	2.0%
Total Residency & Ethnicity Known	1,431		97		120		1,648	
Resident, ethnicity unknown	91		1		4		96	
Residency unknown	70		12		8		90	
Grand Total	1,592		110		139		1,834	



## 2017 CRA Taulbee Survey (continued)

**Table D4. Employment of New PhD Recipients By Specialty**

	Artificial Intelligence	Computing Education	Databases / Information Retrieval	Graphics/Visualization	Hardware/Architecture	High-Performance Computing	Human-Computer Interaction	Informatics: Biomedical/ Other Science	Information Science	Information Systems	Networks	Operating Systems	Programming Languages/ Compilers	Robotics/Vision	Scientific/ Numerical Computing	Security / Information Assurance	Social Computing/ Social Informatics	Software Engineering	Theory and Algorithms	Other	Total	
<b>North American PhD Granting Depts.</b>																						
Tenure-track	22	3	11	2	5	4	12	5	10	5	8	2	2	2	0	14	0	9	2	11	129	9.1%
Researcher	2	0	0	1	0	1	3	2	1	1	2	3	2	0	1	4	0	1	1	2	27	1.9%
Postdoc	28	1	8	10	4	2	1	6	3	2	7	2	12	12	1	12	1	4	15	20	151	10.7%
Teaching Faculty	7	5	4	1	4	3	5	2	3	0	4	0	1	1	1	3	0	3	0	7	54	3.8%
<b>North American, Other Academic</b>																						
Other CS/CE/I Dept.	1	0	3	1	0	0	3	1	2	0	3	0	1	1	0	4	0	2	3	7	32	2.3%
Non-CS/CE/I Dept	0	0	0	0	0	0	0	2	3	0	0	1	0	0	0	0	0	0	0	1	7	0.5%
<b>North American, Non-Academic</b>																						
Industry	116	2	57	48	45	38	34	22	4	11	62	29	28	54	5	58	8	77	37	106	841	59.4%
Government	2	0	0	2	1	3	1	0	2	1	1	1	0	0	1	7	1	2	0	4	29	2.0%
Self-Employed	8	0	1	1	1	1	2	0	2	0	0	2	0	0	0	1	0	1	0	0	20	1.4%
Unemployed	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	3	0.2%
Other	1	0	0	1	0	0	0	1	2	0	0	0	1	0	2	3	2	2	0	7	22	1.6%
<b>Total Inside North America</b>																						
	188	11	84	67	60	52	61	41	32	20	87	40	47	71	11	106	12	101	59	165	1,315	92.8%
<b>Outside North America</b>																						
Ten-Track in PhD	2	0	3	1	0	1	4	1	5	0	1	1	0	0	1	2	0	3	2	4	31	2.2%
Researcher in PhD	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	4	0.3%
Postdoc in PhD	6	0	0	0	1	0	3	0	0	1	1	0	0	0	0	1	0	1	3	1	18	1.3%
Teaching in PhD	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	1	3	0	1	7	0.5%
Other Academic	1	0	0	0	1	0	1	0	0	0	1	0	1	0	0	1	1	1	0	0	8	0.6%
Industry	5	0	2	3	0	0	2	0	0	1	2	0	1	1	0	1	1	1	1	3	24	1.7%
Government	0	1	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	5	0.4%
Self-Employed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Unemployed	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Other	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	1	0	1	5	0.4%
Total Outside NA	15	1	7	5	3	1	11	1	6	3	7	1	2	1	1	5	3	11	7	11	102	7.2%
<b>Total with Employment Data, Inside North America plus Outside North America</b>																						
	203	12	91	72	63	53	72	42	38	23	94	41	49	72	12	111	15	112	66	176	1,417	
<b>Employment Type &amp; Location Unknown</b>																						
	43	2	19	21	16	5	11	7	2	5	17	7	2	8	3	9	2	14	18	206	417	
<b>Grand Total</b>	246	14	110	93	79	58	83	49	40	28	111	48	51	80	15	120	17	126	84	382	1,834	

## 2017 CRA Taulbee Survey (continued)

students who are not either Non-resident Aliens, Asian, or White remains below 5 percent overall and also within CS programs (Table D8).

As has been true in previous years, Non-resident Aliens comprise a higher percentage of the enrolled women than they do the enrolled men, and Whites comprise a lower percentage of enrolled women. This year, resident Asians comprise a higher percentage of enrolled Asian women than they do Asian men; last year, these percentages were similar.

Among those pursuing I degrees, 58 percent of the men and 61 percent of the women are Non-resident Aliens or Resident Asians. Last year these percentages were 59 and 54, respectively. This year, Whites comprise a higher percentage of men than they do women among those pursuing I degrees; last year, the reverse was true (Table D10).

At U.S. CS departments, the average number of students per department who passed qualifier exams in 2016-17 was 16.1. For the past three years, this average was between 13.9 and 14.3. Both public and private

**Table D4a. Detail of Industry Employment**

	Artificial Intelligence	Computing Education	Databases / Information Retrieval	Graphics/Visualization	Hardware/Architecture	High-Performance Computing	Human-Computer Interaction	Informatics: Biomedical/ Other Science	Information Science	Information Systems	Networks	Operating Systems	Programming Languages/ Compilers	Robotics/Vision	Scientific/ Numerical Computing	Security / Information Assurance	Social Computing/ Social Informatics	Software Engineering	Theory and Algorithms	Other	Total		
<b>Inside North America</b>																							
Research	82	1	21	20	27	14	20	14	3	6	21	12	15	40	3	24	2	34	17	23	28	427	50.8%
Non-Research	18	1	29	20	16	22	12	6	1	1	27	15	11	6	1	23	6	39	9	17	12	292	34.7%
Postdoctorate	0	0	2	1	0	2	0	1	0	0	4	1	2	1	1	2	0	0	4	3	2	26	3.1%
Type Not Specified	16	0	5	7	2	0	2	1	0	4	10	1	0	7	0	9	0	4	7	17	4	96	11.4%
Total Inside NA	116	2	57	48	45	38	34	22	4	11	62	29	28	54	5	58	8	77	37	60	46	841	
<b>Outside North America</b>																							
Research	3	0	2	3	0	0	2	0	0	0	0	0	0	1	0	0	0	0	1	0	1	13	54.2%
Non-Research	0	0	0	0	0	0	0	0	0	0	2	0	1	0	0	1	1	1	0	1	1	8	33.3%
Postdoctorate	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Type Not Specified	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	12.5%
Total Outside NA	5	0	2	3	0	0	2	0	0	1	2	0	1	1	0	1	1	1	1	1	2	24	

**Table D5. New PhD Students by Department Type**

Department Type	CS				CE				I				Total	
	New Admit	MS to PhD	Total	Avg. per Dept.	New Admit	MS to PhD	Total	Avg. per Dept.	New Admit	MS to PhD	Total	Avg. per Dept.	Total	Avg. per Dept.
US CS Public	1,668	135	1,803	18.8	112	3	115	7.2	84	0	84	10.5	2,002	20.6
US CS Private	781	61	842	24.1	12	1	13	2.6	17	1	18	6.0	873	24.9
US CS Total	2,449	196	2,645	20.2	124	4	128	6.1	101	1	102	9.3	2,875	21.8
US CE	0	0	0	0.0	56	35	91	13.0	0	0	0	0.0	91	13.0
US Information	9	0	9	9.0	0	0	0	0.0	126	5	131	9.4	140	10.0
Canadian	141	17	158	14.4	0	0	0	0.0	0	0	0	0.0	158	14.4
Grand Total	2,599	213	2,812	19.7	180	39	219	7.8	227	6	233	9.3	3,264	19.9

## 2017 CRA Taulbee Survey (continued)

**Table D5a. New PhD Students from Outside North America**

Department Type	CS	CE	I	Total New Outside	Total New	% outside North America
US CS Public	1,226	88	44	1,358	2,002	67.8%
US CS Private	488	8	14	510	873	58.4%
Total US CS	1,714	96	58	1,868	2,875	65.0%
US CE	0	61	0	61	91	67.0%
US Info	4	0	72	76	140	54.3%
Canadian	101	0	0	101	158	63.9%
Grand Total	1,819	157	130	2,106	3,264	64.5%

**Table D6. PhD Enrollment by Department Type**

Department Type	# Depts	CS		CE		I		Total	
US CS Public	99	9,336	66.2%	511	66.2%	410	66.2%	10,257	66.2%
US CS Private	36	3,353	24.2%	81	24.2%	165	24.2%	3,599	24.2%
Total US CS	135	12,689	90.3%	592	90.3%	575	90.3%	13,856	90.3%
US CE	6	0	0.1%	549	0.1%	0	0.1%	549	0.1%
US Info	14	37	0.2%	0	0.2%	652	0.2%	689	0.2%
Canadian	11	832	9.3%	25	9.3%	0	9.3%	857	9.3%
Grand Total	166	13,558		1,166		1,227		15,951	

**Table D7. PhD Enrollment by Gender**

	CS		CE		I		Total	
Male	10,251	78.9%	957	82.1%	669	60.7%	11,877	77.9%
Female	2,734	21.1%	208	17.9%	434	39.3%	3,376	22.1%
Total Known Gender	12,985		1,165		1,103		15,253	
Gender Unknown	573		1		124		698	
Grand Total	13,558		1,166		1,227		15,951	

**Table D8. PhD Enrollment by Ethnicity**

	CS		CE		I		Total	
Nonresident Alien	8,058	64.3%	750	68.1%	507	46.7%	9,315	63.2%
Amer Indian or Alaska Native	22	0.2%	0	0.0%	3	0.3%	25	0.2%
Asian	1,069	8.5%	99	9.0%	108	9.9%	1,276	8.7%
Black or African-American	170	1.4%	17	1.5%	54	5.0%	241	1.6%
Native Hawaiian/Pac Islander	32	0.3%	0	0.0%	0	0.0%	32	0.2%
White	2,884	23.0%	194	17.6%	371	34.2%	3,449	23.4%
Multiracial, not Hispanic	73	0.6%	18	1.6%	12	1.1%	103	0.7%
Hispanic, any race	233	1.9%	24	2.2%	31	2.9%	288	2.0%
Total Known	12,541		1,102		1,086		14,729	
Resident, ethnicity unknown	565		17		21		603	
Residency unknown	452		47		120		619	
Grand Total	13,558		1,166		1,227		15,951	



## 2017 CRA Taulbee Survey (continued)

**Table D9. PhDs Awarded by Gender and Ethnicity, From 154 Departments**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	727	164	0	62	63	48	6	0	55	60	33	9	0	46	19	987	59.9
Amer Indian or Alaska Native	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0.0
Asian	103	27	0	9	10	15	1	0	17	10	6	6	0	8	13	158	9.6
Black or African-American	6	4	0	1	2	0	0	0	0	0	3	5	0	4	10	18	1.1
Native Hawaiian/Pac Islander	1	0	0	0	0	0	0	0	0	0	0	1	0	0	2	2	0.1
White	307	64	0	26	25	21	3	0	24	30	26	22	0	36	46	443	26.9
Multiracial, not Hispanic	4	0	0	0	0	1	0	0	1	0	2	0	0	3	0	7	0.4
Hispanic, any race	22	2	0	2	1	2	0	0	2	0	2	5	0	3	10	33	2.0
Total Res & Ethnicity Known	1,170	261	0	0	0	87	10	0			72	48	0			1,648	
Resident, ethnicity unknown	76	15	0			1	0	0			2	2	0			96	
Not Reported (N/R)	52	15	3			10	2	0			4	0	4			90	
Gender Totals	1,298	291	3			98	12	0			78	50	4			1,834	
%	81.7%	18.3%				89.1%	10.9%				60.9%	39.1%					

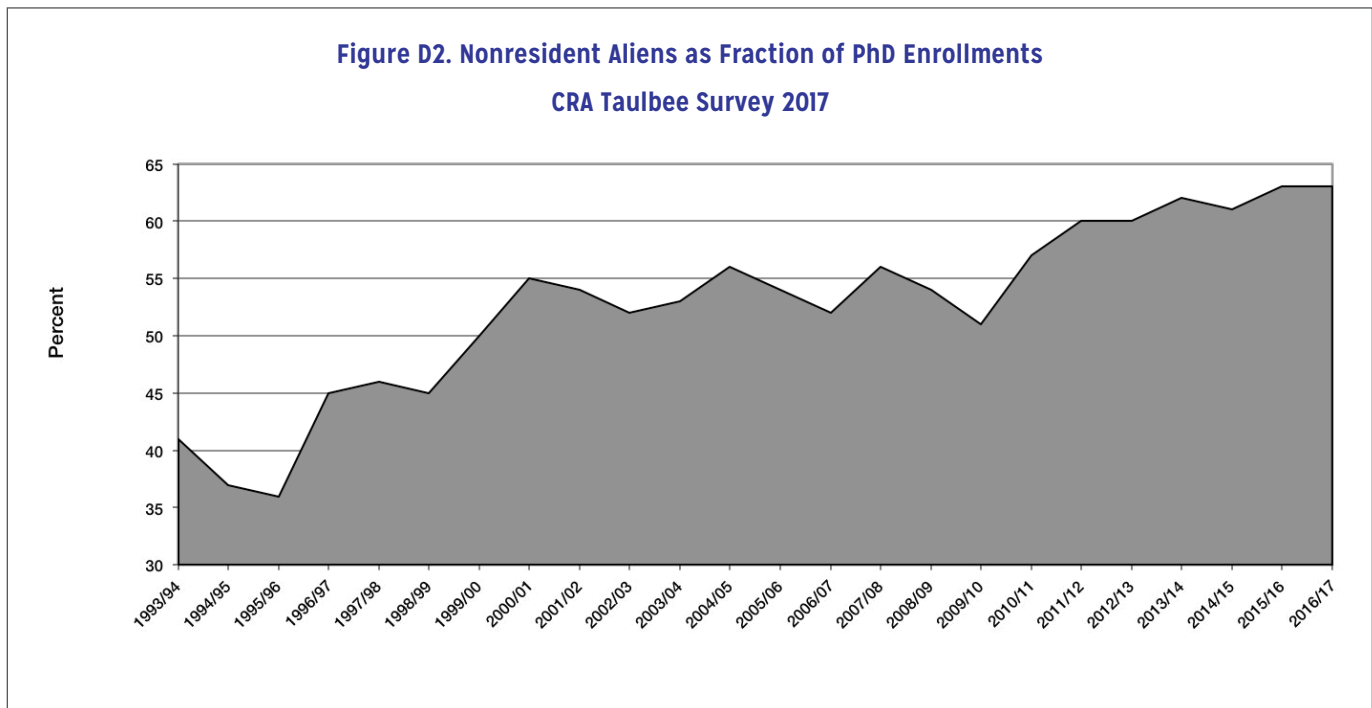
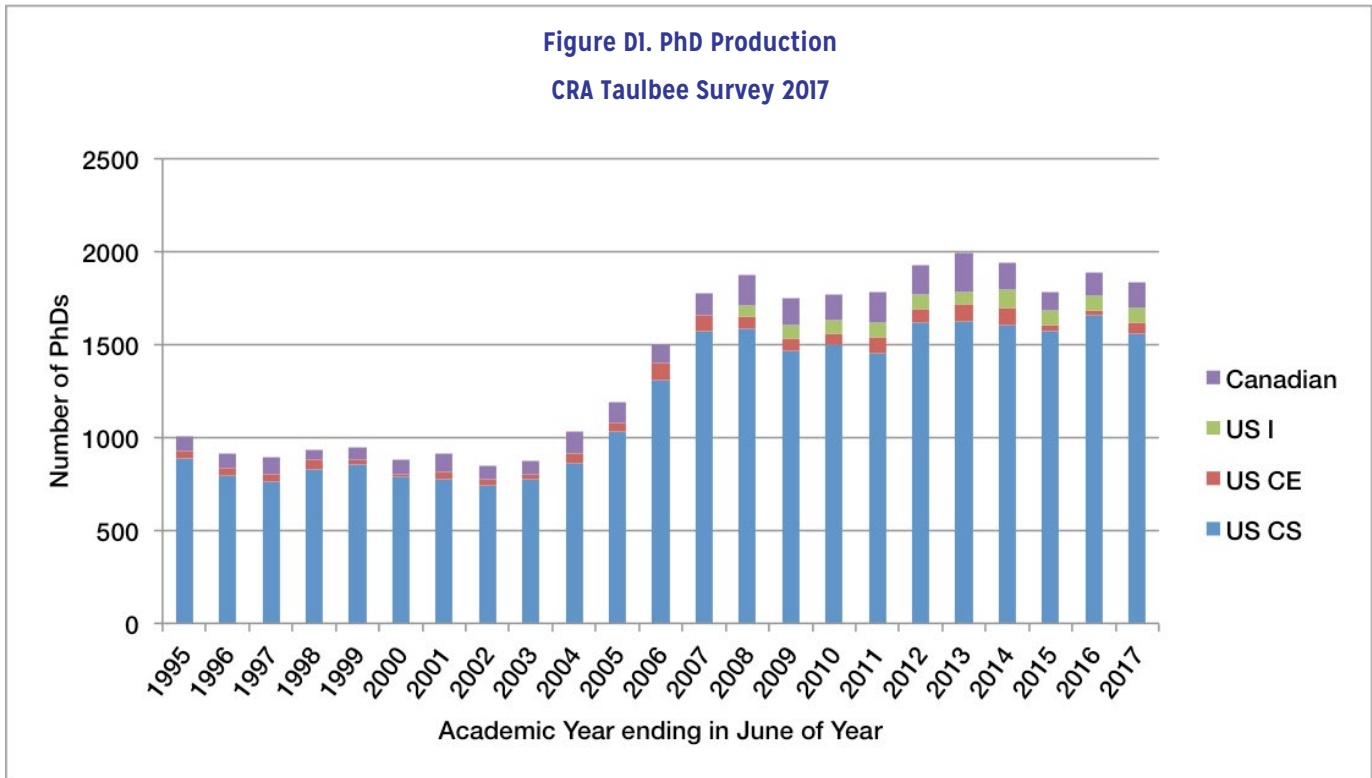
\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

**Table D10. PhD Enrollment by Gender and Ethnicity, From 164 Departments Providing Breakdown Data**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	6,125	1,689	244	64	66	627	123	0	69	62	303	193	11	49	52	9,315	63.2%
Amer Indian or Alaska Native	18	3	1	0	0	0	0	0	0	0	2	1	0	0	0	25	0.2%
Asian	783	249	37	8	10	75	24	0	8	12	58	32	5	9	9	1276	8.7%
Black or African-American	107	58	5	1	2	12	5	0	1	3	24	21	2	4	6	241	1.6%
Native Hawaiian/Pac Islander	21	11	0	0	0	0	0	0	0	0	0	0	0	0	0	32	0.2%
White	2,273	495	116	24	19	153	41	0	17	21	207	107	28	34	29	3,449	23.4%
Multiracial, not Hispanic	52	17	4	1	1	16	2	0	2	1	7	4	1	1	1	103	0.7%
Hispanic, any race	181	43	9	2	2	20	4	0	2	2	14	12	2	2	3	288	2.0%
Total Res & Ethnicity Known	9,560	2,565	416			903	199				615	370	49			14,729	
Resident, ethnicity unknown	448	106	11			17	0				16	4	1			603	
Not Reported (N/R)	243	63	146			37	9				24	22	74			619	
Gender Totals	10,251	2,734	573			957	208				669	434	124			15,951	
%	78.9%	21.1%				82.1%	17.9%				60.7%	39.3%	0%				0.0%

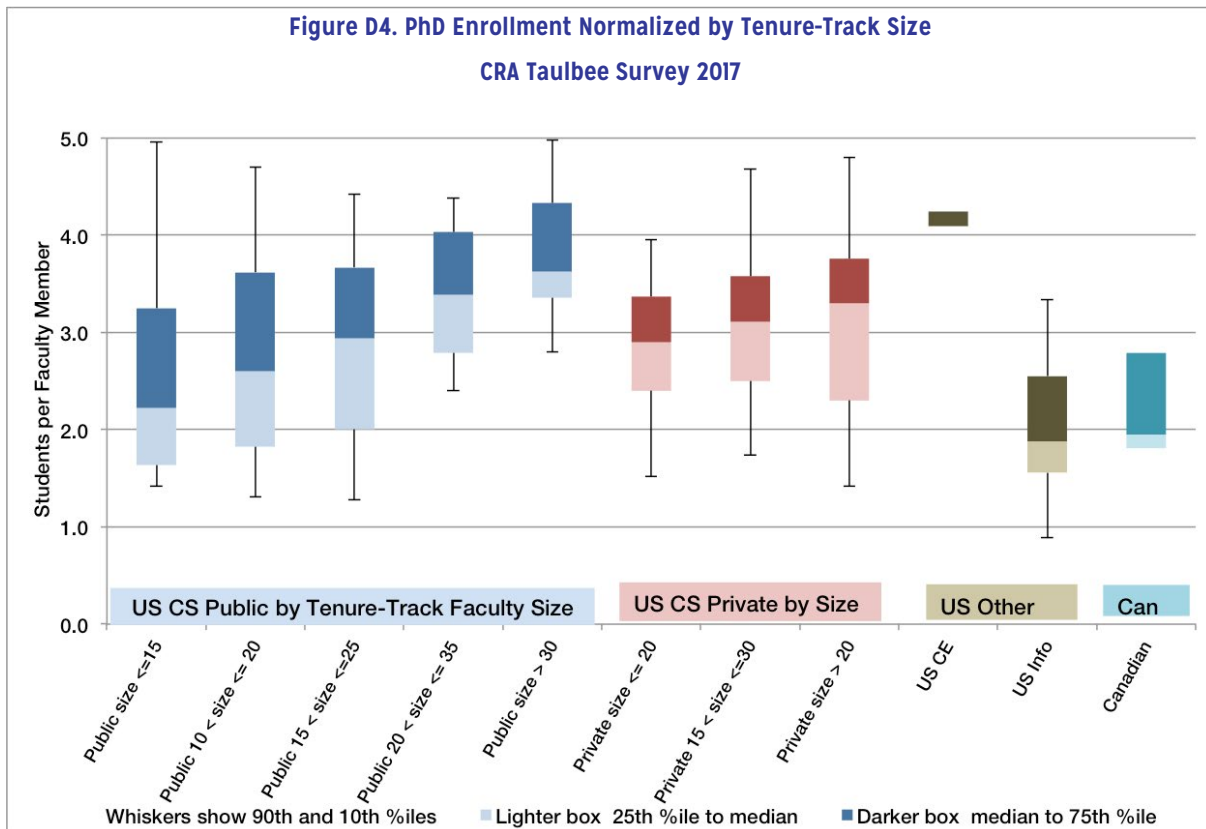
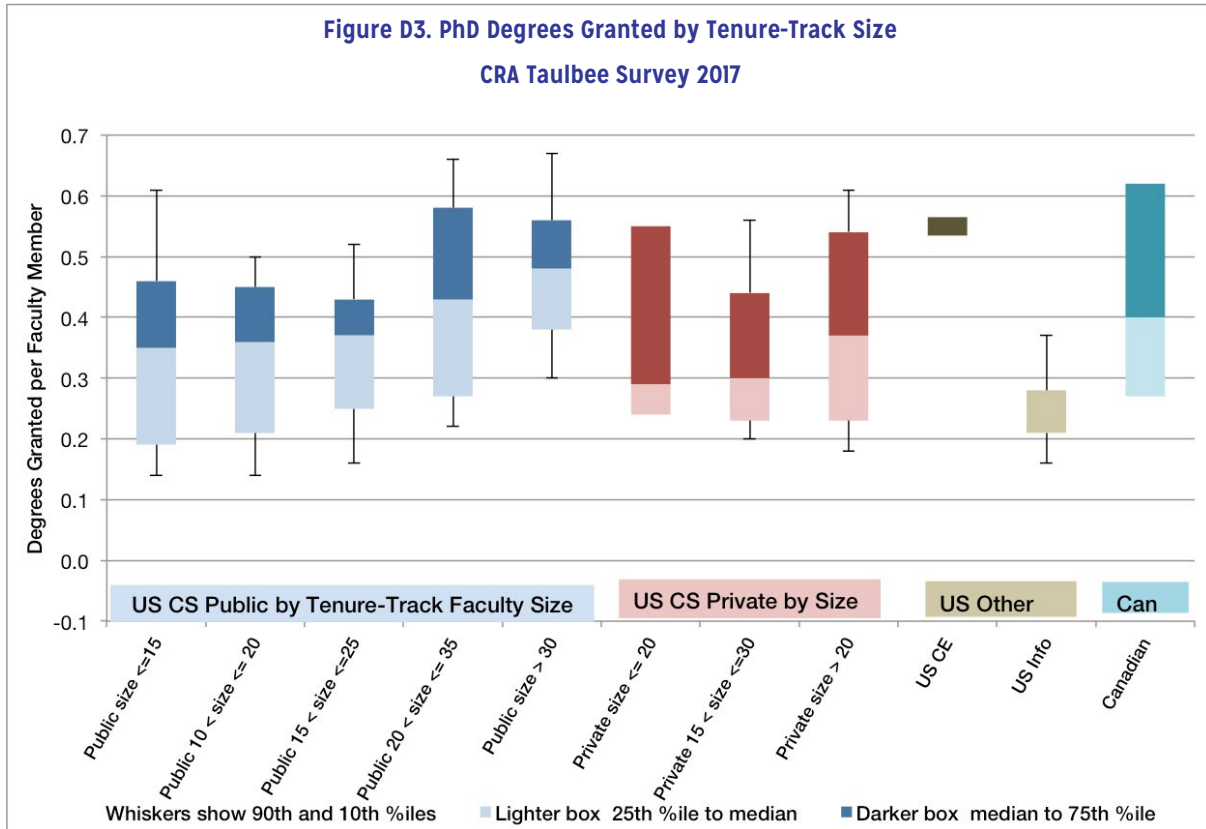
\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

## 2017 CRA Taulbee Survey (continued)



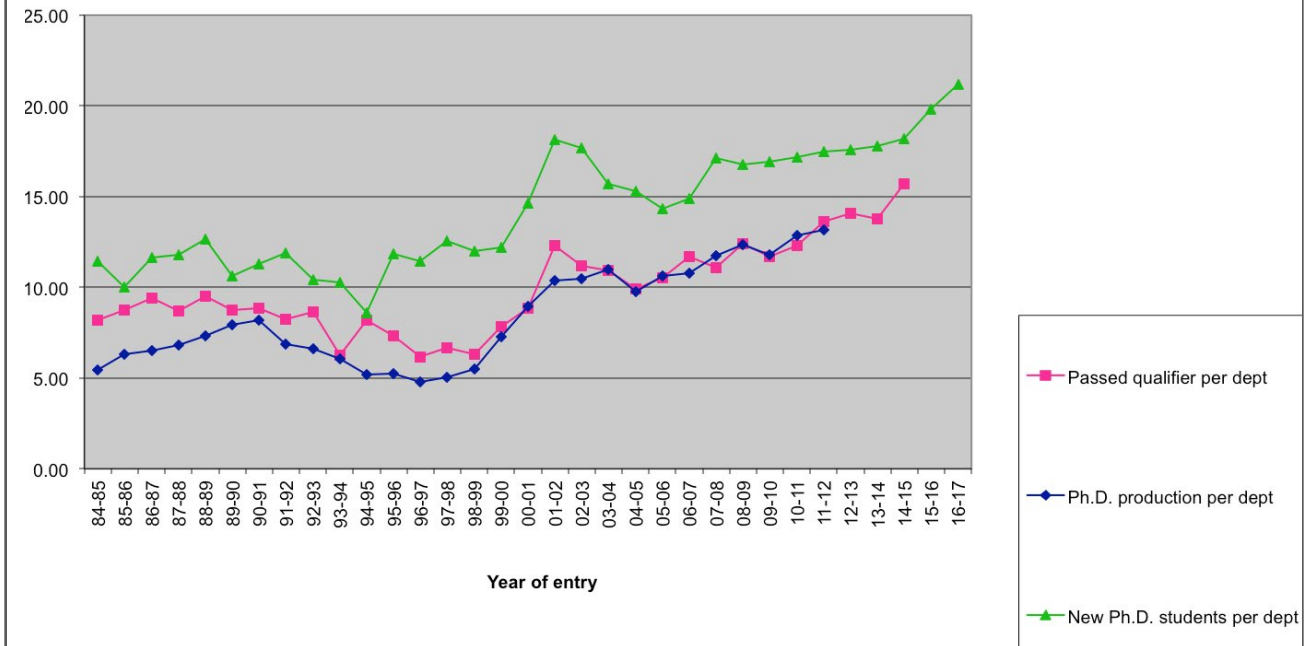


## 2017 CRA Taulbee Survey (continued)

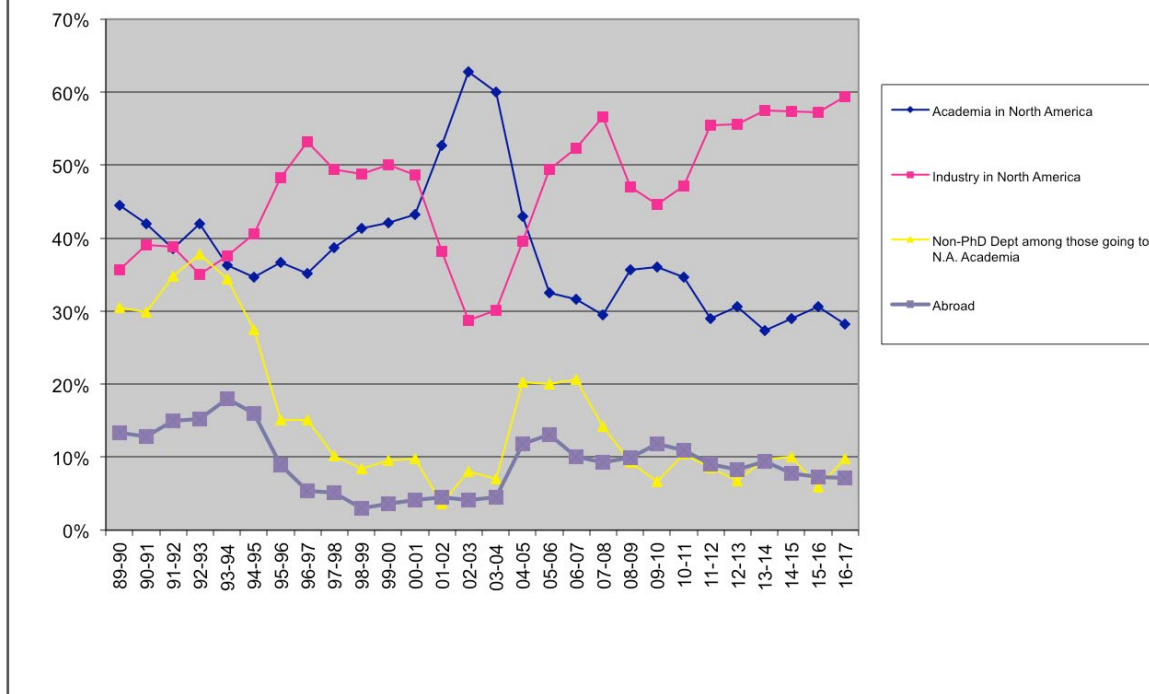


## 2017 CRA Taulbee Survey (continued)

**Figure D5. CS Pipeline corrected for year of entry**  
CRA Taulbee Survey 2017



**Figure D6. Employment Trends for New Ph.D.s**  
CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)

institutions reported increases. The average number per U.S. CS department who passed thesis candidacy exams in 2016-17 (most, but not all, departments have such exams) increased slightly from 2015-16, mainly due to increases at private institutions (Table D1).

The number of new Ph.D. students per department reporting increased this year compared with those from last year's reporting departments (Tables I and D5) in CS, CE and Canadian departments. There was somewhat of a decrease in I departments. Among all departments that reported both years, the number of new Ph.D. students increased 3.9 percent. If only U.S. CS departments that reported both years are considered, the increase was 4.1 percent.

The proportion of new doctoral students from outside North America rose this year to 64.5% from 62.0% last year. There were increases in all categories of departments, while last year there were decreases in all categories of departments (Table D5a).

Figure D5 shows a graphical view of the Ph.D. pipeline for U.S. computer science and Canadian departments, the main producers of CS doctoral degrees. The data in this graph are normalized by the number of reporting departments. The graph offsets the qualifier data by two years from the data for new students, and offsets the graduation data by five years from the data for new students.

These data have been useful in estimating the timing of changes in production rates. The graph suggests small growth in doctoral production during the next two years. However, departments are forecasting a double-digit percent increase in production during 2017-18 (Table D1). Last year's optimistic departmental production forecast was not realized.

### Ph.D. Employment

Figure D6 shows the employment trend of new Ph.D.s in academia and industry within North America, those taking employment outside of North America, and those going to academia in North America who took positions in departments other than Ph.D.-granting CS and CE departments. Table D4 shows a more detailed breakdown of the employment data for new Ph.D.s. The percentage of new Ph.D.s who took positions in North American industry was 59.4 percent, an increase from the 57.2 percent reported last year. Among those doctoral graduates who went to North American industry and for whom the type of industry position was known, about 57 percent took research positions (Table D4a). This is lower than the 60 percent reported in 2016, but the same as the percentage in 2015. This year, definitive data was provided for 89 percent of the graduates who went to North American industry, slightly less than the 91 percent last year.

**Table 1. Degree Production and Enrollment Change From Previous Year**

	Total						Only Departments Responding Both Years					
	US CS Only			All Departments			US CS Only			All Departments		
	2016	2017	% chg	2016	2017	% chg	2016	2017	% chg	2016	2017	% chg
<b>PhDs</b>												
PhD Awarded	1,655	1,557	-5.9%	1,888	1,834	-2.9%	1,444	1,456	0.8%	1,633	1,653	1.2%
#Units PhD Awd	128	119	-7.0%	154	148	-3.9%	108	108		129	129	
PhD Enrollment	13,243	13,856	4.6%	15,093	15,951	5.7%	12,836	13,310	3.7%	14,467	14,901	3.0%
#Units PhD Enr	134	135	0.7%	164	166	1.2%	126	126		152	152	
New PhD Enroll	2,672	2,875	7.6%	2,996	3,264	8.9%	2,604	2,710	4.1%	2,902	3,014	3.9%
#Units New PhD	130	132	1.5%	161	164	1.9%	120	120		147	147	
<b>Bachelor's</b>												
BS Awarded	20,709	24,291	17.3%	25,508	29,587	16.0%	19,980	23,577	18.0%	24,125	28,178	16.8%
#Units BS Awd	131	131	0.0%	156	157	0.6%	123	123		146	146	
BS Enrollment	114,607	127,739	11.5%	136,589	153,610	12.5%	109,510	121,371	10.8%	130,903	141,670	8.2%
#Units BS Enr	131	131	0.0%	155	160	3.2%	123	123		145	145	
New BS Majors	27,266	30,734	12.7%	32,216	35,902	11.4%	26,011	27,139	4.3%	30,541	31,704	3.8%
#Units New BS	112	113	0.9%	137	138	0.7%	101	101		123	123	
BS Enroll/Dept	874.9	975.1	11.5%	881.2	960	9.0%	890	986.8	10.8%	902.8	977	8.2%

## 2017 CRA Taulbee Survey (continued)

After a two-year rise, the percentage of Ph.D. graduates who took North American academic jobs fell in 2016-17 to 28.2 from 30.7 last year. However, the percentage of graduates taking tenure-track positions in North American doctoral-granting computing departments rose slightly, from 9.0 in 2015-16 to 9.8 in 2016-17. The percentage taking positions in North American non-Ph.D.-granting computing departments jumped from 1.6 percent in last year's report to 2.8 percent, while the percentage taking North American academic postdoctoral positions fell from 14.3 percent to 10.7 percent.

Among those whose employment is known, the proportion of Ph.D. graduates who were reported taking positions outside of North America was 7.2 percent, similar to last year's reported value. In 2016-17, 24 percent of those employed outside of North America went to industry. This is similar to the percentage reported for 2014-15, but lower than the 28 percent reported for 2015-16. About 30 percent went to tenure-track academic positions, similar to last year's 33 percent, while approximately 18 percent went to academic postdoctoral positions, compared with 15 percent last year. Of the doctoral graduates who went to non-North American industry positions, there was a much greater balance between research and non-research positions than was the case last year. Last year, the positions were in research by more than a three-to-one margin, while this year the positions still favored research, but by less than two-to-one. Definitive data was provided for 88 percent of these graduates.

When academic and industry postdocs are combined, the result is that 13.8 percent of 2016-17 doctoral graduates whose employment was known took some type of postdoctoral position. This is lower than the 16.6 percent reported last year. Thirteen percent of these were industry postdocs, an increase over last year's 8 percent, indicating that academic postdocs were the basis for the overall decline.

The unemployment rate for new Ph.D.s again this year was below 1 percent. In 2016-17, 22.7 percent of new Ph.D.s' employment status was unknown; in 2015-16 it was 20.6 percent. The lack of information about the employment of more than one in five graduates may skew the real overall percentages for certain employment categories.

Table D4 also indicates the areas of specialty of new Ph.D.s. Artificial intelligence/machine learning, software engineering, security/information assurance, networks, and databases are the most popular areas of specialization for doctoral graduates, in that order. These five areas comprise almost 39 percent of all the doctoral degrees produced in 2016-17. The hardware/architecture, HCI, and HPC areas showed decent increases in degree production. There are many Ph.D.s categorized as "other," which includes "unknown." It is unclear how many of these are really "other" and how many were just not categorized.

**Table M1. Master's Degrees Awarded by Department Type**

Department Type	# Depts	CS		CE		I		Total	
US CS Public	97	7,388	56.7%	372	40.9%	1,005	30.4%	8,765	50.8%
US CS Private	35	5,095	39.1%	81	8.9%	534	16.2%	5,710	33.1%
<b>Total US CS</b>	<b>132</b>	<b>12,483</b>	<b>95.8%</b>	<b>453</b>	<b>49.8%</b>	<b>1,539</b>	<b>46.6%</b>	<b>14,475</b>	<b>83.9%</b>
US CE	6	0	0.0%	448	49.2%	0	0.0%	448	2.6%
US Info	12	39	0.3%	0	0.0%	1,763	53.4%	1,802	10.4%
Canadian	11	515	4.0%	9	1.0%	0	0.0%	524	3.0%
<b>Grand Total</b>	<b>161</b>	<b>13,037</b>		<b>910</b>		<b>3,302</b>		<b>17,249</b>	

**Table M2. Master's Degrees Awarded by Gender**

	CS		CE		I		Total	
Male	8,956	73.9%	710	78.0%	1,690	54.3%	11,356	70.4%
Female	3,162	26.1%	200	22.0%	1,422	45.7%	4,784	29.6%
<b>Total Known Gender</b>	<b>12,118</b>		<b>910</b>		<b>3,112</b>		<b>16,140</b>	
Gender Unknown	919		0		190		1,109	
<b>Grand Total</b>	<b>13,037</b>		<b>910</b>		<b>3,302</b>		<b>17,249</b>	

## 2017 CRA Taulbee Survey (continued)

**Table M3. Master's Degrees Awarded by Ethnicity**

	CS		CE		I		Total	
	#	%	#	%	#	%	#	%
Nonresident Alien	8,813	73.8%	675	76.1%	1,589	49.9%	11,077	69.2%
Amer Indian or Alaska Native	23	0.2%	0	0.0%	2	0.1%	25	0.2%
Asian	921	7.7%	41	4.6%	252	7.9%	1,214	7.6%
Black or African-American	111	0.9%	9	1.0%	137	4.3%	257	1.6%
Native Hawaiian/Pac Island	3	0.0%	1	0.1%	2	0.1%	6	0.0%
White	1,842	15.4%	126	14.2%	1,040	32.7%	3,008	18.8%
Multiracial, not Hispanic	62	0.5%	10	1.1%	58	1.8%	130	0.8%
Hispanic, any race	173	1.4%	25	2.8%	102	3.2%	300	1.9%
Total Residency & Ethnicity Known	11,948		887		3,182		16,017	
Resident, ethnicity unknown	307		12		89		408	
Residency unknown	782		11		31		824	
Grand Total	13,037		910		3,302		17,249	

**Table M4. Master's Degrees Expected Next Year by Department Type**

Department Type	# Depts	CS		CE		I		Total	
		#	%	#	%	#	%	#	%
US CS Public	89	5,863	54.7%	163	26.4%	504	19.0%	6,530	46.7%
US CS Private	31	4,305	40.1%	102	16.5%	405	15.3%	4,812	34.4%
Total US CS	120	10,168	94.8%	265	42.9%	909	34.3%	11,342	81.0%
US CE	6	0	0.0%	343	55.5%	0	0.0%	343	2.5%
US Info	11	35	0.3%	0	0.0%	1,744	65.7%	1,779	12.7%
Canadian	11	523	4.9%	10	1.6%	0	0.0%	533	3.8%
Grand Total	148	10,726		618		2,653		13,997	

**Table M5. New Master's Students by Department Type**

Department Type	CS			CE			I			Total			Outside North America	
	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.	# Depts	%
US CS Public	7,994	96	83.3	301	17	17.7	797	10	79.7	9,092	96	94.7	5,714	62.8%
US CS Private	4,176	33	126.5	99	5	19.8	366	5	73.2	4,641	33	140.6	3,016	65.0%
Total US CS	12,170	129	94.3	400	22	18.2	1,163	15	77.5	13,733	129	106.5	8,730	63.6%
US CE	0	0	0.0	382	6	63.7	0	0	0.0	382	6	63.7	297	77.7%
US Info	18	1	18.0	0	0	0.0	1,651	12	137.6	1,669	12	139.1	714	42.8%
Canadian	679	11	61.7	9	1	9.0	0	0	0.0	688	11	62.5	295	42.9%
Grand Total	12,867	141	91.3	791	29	27.3	2,814	27	104.2	16,472	158	104.3	10,036	60.9%

## 2017 CRA Taulbee Survey (continued)

### Master's and Bachelor's Degree Production and Enrollments

This section reports data about enrollment and degree production for master's and bachelor's programs in the doctoral-granting departments. Although the absolute number of degrees and enrolled students reported herein only reflect departments that offer the doctoral degree, the trends observed in the master's and bachelor's data from these departments tend to strongly reflect trends in the larger population of programs that offer such degrees.

### Master's (Tables MI-M8; Figures MI-M2)

On a per department basis, CS master's degree production in U.S. CS departments rose over 19 percent in 2016-17; this follows approximately 17 and 25 percent increases in the previous two years. Both public and private departments again reported large increases.

**Table M6. Total Master's Enrollment by Department Type**

Department Type	CS			CE			I			Total		
	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.	Total	# Depts	Avg. per Dept.
US CS Public	16,425	96	171.1	769	21	36.6	2,325	14	166.1	19,519	96	203.3
US CS Private	10,330	34	303.8	322	6	53.7	1,938	6	323.0	12,590	35	359.7
Total US CS	26,755	130	205.8	1,091	27	40.4	4,263	20	213.2	32,109	131	245.1
US CE	0	0	0.0	974	7	139.1	0	0	0.0	974	7	139.1
US Info	74	1	74.0	0	0	0.0	4,095	12	341.3	4,169	12	347.4
Canadian	1,237	11	112.5	27	1	27.0	0	0	0.0	1,264	11	114.9
Grand Total	28,066	142	197.6	2,092	35	59.8	8,358	32	261.2	38,516	161	239.2

**Table M7. Masters Degrees Awarded by Gender and Ethnicity, From 163 Departments Providing Breakdown Data**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	6,094	2,462	257	71	81	514	161	0	74	83	923	595	71	57	43	11,077	69.2
Amer Indian or Alaska Native	13	10	0	0	0	0	0	0	0	0	1	1	0	0	0	25	0.2
Asian	641	272	8	7	9	31	10	0	5	5	137	109	6	8	8	1,214	7.6
Black or African-American	87	24	0	1	1	8	1	0	1	1	68	61	8	4	4	257	1.6
Native Hawaiian/Pac Islander	3	0	0	0	0	1	0	0	0	0	1	0	1	0	0	6	0.0
White	1,579	250	13	18	8	110	16	0	16	8	436	529	75	27	38	3,008	18.8
Multiracial, not Hispanic	51	9	2	1	0	8	2	0	1	1	19	34	5	1	3	130	0.8
Hispanic, any race	139	32	2	2	1	22	3	0	3	2	46	49	7	3	4	300	1.9
Total Res & Ethnicity Known	8,607	3,059	282			694	193	0			1,631	1,378	173			16,017	
Resident, ethnicity unknown	228	61	18			8	4	0			47	42	0			408	
Not Reported (N/R)	121	42	619			8	3	0			12	2	17			824	
Gender Totals	8,956	3,162	919			710	200	0			1,690	1,422	190			17,249	
%	73.9%	26.1%				78.0%	22.0%				54.3%	45.7%					

\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

## 2017 CRA Taulbee Survey (continued)

**Table M8. Masters Enrollment by Gender and Ethnicity, From 162 Departments Providing Breakdown Data**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	11,231	5,183	196	61	78	1,082	354	83	73	82	1,864	1,298	94	50	40	21,385	61.5
Amer Indian or Alaska Native	16	3	0	0	0	1	0	0	0	0	1	4	2	0	0	27	0.1
Asian	1,793	620	18	10	9	81	27	0	5	6	319	205	16	9	6	3,079	8.9
Black or African-American	341	81	2	2	1	22	4	0	2	1	232	182	19	6	6	883	2.5
Native Hawaiian/Pac Islander	5	1	0	0	0	0	0	0	0	0	3	8	0	0	0	17	0.0
White	4,335	661	78	24	10	236	33	1	16	8	1,098	1,349	171	29	42	7,962	22.9
Multiracial, not Hispanic	191	38	2	1	1	6	6	0	0	1	50	65	4	1	2	362	1.0
Hispanic, any race	532	95	9	3	1	63	10	0	4	2	166	140	21	4	4	1,036	3.0
Total Res & Ethnicity Known	18,444	6,682	305			1,491	434	84			3,733	3,251	327			34,751	
Resident, ethnicity unknown	950	258	12			15	3	1			217	162	14			1,632	
Not Reported (N/R)	715	230	470			27	16	21			1	0	653			2,133	
Gender Totals	20,109	7,170	787			1,533	453	106			3,951	3,413	994			38,516	
%	73.7%	26.3%				77.2%	22.8%				53.7%	46.3%					

\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

Overall production of master's degrees in the CE and Information areas also rose in 2015-16. Canadian departments showed a decline in master's production (Table M1).

The proportion of female graduates among CS master's degree recipients rose from 25.2 percent to 26.1 percent. The CE area also showed a small increase in gender diversity. The overall percentage of master's degrees to women increased only 0.2 to 29.6 percent, due to a drop in the I area from 47.9 percent to 45.7 percent (Table M2).

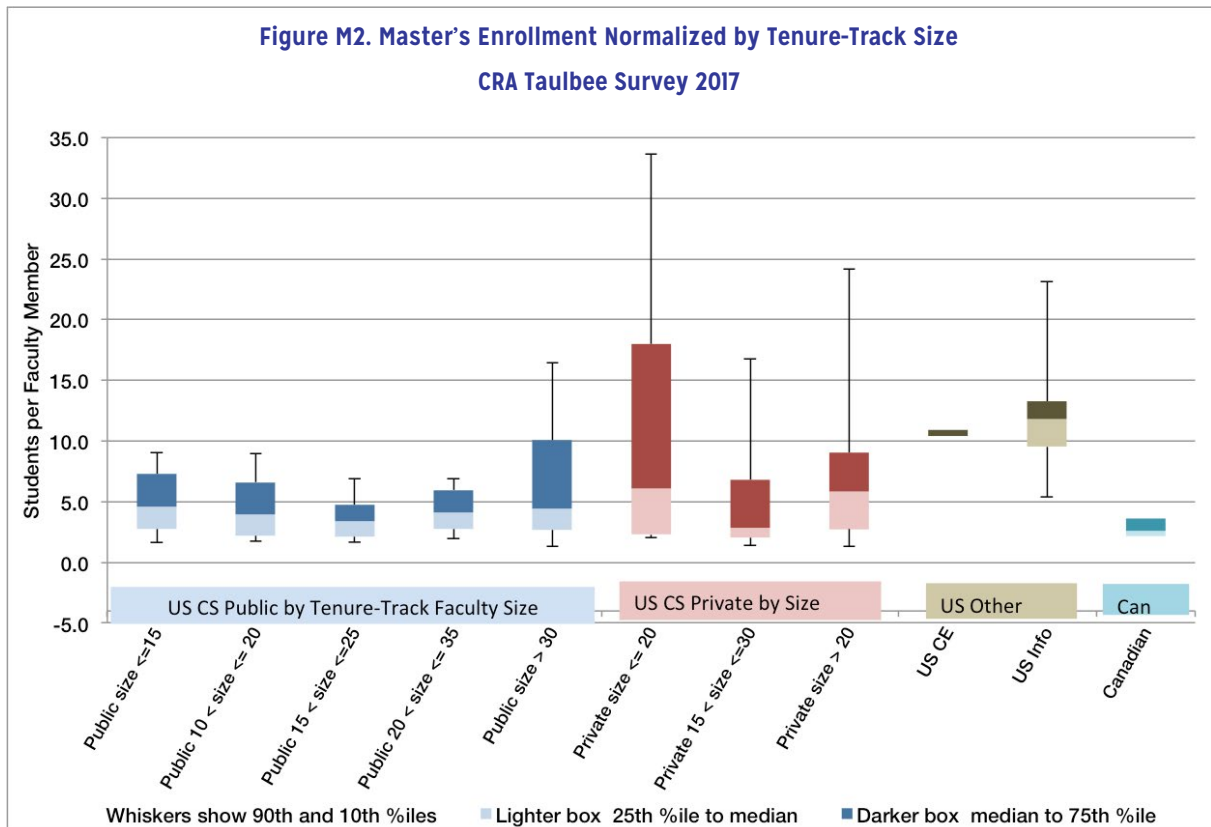
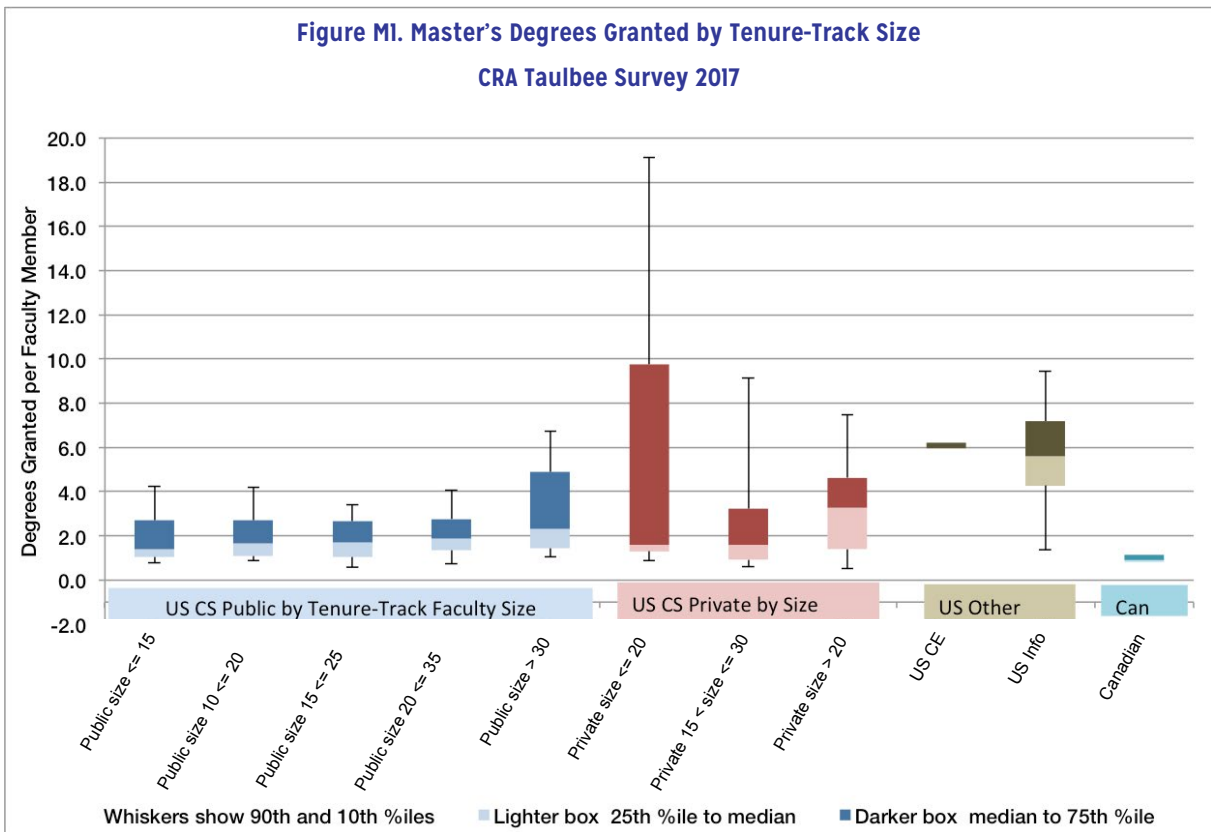
In CS, 73.8 percent of master's degrees went to Non-resident Aliens, a dip from the 75.6 percent in 2015-16. The CE area showed a bit of an increase, from 73.6 percent to 76.1 percent, while in the Information area, the percentage of the master's recipients that were Non-resident Aliens remained steady at 49.9 percent. The CS decline in non-resident Alien percentage was offset by slight gains by Whites and resident Asians. The percentage of master's recipients among American Indian/Alaska Native, Black/African-American, Native Hawaiian/Pacific Islander, Hispanic, and Multiracial in CS was approximately 3 percent in 2016-17, similar to that reported last year. This percentage dropped in the I area from 10.6 percent to 9.5 percent (Table M3).

Non-resident Aliens again comprised a much larger proportion of female CS and CE degree recipients than male CS and CE degree recipients, while Whites again comprised a larger percentage of male CS and CE degree recipients than female CS and CE degree recipients (Table M7). In the I area, Non-resident Aliens again comprised a larger percentage of male master's graduates than female master's graduates, and Whites comprised a smaller fraction of male master's graduates than female master's graduates. The current enrollment breakdown by gender and ethnicity (Table M8) suggests that these observations will continue to be reflected in master's recipients in the near future.

The average number of new master's students enrolled in U.S. CS departments rose again this year, from 89.1 to 106.5. Once again, U.S. CS departments at both public and private institutions experienced increases (Table M5).

The fraction of new master's students in U.S. CS departments that is reported to be from outside North America dropped to 63.6 percent in 2017-18 from 67.5 percent in 2016-17 (Table M5). The fraction of new master's students at U.S. CS institutions is approximately at the level from 2015-16. This year's decrease was in departments at public institutions; private institutions showed an increase from 60.8 percent

## 2017 CRA Taulbee Survey (continued)





## 2017 CRA Taulbee Survey (continued)

to 65.0 percent. At U.S. Information departments, the fraction of new master's students from outside North America dropped from 49.3 percent to 42.8 percent, following a large increase last year.

### Bachelor's

(Tables I, BI-B8; Figures BI-B4)

Bachelor's degree production continues its upward trend, with double-digit percentage increases for the fourth consecutive year. Overall degree production, aggregated across all three areas of computing, is 15.3 percent higher at this year's reporting departments than it was at

last year's reporting departments. In U.S. CS departments, the increase is 17.3 percent. When considering only those departments that reported both years, the increase was 16.8 percent for all departments and 18.0 percent for U.S. CS departments (Table I). When only the CS area is considered, bachelor's degree production per department increased 21.2 percent at U.S. CS departments, and it increased 17.1 percent among all reporting departments (Table BI).

Figure BI shows the trend in total computing bachelor's degree production since 1995 for all departments reporting to the Taulbee

**Table BI. Bachelor's Degrees Awarded by Department Type**

Department Type	# Depts	CS		CE		I		Total	
US CS Public	96	15,345	68.7%	1,910	64.5%	1,869	43.6%	19,124	64.6%
US CS Private	35	4,562	20.4%	277	9.4%	328	7.7%	5,167	17.5%
Total US CS	131	19,907	89.1%	2,187	73.9%	2,197	51.3%	24,291	82.1%
US CE	6	0	0.0%	756	25.5%	0	0.0%	756	2.6%
US Info	10	129	0.6%	0	0.0%	1,738	40.6%	1,867	6.3%
Canadian	10	2,307	10.3%	17	0.6%	349	8.1%	2,673	9.0%
Grand Total	157	22,343		2,960		4,284		29,587	

**Table B2. Bachelor's Degrees Awarded by Gender**

	CS		CE		I		Total	
Male	17,252	81.0%	2,551	87.4%	3,159	75.0%	22,962	80.8%
Female	4,036	19.0%	369	12.6%	1,054	25.0%	5,459	19.2%
Total Known Gender	21,288		2,920		4,213		28,421	
Gender Unknown	1,055		40		71		1,166	
Grand Total	22,343		2,960		4,284		29,587	

**Table B3. Bachelor's Degrees Awarded by Ethnicity**

	CS		CE		I		Total	
Nonresident Alien	2,205	12.5%	344	13.7%	304	8.2%	2,853	12.0%
Amer Indian or Alaska Native	42	0.2%	20	0.8%	21	0.6%	83	0.3%
Asian	4,564	25.9%	602	24.0%	629	16.9%	5,795	24.3%
Black or African-American	547	3.1%	88	3.5%	258	6.9%	893	3.7%
Native Hawaiian/Pac Islander	45	0.3%	4	0.2%	49	1.3%	98	0.4%
White	8,402	47.6%	1,174	46.8%	1,893	51.0%	11,469	48.1%
Multiracial, not Hispanic	511	2.9%	64	2.5%	159	4.3%	734	3.1%
Hispanic, any race	1,322	7.5%	215	8.6%	401	10.8%	1,938	8.1%
Total Residency & Ethnicity Known	17,638		2,511		3,714		23,863	
Resident, ethnicity unknown	1,385		69		127		1,581	
Residency unknown	3,320		380		443		4,143	
Grand Total	22,343		2,960		4,284		29,587	

## 2017 CRA Taulbee Survey (continued)

**Table B4. Bachelor's Degrees Expected Next Year by Department Type**

Department Type	# Depts	CS		CE		I		Total	
US CS Public	88	15,261	63.9%	1,793	61.9%	1,471	45.9%	18,525	61.7%
US CS Private	31	5,103	21.4%	325	11.2%	230	7.2%	5,658	18.9%
Total US CS	119	20,364	85.2%	2,118	73.1%	1,701	53.0%	24,183	80.6%
US CE	6	0	0.0%	728	25.1%	0	0.0%	728	2.4%
US Info	10	140	0.6%	0	0.0%	1,506	47.0%	1,646	5.5%
Canadian	10	3,393	14.2%	51	1.8%	0	0.0%	3,444	11.5%
Grand Total	145	23,897		2,897		3,207		30,001	

**Table B5. New Bachelor's Students by Department Type**

Department Type	CS				CE				I				Total	
	Major	Pre-Major	# Depts	Avg. Major /Dept	Total	Pre-Major	# Depts	Avg. Major /Dept	Total	Pre-Major	# Depts	Avg. Major /Dept	Total Major	Avg. Major /Dept
US CS Public	20,457	7,467	87	235.1	2,468	956	27	91.4	1,111	408	19	58.5	24,036	276.3
US CS Private	6,004	1,691	26	230.9	334	55	8	41.8	360	13	5	72.0	6,698	257.6
US CS Total	26,461	9,158	113	234.2	2,802	1,011	35	80.1	1,471	421	24	61.3	30,734	272.0
US CE	0	0	0	0.0	707	356	6	117.8	0	0	0	0.0	707	117.8
US Information	275	0	1	275.0	0	0	0	0.0	885	132	10	88.5	1,160	116.0
Canadian	3,301	1,123	9	366.8	0	0	0	0.0	0	0	0	0.0	3,301	366.8
Grand Total	30,037	10,281	123	244.2	3,509	1,367	41	85.6	2,356	553	34	69.3	35,902	260.2

**Table B6. Total Bachelor's Enrollment by Department Type**

Department Type	CS				CE				I				Total	
	Major	Pre-Major	# Depts	Avg. Major /Dept	Total	Pre-Major	# Depts	Avg. Major /Dept	Total	Pre-Major	# Dept	Avg. Major /Dept	Total Major	Avg. Major /Dept
US CS Public	81,200	17,215	96	845.8	9,699	1,830	33	293.9	8,905	738	23	387.2	99,804	1039.6
US CS Private	25,087	3,169	34	737.9	1,085	113	10	108.5	1,763	90	6	293.8	27,935	798.1
US CS Total	106,287	20,384	130	817.6	10,784	1,943	43	250.8	10,668	828	29	367.9	127,739	975.1
US CE	0	0	0	0.0	4,210	1,089	7	601.4	0	0	0	0.0	4,210	601.4
US Info	799	0	1	799.0	0	0	0	0.0	5,335	1,346	12	444.6	6,134	511.2
Canadian	13,503	3,515	10	1350.3	175	0	1	175.0	1,849	0	1	1849.0	15,527	1552.7
Grand Total	120,589	23,899	141	855.2	9,699	1,830	33	293.9	17,852	2,174	42	425.0	153,610	960.1

Survey. Double-digit percentage increases in CS bachelor's degree production are likely to continue for the next few years based on current enrollments.

For the tenth consecutive year, there was an increase in the number of new undergraduate computing majors despite the capacity pressures facing departments. This year's respondents reported 11.4 percent more

new majors, with an average of 10.6 percent more per department than did last year's respondents (Table B5). The increase is only 3.8 percent when considering only those departments reporting both this year and last year. Among U.S. computer science departments, the increase was 12.7 percent overall (11.8 percent per department), and 4.3 percent among departments reporting both this year and last year. If only increases in new CS majors at U.S. CS departments are considered, the average

## 2017 CRA Taulbee Survey (continued)

**Table B7. Bachelors Degrees Awarded by Gender and Ethnicity, From 156 Departments Providing Breakdown Data**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	1,673	529	3	12	17	289	55	0	13	17	202	102	0	7	11	2,853	12.0
Amer Indian or Alaska Native	34	8	0	0	0	15	5	0	1	2	11	10	0	0	1	83	0.3
Asian	3,415	1,104	29	24	35	494	105	3	23	32	427	202	0	15	22	5,795	24.3
Black or African-American	448	93	5	3	3	72	16	0	3	5	185	73	0	7	8	893	3.7
Native Hawaiian/Pac Islander	38	7	0	0	0	3	1	0	0	0	45	4	0	2	0	98	0.4
White	7,143	1,110	57	50	35	1,053	113	8	49	35	1,500	393	0	54	43	11,469	48.1
Multiracial, not Hispanic	361	147	3	3	5	54	10	0	3	3	104	54	1	4	6	734	3.1
Hispanic, any race	1,082	200	7	8	6	191	20	4	9	6	325	76	0	12	8	1,938	8.1
Total Res & Ethnicity Known	14,194	3,198	104			2,171	325	15			2,799	914	1			23,863	
Resident, ethnicity unknown	839	251	2			60	9	0			99	26	2			1,581	
Not Reported (N/R)	1,867	504	949			320	35	25			261	114	68			4,143	
Gender Totals	17,252	4,036	1,055			2,551	369	40			3,159	1,054	71			29,587	
%	81.0%	19.0%				87.4%	12.6%				75.0%	25.0%					

\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

**Table B8. Bachelors Enrollment by Gender and Ethnicity, From 155 Departments Providing Breakdown Data**

	CS					CE					I					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	8,063	2,641	30	11	17	1,297	260	4	12	14	609	236	19	5	8	13,437	11.4
Amer Indian or Alaska Native	230	56	0	0	0	21	6	0	0	0	37	16	2	0	1	372	0.3
Asian	15,933	5,180	139	23	32	2,501	612	14	24	33	1,954	754	144	17	24	28,374	24.0
Black or African-American	2,997	803	21	4	5	426	118	9	4	6	900	301	127	8	10	5,945	5.0
Native Hawaiian/Pac Islander	149	54	0	0	0	33	9	21	0	1	27	5	0	0	0	305	0.3
White	34,069	5,347	348	48	33	4,704	614	45	45	33	5,824	1,347	118	52	43	54,129	45.7
Multiracial, not Hispanic	2,142	537	21	3	3	355	64	13	3	3	346	127	22	3	4	3,753	3.2
Hispanic, any race	7,014	1,381	41	10	9	1,140	195	15	11	10	1,537	342	43	14	11	12,030	10.2
Total Res & Ethnicity Known	70,597	15,999	600			10,477	1,878	121			11,234	3,128	475			118,345	
Resident, ethnicity unknown	3,862	1,498	2,360			345	55	1			429	96	3			9,951	
Not Reported (N/R)	11,235	3,251	6,049			2,041	244	7			1,422	694	371			25,314	
Gender Totals	89,847	21,733	9,009			12,863	2,177	129			13,085	3,918	849			153,610	
%	80.5%	19.5%				85.5%	14.5%				77.0%	23.0%					

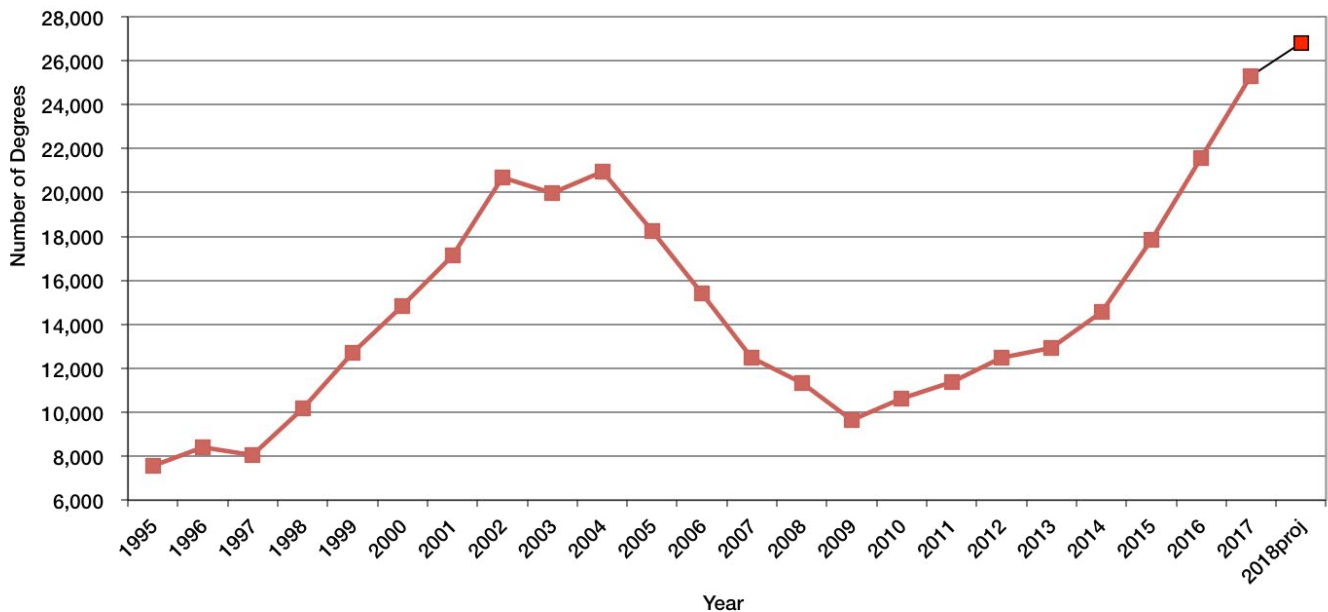
\* % of M and % of F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

## 2017 CRA Taulbee Survey (continued)

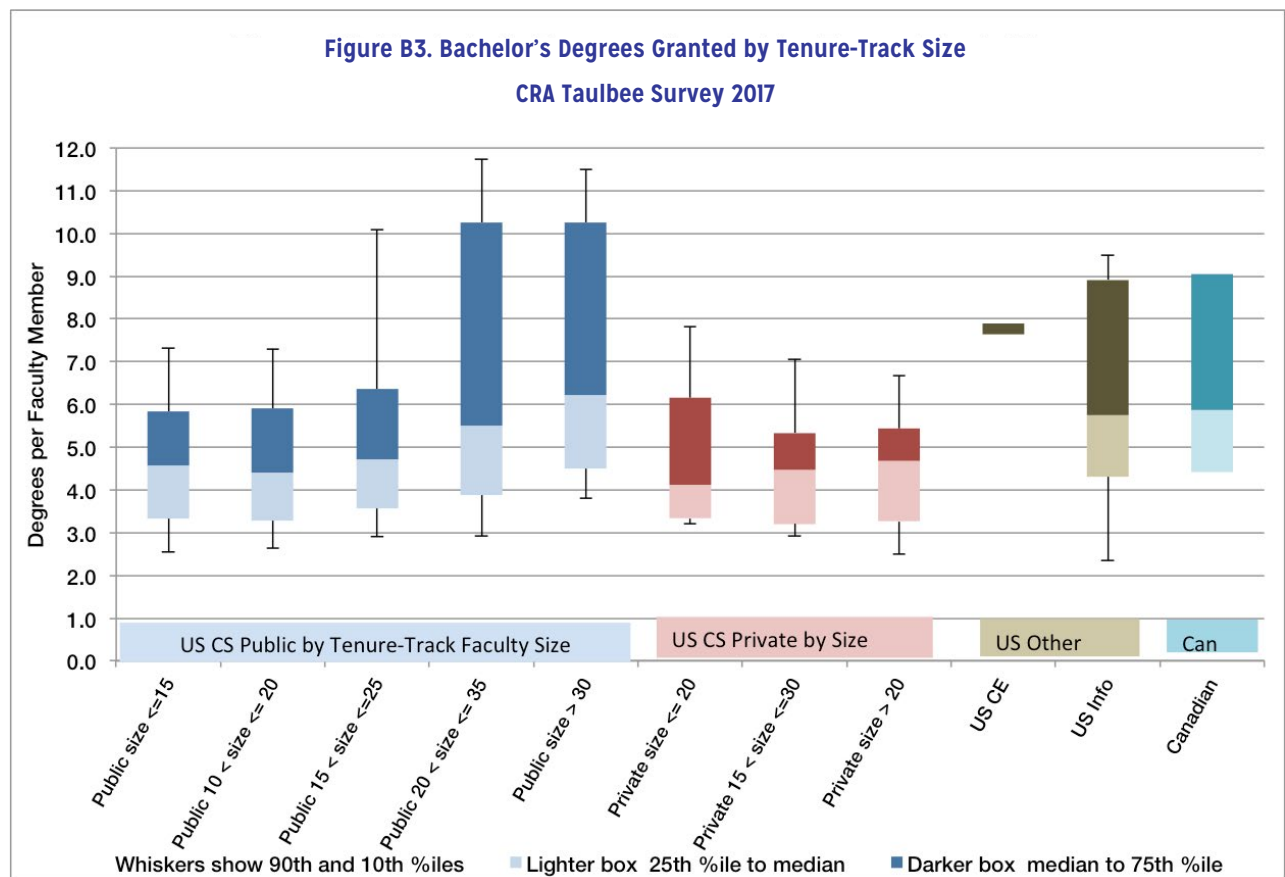
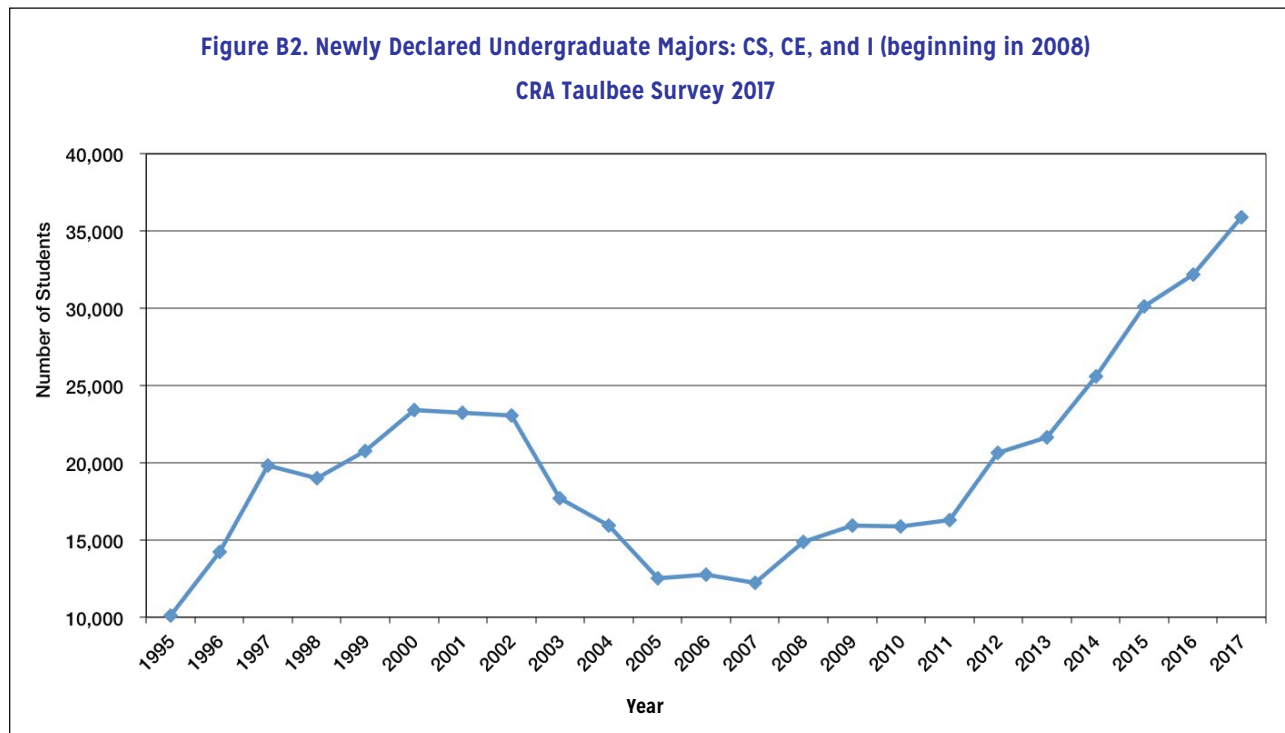
**Table B9. Undergraduate Representative Course Enrollments 2015-2017, Department-Level Percentiles**

Number of Students Reported				% Who Are Majors				% Who Are Women				% URM at Non-MSI			
<b>Intro-Level for Non Majors</b>															
(N=54)	2015	2016	2017	(N=37)	2015	2016	2017	(N=33)	2015	2016	2017	(N=23)	2015	2016	2017
25	74	77	76.75	25	0.9	0.4	0.3	25	26.6	26.1	33.4	25	11.1	8.8	12.0
50	182	207.5	210	50	3.5	3.5	2.7	50	38.6	38.2	40.6	50	15.9	12.5	15.8
75	347	382.5	343	75	16.6	16.6	11.9	75	49.7	45.8	48.0	75	22.9	23.8	23.7
<b>Intro for Majors</b>															
(N=55)	2015	2016	2017	(N=39)	2015	2016	2017	(N=33)	2015	2016	2017	(N=22)	2015	2016	2017
25	185	193	221	25	22.4	15.2	20.4	25	16.7	17.1	18.0	25	9.2	9.1	8.5
50	286	299	314	50	44.8	41.9	36.5	50	20.6	21.9	22.2	50	12.9	15.1	15.8
75	454	436	489	75	60.3	56.5	73.7	75	32.7	36.3	35.8	75	20.3	21.2	21.5
<b>Mid-Level</b>															
(N=54)	2015	2016	2017	(N=40)	2015	2016	2017	(N=33)	2015	2016	2017	(N=21)	2015	2016	2017
25	85.75	107	113.5	25	45.2	43.5	39.0	25	13.2	14.5	15.1	25	7.4	8.2	9.5
50	134.5	151.5	176.5	50	62.2	60.8	57.2	50	17.4	20.0	19.2	50	12.6	11.3	13.6
75	260.25	294.25	355.75	75	81.7	86.1	83.2	75	25.1	26.7	28.1	75	17.8	18.6	20.8
<b>Upper-Level</b>															
(N=52)	2015	2016	2017	(N=38)	2015	2016	2017	(N=31)	2015	2016	2017	(N=21)	2015	2016	2017
25	56	54.5	67.25	25	60.9	69.3	63.5	25	8.8	10.8	11.5	25	3.6	4.0	7.0
50	100.5	123.5	132.5	50	82.0	82.2	86.5	50	14.1	16.0	17.6	50	10.2	8.9	10.8
75	186	194	191.5	75	95.4	97.6	96.3	75	23.9	23.1	29.9	75	18.0	20.2	19.4

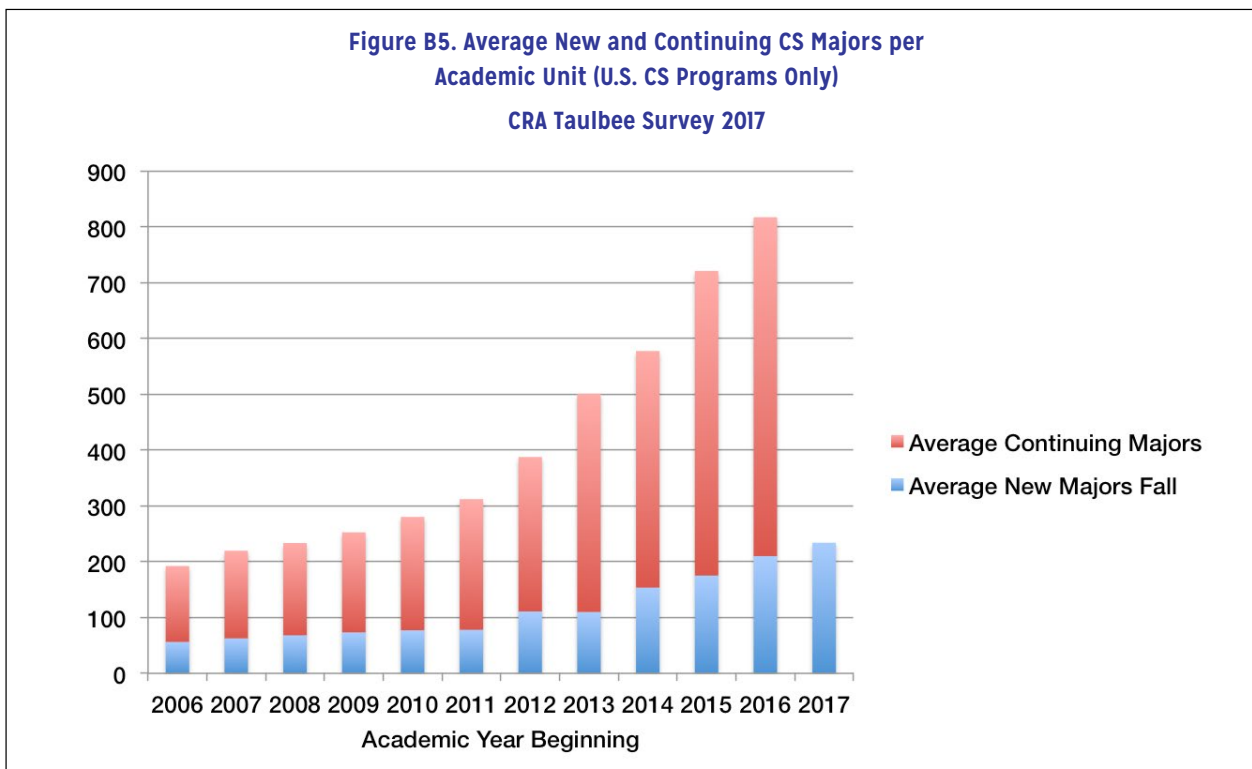
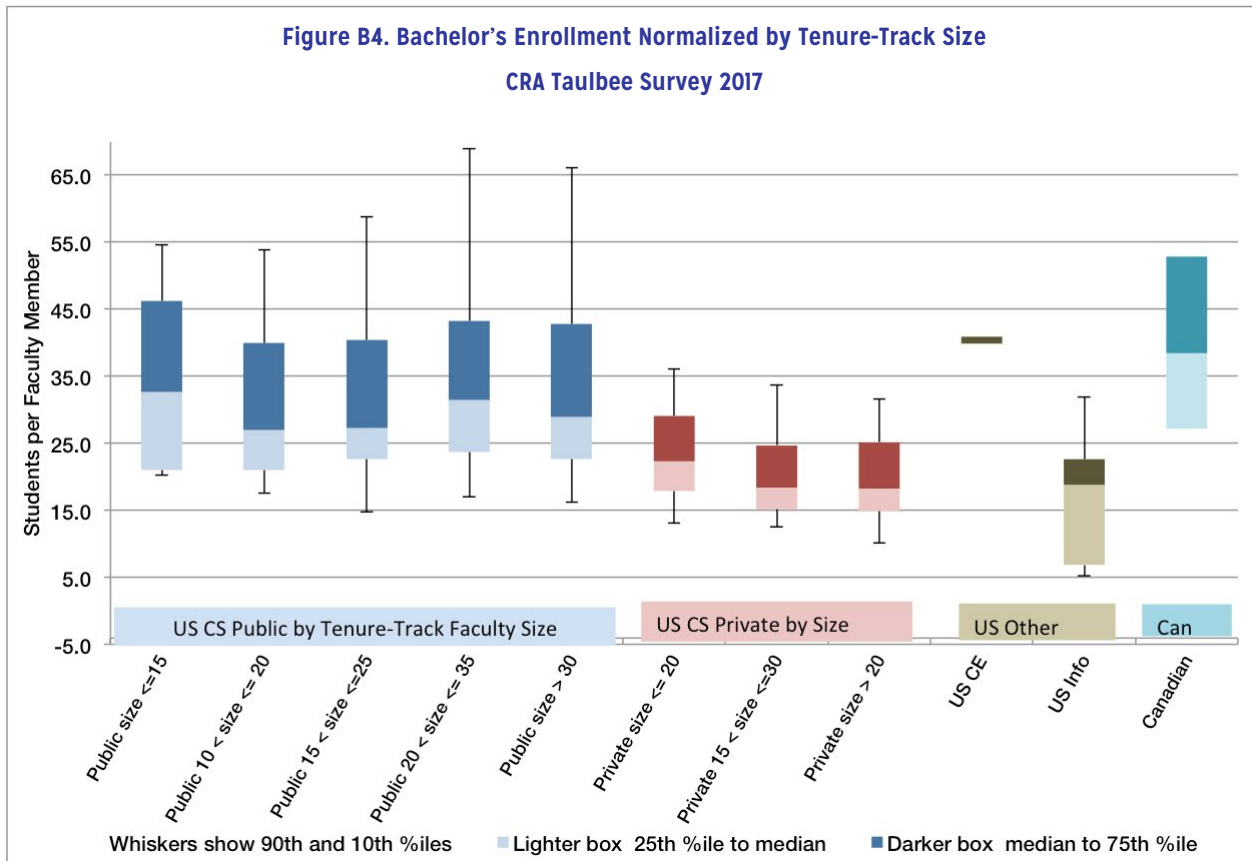
**Figure B1. BS Production (CS & CE)**  
 CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)



## 2017 CRA Taulbee Survey (continued)



## 2017 CRA Taulbee Survey (continued)

**Table FI. Actual and Anticipated Faculty Size by Position and Department Type**

	Actual		Projected				Expected 2-Yr Growth	
	2017-2018		2018-2019		2019-2020		#	%
	Total	Average	Total	Average	Total	Average		
<b>US CS Public</b>								
TenureTrack	2,970	30.0	3,161	31.9	3,264	33.0	294	9.9%
Teaching	707	8.2	763	9.0	812	9.6	105	14.9%
Research	258	5.0	277	5.2	296	5.5	38	14.7%
Postdoc	311	6.2	345	6.5	367	7.2	56	18.0%
<b>Total</b>	<b>4,236</b>	<b>42.8</b>	<b>4,538</b>	<b>45.8</b>	<b>4,730</b>	<b>47.8</b>	<b>494</b>	<b>11.7%</b>
<b>US CS Private</b>								
TenureTrack	1,206	33.5	1,280	35.5	1,358	37.7	152	12.6%
Teaching	240	8.3	274	9.4	299	10.3	59	24.6%
Research	150	8.3	157	8.7	170	9.4	20	13.3%
Postdoc	256	10.7	277	11.5	302	12.6	46	18.0%
<b>Total</b>	<b>1,848</b>	<b>51.3</b>	<b>1,986</b>	<b>55.2</b>	<b>2,128</b>	<b>59.1</b>	<b>280</b>	<b>15.2%</b>
<b>All US CS</b>								
TenureTrack	4,176	30.9	4,441	32.9	4,622	34.2	446	10.7%
Teaching	947	8.2	1,037	9.1	1,111	9.7	164	17.3%
Research	408	5.8	434	6.1	466	6.5	58	14.2%
Postdoc	567	7.7	622	8.1	669	8.9	102	18.0%
<b>Total</b>	<b>6,084</b>	<b>45.1</b>	<b>6,524</b>	<b>48.3</b>	<b>6,858</b>	<b>50.8</b>	<b>774</b>	<b>12.7%</b>
<b>US CE</b>								
TenureTrack	105	15.0	109	15.6	110	15.7	5	4.8%
Teaching	21	3.4	22	3.6	22	3.7	1	4.8%
Research	1	0.6	2	1.0	3	1.3	2	200.0%
Postdoc	6	2.1	8	2.7	10	3.2	4	66.7%
<b>Total</b>	<b>132</b>	<b>18.9</b>	<b>140</b>	<b>20.0</b>	<b>144</b>	<b>20.6</b>	<b>12</b>	<b>9.1%</b>
<b>US I</b>								
TenureTrack	356	25.4	379	27.1	397	28.4	41	11.5%
Teaching	141	10.8	155	11.9	168	12.9	27	19.1%
Research	16	2.6	17	2.8	19	3.1	3	18.8%
Postdoc	34	3.4	41	4.1	45	4.5	11	32.4%
<b>Total</b>	<b>545</b>	<b>38.9</b>	<b>590</b>	<b>42.1</b>	<b>627</b>	<b>44.8</b>	<b>82</b>	<b>15.0%</b>
<b>Canadian</b>								
TenureTrack	422	38.3	446	40.5	464	42.2	42	10.0%
Teaching	72	6.5	74	6.7	76	6.9	4	5.6%
Research	8	4.0	11	3.7	11	3.7	3	37.5%
Postdoc	83	10.4	92	11.5	96	12.0	13	15.7%
<b>Total</b>	<b>584</b>	<b>53.1</b>	<b>622</b>	<b>56.5</b>	<b>646</b>	<b>58.7</b>	<b>62</b>	<b>10.6%</b>
<b>Grand Total</b>								
TenureTrack	5,059	30.3	5,375	32.2	5,593	33.5	534	10.6%
Teaching	1,180	8.1	1,287	8.9	1,376	9.6	196	16.6%
Research	432	5.4	464	5.7	498	6.0	66	15.3%
Postdoc	691	7.3	763	7.8	819	8.5	128	18.5%
<b>Total</b>	<b>7,345</b>	<b>44.0</b>	<b>7,876</b>	<b>47.2</b>	<b>8,275</b>	<b>49.6</b>	<b>930</b>	<b>12.7%</b>

## 2017 CRA Taulbee Survey (continued)

increase is 11.4 percent per department. Figure B2 illustrates the trend in the total number of newly declared computing undergraduate majors as reported in the Taulbee Survey. Total undergraduate enrollment in computing majors among U.S. CS departments (i.e., the sum of the number of majors in CS, CE, and I at these departments) increased 11.5 percent (also 11.5 percent per department) when all respondents are compared, and increased 10.8 percent among U.S. CS departments reporting both this year and last year. Total enrollment per department increased in all three computing areas (CS, CE, and I) (Table B6).

Per-department averages smooth out comparisons from year to year when there are differences in the number of reporting departments, but the averages include both very large and very small departments. Figures B3 and B4 show the distribution of number of degrees awarded (Figure B3) and total enrollment (Figure B4) per tenured or tenure-track faculty member, in department size groupings for the U.S. CS departments. Larger departments, both public and private, produce more bachelor's degrees per tenure-track faculty member than do smaller departments. Departments from private institutions enroll fewer bachelor's students per tenure-track faculty as faculty size increases. Departments from public institutions have a less clear relationship between faculty size and enrollment per tenure-track faculty member.

The enrollment increases in CS are of particular interest to our community. This year's Taulbee Survey data shows that the per-department enrollment of CS bachelor's majors in U.S. CS departments increased by 13.3 percent over last year. While understandably lower than the 24.8 percent reported last year, this increase is formidable given the sustained growth surge of more than decade and the capacity barriers that have caused several departments to limit entrance into the major. Figure B5 shows the enrollment trend from Taulbee Survey data since this surge began. The average enrollment per U.S. CS department has increased over 300 percent during this period; that is, it has more than quadrupled. For the past four years, it has exceeded the previous peak reached during the dot-com enrollment surge.

Another view of bachelor's enrollments can be gleaned from CS course-level data. Such data was first reported in CRA's Generation-CS report for the fall terms in 2005, 2010 and 2015. The Taulbee Survey began collecting follow-up data in the 2016 survey, and now does so annually. Table B9 shows the three-year enrollment trends for the four types of courses for which data is collected. Only those departments are included that reported data for each of the three years. The data indicate that, between fall 2015 and fall 2017, median enrollment in the introductory course for CS majors, a representative mid-level course, and a representative upper-level course each increased. The percentage increases were 9.8%, 31.2% and 31.8%, respectively. The table further

**Table F2. Vacant Positions 2016-2017 by Position and Department Type**

	Tried to fill	Filled
<b>US CS Public</b>		
TenureTrack	307	261
Teaching	167	147
Research	51	52
Postdoc	79	103
<b>Total</b>	<b>604</b>	<b>563</b>
<b>US CS Private</b>		
TenureTrack	127	99
Teaching	52	44
Research	21	21
Postdoc	90	88
<b>Total</b>	<b>290</b>	<b>252</b>
<b>All US CS</b>		
TenureTrack	434	360
Teaching	219	191
Research	72	73
Postdoc	169	191
<b>Total</b>	<b>894</b>	<b>815</b>
<b>US CE</b>		
TenureTrack	11	10
Teaching	11	11
Research	8	8
Postdoc	5	5
<b>Total</b>	<b>35</b>	<b>34</b>
<b>US I</b>		
TenureTrack	18	19
Teaching	15	14
Research	1	2
Postdoc	18	17
<b>Total</b>	<b>52</b>	<b>50</b>
<b>Canadian</b>		
TenureTrack	46	33
Teaching	12	10
Research	0	1
Postdoc	2	28
<b>Total</b>	<b>59</b>	<b>71</b>
<b>Grand Total</b>		
TenureTrack	509	421
Teaching	257	226
Research	81	84
Postdoc	194	241
<b>Total</b>	<b>1,040</b>	<b>970</b>



## 2017 CRA Taulbee Survey (continued)

shows that the median percent of non-majors in both the introductory course for majors and the mid-level course increased during this period (as indicated by decreasing median percentages of majors). There are fewer data points for the representation of women and under-represented minority groups, and as yet no clear trends to report for the data we have obtained.

Gender diversity among bachelor's graduates in CS improved again this year, with women comprising 19.0 percent of the 2016-17 graduates, compared to 17.9 percent in 2015-16. In CE, the percentage of women among bachelor's graduates was steady at 12.6 percent and the percentage of women among I graduates rose from 22.9 percent to 25.0 percent (Table B2). The percentage of CS bachelor's degrees awarded to Whites again declined from 50.3 percent in 2015-16 to 47.6 percent in

**Table F2a. Reasons Positions Left Unfilled**

Reason	# Reported	% of Reasons
Didn't find a person who met our hiring goals*	19	14.3%
Offers turned down	69	51.9%
Technically vacant, not filled for admin reasons	3	2.3%
Hiring in progress	37	27.8%
Other	5	3.8%
Total Reasons Provided	133	
<b>*What hiring goals could not be met?</b>		<b># Given</b>
Specific specialty area not found (no two the same)		7
Poor qualifications for teaching faculty		2
Not right qualifications or complement to current faculty		4

**Table F3. Gender of Newly Hired Faculty**

	Tenure-Track		Teaching		Research		Postdoc		Total	
Male	313	79.2%	104	67.5%	28	66.7%	111	74.5%	556	75.1%
Female	82	20.8%	50	32.5%	14	33.3%	38	25.5%	184	24.9%
Unknown	1		0		0		8		9	
Total	396		154		42		157		749	

**Table F4. Ethnicity of Newly Hired Faculty**

	Tenure-Track		Teaching		Research		Postdoc		Total	
Nonresident Alien	47	13.5%	14	10.4%	3	7.9%	46	32.2%	110	16.6%
American Indian / Alaska Native	1	0.3%	1	0.7%	0	0.0%	3	2.1%	5	0.8%
Asian	102	29.4%	15	11.1%	13	34.2%	30	21.0%	160	24.1%
Black or African-American	6	1.7%	1	0.7%	1	2.6%	2	1.4%	10	1.5%
Native Hawaiian/ Pacific Islander	1	0.3%	0	0.0%	0	0.0%	0	0.0%	1	0.2%
White	145	41.8%	82	60.7%	18	47.4%	41	28.7%	286	43.1%
Multiracial, not Hispanic	1	0.3%	0	0.0%	0	0.0%	3	2.1%	4	0.6%
Hispanic, any race	9	2.6%	6	4.4%	1	2.6%	2	1.4%	18	2.7%
Resident, race/ethnic unknown	35	10.1%	16	11.9%	2	5.3%	16	11.2%	69	10.4%
Total known residency	347		135		38		143		663	
Residency Unknown	49		19		3		14		86	
Total	396		154		42		157		732	

## 2017 CRA Taulbee Survey (continued)

2016-17, while the percentage awarded to Asians was up slightly, from 25.3 percent to 25.9 percent. The percentage awarded to Non-resident Aliens rose from 10.4 percent to 12.5 percent. Changes in other ethnicity categories were less than 1 percent in CS. In aggregate across the three areas of computing, 48.1 percent of the graduates were White, 24.3 percent Asian, 12.0 percent Non-resident Aliens, and 15.6 percent all other ethnicity categories combined. However, in I programs, the other ethnicity categories accounted for approximately 24 percent of the graduates (Table B3).

**Table F5. Faculty Losses**

Died	5
Retired	80
Took Academic Position Elsewhere	85
Took Nonacademic Position	26
Remained, but Changed to Part Time	12
Other	20
Unknown	6
<b>Total</b>	<b>234</b>

**Table F6. Gender of Current Faculty**

	Full		Associate		Assistant		Teaching		Research		Postdoc		Total	
Male	2,051	84.9%	997	77.2%	920	76.8%	914	73.1%	360	80.0%	607	80.4%	5,849	79.5%
Female	365	15.1%	294	22.8%	278	23.2%	336	26.9%	90	20.0%	148	19.6%	1,511	20.5%
Unknown	66		28		21		38		4		35		192	
<b>Total</b>	<b>2,482</b>		<b>1,319</b>		<b>1,219</b>		<b>1,288</b>		<b>454</b>		<b>790</b>		<b>7,552</b>	

**Table F7. Ethnicity of Current Faculty**

	Full		Associate		Assistant		Teaching		Research		Postdoc		Total	
Nonresident Alien	22	1.0%	7	0.6%	139	12.6%	40	3.5%	59	13.9%	217	31.6%	484	7.1%
American Indian / Alaska Native	1	0.0%	4	0.3%	3	0.3%	2	0.2%	1	0.2%	0	0.0%	11	0.2%
Asian	609	26.9%	357	30.9%	327	29.6%	120	10.4%	73	17.2%	168	24.5%	1,654	24.4%
Black or African-American	22	1.0%	31	2.7%	35	3.2%	34	3.0%	2	0.5%	8	1.2%	132	1.9%
Native Hawaiian / Pacific Islander	1	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.1%	2	0.0%
White	1,447	63.9%	637	55.1%	511	46.2%	846	73.5%	258	60.8%	216	31.5%	3,915	57.7%
Multiracial, not Hispanic	11	0.5%	10	0.9%	10	0.9%	7	0.6%	1	0.2%	6	0.9%	45	0.7%
Hispanic, any race	44	1.9%	32	2.8%	21	1.9%	39	3.4%	15	3.5%	13	1.9%	164	2.4%
Resident, race/ethnic unknown	107	4.7%	79	6.8%	60	5.4%	63	5.5%	15	3.5%	57	8.3%	381	5.6%
<b>Total known residency</b>	<b>2,264</b>		<b>1,157</b>		<b>1,106</b>		<b>1,151</b>		<b>424</b>		<b>686</b>		<b>6,788</b>	
Residency Unknown	218		162		113		137		30		104		764	
<b>Total</b>	<b>2,482</b>		<b>1,319</b>		<b>1,219</b>		<b>1,288</b>		<b>454</b>		<b>790</b>		<b>7,552</b>	

In all three computing areas (CS, CE, and I), Resident Asians and Non-resident Aliens once again comprise a larger fraction of female enrollment than male enrollment, while Whites comprise a larger fraction of male enrollment than female enrollment (Table B8). Table B7 indicates that the same comparisons hold true for degree awardees.

## Faculty Demographics<sup>4</sup>

(Tables FI-F9; Figure FI)

Table FI shows the current and anticipated sizes, in FTE, for tenure-track, teaching, and research faculty, and postdocs. The total tenure-track faculty count in U.S. CS departments increased by 5.2 percent over last year, and the average tenure-track faculty size increased by 5.1 percent. Both of these values are larger increases than last year (2.3 and 4.6 percent, respectively). In U.S. CS departments, the average number of teaching faculty increased from 7.7 to 8.2 (6.5 percent vs 11.6 percent last year) and the average number of research faculty is 5.8, vs 5.7 last year. The average number of postdocs increased from 6.5 to 7.7. Canadian, CE, and I departments have much more volatile data due to the small number of departments reporting in each of these categories.

## 2017 CRA Taulbee Survey (continued)

**Table F8. Current Tenured and Tenure-Track Faculty by Gender and Ethnicity, From 159 Departments**

	Full Professor					Associate Professor					Assistant Professor					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	17	5	0	1	2	7	0	0	1	0	104	29	0	13	12	168	3.9
Amer Indian or Alaska Native	1	0	0	0	0	2	2	0	0	1	1	2	0	0	1	8	0.2
Asian	525	78	0	29	25	256	98	0	31	38	250	77	0	32	30	1,293	30.2
Black or African-American	18	3	0	1	1	20	11	0	3	4	21	14	0	3	6	88	2.1
Native Hawaiian/Pac Islander	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0.0
White	1,220	220	0	67	70	495	137	1	61	54	385	123	0	49	49	2,595	60.6
Multiracial, not Hispanic	11	0	0	1	0	8	2	0	1	1	7	3	0	1	1	31	0.7
Hispanic, any race	33	10	0	2	3	27	5	0	3	2	16	5	0	2	2	97	2.3
Total Res & Ethnicity Known	1,826	316	0			815	255	1			784	253	0			4,281	
Resident, ethnicity unknown	83	20	0			59	17	0			43	13	0			246	
Not Reported (N/R)	126	26	66			113	22	27			82	10	21			493	
Gender Totals	2,051	365	66			997	294	28			920	278	21			5,020	
%	84.9%	15.1%				77.2%	22.8%				76.8%	23.2%					

\* %M and %F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

**Table F9. Current Non-Tenure-Track Faculty and Postdoctorates by Gender and Ethnicity, From 160 Departments**

	Non-Tenure-Track Teaching					Non-Tenure-Track Research					Postdoctorates					Ethnicity Totals	
	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Male	Fem	N/R	% of M*	% of F*	Total	%
Nonresident Alien	29	8	0	4	3	43	13	0	13	17	184	31	0	36	26	316	15
Amer Indian or Alaska Native	1	1	0	0	0	0	1	0	0	1	0	0	0	0	0	3	0
Asian	78	41	0	10	14	59	14	0	18	18	137	31	0	27	26	361	17
Black or African-American	22	12	0	3	4	0	2	0	0	3	4	4	0	1	3	44	2
Native Hawaiian/Pac Islander	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
White	620	218	0	79	75	212	45	0	65	57	172	44	0	34	37	1,320	62
Multiracial, not Hispanic	5	2	0	1	1	1	0	0	0	0	3	3	0	1	3	14	1
Hispanic, any race	31	8	0	4	3	10	4	0	3	5	8	5	0	2	4	67	3
Total Res & Ethnicity Known	786	290	0			325	79	0			508	119	0			2,126	
Resident, ethnicity unknown	40	17	0			10	4	0			46	11	0			135	
Not Reported (N/R)	71	28	38			20	6	4			51	18	35			271	
Gender Totals	914	336	38			360	90	4			607	148	35			2,532	
%	73.1%	26.9%				80.0%	20.0%				80.4%	19.6%					

\* %M and %F columns are the percent of that gender who are of the specified ethnicity, of those whose ethnicity is known

## 2017 CRA Taulbee Survey (continued)

While the increases in both tenure-track and teaching faculty are no doubt welcome, they again lag the increases in undergraduate student enrollment, as reported in an earlier section. Figure F1 illustrates the comparative changes in enrollment and faculty since 2006, when the current enrollment surge began. This figure updates with recent years' data a figure from the Generation-CS report. Keeping instructional resources apace of enrollment increases remains a continuing challenge to the doctoral-granting departments.

As noted in previous Taulbee reports, Canadian universities, on average, have several more tenure-track faculty members per department than do U.S. universities, while U.S. I and CE departments, on average, are somewhat smaller than U.S. CS departments. The observations about U.S. CE and I departments may reflect the fact that we ask departments to report only computing-related faculty, so departments with Library Science or EE programs may report only part of their faculty.

Among U.S. CS departments, those at private universities have more of each category of faculty, including postdocs, than do those at public universities on average. However, there now is little difference in the average number of teaching faculty at publics and privates. The average tenure-track size at private universities rose from 30.9 to 33.5 while the average number of teaching faculty declined from 8.7 to 8.3. At the public universities, both the average tenure-track size and the average teaching faculty size increased. The specific set of departments reporting from one year to the next can impact these figures.

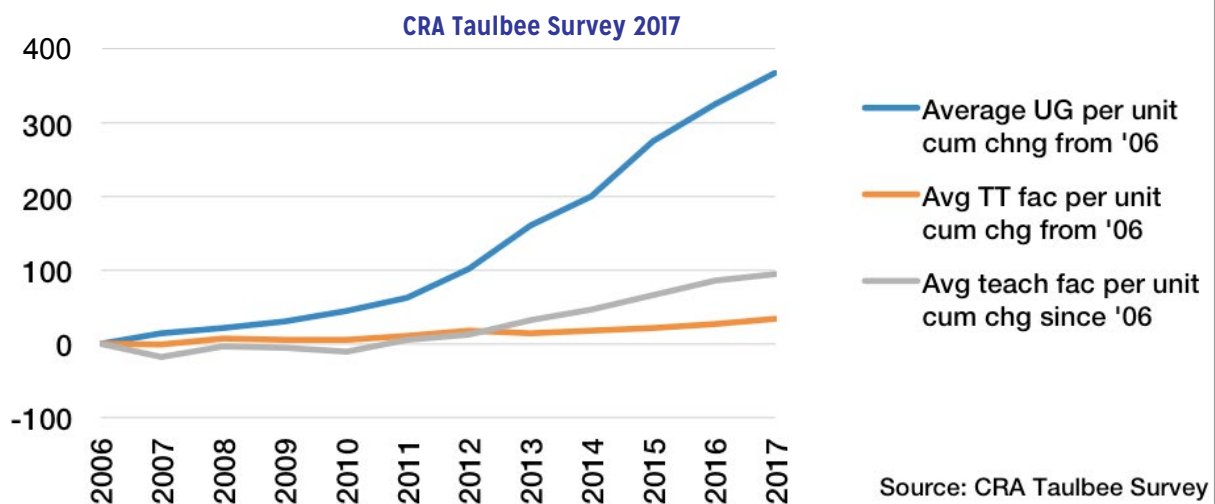
Table F2 summarizes faculty hiring this past year. The success rate for hiring tenure-track faculty at U.S. CS departments rose quite a bit this year, from 72.7 percent last year to 82.9 percent this year. The

success rate among departments at public universities was higher than that at private universities (85.2 percent vs 78.0 percent). Again this year, Canadian departments had lower success rates, on average, than did U.S. CS, CE, and I departments. In aggregate across all types of departments, the tenure-track hiring success rate increased from 71.9 percent to 82.7 percent.

Among those hired into all categories of academic positions (tenure-track, teaching faculty, research faculty, and postdoc) for 2016-17, 24.9 percent were women, similar to last year's percentage (Table F3). However, among those newly hired into tenure-track positions, the proportion of women declined from 24.3 percent last year to 20.8 percent this year. This year's figure is still slightly higher than that of two years ago. The percentage of positions going to women in each of the teaching faculty, research faculty, and postdoctoral positions rose as compared with those reported last year. Both the percentage of women among new tenure-track faculty hires and among newly hired faculty overall are once again higher than the percentage of new female Ph.D.s produced this past year.

Among new tenure-track faculty, the fraction who are White again declined slightly, from 43.8 percent to 41.8 percent, while the fraction who are Non-resident Alien or Asian new hires declined from 47.7 percent to 42.9 percent. This year, there was a larger fraction of new hires who are residents with unknown race. Once again, Whites dominated the newly hired teaching faculty, with Asians and Non-resident Aliens accounting for much of the remainder (and an even larger part of the remainder than was the case last year). Among research faculty, Whites comprised 47.4 percent of new hires, while Non-resident Aliens or resident Asians in aggregate comprised 42.1

**Figure F1. Comparative Change in Majors and Instructional Resources per Unit**



## 2017 CRA Taulbee Survey (continued)

percent of new hires. Both figures are higher than those reported last year. Among postdoc new hires, Whites comprised 28.7 percent, compared to 29.3 percent last year, while Non-resident Aliens and resident Asians collectively comprised 53.2 percent compared with 62.1 percent last year. Note, however, that the fraction of new postdocs who are residents with ethnicity unknown is greater than that reported last year (Table F4).

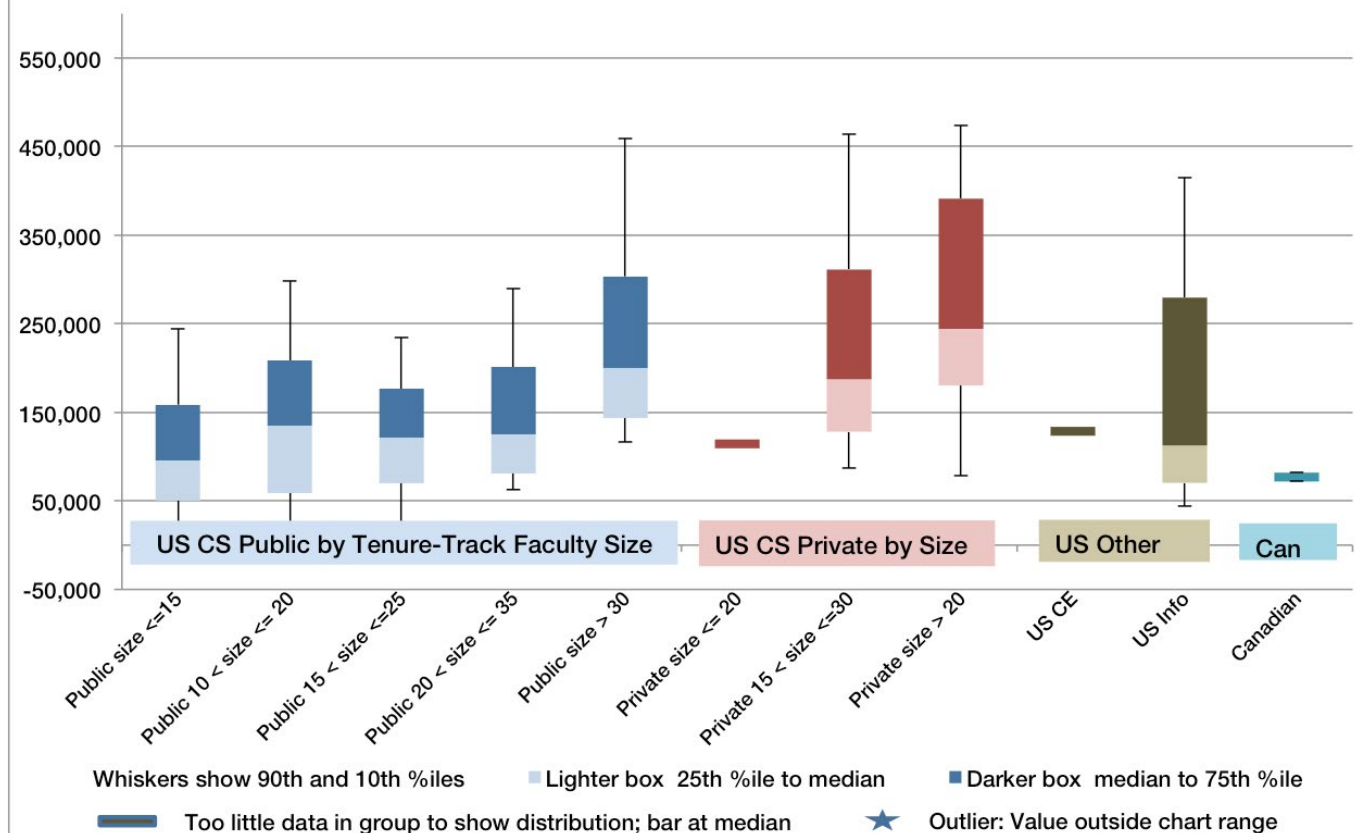
Since 2015, the Taulbee Survey has been collecting information on the number of new faculty hires who had been postdocs in the previous

year. In 2015, the departments reporting to the survey hired 233 new assistant professors. Of those, 78 (33 percent) had received their Ph.D. in the previous academic year, and 72 (31 percent) had previously been in a postdoc. In 2016, 279 new assistant professors were hired, 87 of whom were new Ph.D.s (31 percent) and 86 of whom were recent postdocs (also 31 percent). In 2017, 298 new assistant professors were hired, 91 of whom (31 percent) were new Ph.D.s and 63 of whom (21 percent) were recent postdocs. The percent of new hires who are new Ph.D.s has been relatively constant, but this year, the percent who were recent postdocs dropped quite a bit. This suggests that more of the new

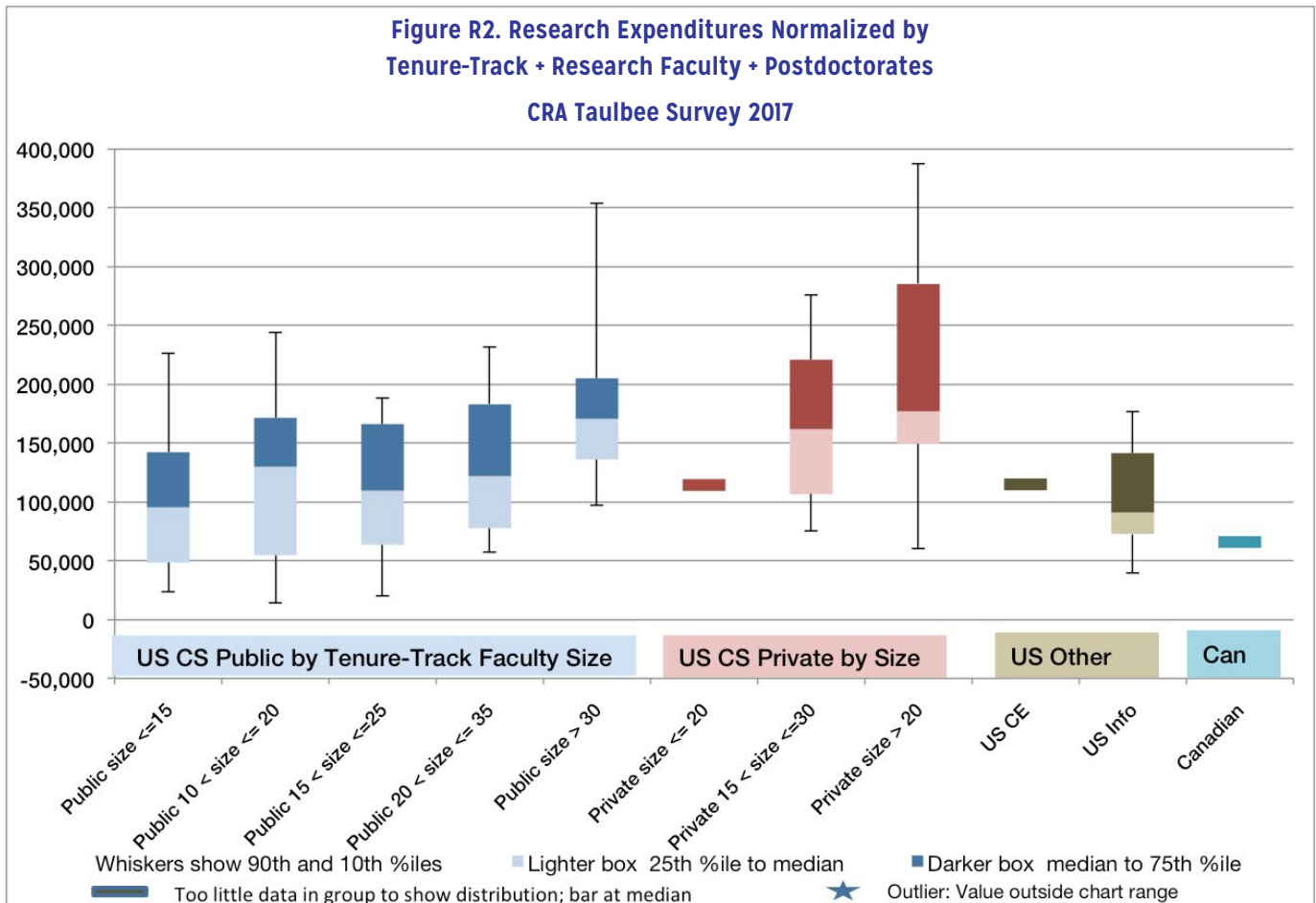
**Table RI. Total Expenditure from External Sources for Computing Research**

Department Type	# Depts	10th	25th	50th	75th	90th
US CS Public	85	\$501,735	\$1,957,603	\$4,054,147	\$7,983,775	\$17,096,345
US CS Private	26	\$1,996,536	\$3,190,845	\$7,466,028	\$11,814,182	\$18,864,715
US CE	6		\$1,180,526	\$2,090,478	\$2,978,273	
US Information	13	\$1,081,357	\$2,078,548	\$2,808,247	\$3,913,548	\$4,925,074
Canadian	6		\$754,225	\$1,871,107	\$5,624,497	

**Figure RI. Research Expenditures Normalized by Tenure-Track Size**  
 CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)



assistant professor hires are coming from other institutions or from industry. From other data in the Taulbee Survey, we note that a greater percentage of new doctoral graduates have been taking teaching faculty positions. It is possible that some of these are short-term, full-time appointments at the institution in which the student graduated, prior to taking a tenure-track position elsewhere. However, we have no definitive data to support this conjecture.

There were fewer faculty losses reported this year as compared with last year (Table F5). Reported deaths, retirements and faculty taking non-academic positions each were lower than last year, while movement from one academic position to another was comparable to last year.

The proportion of women at the full and associate professor ranks rose slightly from those reported last year, while the proportion at the assistant professor level dropped slightly (Table F6). There was a slight increase in the proportion of women among research faculty, while there was a slight decrease in the proportion of women among teaching faculty and postdocs. This is the reverse of what happened last year, but is the same as what happened two years ago. Whites, Asians, and Non-resident Aliens dominate each category of faculty members (Table F7).

Among the 163 departments who report gender by ethnicity breakdowns (which represents the vast majority of departments), Whites again comprised a greater percentage of female full professors than they do male full professors, while the reverse is true at the associate professor level. Asians comprise a greater percentage of male full professors than they do female full professors while the reverse is true at the associate professor level (Table F8).

For next year, U.S. CS departments forecast an average 6.5 percent growth in tenure-track faculty and 11.0 percent growth in teaching faculty. They also forecast an average 5.2 percent growth in postdocs. The departments missed last year's expectations for both tenure-track and research faculty hiring. They exceeded their expectations for postdoc hiring.

### Non-Tenure-Track Teaching Faculty

The 2016 Taulbee Survey contained several questions about non-tenure-track teaching faculty to help CRA decide what, if anything, the survey should collect differently about those faculty.

## 2017 CRA Taulbee Survey (continued)

The majority of responding units (61 percent) were interested in having the Taulbee Survey provide more fine-grained information about non-tenure-track teaching faculty. To further probe the landscape of teaching faculty, CRA formed a special committee that conducted a targeted survey about teaching faculty during fall of 2017. The results of this survey are now being analyzed and are expected to inform the 2018 Taulbee Survey.

### Research Expenditures

(Table RI; Figures RI-R2)

Table RI shows the distribution of departments' total research expenditure (including indirect costs or "overhead" as stated on project budgets) from external sources of support. Figures RI and R2 show the per capita expenditure, where capitation is computed two ways. The first (Figure RI) is relative to the number of tenure-track faculty members. The second (Figure R2) is relative to research faculty and postdocs as well as tenure-track faculty. Canadian levels are shown in Canadian dollars.

**Table GI. Doctoral Students Supported as Full-Time Students by Department Type**

Department Type	# Dept	On Institutional Funds						On External Funds						Total
		Teaching Assistants		Research Assistants		Full-Support Fellows		Teaching Assistants		Research Assistants		Full-Support Fellows		
US CS Public	93	3,188.1	39.5%	1,034.0	12.8%	412.5	5.1%	13.4	0.2%	3,198.6	39.7%	217.5	2.7%	8,064.1
US CS Private	32	1,126.0	29.4%	432.0	11.3%	271.0	7.1%	10.0	0.3%	1,870.0	48.7%	127.0	3.3%	3,836.0
US CS Total	125	4,314.1	36.3%	1,466.0	12.3%	683.5	5.7%	23.4	0.2%	5,068.6	42.6%	344.5	2.9%	11,900.1
US CE	6	143.0	41.2%	152.0	43.8%	11.0	3.2%	0.0	0.0%	41.0	11.8%	0.0	0.0%	347.0
US I	14	204.3	38.9%	64.8	12.3%	30.0	5.7%	0.2	0.0%	204.7	39.0%	21.0	4.0%	525.0
Canadian	9	307.5	52.8%	95.0	16.3%	6.0	1.0%	0.0	0.0%	174.0	29.9%	0.0	0.0%	582.5
Grand Total	154	4,968.9	37.2%	1,777.8	13.3%	730.5	5.5%	23.6	0.2%	5,488.3	41.1%	365.5	2.7%	13,354.6

**Table GIa. Master's Students Supported as Full-Time Students by Department Type**

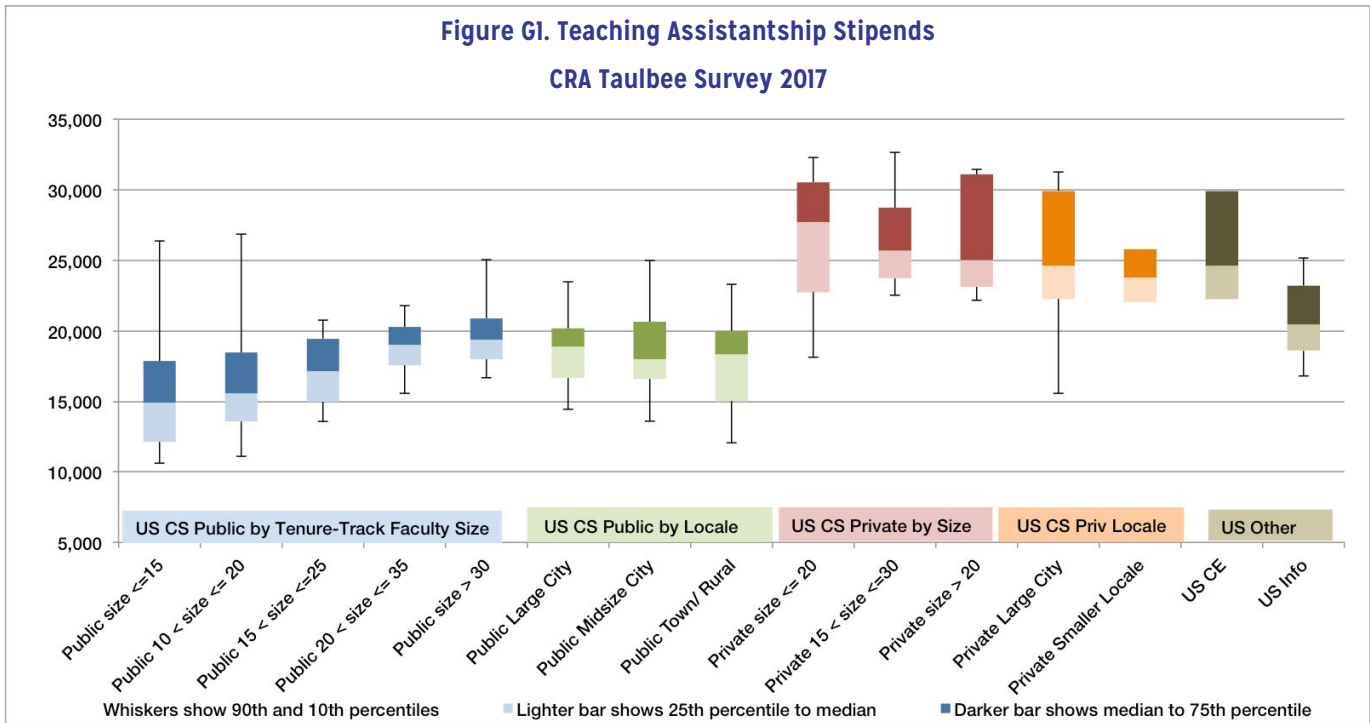
Department Type	# Dept	On Institutional Funds						On External Funds						Total
		Teaching Assistants		Research Assistants		Full-Support Fellows		Teaching Assistants		Research Assistants		Full-Support Fellows		
US CS Public	72	1,400.7	67.6%	196.8	9.5%	7.0	0.3%	5.0	0.2%	417.1	20.1%	47.0	2.3%	2,073.5
US CS Private	18	100.0	63.7%	29.0	18.5%	3.0	1.9%	1.0	0.6%	19.0	12.1%	5.0	3.2%	157.0
US CS Total	90	1,500.7	67.3%	225.8	10.1%	10.0	0.4%	6.0	0.3%	436.1	19.6%	52.0	2.3%	2,230.5
US CE	7	44.0	65.7%	21.0	31.3%	0.0	0.0%	0.0	0.0%	2.0	3.0%	0.0	0.0%	67.0
US I	10	61.2	34.5%	18.6	10.5%	47.0	26.5%	1.8	1.0%	47.0	26.5%	2.0	1.1%	177.5
Canadian	7	338.5	59.6%	77.0	13.6%	7.0	1.2%	0.0	0.0%	145.0	25.6%	0.0	0.0%	567.5
Grand Total	114	1,944	63.9%	342	11.3%	64	2.1%	8	0.3%	630	20.7%	54	1.8%	3,043

**Table GIb. Master's Students Eligibility for Assistantship Support**

	# Depts	% of Depts
All master's students are eligible for assistantships	83	59.7%
No master's students are eligible for assistantships	18	12.9%
Students in some master's programs but not others are eligible for assistantships	25	18.0%
Other*	13	9.4%

\*Other responses divided between individual student qualifications (e.g. GPA or training) and department needs or resources (research needs, funds availability)

## 2017 CRA Taulbee Survey (continued)



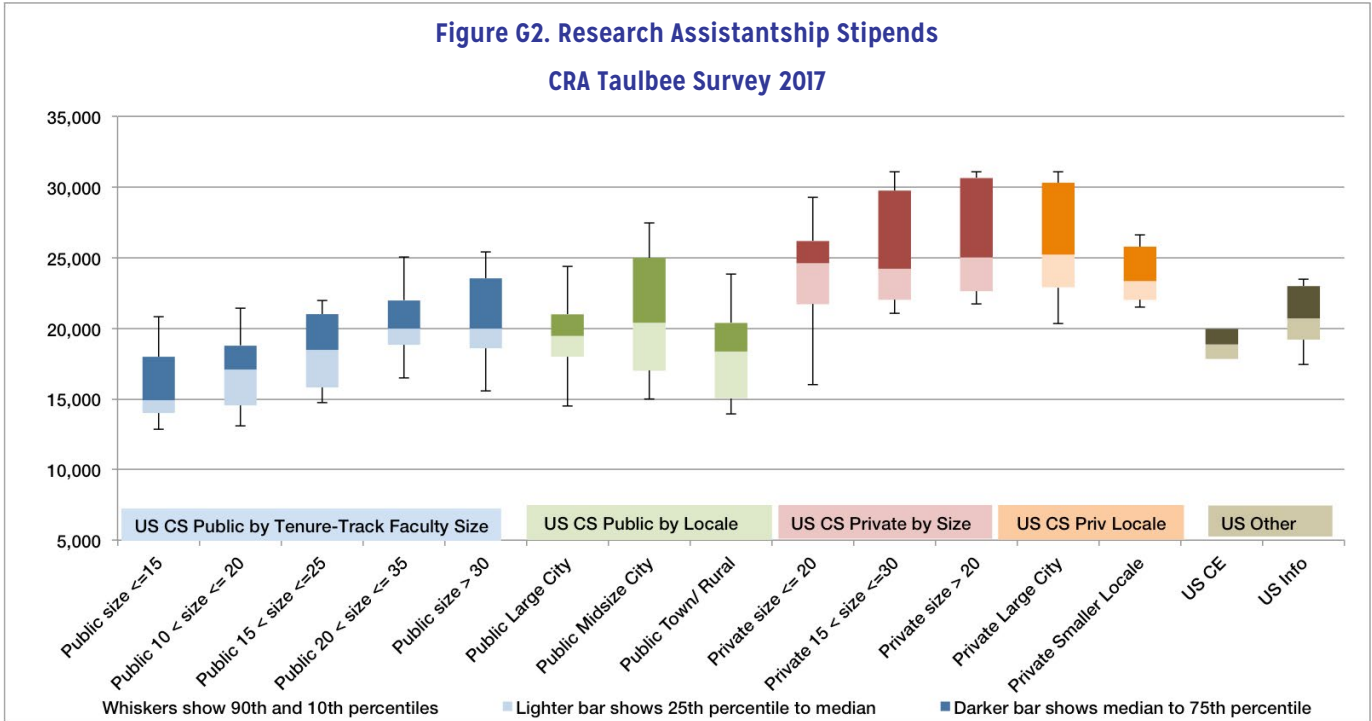
**Table G2. Fall 2017 Academic-Year Graduate Stipends by Department Type and Support Type**

Teaching Assistantships						
		Percentiles of Department Averages				
Department Type	# Depts	10th	25th	50th	75th	90th
US CS Public	94	\$12,045	\$15,648	\$18,498	\$20,199	\$23,966
US CS Private	25	\$18,540	\$22,050	\$24,225	\$27,333	\$31,270
US CE	7		\$15,291	\$18,000	\$19,876	
US Info	11	\$16,783	\$18,113	\$20,520	\$23,339	\$25,369
Canadian	8		\$5,175	\$14,005	\$17,937	
Research Assistantships						
		Percentiles of Department Averages				
Department Type	# Depts	10th	25th	50th	75th	90th
US CS Public	94	\$13,943	\$16,196	\$19,085	\$21,430	\$25,218
US CS Private	33	\$20,880	\$22,440	\$25,029	\$29,532	\$31,004
US CE	7		\$17,835	\$18,864	\$19,971	
US Information	12	\$17,240	\$20,100	\$21,813	\$23,024	\$23,535
Canadian	6		\$7,785	\$12,819	\$20,225	
Full-Support Fellows						
		Percentiles of Department Averages				
Department Type	# Depts	10th	25th	50th	75th	90th
US CS Public	60	\$14,925	\$20,000	\$23,000	\$27,243	\$32,500
US CS Private	32	\$22,541	\$23,940	\$26,011	\$30,742	\$32,450
US CE	3			\$25,000		
US Information	9		\$20,399	\$24,000	\$29,827	
Canadian	4			\$18,192		

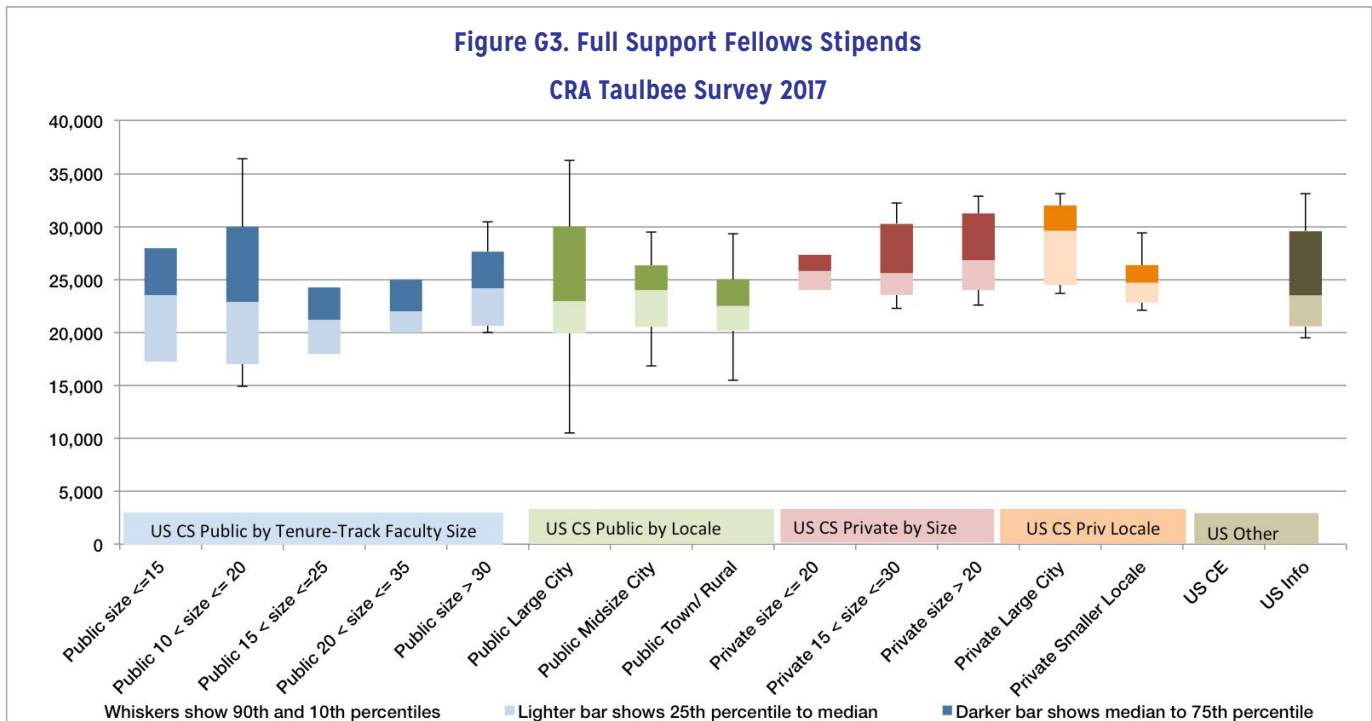


## 2017 CRA Taulbee Survey (continued)

**Figure G2. Research Assistantship Stipends**  
CRA Taulbee Survey 2017



**Figure G3. Full Support Fellows Stipends**  
CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)

Overall median research expenditures for 2016-17 at U.S. CS public departments increased 8.7 percent in comparison with 2015-16. At U.S. CS departments in private institutions, median expenditures rose 19.6 percent. The direction of change at private universities was the reverse of what was experienced last year. The median research expenditure at U.S. CS departments in private institutions remains considerably higher than that of public institutions. Median expenditures at U.S. I departments was within one-half of one percent of last year's figure, and that for Canadian departments was one percent higher than last year. The sample size for I departments and Canadian departments is small, which makes these comparisons subject to more volatility.

The U.S. CS data show a tendency for larger departments to have more external funding per capita than smaller departments. This holds for departments at both public and private institutions.

### Graduate Student Support

(Tables G1-G2; Figures G1-G3)

Table G1 shows the number of doctoral students supported as full-time students as of fall 2017, further categorized as teaching assistants (TAs), research assistants (RAs), and full-support fellows. In the past,

the heading for this table read "Graduate Students Supported as Full-Time Students by Department Type". In fact, this table only reported responses to a question that was about support of doctoral students, and has been renamed accordingly. The table also shows the split between those on institutional vs. external funds. The average number of TAs on institutional funds in U.S. CS departments dropped slightly from last year's value, from 35.3 to 34.5. Public universities reported a slight decrease, while the average at private universities rose by 7.9 percent after declining by a similar percentage last year. The reported values at private universities have been somewhat volatile in recent years. Since there are fewer of them, compared with public universities, they are more sensitive to the specific units reporting in a given year. The small number of CE, I, and Canadian departments also make these comparative averages subject to volatility.

The average number of RAs on external funding was slightly lower at public and slightly higher at private U.S. CS departments, while the average number of RAs supported on institutional funds declined at private universities and rose at public. The average number of full-support fellows on internal funds dropped slightly in U.S. CS public departments and rose at U.S. private departments. The average number of

**Table S1. Nine-month Salaries, 141 Responses of 192 US CS Departments, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	113	117	123	138	111	129	138	137	107	52	48
Indiv	673	518	714	1,992	404	562	1,024	1,028	848	289	425
10	\$134,404	\$124,614	\$120,732	\$124,517	\$99,151	\$102,139	\$100,004	\$89,327	\$66,015	\$60,754	\$47,891
25	\$152,091	\$142,483	\$132,108	\$143,451	\$105,687	\$109,353	\$108,597	\$95,440	\$70,906	\$74,157	\$50,000
50	\$173,987	\$165,230	\$149,469	\$159,958	\$114,204	\$120,595	\$117,505	\$103,014	\$80,102	\$92,228	\$57,159
75	\$193,929	\$191,967	\$168,729	\$179,071	\$127,500	\$130,397	\$128,569	\$111,085	\$91,852	\$122,020	\$62,378
90	\$216,805	\$213,326	\$188,049	\$197,867	\$138,611	\$142,850	\$140,675	\$120,516	\$103,122	\$150,085	\$69,066

**Table S2. Nine-month Salaries, 103 Responses of 139 US CS Public (All Public), Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	81	83	93	101	84	95	101	100	77	36	34
Indiv	447	374	521	1,404	300	400	742	748	567	184	203
10	\$130,839	\$118,948	\$119,475	\$122,317	\$98,224	\$100,192	\$99,707	\$88,598	\$63,269	\$51,975	\$47,747
25	\$147,991	\$137,913	\$129,424	\$142,178	\$102,250	\$108,756	\$106,568	\$93,584	\$69,692	\$71,000	\$49,807
50	\$167,790	\$159,207	\$144,760	\$155,652	\$111,643	\$118,108	\$114,581	\$99,176	\$77,226	\$84,503	\$54,249
75	\$186,554	\$179,282	\$162,209	\$171,320	\$122,500	\$125,331	\$124,261	\$107,128	\$85,445	\$109,169	\$59,602
90	\$199,575	\$196,250	\$175,351	\$183,118	\$132,129	\$134,392	\$136,236	\$113,557	\$97,200	\$122,479	\$63,139

## 2017 CRA Taulbee Survey (continued)

full-support fellows on external funds increased at U.S. CS departments in both public and private universities.

This year, for the first time, we also requested information about supported master's students. The results are shown in Table G1a. While 37.4 percent of doctoral student support is for TAs, 64.2 percent of master's student support is for TAs. Conversely, 54.4 percent of doctoral student support is for RAs, while 32.0 percent of master's student support is for RAs. Among the 90 U.S. CS departments that provided master's support data, the average number of TAs per department on institutional funds is 16.7, which is about half the level reported above for doctoral student support per department. However, since there are only about ¼ as many U.S. CS departments reporting master's support data, one should be careful when trying to compare these two averages.

Table G2 shows the distribution of stipends for TAs, RAs, and full-support fellows. U.S. CS data are further broken down in this table by public and private institution. Figures G1-G3 further break down the U.S. CS data by size of department and by geographic location of the university.

The median TA salaries at U.S. CS departments increased 3.0 percent at public universities and increased 1.1 percent at private universities. Median salaries of RAs rose 2.2 percent at public universities and 0.7 percent at private universities. For full-support fellows, median salaries rose 3.9 percent at U.S. public universities and 1.3 percent at U.S. private universities.

Median stipends are higher at private U.S. CS departments, compared with public U.S. CS departments, in each of the three stipend categories. Stipends at U.S. I schools fall in between those at public and private U.S. CS departments. These relationships are unchanged from previous years.

At U.S. CS departments in public institutions, larger departments have higher salaries than do smaller departments for both TAs and RAs. Stipends in U.S. CS departments at private institutions do not exhibit a clear relationship based on department size for RAs, but for TAs, stipends are lower at larger departments.

**Table S3. Nine-month Salaries, 38 Responses of 53 US CS Private (All Private), Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	32	34	30	37	27	34	37	37	30	16	14
Indiv	226	144	193	588	104	162	282	280	281	105	222
10	\$148,797	\$134,032	\$140,007	\$140,051	\$106,399	\$106,751	\$107,454	\$101,096	\$76,896	\$73,824	\$57,470
25	\$164,928	\$147,968	\$155,716	\$160,936	\$109,316	\$121,079	\$117,007	\$103,862	\$81,170	\$93,582	\$61,102
50	\$198,716	\$191,491	\$172,029	\$184,034	\$122,784	\$131,888	\$128,015	\$112,525	\$92,378	\$138,789	\$65,136
75	\$218,000	\$221,125	\$193,762	\$204,459	\$136,724	\$144,234	\$143,289	\$123,150	\$100,616	\$157,024	\$68,007
90	\$238,456	\$253,604	\$205,195	\$221,400	\$146,813	\$153,837	\$149,849	\$128,419	\$112,708	\$161,890	\$69,148

**Table S4. Nine-month Salaries, 23 Responses of US CS Public With <=15 Tenure-Track Faculty, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	14	11	19	22	18	20	23	22	15	2	1
Indiv	38	16	35	95	52	47	108	72	53		
10	\$116,617	\$100,778	\$111,988	\$115,400	\$95,380	\$94,915	\$94,594	\$85,001	\$57,306		
25	\$126,804	\$115,522	\$114,138	\$119,132	\$99,016	\$99,231	\$98,838	\$87,070	\$61,247		
50	\$136,190	\$118,593	\$121,311	\$126,624	\$100,083	\$103,243	\$102,327	\$90,436	\$66,199		
75	\$152,100	\$129,333	\$128,423	\$143,435	\$109,792	\$109,539	\$109,088	\$94,361	\$73,359		
90	\$171,945	\$145,288	\$151,497	\$151,194	\$127,965	\$122,503	\$122,118	\$98,379	\$78,387		

## 2017 CRA Taulbee Survey (continued)

### Faculty Salaries

(Tables SI-S21; Figures SI-S9)

Each department was asked to report individual (but anonymous) faculty salaries if possible; otherwise, the department was requested to provide the mean salary for each rank (full, associate, and assistant professors and non-tenure-track teaching faculty, research faculty, and post-doctorates) and the number of persons at each rank. The salaries are those in effect on January 1, 2018 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.

U.S. CS data are reported in Tables SI-S16 and in the box and whiskers diagrams. Data for CE, I, Canadian, and new Ph.D.s are reported in Tables SI7-S20. The tables and diagrams contain distributional data (first decile, quartiles, and ninth decile) computed from the department averages only. Thus, for example, a table row labeled "50" or the median line in a diagram is the median of the averages for the departments that

reported within the stratum (the number of such departments reporting is shown in the "depts" row). Therefore, it is not a true median of all of the salaries.

We also report salary data for senior faculty based on time in rank, for more meaningful comparison of individual or departmental faculty salaries with national averages. We report associate professor salaries for time in rank of 7 years or less, and of more than 7 years. For full professors, we report time in rank of 7 years or less, 8 to 15 years, and more than 15 years.

Those departments reporting salary data were provided a summary report in December 2017. Those departments that provided individual salaries were additionally provided more comprehensive distributional information based on these individual salaries. This year, 70 percent of those reporting salary data provided salaries at the individual level.

The remainder of this section summarizes the basic report provided in December 2017 to all departments that provided salary data. The

**Table S5. Nine-month Salaries, 38 Responses of US CS Public With 10 < Tenure-Track Faculty <=20, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	27	25	32	37	32	34	37	35	25	5	7
Indiv	82	62	85	243	86	85	186	135	114	25	16
10	\$114,463	\$108,741	\$113,099	\$117,105	\$94,099	\$95,886	\$95,922	\$86,000	\$57,086		
25	\$129,319	\$118,580	\$120,095	\$125,425	\$99,106	\$101,700	\$99,918	\$89,205	\$61,671		\$48,163
50	\$145,683	\$134,613	\$132,791	\$143,028	\$102,542	\$108,756	\$107,786	\$93,654	\$71,792	\$62,000	\$50,000
75	\$161,775	\$149,500	\$148,896	\$153,799	\$110,551	\$120,040	\$114,154	\$98,319	\$76,451		\$57,070
90	\$181,204	\$173,452	\$162,041	\$164,918	\$115,746	\$124,938	\$120,956	\$100,995	\$83,138		

**Table S6. Nine-month Salaries, 31 Responses of US CS Public With 15 < Tenure-Track Faculty <=25, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	23	26	27	30	25	28	29	29	22	7	9
Indiv	79	85	103	278	68	78	157	134	107	31	19
10	\$132,783	\$120,708	\$122,644	\$137,494	\$95,776	\$100,375	\$99,551	\$91,322	\$58,774		
25	\$145,047	\$134,985	\$132,791	\$140,747	\$102,001	\$109,038	\$105,900	\$94,442	\$69,732	\$53,817	\$50,000
50	\$160,044	\$152,479	\$142,012	\$151,234	\$109,254	\$114,562	\$112,737	\$98,187	\$73,664	\$76,000	\$54,325
75	\$174,560	\$179,489	\$149,129	\$165,187	\$114,136	\$121,188	\$117,616	\$101,333	\$78,958	\$117,636	\$59,814
90	\$192,454	\$190,506	\$168,558	\$172,557	\$121,961	\$125,586	\$124,723	\$110,528	\$91,497		

## 2017 CRA Taulbee Survey (continued)

**Table S7. Nine-month Salaries, 29 Responses of US CS Public With 20 < Tenure-Track Faculty <=35, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	24	28	29	29	24	28	28	29	20	11	10
Indiv	106	99	154	361	87	106	197	203	125	26	28
10	\$141,945	\$143,095	\$123,727	\$138,580	\$101,525	\$104,542	\$104,470	\$93,622	\$69,154	\$37,923	\$48,221
25	\$152,536	\$152,489	\$132,039	\$148,241	\$107,808	\$109,919	\$110,524	\$96,325	\$69,662	\$71,199	\$49,807
50	\$170,016	\$170,156	\$145,299	\$162,766	\$114,170	\$117,531	\$117,059	\$99,868	\$76,032	\$88,592	\$55,336
75	\$188,041	\$182,599	\$164,985	\$175,445	\$121,316	\$125,671	\$124,224	\$107,496	\$82,332	\$105,211	\$59,340
90	\$195,629	\$204,215	\$168,999	\$181,027	\$127,500	\$133,703	\$128,507	\$113,601	\$92,452	\$113,712	\$64,540

**Table S8. Nine-month Salaries, 38 Responses of US CS Public With Tenure-Track Faculty >30, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	36	36	36	38	31	36	38	38	33	24	21
Indiv	298	247	315	905	138	232	392	460	362	139	173
10	\$157,977	\$145,474	\$134,751	\$152,683	\$106,849	\$111,916	\$113,051	\$98,295	\$70,606	\$67,899	\$45,042
25	\$168,740	\$155,907	\$143,442	\$158,470	\$115,862	\$119,814	\$116,789	\$103,166	\$79,307	\$74,157	\$51,844
50	\$181,869	\$166,889	\$158,063	\$170,200	\$121,001	\$125,670	\$124,886	\$107,251	\$84,590	\$90,086	\$54,828
75	\$193,892	\$185,752	\$167,158	\$180,782	\$129,952	\$134,386	\$134,720	\$112,268	\$92,189	\$109,169	\$58,964
90	\$215,402	\$202,628	\$177,983	\$190,600	\$138,611	\$138,178	\$140,382	\$115,159	\$102,855	\$125,981	\$61,010

data reported below, and the accompanying tables, were updated to reflect a small amount of data provided after the deadline for the December report.

Salaries at private institutions tend to be higher than those at public institutions for all faculty types (Tables S2 and S3). This pattern is consistent with data from previous years.

When viewed relative to faculty size (Figures S1-S7), salaries at each tenure-track rank tend to be higher for larger departments at both public and private institutions. This pattern is consistent with last year's pattern. Salaries for teaching faculty exhibit this pattern at private institutions and, for the most part, also at public institutions.

When viewed relative to type of locale (also Figures S1-S7), public institution salaries appear to be generally lower in smaller locales than in mid-size or large cities for all tenure-track faculty ranks and for teaching faculty. Private institution salaries also exhibit this behavior except for full professors in rank 8-15 years.

Our analysis of faculty salary changes from one year to the next uses only those departments that reported both years; otherwise, the departments that reported during only one year can skew the comparison. Because some departments that reported both years provided only aggregate salaries for their full and associate professors during one year and in the other year reported them by years in rank, we only report salary changes for all full professors and for all associate professors in the year-to-year comparison. Table S21 shows, by type of faculty and type of department, the change in the median of the average salaries from departments that reported both years (the number of departments being compared is indicated in parentheses in each column heading). Using the cell showing full professors at U.S. CS departments as an example, the table indicates that the median of the 124 average salaries for full professors was 2.4 percent higher in 2017 than was the median of the average full professor salaries in 2016 from these same 124 departments.

When interpreting these changes, it is important to remember the effect that promotions have on the departmental data from

## 2017 CRA Taulbee Survey (continued)

**Table S9. Nine-month Salaries, 15 Responses of US CS Private With <=20 Tenure-Track Faculty, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank n		Teach	Research	Postdoc
Depts	11	13	11	14	11	13	14	14	10	3	2
Indiv	37	29	32	101	22	33	60	48	38		
10	\$130,076	\$132,213	\$140,037	\$124,771	\$100,025	\$104,282	\$101,058	\$96,840	\$76,102		
25	\$151,143	\$133,790	\$148,601	\$147,796	\$107,067	\$106,526	\$108,018	\$101,869	\$80,270		
50	\$163,728	\$152,435	\$169,014	\$169,014	\$114,585	\$120,688	\$118,008	\$106,128	\$83,103		
75	\$176,403	\$194,150	\$181,625	\$183,401	\$125,536	\$131,775	\$127,511	\$117,850	\$89,591		
90	\$206,690	\$222,479	\$198,359	\$193,657	\$130,268	\$139,268	\$132,918	\$123,402	\$95,506		

**Table S10. Nine-month Salaries, 18 Responses of US CS Private With 15 < Tenure-Track Faculty <=30, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	15	15	14	17	11	15	17	18	14	9	7
Indiv	82	51	66	210	22	41	72	109	74	33	58
10	\$162,620	\$150,783	\$145,376	\$162,279	\$107,829	\$120,176	\$114,594	\$102,940	\$77,339		
25	\$170,398	\$169,630	\$155,998	\$170,701	\$114,317	\$122,487	\$119,000	\$104,772	\$80,361	\$111,400	\$61,120
50	\$183,850	\$191,967	\$170,280	\$183,581	\$122,784	\$132,000	\$128,642	\$111,634	\$92,057	\$137,518	\$62,008
75	\$207,106	\$214,373	\$192,655	\$203,454	\$133,223	\$146,613	\$140,247	\$124,909	\$109,537	\$141,667	\$67,996
90	\$230,439	\$234,937	\$214,487	\$213,029	\$134,105	\$153,561	\$148,241	\$127,170	\$121,960		

**Table S11. Nine-month Salaries, 23 Responses of US CS Private With Tenure-Track Faculty >20, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	21	21	19	23	16	21	23	23	20	13	12
Indiv	189	115	161	487	82	129	222	232	243	99	216
10	\$165,924	\$147,396	\$144,191	\$153,344	\$107,728	\$122,250	\$115,368	\$103,646	\$77,257	\$73,643	\$57,118
25	\$183,850	\$172,010	\$156,876	\$177,308	\$116,159	\$129,392	\$122,480	\$108,855	\$84,235	\$98,899	\$61,182
50	\$205,973	\$197,960	\$174,714	\$194,490	\$133,303	\$140,295	\$137,381	\$113,662	\$97,052	\$140,060	\$66,984
75	\$235,233	\$228,729	\$197,971	\$216,785	\$146,118	\$148,740	\$145,405	\$124,764	\$108,010	\$157,793	\$68,401
90	\$240,269	\$259,830	\$219,477	\$224,481	\$152,142	\$171,200	\$155,229	\$130,329	\$115,455	\$163,956	\$69,189

## 2017 CRA Taulbee Survey (continued)

**Table S12. Nine-month Salaries, 38 Responses of US CS Public In Large City or Suburbs, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	35	34	36	38	34	37	38	37	28	16	13
Indiv	205	166	193	566	128	171	304	294	238	95	89
10	\$142,424	\$132,706	\$126,324	\$142,726	\$100,455	\$107,511	\$104,902	\$93,448	\$69,504	\$51,975	\$45,634
25	\$157,153	\$144,013	\$133,610	\$148,363	\$107,609	\$111,753	\$110,991	\$98,187	\$72,037	\$67,348	\$48,325
50	\$172,781	\$159,452	\$144,827	\$159,037	\$116,100	\$118,701	\$117,055	\$103,014	\$79,493	\$104,943	\$52,979
75	\$186,083	\$180,804	\$163,450	\$172,172	\$127,500	\$127,148	\$127,821	\$107,718	\$87,070	\$113,178	\$56,958
90	\$208,145	\$200,032	\$173,702	\$186,543	\$132,129	\$135,509	\$137,455	\$113,900	\$92,977	\$133,368	\$59,793

**Table S13. Nine-month Salaries, 25 Responses of US CS Public In Midsize City or Suburbs, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	21	19	21	24	18	23	24	23	17	9	6
Indiv	127	93	157	386	64	93	166	159	139	39	36
10	\$135,953	\$114,421	\$125,000	\$137,257	\$100,060	\$106,496	\$102,331	\$92,029	\$63,479		
25	\$152,867	\$135,356	\$140,581	\$145,251	\$105,383	\$111,904	\$110,708	\$95,217	\$69,692	\$73,642	
50	\$173,987	\$164,693	\$151,471	\$159,563	\$111,358	\$120,170	\$115,341	\$101,084	\$79,000	\$83,685	\$54,983
75	\$192,881	\$170,555	\$164,913	\$173,191	\$117,609	\$126,910	\$124,689	\$110,592	\$88,644	\$115,100	
90	\$194,825	\$192,022	\$176,383	\$185,927	\$137,364	\$135,088	\$138,294	\$118,383	\$111,889		

**Table S14. Nine-month Salaries, 39 Responses of US CS Public in Small City, Town, or Rural, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	25	30	36	39	31	34	38	39	31	11	15
Indiv	115	115	171	452	102	135	265	294	189	50	78
10	\$121,826	\$118,345	\$114,138	\$118,830	\$97,208	\$98,043	\$98,069	\$85,267	\$61,671	\$68,000	\$47,897
25	\$138,166	\$133,496	\$121,130	\$126,624	\$99,437	\$101,700	\$101,704	\$89,272	\$66,760	\$73,165	\$51,396
50	\$151,542	\$157,567	\$137,832	\$147,969	\$107,199	\$112,369	\$109,811	\$96,325	\$74,213	\$75,458	\$54,828
75	\$180,019	\$179,034	\$158,140	\$162,396	\$117,941	\$124,668	\$121,625	\$99,919	\$84,725	\$86,871	\$60,412
90	\$190,053	\$197,450	\$170,794	\$177,601	\$126,538	\$129,300	\$127,394	\$109,133	\$91,956	\$92,284	\$62,852

## 2017 CRA Taulbee Survey (continued)

**Table S15. Nine-month Salaries, 25 Responses of US CS Private in Large City or Suburbs, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	22	23	24	25	19	25	25	24	21	11	8
Indiv	123	102	160	401	86	121	215	195	240	78	154
10	\$141,061	\$135,116	\$139,830	\$139,771	\$107,467	\$111,772	\$111,034	\$100,602	\$77,218	\$77,629	
25	\$164,128	\$148,123	\$153,024	\$167,631	\$112,694	\$120,688	\$118,222	\$106,523	\$81,443	\$105,150	\$61,139
50	\$204,449	\$191,015	\$170,280	\$184,034	\$128,287	\$132,000	\$128,642	\$115,148	\$94,755	\$141,667	\$65,460
75	\$216,070	\$221,174	\$190,087	\$203,454	\$136,724	\$144,512	\$144,994	\$125,552	\$98,186	\$157,281	\$68,401
90	\$238,456	\$267,333	\$202,117	\$219,849	\$149,254	\$153,561	\$150,533	\$130,288	\$107,247	\$165,334	

**Table S16. Nine-month Salaries, 13 Responses of US CS Private in Other than Large City, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	10	11	6	12	8	9	12	13	9	5	6
Indiv	103	42	33	187	18	41	67	85	41	27	68
10	\$153,312	\$134,595		\$146,954			\$104,113	\$103,283			
25	\$168,310	\$157,323		\$158,563	\$106,916	\$124,700	\$113,015	\$103,862	\$81,079		
50	\$189,471	\$192,706	\$180,803	\$185,537	\$117,064	\$129,776	\$123,705	\$111,820	\$89,907	\$114,052	\$64,396
75	\$217,288	\$217,024		\$205,873	\$127,419	\$142,759	\$140,259	\$118,256	\$110,300		
90	\$237,723	\$228,729		\$221,880			\$142,990	\$122,359			

**Table S17. Nine-month Salaries, 8 Responses of 35 US Computer Engineering Departments, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	5	6	6	8	5	7	8	8	5	1	3
Indiv	26	15	28	77	16	27	49	27	19	0	0
10											
25				\$150,943		\$108,959	\$109,878	\$94,125			
50	\$186,903	\$165,184	\$132,624	\$172,792	\$114,052	\$111,573	\$120,319	\$98,500	\$77,915		
75				\$183,667		\$117,033	\$124,967	\$105,548			
90											



## 2017 CRA Taulbee Survey (continued)

**Table S18. Nine-month Salaries, 14 Responses of 24 US Information Departments, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	11	13	12	14	10	14	14	14	13	5	6
Indiv	33	55	62	151	42	93	135	137	109	17	31
10	\$138,603	\$131,607	\$124,507	\$140,778	\$95,752	\$96,788	\$95,403	\$83,635	\$73,922		
25	\$156,674	\$145,438	\$143,136	\$148,582	\$101,953	\$106,333	\$106,333	\$92,870	\$78,718		
50	\$176,408	\$159,207	\$148,075	\$164,306	\$115,800	\$118,028	\$119,457	\$100,671	\$90,953	\$79,977	\$56,141
75	\$193,204	\$183,027	\$156,561	\$172,478	\$125,205	\$138,546	\$138,134	\$106,370	\$103,304		
90	\$199,984	\$197,404	\$172,154	\$192,851	\$138,956	\$143,546	\$142,240	\$114,724	\$135,420		

**Table S19. Twelve-month Salaries, 9 Responses of 30 Canadian Departments, Percentiles from Department Averages**

	Full Professor				Associate			Assistant	Non-Tenure Track		
	In rank 16+ yrs	In rank 8-15 yrs	In rank 0-7 years	All years in rank	In rank 8+ years	In rank 0-7 years	All years in rank		Teach	Research	Postdoc
Depts	9	8	9	9	9	7	9	9	6	3	4
Indiv	57	50	56	163	64	37	101	51	59		45
10											
25	\$167,307	\$166,529	\$145,915	\$170,603	\$142,851	\$127,311	\$134,901	\$100,653			
50	\$205,063	\$176,028	\$157,979	\$176,965	\$151,064	\$144,960	\$148,775	\$118,994	\$120,506		\$55,525
75	\$210,452	\$197,717	\$188,592	\$197,802	\$173,843	\$163,028	\$168,398	\$132,508			
90											

**Table S20. Nine-month Salaries for New PhDs (Twelve-month for Canadian)**

	US (CS, CE, and Info Combined)				Canadian			
	Tenure-Track	Non-ten Teaching	Non-ten Research	Postdoc	Tenure-Track	Non-ten Teaching	Non-ten Research	Postdoc
Depts	81	27	8	28	4	1	1	3
Indiv	151	37	11	132	15	2	2	17
10	\$90,000	\$64,500	\$60,000	\$43,436				
25	\$95,200	\$72,500	\$65,421	\$50,689				
50	\$102,504	\$78,000	\$68,333	\$59,000	\$120,000			
75	\$110,000	\$90,000	\$72,750	\$67,425				
90	\$114,400	\$97,221	\$84,999	\$67,425				

## 2017 CRA Taulbee Survey (continued)

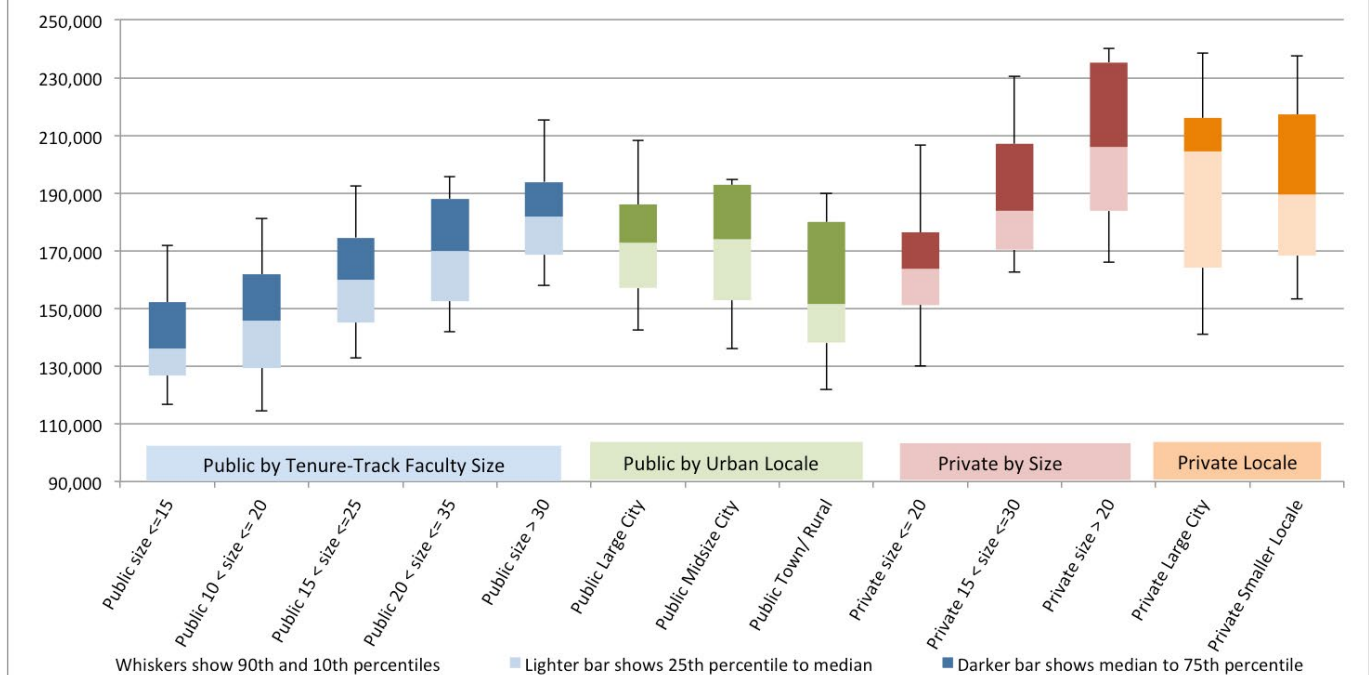
one year to the next, since a promotion causes an individual faculty member to move from one rank to another. Thus, a department with a small number of faculty members in a particular rank can have its average salary in that rank change appreciably (in either direction) by a single promotion to or from that rank. Departures via resignation or retirement also impact these figures, particularly in the non-tenure-track categories. Because of the small number of Canadian, CE, and I departments reporting, the values in those columns are considerably more volatile; this is evident in several of the entries in Table S21.

For new Ph.D.s in tenure-track positions at U.S. CS, CE, and I school departments (Table S20) the median of the averages was \$102,504, an increase of 2.5 percent vs. last year. There were not enough new tenure-track faculty salaries from Canadian institutions last year to report any salary distribution data, so year-to-year comparisons cannot be made.

**Table S21. Change in Salary Median for Departments that Reported in Both 2016 and 2017**

	U.S. CS	U.S. CE	U.S. I	Canadian
Departments	133	8	13	8
Full Profs	1.3%	5.5%	2.6%	-1.8%
Assoc. Profs.	3.5%	1.8%	4.3%	1.5%
Asst. Profs.	1.5%	-2.5%	2.5%	5.4%
Non-ten-track teaching faculty	2.8%	-4.3%	4.5%	
Research faculty	2.4%		0.2%	
Post doctorates	3.9%	0.5%	-3.2%	1.7%

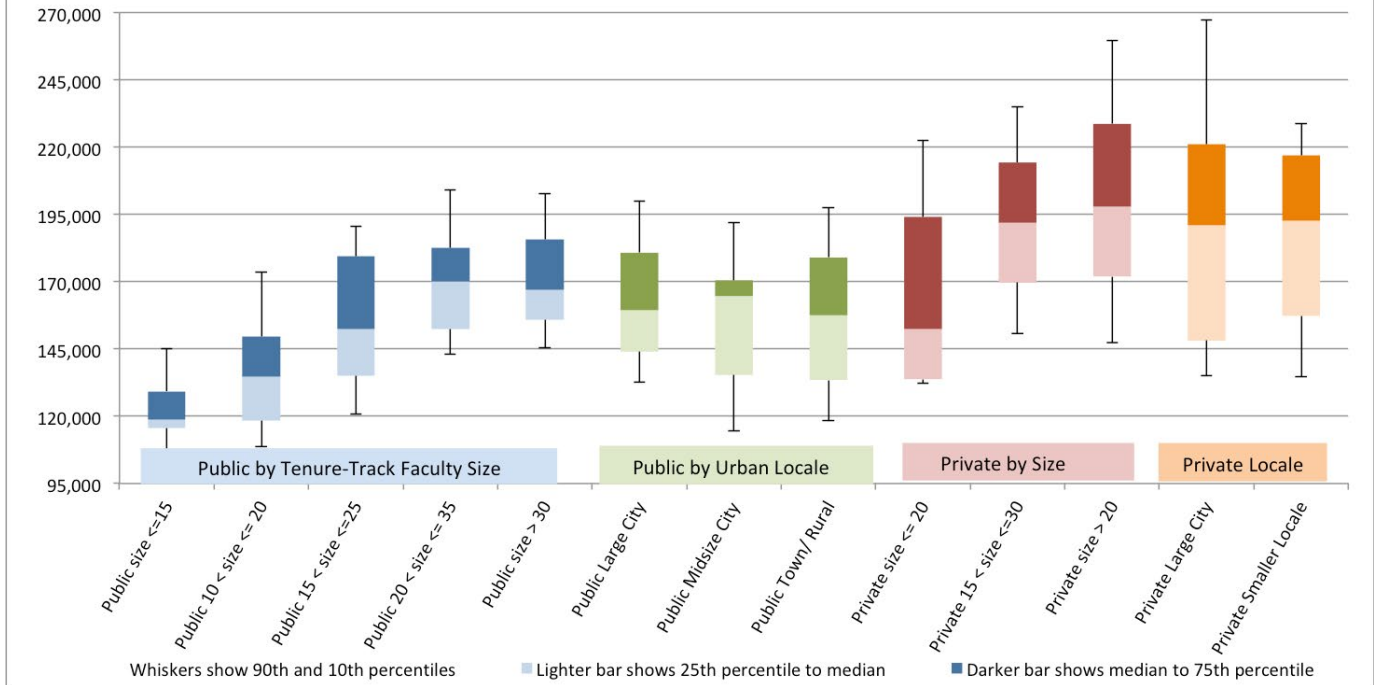
**Figure S1. US CS Department Average Salary, Full Professor in Rank 16+ Years**  
CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)

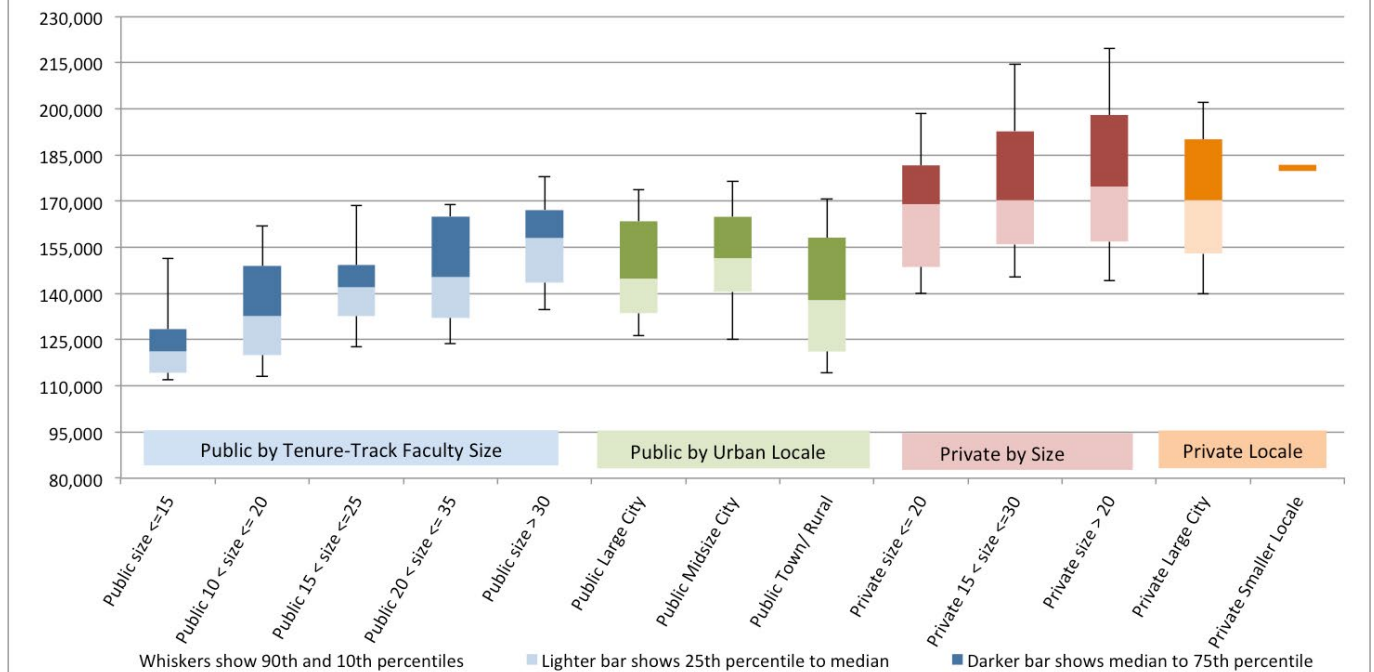
**Figure S2. US CS Department Average Salary, Full Professor in Rank 8-15 Years**

CRA Taulbee Survey 2017



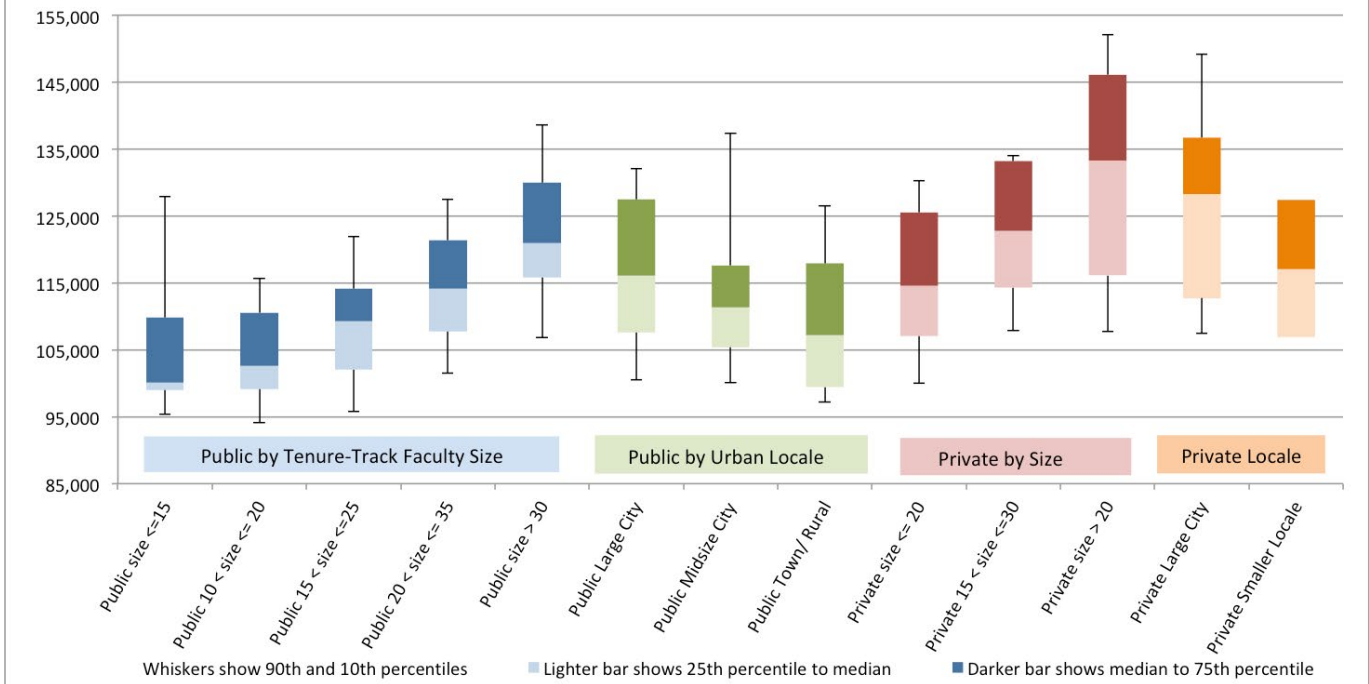
**Figure S3. US CS Department Average Salary, Full Professor in Rank 0-7 Years**

CRA Taulbee Survey 2017

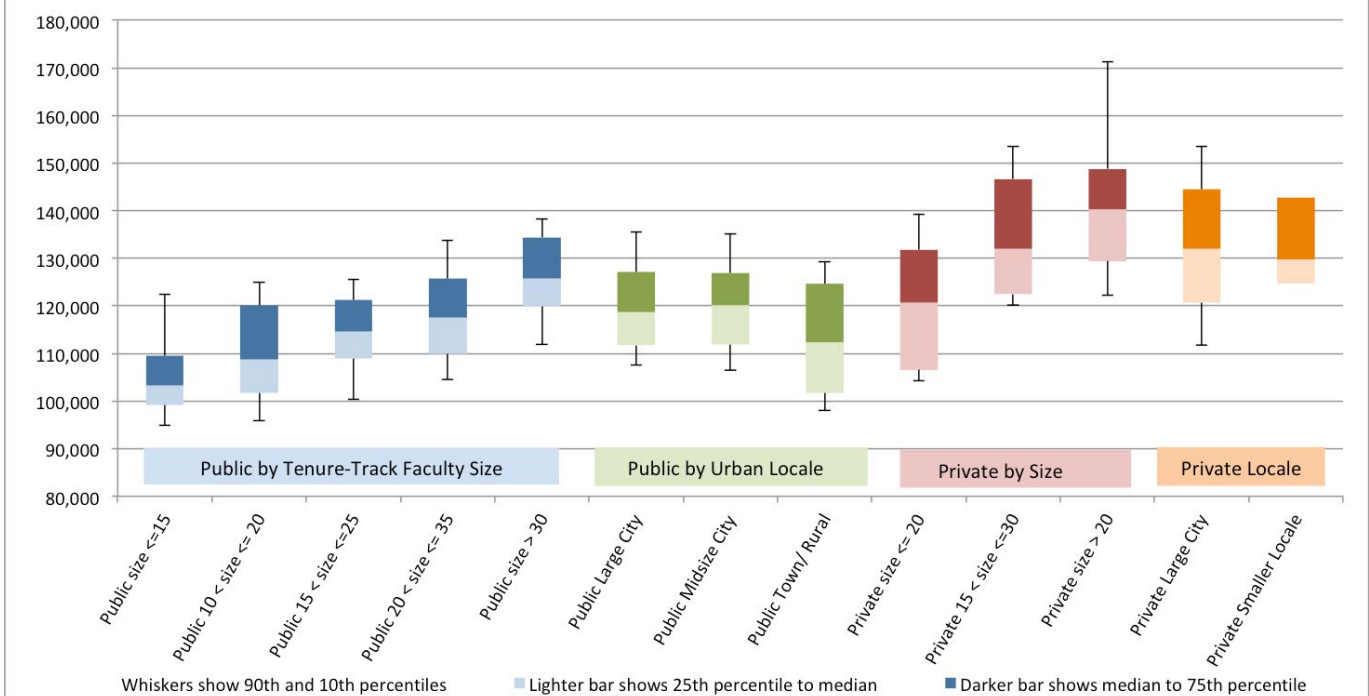


## 2017 CRA Taulbee Survey (continued)

**Figure S4. US CS Department Average Salary, Associate Professor in Rank 8+ Years**  
CRA Taulbee Survey 2017

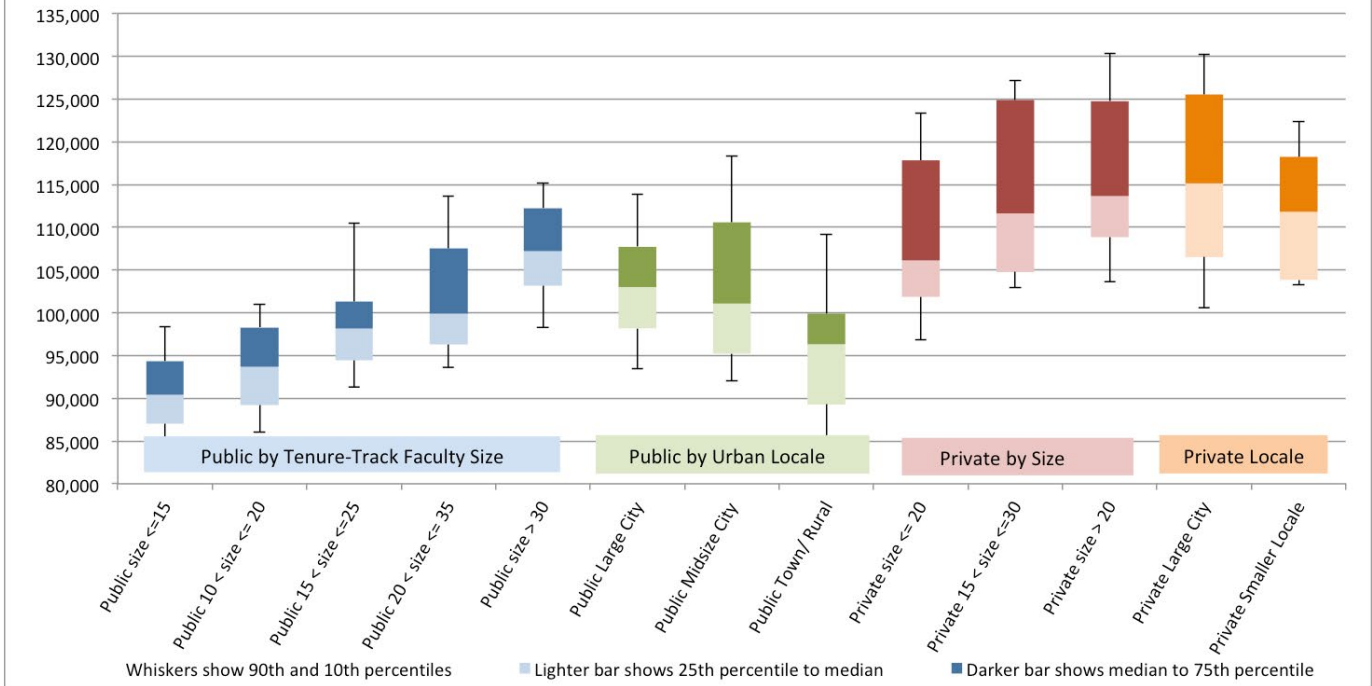


**Figure S5. US CS Department Average Salary, Associate Professor in Rank 0-7 Years**  
CRA Taulbee Survey 2017

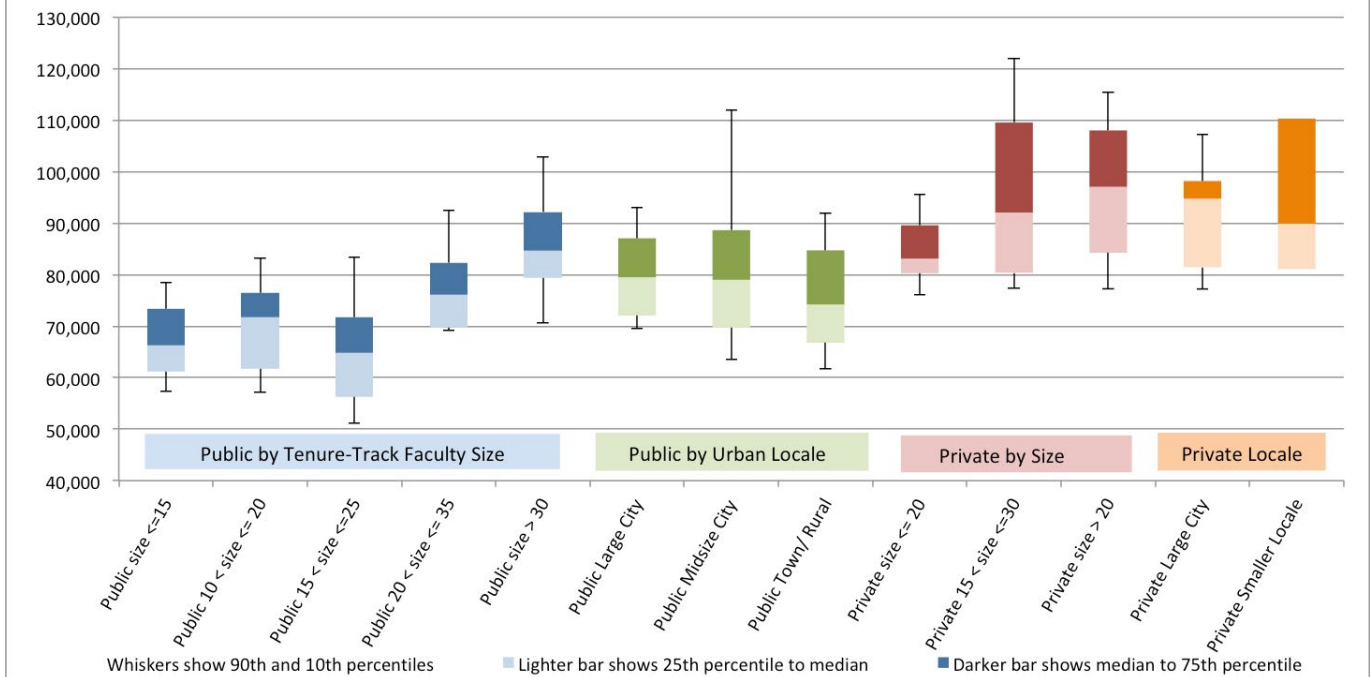


## 2017 CRA Taulbee Survey (continued)

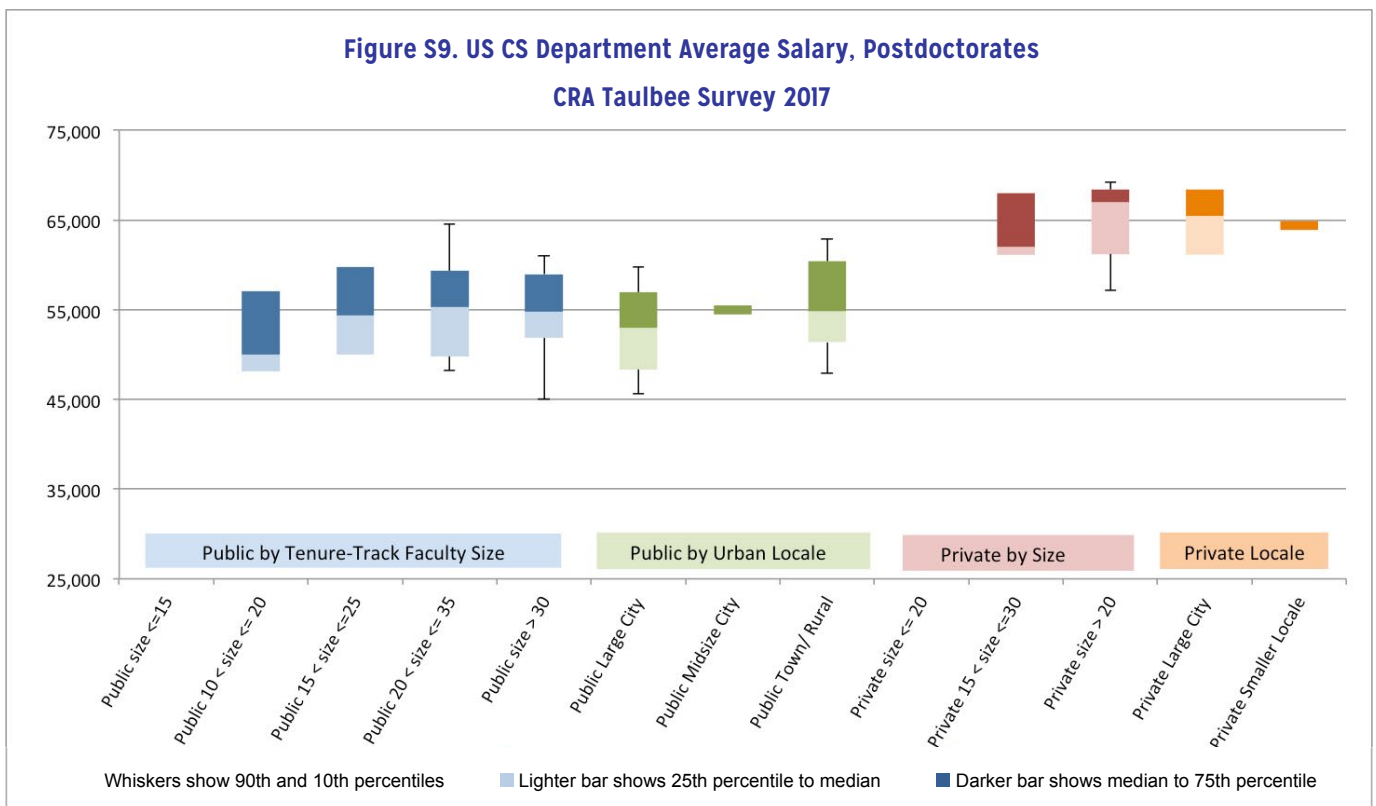
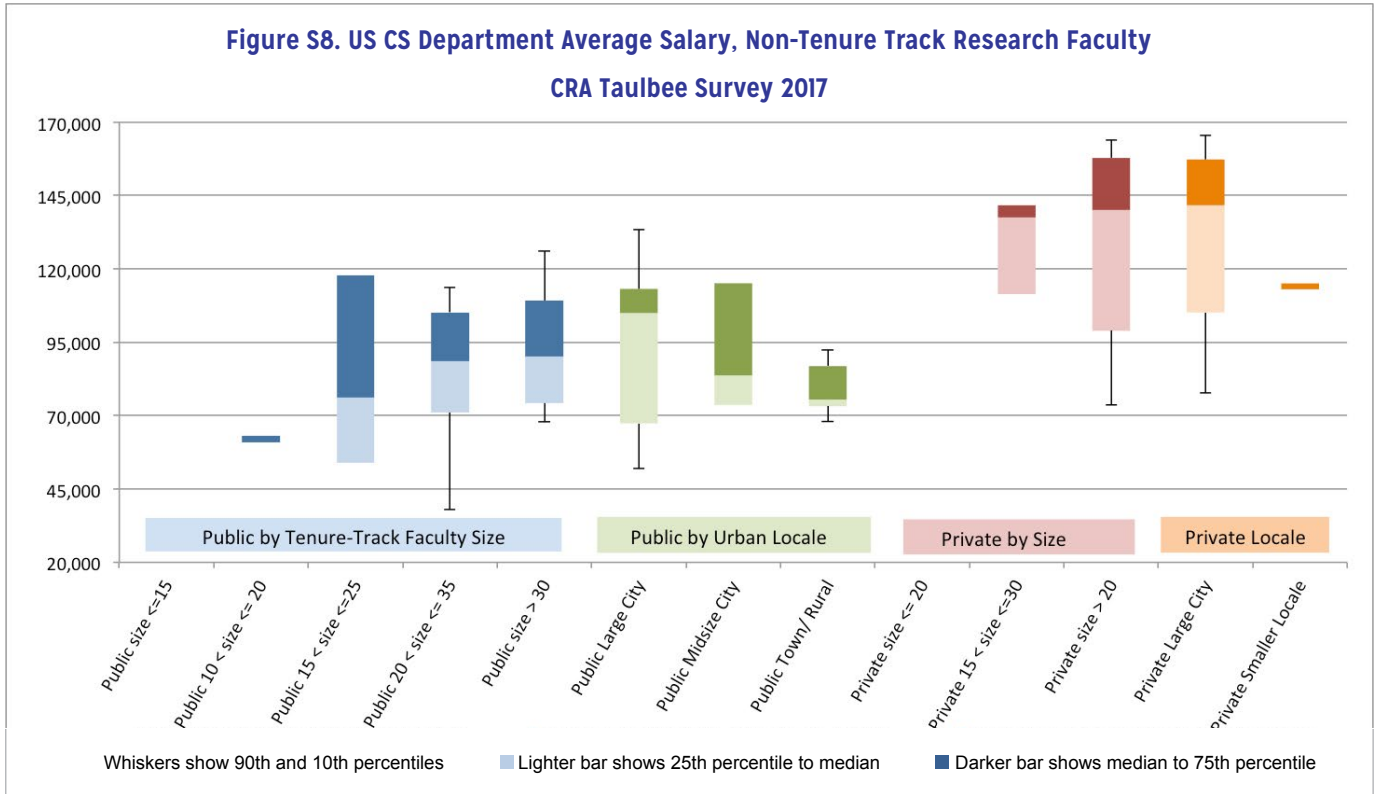
**Figure S6. US CS Department Average Salary, Assistant Professor**  
CRA Taulbee Survey 2017



**Figure S7. US CS Department Average Salary, Non-Tenure Track Teaching Faculty**  
CRA Taulbee Survey 2017



## 2017 CRA Taulbee Survey (continued)



## 2017 CRA Taulbee Survey (continued)

### Concluding Observations

Once again, undergraduate enrollments in U.S. doctoral-granting computer science programs increased, as did the number of new students in the departments' graduate programs at both the master's and doctoral levels. While there also were increases in the number of tenure-track and teaching faculty, these increases continue to not keep pace with the increases in students. Next year, as part of the Department Profiles section of the Taulbee Survey that runs every three years, we intend to gather updated information about how departments are coping with this situation.

### Participating CS, CE, I and Canadian Departments

*(Departments marked with \* have participated in all 5 of the most recent Taulbee surveys)*

**U.S. CS Public (109):** Arizona State\*, Auburn\*, Binghamton, Clemson\*, College of William & Mary\*, Colorado School of Mines\*, Colorado State\*, Florida International\*, George Mason\*, Georgia Tech\*, Georgia State, Indiana\*, Iowa State\*, Kansas State\*, Kent State\*, Michigan State\*, Michigan Technological University, Mississippi State\*, Missouri University of Science and Technology, Montana State\*, Naval Postgraduate School\*, New Jersey Institute of Technology, New Mexico State, North Carolina State\*, North Dakota State\*, Ohio State\*, Ohio\*, Oklahoma State\*, Old Dominion, Oregon State, Pennsylvania State\*, Portland State\*, Purdue\*, Rutgers, Southern Illinois (Carbondale), Stony Brook (SUNY)\*, Texas A&M\*, Texas Tech, University at Buffalo, Universities of: Alabama (Birmingham\* and Tuscaloosa\*), Arizona, Arkansas\*, Arkansas at Little Rock\*, California (Berkeley\*, Davis\*, Irvine\*, Los Angeles, Riverside\*, San Diego, Santa Barbara\*, and Santa Cruz\*), Central Florida\*, Colorado (Boulder)\*, Connecticut, Delaware\*, Florida\*, Georgia\*, Houston\*, Idaho, Illinois (Chicago\* and Urbana-Champaign\*), Iowa\*, Kansas\*, Kentucky, Louisiana at Lafayette\*, Maryland (College Park\* and Baltimore County\*), Massachusetts (Amherst\*, Boston\*,

and Lowell), Memphis, Michigan\*, Minnesota\*, Nebraska (Omaha and Lincoln\*), Nevada (Las Vegas and Reno\*), New Hampshire\*, New Mexico, North Carolina (Chapel Hill\* and Charlotte\*), North Dakota, North Texas\*, Oklahoma\*, Oregon\*, Pittsburgh, Rhode Island\*, South Carolina\*, South Florida\*, Southern Mississippi, Tennessee (Knoxville)\*, Texas (Arlington, Austin\*, Dallas\*, and El Paso\*), Utah\*, Vermont, Virginia\*, Washington\*, Wisconsin (Madison\* and Milwaukee), Wyoming, Virginia Commonwealth, Virginia Tech\*, Washington State\*, Wayne State, Western Michigan, and Wright State.

**U.S. CS Private (40):** Boston University\*, Brandeis, Brown, Carnegie Mellon\*, Case Western Reserve\*, Clarkson, Columbia, Cornell\*, DePaul\*, Drexel\*, Duke\*, Emory, George Washington, Georgetown, Harvard, Illinois Institute of Technology, Johns Hopkins\*, Lehigh\*, MIT\*, New York University\*, Northeastern\*, Northwestern, Polytechnic\*, Princeton\*, Rensselaer\*, Rice, Rochester Institute of Technology\*, Stanford\*, Stevens Institute of Technology, Toyota Technological Institute at Chicago\*, Tufts\*, Universities of: Chicago\*, Notre Dame, Pennsylvania\*, Rochester\*, Southern California\*, and Tulsa\*, Washington in St. Louis\*, Worcester Polytechnic Institute\*, and Yale.

**U.S. CE (8):** Iowa State, North Carolina State\*, Northeastern, Universities of: California (Santa Cruz), Central Florida\*, Illinois (Urbana-Champaign), New Mexico\*, and Southern California.

**U.S. Information (15):** Cornell\*, Drexel\*, Florida State, Indiana\*, Penn State\*, Syracuse, Universities of: California (Berkeley)\*, Colorado (Boulder), Illinois (Urbana-Champaign), Maryland (College Park ISchool and Baltimore County\*), Michigan\*, North Carolina (Chapel Hill)\*, Pittsburgh\*, and Washington\*.

**Canadian (11):** Concordia\*, McGill, Simon Fraser\*, Universities of: British Columbia\*, Calgary\*, Manitoba\*, Toronto\*, Victoria\*, Waterloo, Western Ontario, and York\*.

<sup>1</sup>The title of the survey honors 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.

<sup>2</sup>Information (I) programs included here are Information Science, Information Systems, Information Technology, Informatics, and related disciplines with a strong computing component. Surveys were sent to CRA members, the CRA Deans group members, and participants in the iSchools Caucus ([www.ischools.org](http://www.ischools.org)) who met the criteria of granting Ph.D.s and being located in North America. Other I programs who meet these criteria and would like to participate in the survey in future years are invited to contact [survey@cra.org](mailto:survey@cra.org) for inclusion.

<sup>3</sup>Classification of the population of an institution's locale is in accordance with the Carnegie Classification database. Large cities are those with population  $\geq$  250,000. Mid-size cities have population between 100,000 and 250,000. Town/rural populations are less than 100,000.

<sup>4</sup>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.