

ACM-NDC Study 2017–2018:

Sixth Annual Study of Non-Doctoral-Granting Departments in Computing

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In fall 2017 and winter 2018, ACM conducted its sixth annual survey of non-doctoral granting departments in computing (NDC). The survey comprises recent degrees, enrollments, faculty demographics, and faculty salaries, and includes gender and ethnic characteristics of the faculty and of the students in the computing programs. It is designed to complement the Taulbee Survey of doctoral-granting departments in computing conducted by the Computing Research Association (CRA). This article reports the results of the 2017-2018 NDC survey, with comparisons and contrasts to data reported in the Taulbee Survey and, as appropriate, last year's NDC survey results. Additionally, this year our report looks at trends from the past six years of NDC data.

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INTRODUCTION

In fall 2017 and winter 2018, ACM conducted the sixth annual ACM-NDC Study (a survey of “Non-Doctoral-Granting Departments in Computing”), intended to be an annual complement to the Computing Research Association (CRA) Taulbee Survey of Ph.D.-granting departments in computing [8]. ACM-NDC is funded by ACM and continues to be conducted with support from the CRA. The authors comprised the NDC Steering Committee. As an annual study, NDC helps fill in gaps in data on non-Taulbee programs to present a more complete view of the academic landscape in computing and to expand pipeline information on programs that produce candidates for Ph.D. programs as well as the private and public labor markets. The timely reporting of the survey's results provides the community with an early look at workforce-related facts and trends of importance to academic programs and those who rely on them.

The goal of ACM-NDC is to document trends in student enrollment, degree production, faculty demographics and salaries at not-for-profit U.S. academic institutions that grant bachelor's and/or master's degrees (but not doctorate degrees) in the five major computing disciplines in which curricular guidelines and accreditation criteria exist [1,3]: computer science (CS), computer engineering (CE), information systems (IS), information technology (IT), and software engineering (SE). Diversity statistics and trends with respect to students and faculty are important features of this documentation.

The survey was distributed in September 2017 to qualifying programs identified using data in the Integrated Post-secondary Education Data System (IPEDS) [5]. This data is collected annually by the National Center for Education Statistics (NCES) from all U.S. institutions that participate in the federal financial aid programs [6]. This year the survey was distributed to 1098 academic units (departments, schools, or institutions) identified via IPEDS as offering at least one program in computing. In some cases, a single institution received multiple surveys if pro-

grams are housed in different schools or departments. In total, 191 units participated in the survey (compared to 211 last year), supplying either complete or partial information, with 167 units completing the survey in full. Of these, 149 supplied bachelor's data (compared to 168 in 2016-2017) and data was reported for 304 total programs (244 bachelor's and 60 master's), compared to 312 last year. We found that 161 academic units provided data on faculty (152 in 2016-2017) and 135 provided faculty salary information (130 in 2016-2017).

There was a slight dip in overall units and program represented this year, a decrease in units reporting bachelor's data, and a small uptick in the number of units providing master's and faculty data, including salary information. There was a 9.5% decrease in overall units participating, a 2.6% decrease in the total number of programs participating, and an 11.3% decrease in the number of bachelor's programs. In the faculty section, there was a 5.9% increase in the number of units responding, and a 3.8% increase in units supplying faculty salary information. The 2017-2018 NDC cycle marked the earliest release ever of the survey, in September 2017. This was a deliberate decision by the NDC Com-

mittee to allow our respondents more time. Given the slight decrease in overall units participating compared to the 2016-2017 cycle, when the survey was distributed in November, it is unclear whether earlier distribution is conducive to producing higher participation.

Six years into NDC, despite greater overall awareness of the survey, many of the academic units at the generally smaller schools targeted by NDC continue to face challenges in gathering and submitting data. Some of these challenges have been known to us (such as shortage of resources at smaller departments, time required to conduct data gathering, department reorganization, and data privacy concerns). Each year, we have addressed some of these challenges, with improvements to data validation and user interface, an increase in historical reference data, and some reduction in the overall length of the survey. Some NDC participants are able to provide only partial data due to burdens of data-gathering, and we have adapted our platform to capture partial data whenever possible. With response sizes in the 10% to 16.4% range from 2012-2013 to 2017-2018, it is probable that a significant proportion of the overall NDC community may not participate in the survey regardless of the enhancements we continue to make. The NDC Committee will continue to consider how greater engagement can be achieved, and how NDC can provide greater value to the community.

The following presents key findings from this year's study. As in past iterations of this report, where possible we will make comparisons with Taulbee data, and with data from last year's NDC Study [7]. With six years of data in hand, this is the first

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year our report looks at longitudinal trends beginning with the beginning of the survey. However, as in past years, small response sizes in some parts of the survey make it difficult to draw hard conclusions from the data provided. In reading this report, one should consider the following points:

- In this report, we will use the term “academic unit” (or “unit”) to refer to the administrative division responsible for one or more qualifying programs. We will use the term “program” to refer to a course of study leading to a degree in one of the computing disciplines—computer science (CS), computer engineering (CE), information systems (IS), information technology (IT), or software engineering (SE). In the context of this report, “all disciplines” refers to these five computing disciplines.
- A given academic unit may offer multiple programs.
- Degree production (master’s and bachelor’s) refer to the previous academic year (2016-2017)
- Data for current faculty as well as new students in all categories refer to the academic year (2017-2018) in which the survey was given.

BACHELOR'S DEGREE PRODUCTION AND ENROLLMENTS

In comparison to the 2016-2017 survey, the percentage of institutions responding to the bachelor’s portion declined (13.6% vs. 15.3%). The proportion of public institutions among the respondents was slightly lower (38.9% vs. 39.9%) while the rise in the percentage of master’s granting institutions was more pronounced (28.2% vs. 23.2%). The distribution of the responding programs across disciplines (Table B2) shows lower percentages of computer science (66.0% vs. 67.7%), information technology (9.4% vs. 10.0%), and computer engineering (3.3% vs. 3.8%) programs and higher percentages of

TABLE B1. SUMMARY OF INSTITUTIONS RESPONDING TO BACHELOR'S SECTION OF SURVEY

	Number of Programs	% of Total Responses
Yes	149	13.6%
No	949	86.4%
Total Surveys	1,098	
Public	58	38.9%
Private	91	61.1%
Total Yes	149	
Master's	42	28.2%
Non-Master's	107	71.8%
Total Yes	149	

information systems (14.8% vs. 13.1%) and software engineering (6.6% vs. 5.4%) programs.

Computer engineering programs reported the highest percentage of ABET accredited programs (87.5%); however, this percentage was lower than reported last year (100%). Declines in the percentage of ABET accredited programs are also evident in information systems (8.3% vs. 11.8%) and information technology (4.3% vs. 15.4%). CS reports a higher percentage of accredited programs than last year (27.3% vs. 23.3%) as does SE (37.5% vs. 35.7%). Over all disciplines, ABET accredited programs occur more frequently at public institutions than private (37.1% vs. 17.0%) and at master’s granting institutions than non-master’s granting (43.9% vs. 15.4%).

Actual degree production in 2016-2017 and anticipated change in degree production for 2017-2018, broken down by institution type, are depicted in Table B3A for all survey respondents that provided projected degree data. Over all institution types, the 124 units reporting a total of 146 CS programs project an increase in degree production of 9.5%. A somewhat lower increase of 8.5% is projected by the 141 units having 218 programs over all disciplines. Differences in the degree of increase are evident for CS when considering institution type, with private institutions reporting higher anticipated increases than public (17.9% vs. 3.7%) and non-master’s granting institutions projecting larger increases than master’s granting (11.6% vs. 7.5%). Over all disciplines, the differences in projected increases are less pronounced for public vs. private institutions (8.0% vs. 9.6%), while master’s granting institutions project a larger increase than do non-master’s granting (10.1% vs. 7.2%). Projected increases in degree production in CS are lower than last year for both NDC (9.5% vs. 16.0%) and Taulbee institutions (12.6% vs. 14.7%). Projected increases in degree production over all disciplines is also lower this year compared to last year at NDC institutions (8.5% vs. 16.0%) while Taulbee reports a higher percentage this year over last (9.6% vs. 8.5%).

Units that provide actual degree production data in consecutive years enable valid reporting of actual growth in degree production. Table B3B shows double digit increases in the percentage change of actual degree production for the 95 units that reported on 159 programs over all disciplines and for the 85 units that reported on 104 CS-only programs, irrespective of institution type. The one-year increase in actual degree production for CS-only programs over all institution

TABLE B2. SUMMARY OF PROGRAM OFFERINGS

	Overall				Public			Private			Master's			Non-Master's		
	Number of Units	Number of Programs	% of Total	% ABET	Number of Programs	% of Total	% ABET	Number of Programs	% of Total	% ABET	Number of Programs	% of Total	% ABET	Number of Programs	% of Total	% ABET
CS	138	161	66.0%	27.3%	64	66.0%	48.4%	97	66.0%	13.4%	45	54.9%	60.0%	116	71.6%	14.7%
CE	8	8	3.3%	87.5%	2	2.1%	100.0%	6	4.1%	83.3%	4	4.9%	100.0%	4	2.5%	75.0%
IS	35	36	14.8%	8.3%	13	13.4%	7.7%	23	15.6%	8.7%	16	19.5%	18.8%	20	12.3%	0.0%
IT	20	23	9.4%	4.3%	12	12.4%	0.0%	11	7.5%	9.1%	12	14.6%	8.3%	11	6.8%	0.0%
SE	15	16	6.6%	37.5%	6	6.2%	33.3%	10	6.8%	40.0%	5	6.1%	20.0%	11	6.8%	45.5%
Totals	156	244	100.0%	25.0%	97	100.0%	37.1%	147	100.0%	17.0%	82	100.0%	43.9%	162	100.0%	15.4%

TABLE B3A. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY PROGRAM TYPE

	All Respondents													
	CS Only							All Disciplines						
	Number of Units	Number of Programs	2016-2017 actual	2016-2017 actual per Unit	2017-2018 projected	2017-2018 projected per Unit	% change in average per Unit	Number of Units	Number of Programs	2016-2017 actual	2016-2017 actual per Unit	2017-2018 projected	2017-2018 projected per Unit	% change in average per Unit
Public	50	56	1,890	37.8	1,962	39.2	3.7%	56	82	2,508	44.8	2,713	48.4	8.0%
Private	74	90	1,365	18.4	1,606	21.7	17.9%	85	136	2,125	25	2,326	27.4	9.6%
Master's	31	38	1,574	50.8	1,693	54.6	7.5%	39	71	2,361	60.5	2,597	66.6	10.1%
Non-Master's	93	108	1,681	18.1	1,875	20.2	11.6%	102	147	2,272	22.3	2,442	23.9	7.2%
NDC Overall	124	146	3,255	26.3	3,568	28.8	9.5%	141	218	4,633	32.9	5,039	35.7	8.5%
Taulbee (US CS Depts)	"131 (119*)"	NA	19,907	152	20,364	171	12.6%	"131 (119**)"						

*Note: Taulbee CS data excludes departments from Canadian institutions and had fewer departments report projected degree production than actual

**Note: Taulbee only produces averages per department

***Note: Taulbee data excludes departments from Canadian institutions and includes CS, CI and I programs

TABLE B3B. DEGREE PRODUCTION CHANGE BY INSTITUTION TYPE - UNITS RESPONDING BOTH YEARS

	All Respondents													
	CS Only							All Disciplines						
	Number of Units	Number of Programs	2015-2016 actual	2015-2016 Avg per Unit	2016-2017 actual	2016-2017 Avg per Unit	% change in average per Unit	Number of Units	Number of Programs	2015-2016 actual	2015-2016 Avg per Unit	2016-2017 actual	2016-2017 Avg per Unit	% change in average per Unit
Public	32	36	927	29	1,166	36.4	25.5%	35	54	1,261	36	1,632	46.6	29.4%
Private	53	68	917	17.3	1,051	19.8	14.5%	60	105	1,364	22.7	1,519	25.3	11.5%
Master's	22	28	811	36.9	1,046	47.5	28.7%	26	54	1,194	45.9	1,544	59.4	29.4%
Non-Master's	63	76	1,033	16.4	1,171	18.6	13.4%	69	105	1,431	20.7	1,607	23.3	12.6%
NDC Overall	85	104	1,844	21.7	2,217	26.1	20.3%	95	159	2,625	27.6	3,151	33.2	20.3%
Taulbee (US CS Depts)	NA	NA		NA				123	NA	19,980	162.4	23,577	191.7	18.0%

TABLE B4. DEGREE PRODUCTION AND ANTICIPATED CHANGE BY DISCIPLINE

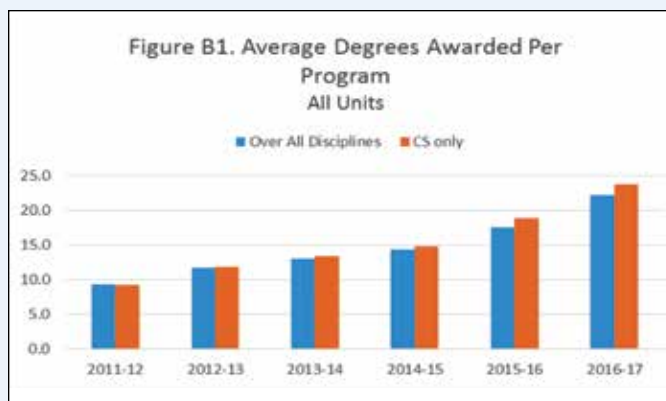
	All Respondents						
	Number of Units	Number of Programs	2016-2017 actual	2016-2017 actual per Program	2017-2018 projected	2017-2018 projected per Program	% Change
NDC Overall	141	218	4,633	32.9	5,039	35.7	8.5%
CS	124	146	3,255	26.3	3,568	28.8	9.5%
CE	6	6	229	38.2	288	48	25.7%
IS	29	30	522	18	466	16.1	-10.6%
IT	18	20	436	24.2	473	26.3	8.7%
SE	15	16	191	12.7	244	16.3	28.3%

	Units Responding Both Years									
	Number of Units	Number of Programs	2015-2016 actual	2015-2016 actual per Program	2016-2017 actual	2016-2017 actual per Program	% change	2017-2018 projected	2017-2018 projected per Program	% projected change
NDC Overall	95	159	2,625	16.5	3,151	19.8	20.0%	3,554	22.4	12.8%
CS	85	104	1,844	17.7	2,217	21.3	20.2%	2,483	23.9	12.0%
CE	5	5	54	10.8	69	13.8	27.8%	104	20.8	50.7%
IS	23	24	317	13.2	372	15.5	17.4%	386	16.1	3.8%
IT	12	13	274	21.1	312	24	13.9%	344	26.5	10.3%
SE	12	13	136	10.5	181	13.9	33.1%	237	18.2	30.9%

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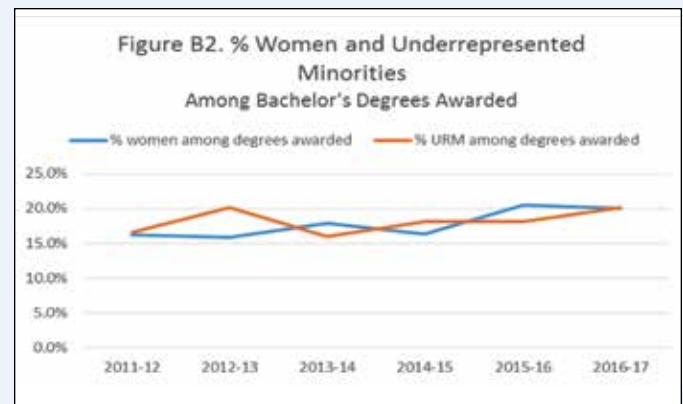
types was higher than that reported last year (20.3% vs. 19.0%). When considering specific institution types, however, some differences are evident. The percentage increases were higher this year than last at public (25.5% vs. 25.2%), private (14.5% vs. 12.9%), and master's granting (28.7% vs. 20.3%) institutions, while the percentage increase was lower at non-master's granting (13.4% vs. 18.2%). Over all disciplines, the one-year percent increase in actual degree production rose from 14.7% reported last year to 20.3% over all institution types, a much larger increase than seen at Taulbee institutions (18.0% vs. 16.7%). Compared with last year's report, larger increases were evident at public (29.4% vs. 21.7%), private (11.5% vs. 6.5%) and master's granting (29.4% vs. 14.9%) institutions, while non-master's granting institution reported a lower percentage increase (12.6% vs. 14.6%).

Table B4A depicts degree production and anticipated change broken down by discipline for the 141 units that provided projected degree data. Increases in degree production are anticipated overall and within each discipline except information systems, but for all disciplines except computer engineering the anticipated increase is lower than reported for 2016-2017. Overall degree production is anticipated to be 8.5% compared to 16.0% reported last year. Among those disciplines reporting lower expected changes, IT saw the largest anticipated difference (8.7% vs. 29.3%), followed by IS (-10.6% vs. 1.4%), CS (9.5% vs. 16.0%) and SE (28.3% vs. 34.3%). The anticipated increase in degree production for CE is 25.7% compared to 10.3% reported last year. For those units that provided actual degree data over two consecutive years as well as projected degree data for 2017-2018, both 2016-2017 actual change in degree production and 2017-2018 projected degree production are reported in table B4B. Actual degree production between 2015-2016 and 2016-2017 increased for NDC overall (20.0%) and for each individual discipline. When compared to the one-year change between 2014-2015 and 2015-2016, the largest productivity change occurred in SE (33.1% vs. -52.9%), followed by IS (39.9% vs. -17.5%), CE (27.8% vs. -1.5%), IT (13.9% vs. 6.2%) and CS (20.2% vs. 19.7%). Degree production is anticipated to continue to show increases in 2017-2018 overall (12.8%). The 20.0% overall productivity change reported this year exceeds the overall 9.5% change reported last year.



Total Bachelor's degree production for all programs that reported their 2016-2017 degrees, as well as a breakdown by gender, discipline, and institution type, is shown in Table B5. Table B6 breaks down this degree data by ethnicity. This year's 228 responding programs reported 5,045 total degrees over all disciplines, for an average of 22.1 per program. In CS, there were 3,583 total degrees among 151 programs, for an average of 23.7 per program. Across the six year history of the NDC Study, the trend in average number of degrees awarded per program for both CS and all disciplines combined is demonstrated in Figure B1.

The percentage of bachelor's degrees earned by women at NDC schools in the five NDC computing disciplines was 20.0%, which is slightly lower than reported last year (20.5%), but higher than reported by Taulbee institutions this year (19.2%). Information systems reports the highest percentage of female degree recipients (27.7%) and software engineering the lowest (13.2%). In CS, 19.0% of degrees overall were awarded to females compared to 22.1% last year. Private institutions awarded more CS degrees to women than public institutions (28.5% vs. 13.0%) and non-master's granting institutions awarded more than master's granting (25.0% vs. 13.5%), a trend that has been consistent in the history of NDC. Figure B2 illustrates the six-year history of gender data reported by NDC.



As seen in table B6, NDC institutions continue to report higher percentages of degree production than do Taulbee institutions for Black/African-American (7.6% vs. 3.7%) and White (61.4% vs. 48.1%) students and lower percentages for Asian (11.0% vs. 24.3%), two or more races (2.6% vs. 3.1%), and non-resident (7.5% vs. 12.0%) students. The combined percentage of under-represented minority students (Hispanic, American Indian/Alaskan, Native Hawaiian/Pacific Islander, Black/African American, and two or more races) at NDC institutions is 20.1%, higher than reported last year (18.1%) and higher than reported at Taulbee schools (15.6%). Figure B2 also includes the history of ethnicity data reported by NDC over six years.

The mean enrollment of majors per academic unit (Table B7) increased by 17.0% between 2016-2017 and 2017-2018 among all NDC respondents this year. Last year's respondents reported only a 4.8% overall increase. All institution types reported more favorable one-year enrollment changes than was the case in last year's report, with private (17.3% vs. 6.4%) and master's granting (12.8% vs. 0.0%) seeing the largest jump. As was the case last

TABLE B5. BACHELOR'S DEGREES AWARDED BY GENDER, DISCIPLINE, AND INSTITUTION TYPE

	Male		Female		Total Known Gender	Gender Unknown	Grand Total	Number of Units	Number of Programs
CS Overall	2,822	81.0%	662	19.0%	3,484	99	3,583	128	151
CS Public	1,857	87.0%	277	13.0%	2,134	66	2,200	53	59
CS Private	965	71.5%	385	28.5%	1,350	33	1,383	75	92
CS Master's	1,574	86.5%	245	13.5%	1,819	65	1,884	34	41
CS Non-Master's	1,248	75.0%	417	25.0%	1,665	34	1,699	94	110
CE Overall	209	79.2%	55	20.8%	264	20	284	8	8
CE Public	76	87.4%	11	12.6%	87	0	87	2	2
CE Private	133	75.1%	44	24.9%	177	20	197	6	6
CE Master's	201	78.8%	54	21.2%	255	0	255	4	4
CE Non-Master's	8	88.9%	1	11.1%	9	20	29	4	4
IS Overall	375	72.3%	144	27.7%	519	3	522	31	32
IS Public	242	75.9%	77	24.1%	319	3	322	11	11
IS Private	133	66.5%	67	33.5%	200	0	200	20	21
IS Master's	199	77.4%	58	22.6%	257	3	260	14	15
IS Non-Master's	176	67.2%	86	32.8%	262	0	262	17	17
IT Overall	364	79.8%	92	20.2%	456	9	465	19	21
IT Public	171	81.4%	39	18.6%	210	0	210	9	10
IT Private	193	78.5%	53	21.5%	246	9	255	10	11
IT Master's	208	79.1%	55	20.9%	263	2	265	9	10
IT Non-Master's	156	80.8%	37	19.2%	193	7	200	10	11
SE Overall	118	86.8%	18	13.2%	136	55	191	15	16
SE Public	69	89.6%	8	10.4%	77	6	83	6	6
SE Private	49	83.1%	10	16.9%	59	49	108	9	10
SE Master's	47	83.9%	9	16.1%	56	6	62	5	5
SE Non-Master's	71	88.8%	9	11.3%	80	49	129	10	11
NDC Overall	3,888	80.0%	971	20.0%	4,859	186	5,045	145	228
"Taulbee Overall"	22,962	80.80%	5,459	19.20%	28,421	1,166	29,587	157	NA
NDC Overall	3,399	79.5%	875	20.5%	4,274	113	4,387	160	250
Taulbee Overall	19,192	81.9%	4,251	18.1%	23,443	2,065	25,508	156	NA

TABLE B6. BACHELOR'S DEGREES AWARDED BY ETHNICITY (145 units)

	US Residents							Others				Total
	Hispanic/Latino	American Indian/Alaska Native	Asian	Native Hawaiian/Pacific Islander	Black/African-American	White	2 or more races, non-Hispanic	Non-Resident	Total Ethnicity, Residency Known	U.S. Residency Race Unknown	Residency Unknown	
NDC Overall	359	15	433	17	301	2,424	102	296	3,947	380	718	5,045
	9.1%	0.4%	11.0%	0.4%	7.6%	61.4%	2.6%	7.5%	100.0%			
CS	243	10	306	14	163	1,713	71	196	2,716	289	578	3,583
	8.9%	0.4%	11.3%	0.5%	6.0%	63.1%	2.6%	7.2%	100.0%			
CE	25	1	53	0	7	68	10	34	198	11	75	284
	12.6%	0.5%	26.8%	0.0%	3.5%	34.3%	5.1%	17.2%	100.0%			
IS	49	0	56	2	66	298	8	15	494	22	6	522
	9.9%	0.0%	11.3%	0.4%	13.4%	60.3%	1.6%	3.0%	100.0%			
IT	37	4	14	1	62	230	10	45	403	58	4	465
	9.2%	1.0%	3.5%	0.2%	15.4%	57.1%	2.5%	11.2%	100.0%			
SE	5	0	4	0	3	115	3	6	136	0	55	191
	3.7%	0.0%	2.9%	0.0%	2.2%	84.6%	2.2%	4.4%	100.0%			
Taulbee Overall	1938	83	5795	98	893	11469	734	2853	23863	1581	4143	29587
	8.1%	0.3%	24.3%	0.4%	3.7%	48.1%	3.1%	12.0%	100.0%			

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year, non-master's granting institutions saw a decline in mean enrollment, but this decline was smaller than that reported last year (-5.8% vs. -11.3%).

Table B7 also shows that enrollment comparisons from year to year for units responding both years are considerably different than for all respondents. Enrollment increases are evident for all institution types; however these one-year increases are lower than reported last year except at master's granting institutions. Aggregated over all institution types, the one-year increase of 8.1% compares with 14.4% reported last year. Master's granting institutions

reported an 11.6% increase this year vs. 10.7% last year. Non-master's granting institutions experienced the largest differential (-14.4%), followed by public (-7.4%) and private (-3.9%) schools.

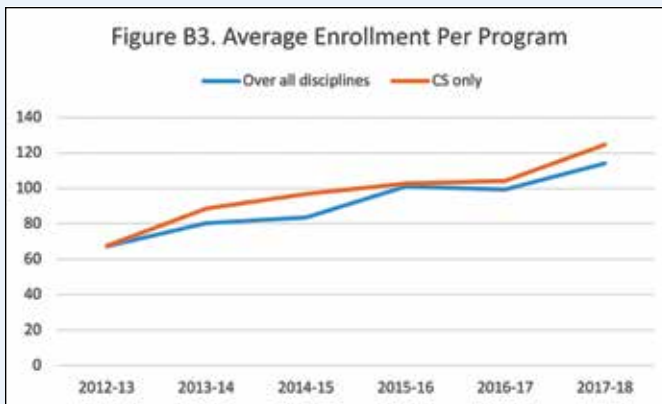
Table B8 shows the one-year changes in enrollment per program, overall and by discipline. Average enrollment per program for 2017-2018 is 114.2 for the 223 responding programs, and average CS enrollment per program is 124.6 for the 148 responding CS programs. The six-year trend in average enrollments per program is shown in Figure B3 for all disciplines combined and for CS-only.

TABLE B7. COMPUTER SCIENCE ENROLLMENT CHANGE BY INSTITUTION TYPE

	All Respondents							Units Responding Both Years						
	2016-2017			2017-2018				Number of Units	2016-2017			2017-2018		
	Number of Units	Headcount	Mean Enroll	Number of Units	Headcount	Mean Enroll	% Increase		Headcount	Mean Enroll	Headcount	Mean Enroll	% Increase	
NDC Overall	134	16,904	126.1	125	18,447	147.6	17.0%	85	11,508	135.4	12,448	146.4	8.1%	
Public	47	10,825	230.3	51	12,379	242.7	5.4%	32	7,265	227	8,000	250	10.1%	
Private	87	6,079	69.9	74	6,068	82	17.3%	53	4,243	80.1	4,448	83.9	4.7%	
Master's	24	7,030	292.9	32	10,575	330.5	12.8%	22	6,603	300.1	7,370	335	11.6%	
Non-Master's	110	9,874	89.8	93	7,872	84.6	-5.8%	63	4,905	77.9	5,078	80.6	3.5%	
Taulbee	141	120,589	855.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

TABLE B8. ACTUAL ENROLLMENT CHANGE FROM PREVIOUS YEAR BY DISCIPLINE

	All Respondents			Units Responding Both Years		
	2016-2017	2017-2018	% Change in Mean per Program	2016-2017	2017-2018	% Change in Mean per Program
All Disciplines						
# Units	152	141	-7.2%	95	95	0.0%
# Programs	242	223	-7.9%	159	159	0.0%
BS enrollment	24,046	25,475	15.0%	16,731	17,866	6.8%
CS						
# Units	134	125	-6.7%	85	85	0.0%
# Programs	162	148	-8.6%	104	104	0.0%
BS enrollment	16,904	18,447	19.5%	11,508	12,448	8.2%
CE						
# Units	8	7	-12.5%	5	5	0.0%
# Programs	9	7	-22.2%	5	5	0.0%
BS enrollment	817	1,218	91.7%	640	645	0.8%
IS						
# Units	31	31	0.0%	23	23	0.0%
# Programs	32	32	0.0%	24	24	0.0%
BS enrollment	2,329	2,153	-7.6%	1,757	1,801	2.5%
IT						
# Units	24	18	-25.0%	12	12	0.0%
# Programs	25	20	-20.0%	13	13	0.0%
BS enrollment	2,968	2,570	8.2%	1,819	1,959	7.7%
SE						
# Units	13	15	15.4%	12	12	0.0%
# Programs	14	16	14.3%	13	13	0.0%
BS enrollment	1,028	1,087	-7.5%	1,007	1,013	0.6%



The remainder of this discussion focuses on units that responded in both years due to the reliability of the information provided. Over all disciplines, the percentage change in mean enrollment was lower than reported last year (6.8% vs. 9.1%). SE reported the largest difference in increase (0.6% vs. 17.7%). Percentages were also lower in CS (8.2% vs. 9.6%), IS (2.5% vs. 8.4%) and IT (7.7% vs. 8.7%) CE was the only discipline with a

positive differential in comparison to last year, reporting a positive change in mean enrollment per program (0.8%) after having reported a negative change last year (-3.5%).

The average majors per program and average new majors per program, broken out by program type and discipline appear in Table B9 for those programs that provided data for both majors and new majors. Average new majors per program increased in CS (35.3 vs. 33.5), CE (54.7 vs. 26.6) and IT (35 vs. 32.3) while decreasing in IS (16.2 vs. 21.2) and SE (21.8 vs. 24.2). For NDC overall, average new majors increased to 32.1 from 30.9. While there is much variation within institution types across disciplines, CE reports increases in average new majors per program for all institution types.

Since this year, in a change from previous reporting of this data, programs were included in Table B9 only if they reported both the number of majors and number of new majors, it is possible to compute the percentage of new majors among the majors from these programs. This statistic is shown in the last column of this table. In previous years, we approximated this statistic by dividing the average new majors per program by the

TABLE B9. 2015-2016 BACHELOR'S ENROLLMENTS BY DISCIPLINE AND PROGRAM TYPE

	Majors	New Majors	# Programs	Avg. Majors per Program	Avg. New Majors per Program	Percentage of New Majors among Majors
CS Overall	16,947	5,086	144	117.7	35.3	30.0%
CS Public	10,964	3,392	54	203	62.8	30.9%
CS Private	5,983	1,694	90	66.5	18.8	28.3%
CS Master's	9,160	2,809	36	254.4	78	30.7%
CS Non-Master's	7,787	2,277	108	72.1	21.1	29.2%
CE Overall	1,218	383	7	174	54.7	31.4%
CE Public	390	136	1	390	136	34.9%
CE Private	828	247	6	138	41.2	29.8%
CE Master's	970	311	3	323.3	103.7	32.1%
CE Non-Master's	248	72	4	62	18	29.0%
IS Overall	2,153	518	32	67.3	16.2	24.1%
IS Public	1,509	372	11	137.2	33.8	24.7%
IS Private	644	146	21	30.7	7	22.7%
IS Master's	1,179	226	15	78.6	15.1	19.2%
IS Non-Master's	974	292	17	57.3	17.2	30.0%
IT Overall	2,570	699	20	128.5	35.0	27.2%
IT Public	1,140	311	9	126.7	34.6	27.3%
IT Private	1,430	388	11	130	35.3	27.1%
IT Master's	1,475	381	10	147.5	38.1	25.8%
IT Non-Master's	1,095	318	10	109.5	31.8	29.0%
SE Overall	1,087	349	16	67.9	21.8	32.1%
SE Public	589	205	6	98.2	34.2	34.8%
SE Private	498	144	10	49.8	14.4	28.9%
SE Master's	417	169	5	83.4	33.8	40.5%
SE Non-Master's	670	180	11	60.9	16.4	26.9%
NDC Overall	23,975	7,035	219	109.5	32.1	29.3%
Taulbee	NA	35902	138	NA	260.2	NA

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average majors per program, but the sets of programs included in these two averages were not necessarily the same. Thus, we do not make comparisons with the previous years' approximations. The percentage of new majors among majors varies across disciplines from a low of 24.1% in IS to a high of 32.1% in SE. Overall, the percentage is 29.3% and for CS it is 30.0%.

MASTER'S DEGREE PRODUCTION AND ENROLLMENTS

In 2017-2018, 38 distinct academic units reported on a total of 60 master's programs in computing, up from last year's 31 units and 52 programs, respectively. Of the 38, 26 were public and 12 private (Tables M1-M2). They accounted for 32 programs in computer science, three in computer engineering, seven in information systems, eleven in information technology, and seven in software engineering. The small number of participating academic units, students, and programs, especially when considered on a discipline-specific basis, should be considered when drawing any conclusions from the data presented here. Furthermore, the low sample of units that provided master's degree data to the survey this year and last precludes our drawing broad conclusions across multiple years.

TABLE M1. BREAKDOWN OF ACADEMIC UNITS RESPONDING TO MASTER'S SECTION OF SURVEY

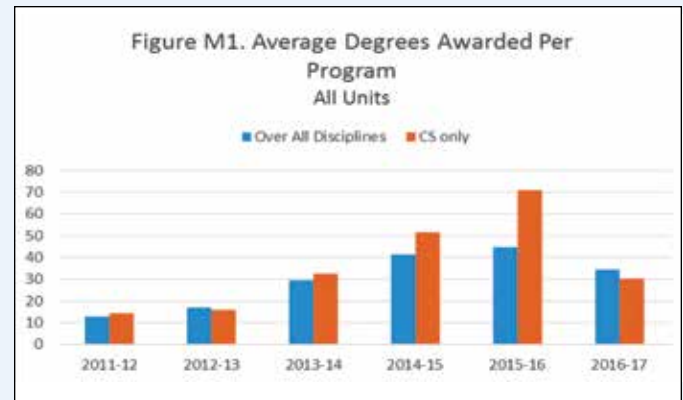
	Number of Units	% of Total Responses
Total Units Proving Data	38	100.0%
Public	26	68.4%
Private	12	31.6%

TABLE M2. SUMMARY OF PROGRAM OFFERINGS

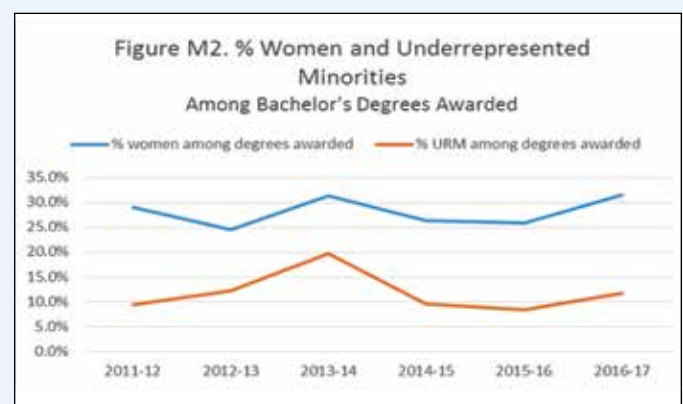
	Overall			Public		Private	
	Number of Units	Number of Programs	% of Total	Number of Programs	% of Total	Number of Programs	% of Total
CS	31	32	53.3%	24	77.4%	8	27.6%
CE	2	3	5.0%	1	3.2%	2	6.9%
IS	5	7	11.7%	1	3.2%	6	20.7%
IT	7	11	18.3%	4	12.9%	7	24.1%
SE	6	7	11.7%	1	3.2%	6	20.7%
Totals	38	60		31		29	

Table M3 shows actual degree production in 2016-2017 and anticipated change in that production for 2017-2018 broken down by discipline. Those institutions responding to this year's survey anticipate an overall 38% decrease in the production of master's degrees in 2017-2018 over those granted in 2016-2017 (Table M3). CS programs anticipate a 62.9% decrease. It should be noted that this marked change was due almost entirely to a dramatic enrollment change at one unit in particular. If that unit were to be omitted, the overall anticipated change in degree production across all responding units would constitute only a 5.2% decline, with a 2.4% decline for CS programs only.

In comparison, Taulbee respondents reported an anticipated decline in master's degree production of 11.7% per unit over all disciplines combined. Further analysis reveals that roughly half of all NDC master's programs anticipated at least some decline in degree production, similar to last year. However, due to the very small sample size, no conclusions should be drawn. Across the six year history of the NDC Study, the trend in average number of master's degrees awarded per program for both CS and all disciplines combined is demonstrated in Figure M1.



Among the 2016-2017 master's degree graduates, 31.5% were female, compared to 29.6% at Taulbee schools. CS, the discipline with the largest response size, reported 31.3% female graduates, compared to 26.1% reported by Taulbee CS master's programs. Taulbee's "I" programs reported that 45.7% of their master's degrees were awarded to females compared to 35.1% of IS and IT master's degrees at NDC programs. Figure M2 illustrates the six-year history of master's program gender data reported by NDC.



A comparison of ethnicity data between NDC and Taulbee schools (Table M5) shows that NDC schools had a higher percentage of Hispanic/Latino US resident graduates (4.5% vs. 1.9%), Black/African-American resident graduates (6.4% vs. 1.6%), and a smaller percentage of White graduates (17.3% vs. 18.8%). The percentage of Asian graduates in NDC was slightly greater than Taulbee (9.1% vs. 7.6%), but the difference was not as large as the double-digit percentage gap we've seen in the

TABLE M3. DEGREE PRODUCTION CHANGE BY DISCIPLINE

	2016-2017				2017-2018		% change
	Number of Units	Number of Programs	Actual	Per Program	Projected	Per Program	
NDC Overall	33	54	2,984	55.3	1,850	34.3	-38.0%
CS	26	27	2,189	81.1	813	30.1	-62.9%
CE	2	3	279	93	496	165.3	77.7%
IS	5	7	95	13.6	98	14	2.9%
IT	6	10	209	20.9	195	19.5	-6.7%
SE	6	7	212	30.3	248	35.4	16.8%

TABLE M4. MASTER'S DEGREES AWARDED BY GENDER, DISCIPLINE AND PROGRAM TYPE

	Male		Female		Total Known Gender	Gender Unknown	Grand Total	Number of Units	Number of Programs
CS Overall	673	68.7%	306	31.3%	979	1,405	2,384	28	29
CS Public	539	70.6%	224	29.4%	763	1,405	2,168	21	22
CS Private	134	62.0%	82	38.0%	216	0	216	7	7
CS Taulbee	8,956	73.9%	3,162	26.1%	12,118	919	13,037	NA	NA
CE Overall	188	67.4%	91	32.6%	279	0	279	2	3
CE Public	70	66.0%	36	34.0%	106	0	106	1	1
CE Private	118	68.2%	55	31.8%	173	0	173	1	2
CE Taulbee	710	78.0%	200	22.0%	910	0	910	NA	NA
IS Overall	61	64.2%	34	35.8%	95	0	95	5	7
IS Public	8	72.7%	3	27.3%	11	0	11	1	1
IS Private	53	63.1%	31	36.9%	84	0	84	4	6
IT Overall	98	65.3%	52	34.7%	150	59	209	7	11
IT Public	15	65.2%	8	34.8%	23	59	82	4	4
IT Private	83	65.4%	44	34.6%	127	0	127	3	7
"I" Taulbee	1,690	54.3%	1,422	45.7%	3,112	190	3,302	NA	NA
SE Overall	155	73.1%	57	26.9%	212	0	212	6	7
SE Public	48	71.6%	19	28.4%	67	0	67	1	1
SE Private	107	73.8%	38	26.2%	145	0	145	5	6
NDC Overall	1,175	68.5%	540	31.5%	1,715	1,464	3,179	35	57
Taulbee Overall	11,356	70.4%	4,784	29.6%	16,140	1,109	17,249	NA	NA

*Program categories where only 1 program provided data. No conclusions should be drawn due to very small sample.

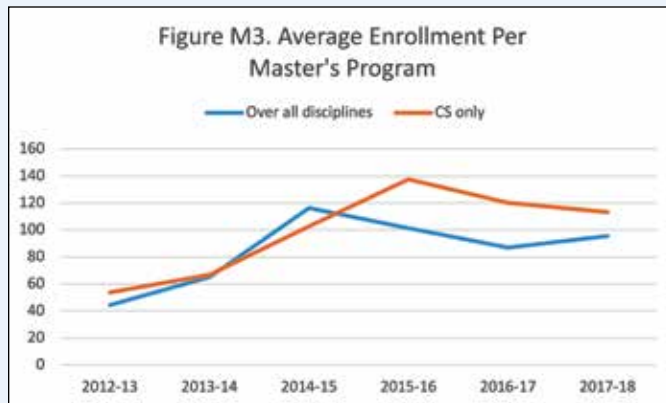
TABLE M5. MASTER'S DEGREES AWARDED BY ETHNICITY (38 units)

	US Residents							Others				Total
	Hispanic/Latino	American Indian/Alaska Native	Asian	Native Hawaiian/Pacific Islander	Black/African-American	White	2 or more races, non-Hispanic	Non-Resident	Total Ethnicity, Residency Known	U.S. Residency Race Unknown	Residency Unknown	
NDC Overall	68	2	139	1	98	264	10	945	1,527	45	1,607	3,179
	4.5%	0.1%	9.1%	0.1%	6.4%	17.3%	0.7%	61.9%	100.0%			
Taulbee Overall	300	25	1,214	6	257	3,008	130	11,077	16,017	408	824	17,249
	1.9%	0.2%	7.6%	0.0%	1.6%	18.8%	0.8%	69.2%	100.0%			

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last two surveys. There was a smaller percentage of non-resident graduates at NDC institutions than at Taulbee (61.9% vs. 69.2%), though this gap was also significantly smaller than years past. It is useful to note that only 4.8% of total Taulbee master's graduates were marked as residents of unknown ethnicity or students of unknown residency. For NDC, the number is 50.6%, again suggesting that gathering ethnicity/residency data is a challenge at NDC programs (a similar gap was observed in all prior years since the beginning of NDC).

Overall enrollment at NDC master's programs reporting this year was 5,439, a 20.2% increase in headcount over last year, while the mean enrollment per program was 95.4, a 9.7% increase over last year (Table M6). Mean enrollment in CS decreased 5.7%. When only those programs that responded both years are considered, overall enrollment per program increased 8%, with CS programs showing a 4.5% increase. The six-year trend in average master's enrollments per program is shown in Figure M3 for all disciplines combined and for CS-only.



FACULTY DEMOGRAPHICS

The average faculty size for this year's responding departments is higher than that for last year's respondents (Table F1). Total faculty head count this year averaged 13.5, with an average 11.6 FTE. Last year's values were 11.2 and 9.4, respectively. There were increases for both tenure-track and part-time/adjunct faculty. The former went from 5.5 (5.4 FTE) to 6.1 (5.9 FTE), and the latter from 4.3 (2.8 FTE) to 5.7 (4.1 FTE).

As has been the case in past years, tenure-track faculty comprise a larger fraction of the total faculty at departments that do not have master's programs, while part-time/adjunct faculty comprise a larger fraction of the total faculty at departments that do have master's programs. Public universities have a slightly larger fraction of tenure-track faculty and a smaller fraction of part-time/adjuncts than do private universities. For both tenure-track and part-time/adjunct faculty, the difference between publics and privates is much less than is the difference between master's-granting and non-master's-granting departments. This also is similar to observations in past years.

The overall distribution of tenure-track faculty continues to be fairly even across ranks. There also is greater similarity in the distributions across ranks at public vs private universities this year as compared with last year (Table F2).

The percentage of female tenure-track faculty increased to 25.6% from 24.4% last year (Table F3). Increased percentages were present at the assistant professor and associate professor ranks, while percentages at the full professor rank were similar to those of last year. Ethnic diversity in tenure-track faculty also improved this year. The total percentage of tenure-track faculty who are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or two or more races, as a percentage for whom residency is known, was 6.4% compared to 4.8% last year. Increases in this percentage were present at all faculty ranks. The biggest ethnicity increase was among Blacks, who this year account for 2.9% of the total while last year accounting for only 1.0%. Slight increases also were present among Whites and two or more races, while Non-resident Aliens and Hispanics declined somewhat (Table F4). Many of the gender and ethnicity changes are the opposite of what was observed last year; this probably is due to the changes in the specific departments that report in a given year. Figure F1 shows the history of NDC reporting of faculty gender and ethnicity for each of the six NDC surveys.

Both gender and ethnic diversity among the NDC departments is greater than that reported for doctoral-granting departments in the CRA Taulbee Survey. Among 2017-2018 tenure-track faculty, the Taulbee Survey shows 19.1% women and 4.5% Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or 2 or more races.

TABLE M6. ACTUAL ENROLLMENT CHANGE FROM PREVIOUS YEAR BY DISCIPLINE

	All Respondents									Units Responding Both Years								
	2016-2017				2017-2018					% Change in Mean per Program	2016-2017				2017-2018			% Change in Mean per Program
	Number of Units	Number of Programs	Headcount	Mean Enroll	Number of Units	Number of Programs	Headcount	Mean Enroll	Number of Units		Number of Programs	Headcount	Mean Enroll	Headcount	Mean Enroll			
CS	25	26	3,126	120.2	28	29	3,286	113.3	-5.7%	19	20	2,593	129.7	2,709	135.5	4.5%		
CE	1	1	185	185	2	3	642	214	15.7%	1	1	185	185	157	157	-15.1%		
IS	7	10	397	39.7	5	7	377	53.9	35.8%	5	8	292	36.5	377	53.9	47.7%		
IT	5	9	471	52.3	7	11	613	55.7	6.5%	4	8	420	52.5	409	51.1	-2.7%		
SE	5	6	346	57.7	6	7	521	74.4	28.9%	5	6	346	57.7	392	65.3	13.2%		
NDC Overall	31	52	4,525	87	35	57	5,439	95.4	9.7%	23	43	3,836	89.2	4,044	96.3	8.0%		

TABLE F1. ACTUAL FACULTY SIZE 2017-2018

Faculty Type	Overall Avg HC	Overall % of HC Total	Overall Avg FTE	Overall % of FTE Total	Public FTE	Private FTE	Non-Master's FTE	Master's FTE
# respondents	161		161		59	102	119	42
Tenure-track	6.1	45.1%	5.9	50.7%	51.9%	49.5%	62.4%	41.9%
Visiting	0.3	2.4%	0.3	2.6%	1.7%	3.5%	4.2%	1.5%
FT Non-TT	1.3	9.9%	1.3	11.3%	14.6%	8.4%	10.4%	12.0%
PT/Adjunct	5.7	42.7%	4.1	35.4%	31.8%	38.6%	23.1%	44.6%
Total	13.5		11.6					

TABLE F2. TENURE-TRACK FACULTY AVERAGE HEADCOUNT BREAKDOWN BY RANK

Faculty Type	Overall	Overall %	Public	Private	Non-Master's	Master's
# respondents	156		59	97	114	42
Full Professor	2.3	37.4%	36.0%	38.6%	35.6%	39.3%
Associate Professor	1.8	29.7%	28.4%	30.8%	30.1%	29.3%
Assistant Professor	1.9	31.7%	34.5%	29.3%	32.9%	30.3%
Other	0.1	1.2%	1.1%	1.4%	1.3%	1.1%

TABLE F3. TENURE-TRACK FACULTY HEADCOUNT BREAKDOWN BY GENDER (156 units)

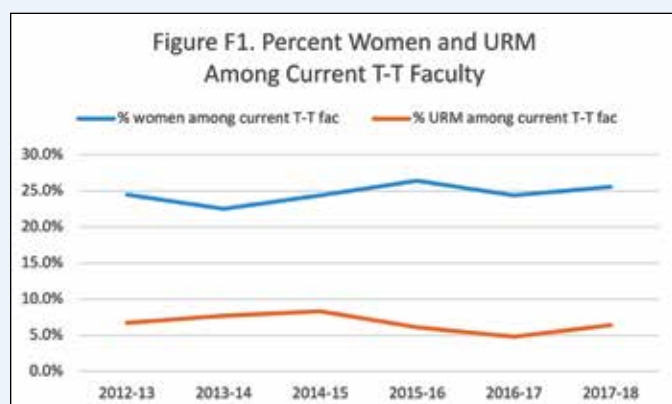
Gender	Full Prof	Assoc Prof	Asst Prof	Other T-T	Total T-T
Total Faculty	365	290	310	12	977
Male	78.9%	73.1%	70.3%	66.7%	74.3%
Female	21.1%	26.9%	29.4%	33.3%	25.6%
Not Reported	0.0%	0.0%	0.3%	0.0%	0.1%
Percent Female*	21.1%	26.9%	29.4%	33.3%	25.6%

* as a percentage of those for whom gender was reported

TABLE F4. TENURE-TRACK FACULTY HEADCOUNT BREAKDOWN BY ETHNICITY (131 units)

Ethnicity	Full Prof	Assoc Prof	Asst Prof	Other T-T	Total T-T
Total faculty	365	290	310	12	977
Nonresident Alien	0.5%	1.4%	5.2%	0.0%	2.3%
American Indian/Alaska Native	0.3%	0.0%	0.6%	0.0%	0.3%
Asian	17.8%	22.1%	21.6%	16.7%	20.3%
Black or African-American	2.5%	3.1%	2.9%	8.3%	2.9%
Native Hawaiian/Pacific Islander	0.0%	0.3%	0.0%	0.0%	0.1%
White	72.1%	67.2%	61.3%	50.0%	66.9%
Multiracial, not Hispanic/Latino	0.5%	1.4%	0.6%	0.0%	0.8%
Hispanic/Latino, any race	1.4%	1.7%	2.6%	16.7%	2.0%
Resident, race/ethnicity unknown	0.5%	1.0%	1.6%	0.0%	1.0%
Total Residency known	95.6%	98.3%	96.5%	91.7%	96.6%
Residency unknown	4.4%	1.7%	3.5%	8.3%	3.4%
Black+Hisp+NatAm+NatHaw+Multi*	4.9%	6.7%	7.0%	27.3%	6.4%

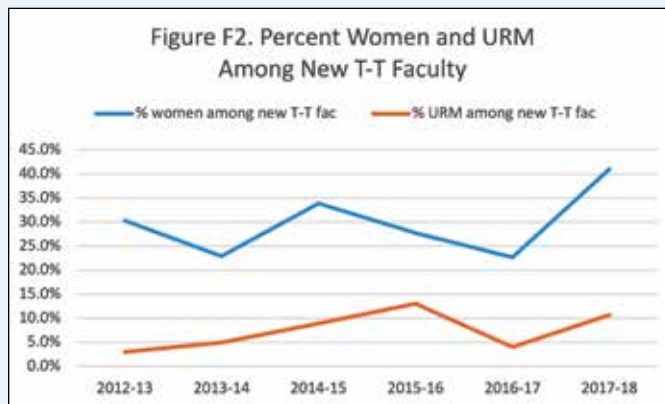
* as a percentage of those for whom residency is known



This year's 88 respondents to the faculty recruiting question sought a total of 108 tenure-track faculty members, and hired 84 for a success rate of 77.8% (Table F5). This is higher than last year's 75.0% success rate, though lower than the 82.9% rate reported by doctoral-granting U.S. CS departments in the Taulbee Survey. Women comprised a remarkable 41.0% of the new tenure-track hires for 2017-2018, much higher than in past years.

Ethnic diversity among the new tenure-track hires also improved considerably. This year's hiring produced 10.7% who are Black, Hispanic, Native American, Native Hawaiian/Pacific Islander, or two or more races, among those for whom residency is known (Table F6). Last year, this was 4.0%, although two years ago it was 13.0%. We caution that the small numbers of total hires in these categories, both individually and collectively, and the changes in

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**TABLE F5. FACULTY RECRUITING DURING 2016-2017 (88 RESPONDENTS)**

Faculty Type	Number Sought	Avg/Unit	Number Filled	Success Rate
Tenure-track	108	1.23	84	77.8%
Full Professor			2	
Associate Professor			11	
Assistant Professor			70	
Other			1	
Visiting	27	0.31	24	88.9%
FT Non-TT	25	0.28	22	88.0%
PT/Adjunct	122	1.39	119	97.5%

TABLE F6. GENDER AND ETHNICITY OF NEWLY HIRED FACULTY (88 units)

Gender	Tenure-Track	% of Total
Male	49	58.3%
Female	34	41.0%
Unknown	1	1.2%
Ethnicity	Tenure-Track	% of Total
Nonresident Alien	6	7.1%
American Indian/Alaska Native	1	1.2%
Asian	25	29.8%
Black or African-American	7	8.3%
Native Hawaiian/Pacific Islander	0	0.0%
White	43	51.2%
2 or more races	0	0.0%
Hispanic/Latino, any race	1	1.2%
Resident, race/ethnicity unknown	1	1.2%
Total Residency known	84	100.0%
Residency unknown	0	0.0%
Black+Hisp+NatAm+NatHaw+Multi	9	10.7%

the set of departments reporting in a given year, make it risky to draw wider conclusions from these data. Figure F2 illustrates the changes in these data from year to year in the NDC.

Table F7 shows the degree required for hiring and promotion of faculty at different ranks. These data do not change much from year to year. However, compared to the 2016-2017

NDC Study, there appeared to be a smaller percentage of this year's respondents who require the doctoral degree for hiring new assistant professors or full-time non-tenure-track faculty members. The decline in the doctoral requirement for assistant professor hiring was due only to departments that do not grant master's degrees, while the decline for full-time non-tenure-track faculty was present at both master's-granting and non-master's-granting departments.

This year, respondents reported on departures for 56 faculty members, similar to the 54 departures reported last year. The distribution of these departures is shown in Table F8. Compared with the previous year, a smaller fraction of this past year's departures left their former positions for other positions, whether the new positions were inside of academia or not. Slight increases were present in the percentage of departures due to retirement and death.

FACULTY SALARIES

Departments were given the option to report faculty salaries by individual faculty member (anonymized) or simply an aggregated median salary for each faculty rank. As has been the case for many years, most departments report aggregated salary data. However, this year almost 44% reported individual salary data, while last year only 32% did so. Table F9 shows the median salaries at each rank for those faculty from departments that reported individual salaries. These values are true medians of the aggregate faculty at each rank among these 41 departments.

Table F10 has the corresponding faculty salary information for all departments that reported salary data. This includes those departments that reported aggregated salaries at each rank; it also includes those that reported individual salaries, as we are able to compute the median salary at each rank for each such academic unit. The entries in Table F10 are the averages of the median salaries among those academic units that reported salary data at a given rank. They are not true medians of all faculty salaries nor true averages of all faculty salaries. They also are more sensitive to a very high or very low salary in a department with a small number of faculty at a given rank, and Table F2 indicates that a typical department does indeed have a small number of faculty at a given rank. For this reason, we do not make comparisons of this year's values with those from last year. As has been observed in past years, the average of the median salaries is higher at all ranks for those departments that have graduate programs as compared with those having only undergraduate programs. This year, there were somewhat higher values for departments at private universities as compared with departments at public universities, except at the associate professor level. This public-private comparison is the reverse of what was reported last year.

CONCLUSION

We continue to see enrollment growth in most areas of computing, and, specifically, in CS. We also see enrollment growth manifested in increased numbers of bachelor-degrees in each

TABLE F7. DEGREE REQUIRED FOR FACULTY PERSONNEL DECISIONS

Required Degree	Hiring Full Prof	Hiring Assoc Prof	Hiring Asst Prof	Hiring FT Non-TT	Tenure	Promotion to Full Prof	Promotion to Assoc Prof
Overall (148)							
Doctoral	95.1%	91.7%	75.0%	13.2%	88.9%	96.6%	89.8%
Masters	4.9%	8.3%	25.0%	84.0%	11.1%	3.4%	10.2%
Bachelors	0.0%	0.0%	0.0%	2.8%	0.0%	0.0%	0.0%
Public (54)							
Doctoral	98.1%	94.3%	81.5%	5.7%	92.5%	96.3%	90.7%
Masters	1.9%	5.7%	18.5%	94.3%	7.5%	3.7%	9.3%
Bachelors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Private (94)							
Doctoral	93.4%	90.2%	71.3%	17.6%	86.8%	96.7%	89.2%
Masters	6.6%	9.8%	28.7%	78.0%	13.2%	3.3%	10.8%
Bachelors	0.0%	0.0%	0.0%	4.4%	0.0%	0.0%	0.0%
Non-Master's (111)							
Doctoral	93.5%	89.0%	69.4%	14.8%	87.0%	95.5%	88.3%
Masters	6.5%	11.0%	30.6%	81.5%	13.0%	4.5%	11.7%
Bachelors	0.0%	0.0%	0.0%	3.7%	0.0%	0.0%	0.0%
Master's (37)							
Doctoral	100.0%	100.0%	91.9%	8.3%	94.4%	100.0%	94.4%
Masters	0.0%	0.0%	8.1%	91.7%	5.6%	0.0%	5.6%
Bachelors	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

TABLE F8. TENURE-TRACK FACULTY DEPARTURES (105 units)

	NDC
Responding units with departures	42
Total number of departures	56
Reason for Departure (percent)	
Retired	44.6%
Deceased	5.4%
Other ac position	19.6%
Non-ac position	12.5%
Changed to PT	3.6%
Other reason	12.5%
Reason unknown	1.8%

TABLE F9. MEDIAN FACULTY SALARIES (FROM INDIVIDUAL SALARY DATA)

	Overall	Public	Private	Non-Master's	Master's
Units responding	41	24	17	30	11
Full Professor					
Number of individual faculty	71	46	25	40	31
Median Salary	107,740	106,513	112,560	103,937.50	107,740
Associate Professor					
Number of individual faculty	61	44	17	32	29
Median Salary	94,269	94,549.50	89,810	86,375.50	95,048
Assistant Professor					
Number of individual faculty	97	80	17	48	49
Median Salary	82,100	81,600	88,900	76,345	87,000
Other					
Number of individual faculty	54	39	15	18	36
Median Salary	62,775	58,710	71,575	60,989	64,425

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TABLE F10. FACULTY SALARIES (FROM AGGREGATE SALARY DATA)

	Overall	Public	Private	Non-Master's	Master's
Units responding	94	43	51	63	31
Full Professor					
Units responding	74	34	40	47	27
Average of Median Salary	103,707	101,721	105,363	102,372	105,917
Associate Professor					
Units responding	68	33	35	41	27
Average of Median Salary	88,194	89,623	86,884	86,120	91,419
Assistant Professor					
Units responding	70	39	31	42	28
Average of Median Salary	78,137	76,529	80,148	77,428	79,189
Other					
Units responding	47	28	19	24	23
Average of Median Salary	55,688	58,163	52,917	49,058	64,336

area of computing. It is encouraging to see increased gender diversity in the CS bachelor-degree graduates, as well as in new computing faculty hires.

Overall bachelor's program enrollment was 17% higher than reported last year, while average FTE faculty size increased by 23%. Although overall progress was made this year in faculty hiring relative to enrollment growth at reporting NDC programs, almost all of the progress was due to the hiring of part-time/adjunct faculty, whose appointments typically are temporary in nature. Due to the decade-long enrollment surge, our academic units continue to face a major challenge in teaching capacity. Faculty workload and adequacy of faculty size are increasing problems at most NDC units, as observed in the recent CRA report on the decade-long growth in CS enrollments [4], and reinforced in concerns expressed by students at multiple institutions (both Taulbee and NDC) [2]. These problems demand continued vigilance to find sustainable solutions.

If your program participated in the 2017-2018 ACM-NDC study, thank you for your help. The 2018-2019 survey will go out to qualifying programs in the fall of 2018 (look for announcements coming early in the fall). We would love to hear from you about how the survey can be improved, and look forward to your continued, annual participation. If you are at a qualifying program but were not able to participate, or were never contacted, we want to hear from you as well. Please send all comments and queries to Yan Timanovsky, ACM Education Manager at yan.timanovsky@acm.org.

LIST OF 2017-2018 ACM-NDC PARTICIPATING ACADEMIC UNITS

Albright College; Amherst College; Arcadia University Department of Computer Science & Mathematics; Arkansas State University Department of Computer & Information Technology; Azusa Pacific University; Baldwin Wallace University; Beacon College; Benedictine College; Bethel University Department of Math & Computer Science; Biola

University; Blackburn College; Bloomsburg University of Pennsylvania; Bluefield State College; Boise State University Computer Science Department; Bowling Green State University Department of Computer Science; Bryn Mawr College; Butler University Department of Computer Science and Software Engineering; California State University, Fullerton Department of Computer Science; Calvin College Department of Computer Science; Canisius College Computer Science Department; Capital University; Carleton College; Carnegie Mellon University Department of Electrical and Computer Engineering (ECE); Central College; Central Connecticut State University Department Of Computer Science; Cheyney University of Pennsylvania; City University of Seattle Technology Institute; Cleveland State University College of Engineering; Colby College; Colgate University; College of Engineering, California State University, Long Beach; College of New Jersey Computer Science Department; College of Saint Benedict and Saint John's University; College of the Holy Cross; Colorado College; Columbia College; Covenant College; Creighton University; CUNY John Jay College of Criminal Justice; CUNY York College; Delaware State University Department of Computer & Information Sciences; Denison University; DePauw University; Dickinson College; Drury University; Eastern Mennonite University; Eastern Oregon University; Eastern Washington University; Edinboro University of Pennsylvania; Elizabethtown College; Evangel University; Gallaudet University Information Technology Program; Gannon University College of Engineering and Business; Georgia College & State University; Gordon College; Governors State University Division of Computing-Mathematics and Technology; Grace College & Theological Seminary Information Systems Program; Grand Valley State University; Grinnell College; Grove City College; Hamilton College; Hampshire College Computer Science Program; Hannibal-Lagrange College; Harding University; Harvey Mudd College; Henderson State University; Hendrix College; Hiram College; Howard Payne University - School of Business; Humboldt State University; Huntington University;

Illinois State University; Illinois Wesleyan University; Indiana University-Purdue University-Fort Wayne Department of Computer Science; Indiana University-Purdue University Indianapolis Computer Engineering Program; Indiana Wesleyan University Division of Mathematics and Computer Information Sciences; Iona College; Ithaca College; Juniata College; Kalamazoo College; Kean University; Kennesaw State University Department of Computer Science; Knox College; Kutztown University of Pennsylvania; Lake Forest College; Lake Superior State University School of Mathematics & Computer Science; La Salle University; Le Moyne College; LeTourneau University; Lewis & Clark College; Longwood University; Loyola University Maryland Department of Computer Science; Macalester College; Marlboro College; Marymount University; McNeese State University; Miami University - College of Engineering & Computing; Middlebury College Department of Computer Science; Millersville University of Pennsylvania; Millikin University; Mills College - Department of Computer Science; Milwaukee School of Engineering; Missouri State University Department of Computer Science; Monmouth University; Montana Tech Department of Computer Science; Mount Holyoke College; Mount St. Mary's University Department of Mathematics and Computer Science; New College of Florida Computer Science Program; North Carolina Agricultural and Technical State University Department of Computer Systems Technology; Northern Kentucky University; Northwestern College; Northwestern State University of Louisiana; Northwest Nazarene University; Oberlin College; Ohio Northern University; Ohio Wesleyan University; Oklahoma Christian University College of Engineering and Computer Science; Olivet Nazarene University; Otterbein University; Ouachita Baptist University; Our Lady of the Lake University-San Antonio; Park University; Plymouth State University; Point Loma Nazarene University; Pomona College; Quinnipiac University School of Engineering; Ramapo College of New Jersey; Regis University College of Computer & Information Sciences; Rhodes College; Roger Williams University; Rollins College; Rose-Hulman Institute of Technology Department of Computer Science and Software Engineering; Rowan University Department of Computer Science; Saint Edward's University; Saint Michael's College; San Diego State University Computer Science Department; San Francisco State University Department of Computer Science; Schreiner University; Seattle University; Siena College; Smith College; Sonoma State University Department of Computer Science; South Dakota School of Mines and Technology Mathematics and Computer Science Department; Southern Connecticut State University; Southern Illinois University Edwardsville Computer Management and Information Systems; Southern Illinois University Edwardsville Department of Computer Science; Southern Oregon University; Southwestern University; State University of New York at Brockport; St. Cloud State University Department of Information Systems; SUNY College at Potsdam; The College of St. Scholastica; The College of Wooster; Thiel College; Trinity College;

Trinity University; Union College (NY) Computer Science Department; United States Air Force Academy Department of Computer Science; University of Akron College of Business Administration; University of Central Missouri Department of Mathematics and Computer Science; University of Central Oklahoma; University of Evansville; University of Hawaii at Hilo; University of Houston-Downtown Management Information Systems Program; University of Minnesota-Morris; University of Nebraska at Kearney; University of New Hampshire at Manchester; University of New Haven; University of North Carolina at Asheville; University of North Carolina at Greensboro; University of North Carolina Wilmington Department of Computer Science; University of South Carolina-Beaufort; University of Wisconsin-Oshkosh Department of Computer Science; University of Wisconsin-Platteville; Upper Iowa University School of Science and Mathematics; Valparaiso University Department of Mathematics & Computer Science; Villanova University Department of Computing Sciences; Walla Walla University Department of Computer Science; Wartburg College; Wellesley College; Western Carolina University; Western New England University; Western Washington University; West Virginia State University; Wheaton College (IL); Whitworth University; William Penn University; Winston-Salem State University; Wisconsin Lutheran College; Xavier University Department of Computer Science; Xavier University of Louisiana. ❖

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